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Amateur Radio

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MAY 1996

CQ

In This Issue

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- **Who Really Invented Radio?**
- **Easy-To-Build Isolation Interface Devices**
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on cover: Ray Rector, WA4NJP, Gillsville, GA

THE RADIO AMATEUR'S JOURNAL

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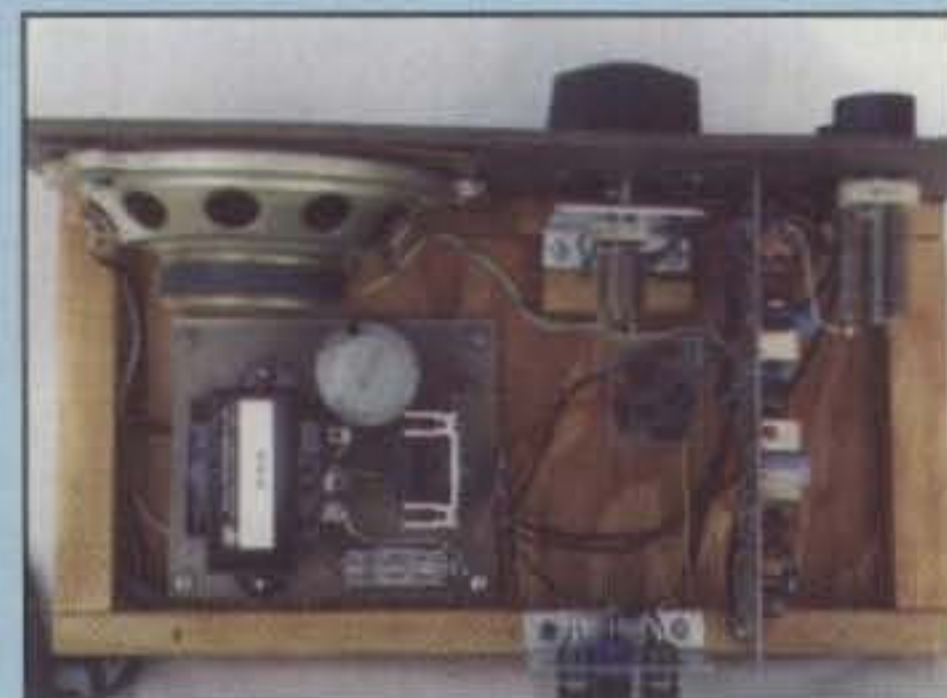
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ON THE COVER: Awesome only begins to describe the 36 ft. dish of Ray Rector, WA4NJP. Ray put this 2,000 pound monster together single-handedly, including design, installation, and fine-tuning. The base alone required 20 yards³ of concrete, 15 yards³ of field stone, and a massive quantity of steel reinforcing bar.

Two years in the making, Ray's installation has helped him achieve impressive on-air results, such as working 30 EME countries on 1296 MHz and 40 on 432 MHz. Running various power levels depending on the band, Ray routinely makes 1296 EME QSOs with only 25 watts! It's common for him to hear his echoes off the moon (on SSB) running just 3 or 4 watts. Perhaps even more impressive is his ability to hear S-9+ European signals on 1296.

Ray, who is 53 and has been a ham since 1963, works for Cummings Engine Company as a Senior Technician and is married with four children and six grandchildren. (Photo by Larry Mulvehill, WB2ZPI)



HF TREASURE

Intelligent Digital Enhanced Communications System

State-Of-The-Art IF-Stage DSP

Once again Kenwood defines the standard with next generation DSP. Utilizing dual digital signal processing chips, the TS-870S captures wave forms at the IF stage (including AGC circuit) in realtime to provide unmatched clarity, noise reduction and control over inbound or outbound signals. The DSP chips deliver a dynamic range of 144dB, enabling you to detect previously unheard signals and customize the filtering system through the menu interface. No other transceiver on the market gives you this much power and flexibility.



Digital Filters

Applying complex algorithms at the IF stage allows you to attain filtering that is unattainable with conventional analog circuits. For instance, you can shape the filter sharp enough to obtain over 100dB out of pass band attenuation with virtually no signal loss. Through the menu-driven interface on the front panel, you can apply standard

filters or customize and store them for rapid and convenient access. And because it's all digital, there is no additional cost of optional filters!



Two Noise Reduction Methods

Choose from 2 methods of noise reduction: Line Enhancer Method (LEM) or Speech Processing/Auto Correlation (SPAC). LEM allows you to custom-shape a filter curve around a target signal, essentially 'carving' it out of the background noise — a powerful tool in SSB operation. For tough CW conditions use the SPAC function, which employs a statistical correlation algorithm to pull weak signals out of the background.

IF Digital Auto-Notch

Another benefit of IF-stage DSP is the ability to detect and eliminate broadcast carrier and continuous beat signals far more effectively than analog systems. It automatically tracks beat signal changes so you can 'set it and forget it'.

FREE
Radio Control Program
Software Included!

57.6 Kbps Computer Control

High speed computer control is available through a built-in RS-232C port and supplied Windows-compatible software called RCP (Radio Control Program). This enables access to most functions of the TS-870S including on/off, frequencies, bands, modes and more. It's also possible to "create" a customized screen radio, based on an original design or the included templates.



Built-In K1 LogiKey Keyer

Sophisticated CW operation is possible with the built-in K1 LogiKey electronic keyer with full or semi break-in, DSP-adjustable rise/fall times, and side tone monitor. A second keyer may also be connected to the TS-870S.

Easy-Access Menu System

Control all of the rig's functions through the menu-driven user interface on the front panel. It also incorporates a Quick Menu feature for rapid access to your most commonly used functions.

Dual Antenna and RX Out

Switch between 2 separate antenna systems from the front panel, plus attach an external receiver to the TS-870S for maximum antenna utilization.



Other Features

- Beat cancel
- Variable AGC
- Selectable voice equalizer (SSB & AM)
- Speech processor
- Selectable transmit equalizer
- 100 watts output on SSB, CW, FSK; 25 watts on AM
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- Built-in automatic antenna tuner (TX & RX)
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- group scan, memory scan with memory channel lock-out
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- Modifiable for MARS/CAP*

*Permits required for MARS and CAP use. Specifications guaranteed for Amateur bands only. Kenwood follows a policy of continuous advancement in development. For this reason, specifications may be changed without notice.

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ZERO BIAS

AN EDITORIAL

This is it! The new official month for the Dayton Hamvention is at hand. This is the month in which it *will* be hard to get hotel rooms in Dayton, because knowledgeable amateurs from all over the world have already booked them. This is amateur radio's closest equivalent to that ritual in Florida—"Spring Break." Thousands upon thousands of amateurs gather in Dayton to have fun, to party, and to be part of an amateur radio extravaganza.

Every year the question "Why Dayton?" comes up. Most people really don't have a good answer to why so many amateurs keep coming back and others just dream of going. No disrespect to Dayton itself, but it really is not that high on the list of tourist attractions.

So what does Dayton have that most, if not all, other hamfest venues lack? Basically, it's called marketing. Long before an amateur sets foot in that arena, he or she has been exposed to hundreds of signs displayed by local businesses, restaurants, and hotels, all welcoming the Dayton Hamvention attendees. The local media offers full coverage of this annual event. The entrance to the arena has a huge sign telling everyone who passes that this is indeed the world-famous place where the Hamvention will be held. Parking fields spring up with their own set of signs offering daily rates for the Hamvention. It is an organized, concerted effort by a club, a community, and a city to "sell" something that by all indications has already been sold. They make you feel welcome, they make it relatively easy, and they make the upcoming experience start on a positive note. All this happens before you set foot in the door.

If you contrast just the above with any other hamfest in the country, you'll see why Dayton grew from that little show downtown at the Biltmore to where it is now. Most shows we attend have very little local publicity, and some have none. Quite a number do not even have prominent (or otherwise) signs to tell the public or even the attendees what is happening. At this juncture you haven't set foot in the door, and for the most part you're not even quite sure where the door is.

By now someone reading this has come up with the obvious cop-out that the Dayton Hamvention, with its size and scope, can afford all of these things while everyone else can't. Well, I've been going to Dayton since just about the time when the show left the Biltmore and took up residence in one tiny corner of the arena complex. It was just about the size of (or smaller than) most shows today. These days most shows have varied very little in size from year to year since their inception, and a few regulars have even slipped into oblivion.

It's not that Dayton is infallible and everyone else is totally flawed. It's just that it is readily apparent that Dayton has a purpose. That purpose is supported by the community, who sees direct benefit to themselves. Therefore, the marketing of having a good time starts before any of us go through that main door to the

arena, and it ultimately determines just how many of us will find the motivation to leave our homes and go through that main door. Will most of our expectancies be met? Will we have fun? Will we leave feeling positive about the experience? Will we tell our friends what a good time we had? Next year, will we take a few friends and go back? If the answer to most of these questions is yes, then the show will grow and prosper.

What happens and what do we see when we finally get through that main door? For most hamfests, it's one large, cavernous room supporting exhibits and a fleamarket area. For some hamfests it may be two areas, depending on the size. The doors open and people swarm in, most heading for the fleamarket. The thrill is the unexpected, the chase, the super find, and of course, saving a few bucks. The commercial area is generally static; nothing is operational. You can heft, poke, twiddle a few knobs, and ask questions. For the most part you will be met by pleasant, informed, and helpful company representatives who will try to explain their products to you. However, picture in your mind's eye, if you will, going into an appliance store to purchase a large-screen TV. There are a dozen or so on display, none turned on. The well-informed, conscientious salesman now describes the picture quality to you, and tells you what you *should* see once you get one home. He may even explain some of the universal controls to you, but once you get it home and turn it on, it may be a problem that Willard Scott is purple and Barney is not. Well, it's not the way most of us would opt to buy a TV set.

There is one subtle factor that helps make Dayton a huge success despite most of the gear on display being inert. Dayton is a jumble of buildings, walk-throughs, and an arena. It's continually walking up, down, and around, from one area to the next and eventually back again. There's always the anticipation of what's ahead in the next area—sort of like a giant treasure hunt. I have a feeling that if they ever move the show to a super-large facility where everything is flat and under one roof, the Hamvention might suffer. Most shows that succeed and thrive involve a lot of walking and physical activity, and few places to sit down.

Dayton is merchandising on both sides of the sales counter. Everybody there—exhibitors, vendors, fleamarket people, and attendees alike—is psyched to have a good time, to buy stuff, to sell stuff, to meet fellow amateurs, to exchange ideas, and to learn about our wonderful hobby. Oh, we may grumble a bit about the weather and the parking, and about being tired and having aching feet, but that's part of the process we all go through. It's the least passive show we have; hence, excitement generates more excitement. I really don't know whether or not it's a grand master plan, but I do know that it works.

Last year when I wrote about the woodwork-

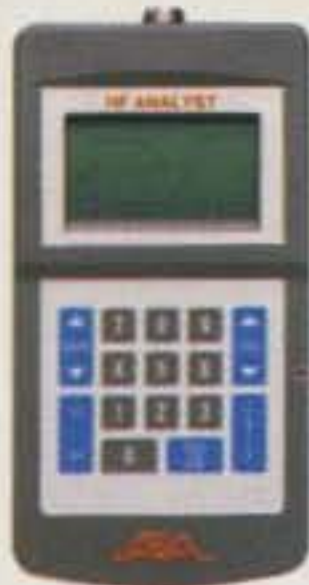
ing show taking place at the same time and at the same facility as the Charlotte Hamfest, I mentioned that there were two distinct philosophies taking place at the same time. It was a great A/B comparison. The woodworking show (obviously geared to sell tools) was extremely focused on creating woodworkers, craftsmen at all levels, and expanding one's capabilities through demonstration and participation. Hamfests typically preach to the choir. They are reactive rather than proactive. Most hamfests do not have a facility to welcome, encourage, and educate newcomers who want to find out and learn about amateur radio right then and there. Unless they stumble errantly upon a talk-in station, they'd be hard pressed to see anything working and simply would be told (if lucky) to write to the ARRL or some other group for more information.

There is no grand master plan to the way we do things either, except that our approach usually is to wait for someone to ask and then react and try to do something (and in some cases only if we feel they're worthy). Our tradition somehow involves putting up hurdles and being somewhat exclusive. Our hamfests really don't need too many signs or much general publicity because the people who *should* know, do. Most of the gear really doesn't have to be working, because most of us *should* know what it is capable of. After all, the only ones who count (meaning us) are born with an innate grasp and understanding of current technology, and we can program and utilize every control and facet of any modern rig by virtue of our very license alone. If someone has the potential to be worthy, he can figure it out for himself.

So why has Dayton grown to a phenomenal size compared to any other hamfest? Maybe Dayton has grown to where it is, simply because more people continually and historically have enjoyed an overwhelmingly positive experience. People arrive happy and leave happy, carting a phenomenal variety and quantity of stuff with them. People go there expecting to be happy and to have fun, plus find terrific deals on stuff they're looking for. It has evolved into the greatest amateur radio toy store at the holidays. The very scale of it makes it more intriguing to more people. It has the mysterious quality that produces smiles, happiness, and a sense of well being. You leave there and everything is possible. It's sort of like the woodworking show.

Maybe all of this is subjective, and other factors apply. However, just about every amateur in the world will respond to the mention of "Dayton" in some way that has very little to do with local cuisine, cultural attractions, or anything else that might be measurable. They sell (and somehow deliver) the sizzle that is amateur radio, an ethereal commodity that everyone wants and dreams of. If the rest of us could package and bottle it, we'd have the best sales tool in the world for amateur radio.

73, Alan, K2EEK



SWR-121 HF Antenna Analyst™ 1-31.999 MHz

This compact, battery powered unit measures, computes, and plots a curve of your VSWR vs. frequency on its high resolution LCD display. Control the unit via keypad. Covers 1-31.999 MHz. View SWR over entire range, or at just one frequency. Measures return loss in dB. Self-contained RF source. No need for a frequency counter.

Interfaces with a PC for printing and saving plots to disk with optional **AEA AACOM™** software. Check any kind of antenna and make sure it is optimized. *Commercial units available.*



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DSP-232™ Multi-Mode Data Controller

The new DSP-232 has two software selectable radio ports for 9600 & 1200 bps VHF Packet, HF Packet, Pactor, Amtor/Sitor, CW, RTTY (ASCII & Baudot), and NAVTEX. Works as a node in VHF Packet and includes GPS features. AEA's SIAM™ Signal Identification mode is built in. This unit is the premier data controller today and will handle new applications in the future. **AEA has big plans for the DSP-232.**

AEA's approach takes full advantage of the fast host processor and 32-bit DSP chip—converting analog signals to DSP data and then running the data through DSP modems. This gives you superior filtering, allowing you to cut through noise and receive signals. The DSP chip is coupled with hardware memory ARQ, hardware HDLC, and the DCD state machine for increased performance. Full mailbox for Packet, Pactor, and Amtor with 32K RAM. Expandable to either 128K or 256K RAM. *See AEA FAX III 900 & AEA ACARS software.*



PK-232MBX™ Multi-Mode Data Controller

Still the best low-cost multi-mode TNC available. Modes include: Packet (HF & VHF), Amtor, Pactor, RTTY (Baudot & ASCII), CW, and WeFax. Receives Navtex and TDM. Two switchable radio ports. Built-in 18K (32K RAM) PakMail™ mailbox for Pactor, Packet, and Amtor mail. New GPS features allow HF or VHF Packet location transmission with APRS™. New DAMA protocol. Ask around, you will find many proud PK-232MBX owners.

IsoLoop™ 10-30 HF Antenna (with cover open)



This compact omnidirectional HF antenna covers 10-30 MHz and is rated at 150W—perfect for those who live in antenna restricted areas or who have space limitations. No rotor, no tuner, ground plane, or radials are required. Simple set-up, easy operation, and great performance.

The outer loop measures 35" and is flexible so it can fit through attic doors and other tight openings. Comes with LC-2 manual tuner, power supply for LC-2, and 50 ft. of shielded control cable.

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The AEA HF System



NEW GPS

PK-900™ Multi-Mode Data Controller

The PK-900 has two radio ports you can use at the same time. With the true Gateway, Packet operators on your Port 2 can use your HF rig on Port 1 to link to, monitor, and leave mail for other Packet, Pactor, and Amtor stations. **This is truly a cross-mode, cross-frequency Gateway!**

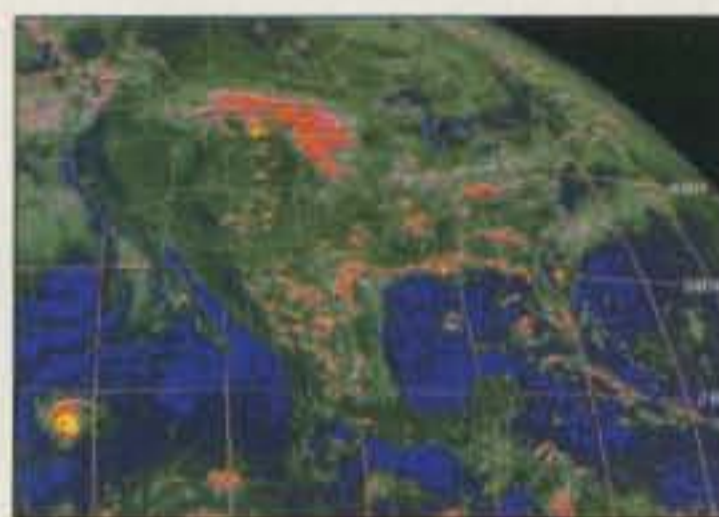
The operating modes include: 1200 bps VHF Packet (9600 bps optional), HF Packet, Pactor, Amtor, CW, RTTY (ASCII & Baudot), NAVTEX, TDM, WeFax, and SIAM™. PakMail™ mailbox for Packet, Pactor, and Amtor.

Three processors provide powerful analog signal filtering. Also incorporates hardware memory ARQ, hardware HDLC, and DCD state machine—all work to let you hear weak signals and cut through noise.

Comes standard with GPS firmware for use with or without APRS™ software. Functions as a node in VHF packet and identifies TCI/IP, TheNet, and NetRom stations. DAMA support included.

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Connects with standard computer keyboard to send hi-speed CW. CW trainer. Sends Farnsworth spacing on the air! Optional **AEA KKCOM** software available.



AEA FAX III™

DOS software and demodulator system displays NOAA HF WeFax images in 16 shades of gray. You can color the image with 256 colors. No TNC is needed. Also decodes RTTY, CW, & NAVTEX!

AEA FAX III 900™: Software-only version for DSP-232 & PK-900 owners. Demodulator is built into the TNC.

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The new MacRatt terminal control program makes full use of the newer Mac computers. Controls all AEA data controllers for all modes.

PC PakRatt for Windows™ 2.0 **NEW**

This terminal control program works with Windows 3.1 and '95. Operate two TNCs at once. Makes working all modes and features of all AEA TNCs easier. QSO logging ability. AEA Log Windows 3.0 logging interface.

Log Windows™ 3.0 **NEW**

This is AEA's premier logging and award tracking program. Offers unbelievable capabilities in managing your log books, controlling your radios, rotors, and TNC. Can interface with PC PakRatt for Windows, callbooks, & QSL mgr.

AEA ACARS 900™ **NEW**

This optional software lets DSP-232 and PK-900 owners decode the air to ground communications of aircraft. See cargo and system status of airplanes. Requires a VHF receiver or scanner covering 129-132 MHz.

☆ **Call the Lit Line for AEA's Catalog**

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ANNOUNCEMENTS

•**The Southwest Ohio Chapter** of the QCWA will hold its 1996 Banquet in conjunction with the Dayton Hamvention on Friday, May 17 at Alex's Continental Restaurant. Reservation deadline May 15. For info, send an SASE to Robert L. Dingle, Treasurer Chapter 9, 1117 Big Hill Road, Kettering, OH 45429-1201.

•**The Forsyth ARC, Inc.** has announced a fund raising campaign geared towards replacing and upgrading its radio tower and antennas located at the Red Cross Chapter House in Winston-Salem, North Carolina. The fund raiser will take place starting Friday April 26 at 6 pm and finish at 6 pm on Monday, April 29. Members of the Forsyth ARC will be soliciting pledges and will attempt to drive in an RV through all 100 counties of North Carolina in 72 hours. County hunters are encouraged to seek a contact from the vehicle. For more info on The Great W4NC County Chase, contact: Henry Heidtmann, at 910-723-8223, or The Forsyth ARC at 910-723-7388; or e-mail to the address n4vnh@sumnet.summit.winston-salem.nc.us.

•**The 1996 QCWA International Convention** hosted by National Capital Chapter No. 70 will be held on October 4-5 at the Citadel Inn, Ontario, Canada. Advance registrations must be received by Sept. 16. For more info, call 613-826-2426.

•**The following Special Events are scheduled for May:**
W1ACT/P, The historic Gay Head Cliffs, Gay Head, Massachusetts, Martha's Vineyard Island; Fall River ARC; for the club's third annual DXpedition; May 3-5; operation on all HF bands, SSB, CW, 2 meters, 220 meters, 440 meters FM, and 421.25-439.25 MHz ATV. Also operating on IOTA frequencies at NA-046. QSL with SASE to Roland Daignault, Jr., N1JOY, 19 Davis Road, Westport, MA 02790.

KB2VPO, Wall Township, New Jersey; Ocean-Morrmouth ARC (OMARC); to commemorate the Marconi Memorial Tower Site, 1600Z May 4th to 1600Z May 5th; operation on CW up to 10 kHz from bottom of Novice subbands and 10.145, 14.045, and 18.080 MHz and bottom of General 80-15 and Novice 10 meter Phone subbands. For certificate, send 9 x 12 SASE (or \$1 US) to KB2SEO at Callbook address.

W2CVT, from the home of Samuel F.B. Morse, Poughkeepsie, New York; The Poughkeepsie ARC; May 4 and 5, 1200-2000Z; on 3.703, 7.103, 10.103, and 14.303 MHz. Send 9 x 12 SASE to D. Stein, W2PTF, 3 Little Road, Wappingers Falls, NY 12590 for certificate.

KB3BKW, from Kennywood Park, West Mifflin, Pennsylvania; Belle Vernon High School ARC; for Amusement Park

Physics Day; May 9, on Novice 10 meter, and on General 15 and 20 meter phone bands. For certificate, send SASE to BVAHS ARC, Road 2, Crest Avenue, Belle Vernon, PA 15012.

W3QLP, from the Baltimore/Washington area; Baltimore, Maryland and Washington, DC; The Bay Area ARS; to commemorate the 152nd anniversary of the telegraph message "What Hath God Wrought," transmitted on an experimental line from Washington, DC to Baltimore, MD; 1300-2000 UTC May 4; on CW 7.125, 14.125, 21.125, and 28.125 MHz. To receive an 8.5 x 11 inch commemorative certificate, send QSL or SW listeners description of the QSO with an 8.5 x 11 inch SASE to Hal Camlin, W3QLP, The Bay Area ARS, 7506 Jacqwill Ct., Glen Burnie, MD 21061.

W4MT, from Newport News, Virginia; The Peninsula ARC, to celebrate the Centennial of Newport News; May 18, 1500-2100Z; operation on General 40, 20, and 15 meter bands and on 145.23 repeater. For certificate and QSL, send 9 x 11 SASE to W4MT, 494 Pamela Drive, Newport News, VA 23601

NJ4F, from 133rd anniversary of the anniversary of the Battle of Chancellorsville, Virginia; Mt. Vernon ARC; May 4; on the General portion of the 40 and 20 meter phone bands; CW contacts by request. For certificates send QSL and large SASE to MVARC, P.O. Box 7234, Alexandria, VA 22307.

KC5PCN, from site of the last battle of the Civil War, Brownsville, Texas; May 11; General 40, 20, 15 meters phone and Novice 10 meters. For certificate send QSL and SASE to Charro ARC, 3554 Boca Chica, Brownsville, TX 78521

K5GH, from 18th Annual Texas Star Party, near the University of Texas McDonald Observatory in the Davis Mtns. of West Texas; Astronomical League, May 13-17; on 28365, 21365, 14265, and 7265. SSTV and CW contacts on request. For astronomical theme QSL card, send QSL/SWL report and SASE to K5GH-TSP, 2619 Bordeaux, McKinney, TX 75070.

KC7KHS, from annual JC Bucking Horse Sale, Miles City, Montana; 0900-1800 MDT May 19; in middle of General phone on 20 meters. send QSL and large SASE for certificate to Tim Patrick, 1305 N. Strevelle, Miles City, MT 59301.

N7WFM, from Promontory, Utah; to commemorate the 127th Anniversary of the completion of the first transcontinental railroad (Driving of the Golden Spike); May 9-11; operation on 7.155 MHz, and on SSB on 7.250 MHz. For commemorative QSL send QSL and SASE to Boyd Young, N7WFM, 256 N. 400 East, Brigham City, UT 84302.

7-land, from Glendive, Montana; Lower Yellowstone ARC; to celebrate Buzzard Day; May 4; operation from 1700-2300Z on General portion of 10-80 meters and all Novice CW subbands. QSL information on contact.

7-land, from Intake, Montana; The Lower Yellowstone ARC; during Spring Paddlefish season; 0000Z May 18 to 2400Z May 19; in General portion of 10-80 meters and all Novice CW subbands. QSL information on contact.

W8BI/B, from Dayton Hamvention, Dayton, Ohio; Dayton ARA; 1200-2100Z May 17; 1200-2100Z May 18; 1200-1600Z May 19; operation 25 kHz up from lower General/Novice and Phone/CW band edges. To receive QSL, send name, address, and SASE to W8BI/B, P.O. Box 44, Dayton, OH 45401-0044.

K8DAA, Holland, Michigan; Holland ARC; to celebrate Tulip Time; May 10-19; operation on the lower portion of the General 20 and 15 meter subbands and 28.400 MHz. Also 146.52 simplex, all bands. For a certificate, send QSL with calls worked and 9 x 12 SASE to Barbara Siebelink, N8NXX, 6418 Otis Road, Saugatuck, MI 49453.

N8BIB, from The Yankee Air Museum at Willow Run Airport, Belleville, Michigan; for Memorial Day; May 27, 1200-2000Z; operation on SSB. For certificate, send QSL and 9 x 12 SASE to Frank Nagy, 24315 Waltz Rd., New Boston, MI 48164-9380.

8-land, from the Thomas Walters Pilot House at The Great Lakes Marine & U.S. Coast Guard Museum; Ashtabula, Ohio; members of the United States Power Squadrons Amateur Radio Net; for National Safe Boating Week; May 25; operation on the General portion of the 80, 40, 20, and 15 meter bands, in the Novice portions of 10 meters and 2 meters. Certificate for a confirming QSL card. Send 9 x 12 SASE to Donald Stark, N3HOW, 65 Stark Spur, Eighty Four, PA 15330-9633.

VE6NC, from Northern Alberta Radio Club's Diamond Jubilee Hamfest, Edmonton, Alberta, Canada; Northern Alberta Radio Club; 1800-2359Z May 24; 1400-2359Z May 25; 1400-1900Z May 26; operation in General CW portions of 80-10 meters, and General SSB portions of 80-10 meters. For QSL send QSL and SASE to Northern Alberta Radio Club, Box 163, Edmonton, AB, Canada T5J 2J1.

KK4WW, US5WE, BY1QH, 8R1WD, and S21AM, from each operator's country; The Foundation for Amateur International Radio Service (FAIRS); to celebrate the 5th anniversary

(Continued on page 122)

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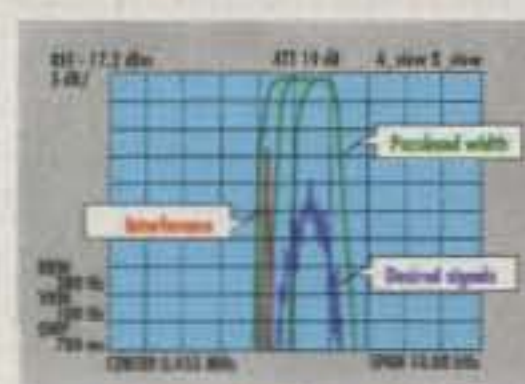
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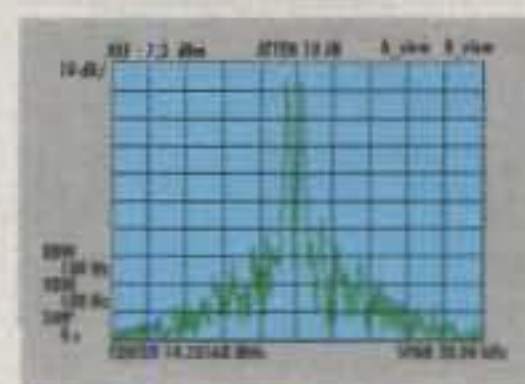
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CQ Communications, Inc.
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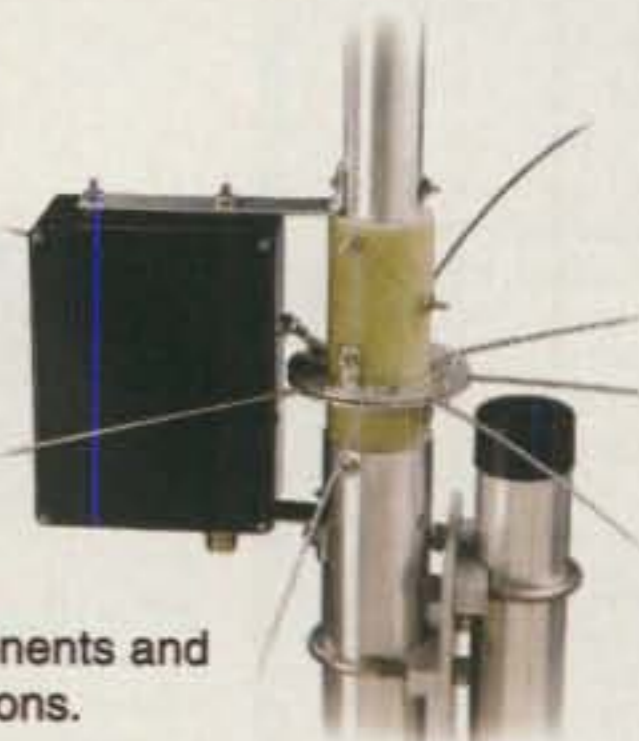
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Results of the 1995 CQ World-Wide WPX CW Contest

BY STEVE BOLIA*, N8BJQ

The last weekend in May coupled with an SFI of 67 usually means big trouble for the CQ WPX CW Contest. However, that was not the case with the 1995 running of the contest. Excellent low-band conditions, increased activity, and some excellent DX stations and new prefixes made the 1995 contest an interesting one.

DX

Robert, S53R, at 4M2BYT took world honors in the single operator category, with XQ1IDM leading a closely bunched group of challengers. A92Q took advantage of the Memorial Day weekend and relative calm in the Persian Gulf to finish third, followed by low power champ YU1RL at PT7CB. Fifth place went to Ollie, OH0XX, at DX1EA, with North American champion CJ3EJ sixth and US champ K5ZD seventh. AA3B at VP5BB finished eighth, with KF3P ninth and S50A rounding out the top ten.

Yes, there was activity on 10 meters. EA1AK/EA8 led the way, followed by S51AY and LZ1KPP. 9Q2L (operated by PA3DZN) survived several power outages to take 15 meter honors, with LT6E (LU6BEG op) second and LU8DPM third. Jose, CT1BOH, operated CT2A to the top of the 20 meter box, with W5ASP at ZF1A second and US champ KI1G third. Taking advantage of the new FCC prefix allocations, Marty, N6VI/KH7 (in Hawaii), was fourth and TA2ZW fifth. Patrick, TK5NN, edged out S50C for 40 meter honors, with OT5T (ON4UN) less than 20K behind. CN7NTT was fourth and UA6LAM fifth. On 75 meters EA8BR finished number one, followed by S56M, S59KW, and G0IVZ. Top band honors went to S50K with a new world record. S57DX was second, followed by LY2ZZ and 9A4D.

Low power scores are on the rise, with YU1RL at PT7CB turning in a fine 6.2 meg effort. Second went to AA3B at VP5BB, with 9X1A operated by ON4WW third, EA7CEZ fourth, and YZ1AU fifth. Rounding out the top ten were HA8FM, UA0JQ, US champ K7GM, WJ20/VP9, and AC10.

EA1AK/EA8 led both high and low power sections on 10 meters, with 9A2OB second and LZ2GS third. LU7FJ topped the 15 meter category, followed by LU3FSP and OH1NOA/OD5. Z30M headed the leader box on 20, with OL7Z second and HA8RH third. PA3AAV edged out HI3JH for 40 meter honors, with HA8EK third. Z32JA captured the 75 meter title, with DL4FMA right on his heels. HA8BE topped YU1RA for top band honors.

In the really low power (or QRP/p) category, UT9FJ led the way, with UN7ID second and JA6GCE third. G0TDX had an excellent 10 meter score, with 9A1CEI taking 15 meter hon-



This is Jose, CT1BOH, who operated as CT2A on 20 meters. Jose's score will get him another CQ plaque for his wall.

ors and CJ7SBO taking 20 meters. JA6UBK had the big score on 40 meters, with SP4GFG taking the 75 meter title and UR4QIC top band.

N3RS was the single op assisted champion, with S50D second and KH6RS (N6HR op) third. AB2E was fourth and DL4MCF finished fifth. HA0DU was tops on 20 meters, followed by WF3T. NA5Q took the top spot on 40 and

PY2DP the top spot on 75. OM6TX won the low power all-band category and WR3L took 20 meter low power honors.

USA

Randy, K5ZD, took advantage of some good low-band openings to take the top spot in the



The ops of HS50A. From left to right are YU7EF, HS2JFW, and YU7AU. HS50 was a welcome new prefix for over 1500 stations.

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TROPHY WINNERS

SINGLE OPERATOR, ALL BAND

World: Steve Bolia, N8BJQ Award. Won by: **4M2BYT** operated by **Robert Kasca, S53R**.
USA: Steve Bolia, N8BJQ Award. Won by: **Randy Thompson, K5ZD**.
OCEANIA: Tom Morton, KT6V Award. Won by: **Station DX1EA** operated by **Olli Rissanen, OH0XX**.
Canada: Radio Amateurs of Canada (RAC) Award. Won by: **John Sluymer, CJ3EJ**.
Canada Low Power: Amateur Radio League of Alberta. Won by: **F. Douglas Rue, VE9/WA2ASM**.
Japan: The DX Family Foundation Award. Won By: **Toshihiko Inoue, JH4UHW**.
USA QRP/p: Richard Arland, K7YHA Award. Won by: **Charles Fulp, K3WW**.

SINGLE OPERATOR, SINGLE BAND

World: Pedro Piza, Sr., KP4ES Memorial Award (Pedro Piza, Jr., NP4A donor). Won by: **Jose Nunes, CT2A**.
World 7 MHz: William D. Johnson, KV0Q Award. Won by: **Patrick Bittiger, TK5NN**.
World 3.5 MHz: Lance Johnson Digital Graphics Award. Won by: **Julio Lopez Ibanez, EA8BR**.
Oceania: D. Craig Boyer, AH9B Award. Won by: **Marty Woll, N6VI/KH7**.
USA: Kansas City DX Club Award. Won by: **Rick Davenport, Jr., K11G**.
USA 28 MHz: Bernie Welch, W8IMZ Memorial Award (Walt Smith, K1DWO donor). Won by: **Melvin Brafford, W4YV**.
USA 21 MHz: Wayne Carroll, W4MPY Award. Won by: **Bruce Bishop, K6OY**.

MULTI-OPERATOR, SINGLE TRANSMITTER

World: Ron Blake, N4KE Award. Won by: **Station CQ3X** operated by **CT3EE, DL5MAE, DL6RAI**.
USA: Austin Regal, N4WW Award. Won by: **Station NB1B** operated by **NB1B, W1KM, W1FJ, K1JKS**.

MULTI-OPERATOR, MULTI-TRANSMITTER

World: Dick Frey, K4XU Award. Won by: **Station 9A1A** operated by **K4XU, F2CW, 9A5W, 9A9A, 9A2DQ, 9A2EU, 9A2HO, 9A2LJ, 9A2NJ, 9A3GW, 9A3NR**.

CONTEST EXPEDITION

World: Ed Roller, K4IA Award. Won by: **Station IH9/OK1MM/P** operated by **OK1CW, OK1DF, OK1FIA, OK1HH, OK1JTS, OK1MM, OK2GG**.

COMBINED SSB/CW

World: Al Slater, G3FXB Award. Won by: **Olli Rissanen, OH0XX**.
Europe: Les Nouvelles DX Group Award. Won by: **Vojislav Kapun, YU7AV**.
USA: Oklahoma Comm Center Award. Won by: **Bob Shohet, KQ2M**.

CLUB (SSB & CW)

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

USA and set the USA record. 1994 champion KF3P was right on his heels, followed by '94 runner up NR1E (W2SC op). KT3Y was fourth and K3ZO less than 4K behind Phil. W1WEF, W3BGN, K4PQL, K7QQ and WZ3Q round out the top ten. W4YV edged K3UA for 10 meter honors, with K6OY edging K9OM for the 15 meter title. K11G now holds the USA 20 meter record with his 3.3M score, with WF3T second and W6EEN (KA6SAR op) third. AC4HB eclipsed N5RZ's 1985 40 meter record by 300K en route to the top spot on 40 meters. Second place went to W3GH, with K3EST third. W4YDD took the top spot on 75. K1ZM's 40K score easily broke K5UR's ten-year-old top band record.

K7GM led the way in the low band category, with AC1O a close second, followed by N2BA, WN3K, and AA8AV. N5NMX repeated as 10 meter champion, with K6OY the USA leader on 15 and WA6KUI winning his second 20 meter title. N4OT topped the 40 meter box, and N5XUS did likewise on 75.

K3WW led all US stations in the QRP/p class, followed by KE0UI and N7IR. WA6FGV took 15 meter honors, with KA1CZF topping 20 meters, N2PEB on 40 meters, and W1MK taking the 75 meter title.

In the assisted section, N3RS took world and US honors, with AB2E second, KM0L third, N1CC in fourth, and WX0B fifth. WF3T led the 20 meter ops, as did NA5Q on 40. In the low power assisted category KO4EW took the all-band honors and WR3L the 20 meter title.

Multis

CT3EE, DL5MAE, and DL6RAI won the world from CQ3X (and own the world record) in the multi-single class. Second place went to expedition trophy winner IH9/OK1MM/P (send that call 10,000 times) followed by HV4NAC, LZ9A, and UU5J. Croatia super-station 9A1A repeat as multi-multi champs, with HG73DX in second, WW2Y third, KG1D fourth, and KL7Y fifth.

In the US the crew at NB1B took the top spot, with N4WW second, NS0Z third, KN5H fourth, and NJ4F in fifth. The multi-multi category was again won by WW2Y, with the gang at KG1D hot on their heels. WZ1R finished third, followed by WC4E and NQ4I.

The Rest of the Story

There are three special plaques for those operators who operated both modes. Olli Rissanen,



Does this count as a multi-operator station? This is PA3DMH and his nine-month-old son, Colin, working a pile-up from Luxembourg.

OH0XX, was the winner of the Al Slater Memorial Award for the top world combined score. Olli operated as ED8OR in the SSB contest and DX1EA in the CW contest, and placed near the top in each contest. Vojislav Kapun, YU7AV (4N0AV), was the European combined champion and the winner of the Les Nouvelles DX Group plaque. In the USA Bob Shohet, KQ2M, was the winner of the Oklahoma Comm Center combined trophy. Bob operated at KM1H's QTH in the SSB contest and from his own QTH in the CW test. To be eligible for any of these awards, you must enter both modes as a single operator, all-band entry.

A new plaque has been added for the 1996 CW contest for the top single operator in Europe, and it is sponsored by Ivo Bezer, 5B4ADA.

The Yankee Clipper Contest Club is the 1995 World club champion, ending the long reign of the Northern California Contest Club. Les Nouvelles DX Group took second in the world, followed by the Slovenia Contest Club, the Northern California Contest Club, and the Potomac Valley Radio Club. The club competition was extremely close, with the top seven clubs all topping 50 million points.

If you noticed your score went up this year (more went down), it's probably because many of you did not take QSO point credit for the WP3 and KP3 prefixes which were used for the first time in the WPX Contest. These are both now authorized for use in Puerto Rico and were both activated in the contest. Common score reductions were for claiming prefixes which are not valid or are miscopied calls. MM0 and QRP0 are not valid prefixes. Check your log over before you send it in. It is surprising how many times MM0, QRP0, and the like appeared in logs from folks who should know better.

In addition to the first-time use of the WP3 and KP3 prefixes, there were a host of special prefixes and DX stations active during the con-

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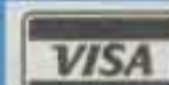


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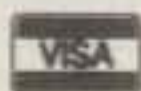


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W3BGN	3,218,004	KA7T	108	W1BIH	235,770
K4PQL	2,746,660			*WR3L	151,641
K7QQ	2,402,588	LOW POWER ALL BAND		KC0EI	75,348
WZ3Q	2,343,460	K7GM	2,165,460	N1OPZ	2,844
*K7GM	2,165,460	AC1O	1,814,676		
*AC1O	1,814,676	N2BA	1,562,022	7 MHz	
AB6FO	1,768,500	WN3K	1,121,642	NA5Q	309,260
KA4RRU	1,641,600	AA8AV	1,111,968	KN6EL	77,840
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AA2FB	1,305,400	K3TLX	470,148	KO4EW	337,464
KQ2M	1,236,168	NF6S	469,872	WT3P	71,610
WA3ECT	1,158,850	N0AX	410,496		
*WN3K	1,121,642			14 MHz	
		28 MHz		WR3L	151,641
		N5NMX	2,397		
		WA8KEM	858	QRP/p	
		21 MHz		K3WW	A 260,536
		K6OY	44,037	KE0UI	A 205,896
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		KB5YVT	9,030	N6OJ	A 103,037
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		14 MHz		WA6FGV	21 4,030
		WA6KUI	393,048	KA1CZF	14 92,587
		WF1L	237,150	N2PEB	7 30,992
		AA0SQ	217,299	W8QZA	7 21,420
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		K2TW	189,756	NS0Z	3,751,326
		AA2SZ	177,530	NJ4F	3,376,965
		W3CPB	104,632	KN5H	2,794,969
		AA7FK	87,236	AG6D	2,709,432
		3.5 MHz		KJ1N/0	2,673,693
		N5XUS	2,632	AA6MC	2,513,502
		7 MHz		N5OK	2,399,412
		AC4HB	2,092,800	NT7Y	1,254,957
		W3GH	1,171,390	MULTI-OPERATOR MULTI-TRANSMITTER	
		K3EST	1,053,328	WW2Y	10,192,260
		NB6U	804,492	KG1D	9,930,228
		N6KI	757,010	WZ1R	7,121,840
		W3AP	414,288	WC4E	6,298,565
		*N4OT	277,020	NQ4I	5,186,775
		WA6AUE	257,040	WD8LLD	3,469,200
		*K2TW	189,756	KU2Q	410,942
		*AA2SZ	177,530		
		ASSISTED ALL BAND			
		N3RS	3,770,096		
		AB2E	1,925,532		
		KM0L	1,105,800		
		N1CC	1,025,114		
		WX0B	822,544		
		K3KO	776,130		
		N8BJQ	459,792		
		WB5B	455,938		

*Denotes low power.

test. The lucky ones got to work XU95HA, XV7SW, YI9CW, A92Q, 5T6E, 9Q2L, S92SS, A71CW, 7Z500, 3D2XC/P, N6VI/KH7, NH7/WV5S, VQ9LW, KC6VW, 4D2C, LS7EE, HS50A, and JU1T. Many thanks to these stations and those who used special contest calls.

The WPX Contest now has a home page on the WWW. Check out <http://ourworld.com-puserve.com/homepages/n8bjq> for a look at the WPX home pages. There you will find 1996 rules, the new contest categories, info on electronic log submission, and other items pertaining to the WPX Contest. This site is in the building process, so things are still changing.

In the past couple of years we have had several inquiries about scoring changes to allow one point for contacts within your own country. If you have an opinion on this (either pro or con), please let me know.

E-mail log submission will continue. Logs can be e-mailed to N8BJQ@ERINET.COM. See the 1996 rules or the WPX Web Page for specifics.

The 1996 contest will be held on May 25th and 26th. As always, you can get forms from the folks in Hicksville for an SASE. Mark your envelopes WPX CW Contest so they get to the right place, and send your logs in early. See you in May!
73, Steve, N8BJQ

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B. FlexiDuck™, MFJ-1716, A. B. \$16.95. Similar to MFJ-1717. Full 1/4 wave on 440 MHz, efficient loaded 1/4 wave on 2 Meters. 8 3/4 inches.

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A. Long Ranger™ 2 Meter Halfwave, MFJ-1714, \$16.95. For really long range this MFJ ended halfwave is hard to beat.

It outperforms a 5/8 wave on a handheld because the 5/8 wave needs a ground plane. The MFJ halfwave doesn't. It's shorter, lighter, has more gain and places less stress on your antenna connector than a 5/8 wave antenna.

When collapsed, it performs like a rubber duck. 40" extended, 10 1/2" collapsed.

B. Dual Bander™ for 2 Meters and 440 MHz, MFJ-1712, \$14.95. Got a new dual band handheld or separate units? One antenna fits all. It's a 1/4 wave for 2 Meters and a 5/8 wave with gain for 440 MHz. 7 1/4" collapsed, 19" extended.

C. Pocket Linear™ 3/8 Wave, 2 Meters, MFJ-1710, \$9.95. Carry this pen size antenna in your pocket like a ballpoint pen. When you're using your rubber duck, on the fringe and noisy, put on the Pocket Linear™, extend it to 24 1/2" and carry on your QSO. Has pocket clip. 5 1/4" collapsed.

144/440 MHz Duplexer

Lets you use dual band 144/440 MHz antenna with separate transceivers or separate 144/440 MHz antennas with dual band transceiver.

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WORLD TOP SCORES

SINGLE OPERATOR ALL BAND								
4M2BYT 8,379,504	RW1ZA	1,966,595	5T6E	1,474,968	S54X	250,976	KP4DDB	A 409,528
XQ1IDM 6,632,912	SP5GRM	1,920,720	IQ4T	1,459,712	UR7TZ	209,334	LY3BA	A 332,367
A92Q 6,397,424	UU1J	1,887,088	S54A	1,446,262	OS4ON	187,488	YU1LM	A 310,247
*PT7CB 6,212,400			CX6VM	1,380,292	OM3ZWA	187,128	VE3KP	A 303,033
DX1EA 5,942,342	7 MHz		NH7/WV5S	1,294,920	OK1JN	177,684	G4UOL	A 277,420
CJ3EJ 5,910,830	TK5NN	3,333,040	A71CW	1,229,760	UR5FAV	151,368	GØTDX	.....28 50,393
K5ZD 5,746,790	S5ØC	3,022,272	WN3K	1,131,438	S59DDR	125,190	HG7MW	.....28 25,058
*VP5BB 5,529,010	OT5T	3,001,544					9A1CEI	.....21 57,782
KF3P 5,188,925	CJ7NTT	2,811,464	28 MHz		1.8 MHz		WA6FGV	.....21 4,030
S5ØA 5,151,120	UA6LAM	2,386,638	EA1AK/EA8	308,855	HA8BE	84,270	CJ7SBO	.....14 186,240
NR1E 4,874,940	YT7A	2,280,060	9A2OB	149,940	YU1RA	62,622	UA9YC	.....14 178,080
S59AA 4,829,660	AC4HB	2,092,800	LZ2GS	40,863	YU1UA	61,480	KA1CZF	.....14 92,587
YT1BB 4,669,962	PYØFF	1,973,016	SP5YQ	28,633	9A3KR	58,606	JA6UBK	.....7 223,300
TM6GG 4,593,379	9A1CRJ	1,833,552	LU2DW	17,617	SP5GH	38,880	N2PEB	.....7 30,992
*9X1A 4,428,648	LY6M	1,808,986	OZ7NB	16,564			W8QZA	.....7 21,420
YT1AD 4,382,774	UT5UGR	1,524,348	RA6LW	12,870	ASSISTED ALL BAND		SP4GFG	.....3.5 100,636
4NØAV 4,313,650	9A3MA	1,352,800	SO3UCW	12,788	N3RS	3,770,096	HA8LUH	.....3.5 34,366
KT3Y 4,283,664	W3GH	1,171,390	YO8MI	10,824	S5ØD	2,596,000	W1MK	.....3.5 19,240
K3ZO 4,279,994	*PA3AAV	1,130,256	ON6NL	10,584	KH6RS	2,025,611	UR4QIC	.....1.8 4,876
JH4UHW 4,236,176	K3EST	1,053,328			AB2E	1,925,532	YO4FRF	.....1.8 3,354
VS6WO 4,108,158	3.5 MHz		21 MHz		DL4MCF	1,714,104	MULTI-OPERATOR SINGLE TRANSMITTER	
*EA7CEZ 3,557,658	EA8BR	949,696	LU7FJ	1,630,470	S56A	1,599,920	CQ3X 13,254,620	
W1WEF 3,552,384	S56M	675,642	LU3FSP	974,647	F5NBX	1,544,485	IH9/OK1MM/P	8,099,712
UT6Q 3,395,456	S59KW	617,824	OH1NOA/OD5	879,152	KMØL	1,105,800	HV4NAC	.....7,732,676
W3BGN 3,218,004	GØIVZ	595,556	LU8HSO	368,944	N1CC	1,025,114	LZ9A	.....7,014,480
28 MHz	4N5ØA	588,874	YC3UEM	272,958	IKØHBN	858,690	UU5J	.....6,778,413
*EA1AK/EA8	SN3A	560,028	S57J	167,349			RK2FWA	.....5,623,884
S51AY	SP7GIQ	546,720	9V1ZB	148,874	14 MHz		OJØ/OH8AA	.....5,482,752
LZ1KPP	S51PE	525,840	Z31GB	135,044	HAØDU	2,033,152	EA3AIR	.....5,214,330
*9A2OB	OM5AW	470,592	EA3ANE	132,616	WF3T	1,162,308	NB1B 5,198,250	
S59ZA	RZ9CO	457,368	EA3DPU	129,417	OH3NXW	635,262	GB6WW	.....5,152,616
	1.8 MHz		14 MHz		W1BIH	235,770	II2K	.....4,659,984
	S5ØK	219,880	Z3ØM	2,212,569	WR3L	151,641	DFØKW	.....4,575,114
	S57DX	175,010	OL7Z	1,577,274	KCØEI	75,348	WP3/WX9E	.....4,511,840
	LY2ZZ	145,080	HA8RH	949,783			OHØX	.....4,501,910
	9A4D	131,166	IR9AF	860,570	7 MHz		4UØITU	.....4,491,593
	SQ5O	123,510	EA7IL	847,780	NA5Q	309,260	RN4W	.....4,359,942
	LY2BR	113,240	7M1MCT	754,885	KN6EL	77,840	EG1RD	.....4,343,479
	ES1RA	104,780	S57U	631,680			N4WW	.....4,275,555
	*HA8BE	84,270	YB9BON	597,381	3.5 MHz		9A7A	.....4,080,114
	*YU1RA	62,622	CJ4VV	539,760	PY2DP	219,454	YT1R	.....4,077,400
	9A3KR	58,606	VE6BMX	483,365			MULTI-OPERATOR MULTI-TRANSMITTER	
	LOW POWER ALL BAND		7 MHz		LOW POWER ALL BAND		9A1A 16,098,986	
	PT7CB	6,212,400	PA3AAV	1,130,256	OM6TX	481,194	HG73DX	.....14,354,816
	VP5BB	5,529,010	HI3JH	976,480	KO4EW	337,464	WW2Y	.....10,192,260
	9X1A	4,428,648	HA8EK	775,838	WT3P	71,610	KG1D	.....9,930,228
	EA7CEZ	3,557,658	HJ6WQH	762,884	OK2ON	64,722	KL7Y	.....9,666,509
	YZ1AU	3,040,290	JR7OMD/2	693,760	JH8KYU/1	59,052	OT5A	.....8,315,727
	HA8FM	2,989,300	OM7DX	641,080			PI4COM	.....7,361,182
	UAØJQ	2,253,072	IK4WMG	620,832	14 MHz		WZ1R	.....7,121,840
	K7GM	2,165,460	EA8CN	591,262	WR3L	151,641	WC4E	.....6,298,565
	WJ2ØMP9	1,892,000	YO3FWC	564,732			LY7A	.....5,500,044
	AC1Ø	1,814,676	S51QZ	557,862	QRP/p			
	8P9GU	1,597,632			UT9FJ	A 1,030,326		
	N2BA	1,562,022	3.5 MHz		UN7ID	A 716,220		
	UR5EAT	1,476,100	Z32JA	328,800	JA6GCE	A 444,276		
			DL4FMA	306,772	SM3CCT	A 426,474		
			HA4FV	267,240	DL3KVR	A 414,918		

Random Comments

Guess having both GB5WW and GB6WW both QRV will give you headaches . . . GB5WW. This is a fun contest to do as multi-single; no need for a separate multiplier station and quite easy to do with two operators . . . GB6WW. QSL via HA1KRR . . . HG75ØK. JA heard on 40 at noon in Boston! . . . KB1BOU. First time ever in this contest. Feel we did real well considering there are no stacked arrays at this station . . . NJ4F. It was thrilling to compete against other better equipped mv's stations in Finland. What is lost in antennas we compensate with a tough attitude . . . OH1AD. OLØØJ was a special call to commemo-

rate Pope John-Paul's visit in Czech Republic . . . OLØØJ. Nice contest but strange propagation on 20. With antenna to US working JA and with antenna to JA working US . . . PI4CC.

We have some problems this year, but WPX is always OK! . . . RU9D. Bedlam on 20 meters both Saturday and Sunday! Great opening . . . WA7FAB. We like to thank Jim, K5RX, for joining us. It was first contest with new 2-element beam for 40. We could still work USA 3 hours after sunrise . . . PI4COM. It seems to me that conds on 10 and 15 meters were surprisingly good . . . DL8WPM. Even in contest QRP is fun . . . F6FHR. Not a big entry/score but very satisfying to add some countries to my QRP DXCC . . .

GW3/JSV. Second year QRP/p. Worked much more Europe with 5 watts than 1 watt last year. Thanks to all those who hung in there for the QSO! . . . N2PEB. Spent 2 hours wresting beam from adjacent tree . . . N7IR.

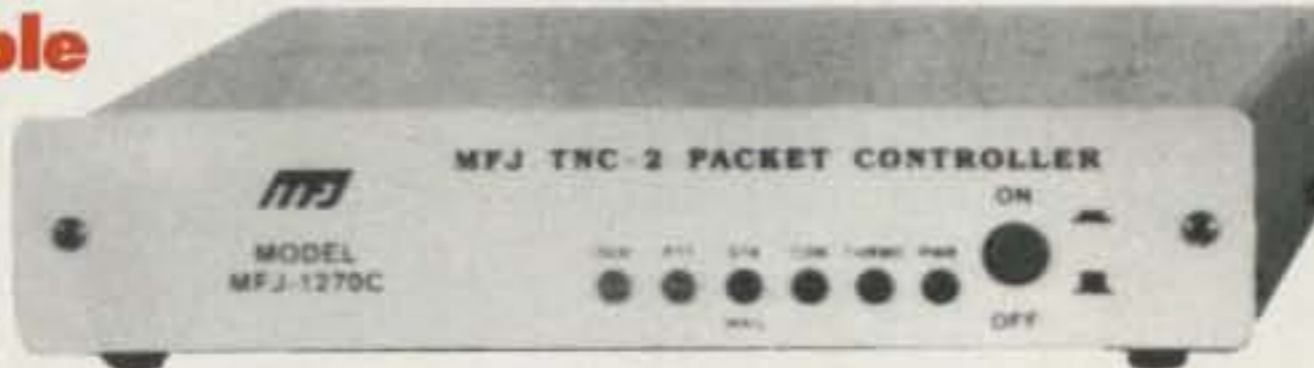
Had a great time operating portable QRP from the Baltic coast to put a rare prefix on the air . . . SO5TW/2. Tnx for nice contest. For first time I was using a computer for my work . . . UT9FJ. QRPp from "left coast" at SFI 67 is hard work . . . W6ZH. Once a year, in this contest, I go into the Novice bands for multipliers. It's fun to chat with the newest members of our hobby . . . W8QZA. Second day, very bad propagation but it was again fun . . . 5T6E. It is my first chance to QRV

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MFJ-1270C super TAPR TNC clone has a world wide reputation as the most reliable packet TNC in the world! Thousands used as digipeaters, nodes, BBS and in all kinds of commercial applications working 24 hours a day -- many work for years without a single failure . . .

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New enhanced Personal Mailbox

The enhanced Easy Mail™ personal mailbox lets you use a dedicated call-sign for your mailbox. Your mailbox can stay on while you operate packet. It will also auto forward or reverse forward mail to and from other BBSs. A check mail LED blinks when you have mail. More features: remote sysop access, sysop paging, mailbox C-text, chat mode and many other features not available in other TNCs. The mailbox memory is expandable to 32K, 128K and 512K.

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Switch between your TNC or Mic by pushing a button!

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You won't have to unplug your microphone and plug in your TNC everytime you want to work packet or other digital modes.

Just plug these pre-wired cables into your rig's microphone connector and into your TNC and



Pre-wired Radio-to-TNC cables . . . \$14⁹⁵

Radios	All MFJ TNCs/ PK900/PK96/ PK12/PacCom/ other TNC-2 compatibles	KAM VHF ¹ / KAM HF ² / KPC3 ³ / KPC9612 ⁵	PK-232	PK-88
Icom/Yaesu/ Alinco/Radio Shack HTs	MFJ-5024	MFJ-5024YV	MFJ-5024X	MFJ-5024Z
Kenwood ² HTs	MFJ-5026	MFJ-5026YV	MFJ-5026X	MFJ-5026Z
Yaesu 8-pin	MFJ-5080	MFJ-5080YV MFJ-5080YH	MFJ-5080X	MFJ-5080Z
Icom ³ 8-pin	MFJ-5084	MFJ-5084YV MFJ-5084YH	MFJ-5084X	MFJ-5084Z
Kenwood/Alinco 8-pin	MFJ-5086	MFJ-5086YV MFJ-5086YH	MFJ-5086X	MFJ-5086Z
Yaesu 8-pin modular	MFJ-5080M	MFJ-5080MYV	MFJ-5080MX	MFJ-5080MZ
Icom ⁴ 8-pin modular	MFJ-5084M	MFJ-5084MYV	MFJ-5084MX	MFJ-5084MZ
Kenwood 8-pin modular	MFJ-5086	MFJ-5086MYV	MFJ-5086MX	MFJ-5086MZ
Radio Shack 8-pin modular	MFJ-5088M	MFJ-5088MYV	MFJ-5088MX	MFJ-5088MZ

1. does not include IC-W2A 4. does not include IC-100H, IC-2700H 6. YV for KPC9612 1200 baud port
2. does not include 2500 5. YV for KAM VHF port, YH for KAM 7. YH models for KPC9612 9600 baud port

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MFJ-1270CQ
\$229⁹⁵



Has all the features of the MFJ-1270C, the most reliable TNC in the world, plus built-in 9600 baud G3RUH compatible modem. Operate 300, 1200 and 9600 baud.

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You can add MFJ's optional internal 2400 baud or 9600 baud modem just by plugging it in and making a few simple connections.

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You get a KISS interface that lets you run TCP/IP and MYSYS and MFJ's Host Mode that makes it easy to write efficient application programs.

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Plus more . . .

You also get 32K RAM, IC sockets for easy service, 256K ROM, speaker jack, lithium battery backup, RS-232 and TTL serial ports, radio cable (you have to add a connector for your radio), Fast-Start™ Manual plus much more. Use 12 VDC or 110 VAC. 9 1/2 x 1 1/2 x 7 1/2 in.

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2400 Baud Turbo™ TNC

MFJ-1270CT, \$209.95. Has all the features of the MFJ-1270C plus built-in fast 2400 baud modem. Operate 300, 1200 and 2400 baud packet with the MFJ-1270CT. Radio modification is not necessary when operating 2400 baud packet.

you're ready to go -- no more hard-to-find connectors and wiring up cables.

Works with HF, VHF and UHF radios with 8 pin mic connectors -- including Kenwood, ICOM, Yaesu, Alinco and others. For radios with 8-pin RJ-45 modular telephone jack, select the new "M" models.

Plug-in jumpers let you quickly set-up for virtually any radio. Factory set for Kenwood and Alinco. Includes easy-to-follow instructions. Has audio-in and speaker jacks, 3 1/4 x 1 1/4 x 4 inches.

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PACKET plus PACTOR TNC

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PACTOR MFJ-1276 combines the best of **\$159⁹⁵** Packet and AMTOR

for HF. You get excellent weak signal operation, error correction, faster baud rate, data compression and full 8-bit word transmissions.

A 20 LED bargraph makes HF tuning easy. Just tune your radio to center a single LED and you're precisely tuned in to within 10 Hz -- and it shows you which way to tune!

You also get an extra 32K of memory for your enhanced Easy Mail™ packet mailbox.

MFJ-1276T, \$249.95, same as MFJ-1276 but includes fast 2400 baud modem. Lets you operate 300, 1200, and 2400 baud packet.



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CIRCLE 3 ON READER SERVICE CARD

1995 CQ WW WPX SSB Contest Errata

The following logs were omitted from the 1995 WPX SSB results.

EMDF	21	1,384,989	1173	509
UXQHA	21	76,987	244	167
*J01MCC	21	55	5	5
UN8LA	14	2,310,164	1347	641
RA9DX	14	2,075,913	1336	581
RW1ZA	14	1,984,923	1591	669
UX7IB	14	1,704,144	1647	624
AJ7/JR3NZC	14	778,421	863	427
SP6ENK	14	400,030	602	367
4N1N	14	92,144	324	208
*T94QE	14	22,248	181	108
YT7A	7	2,485,068	1323	579
*OM7DX	7	2,216,376	1343	558
UX3MO	7	219,008	357	236
9A3B	3.7	1,131,102	938	382
OM5KM	3.7	125,928	295	198
EW6GC	1.8	30,520	141	109

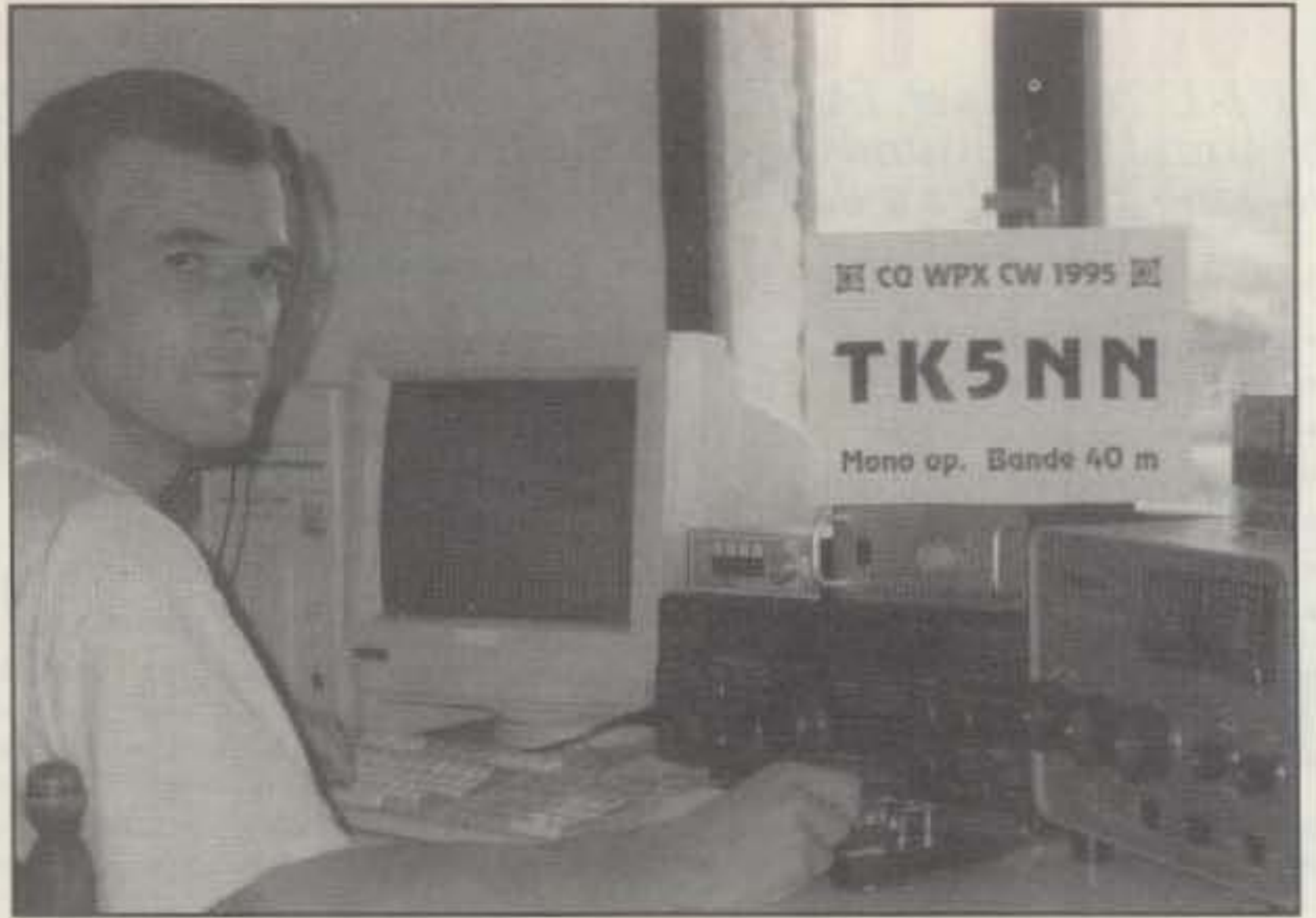
SINGLE OPERATOR

EN7E	A	2,904,365	2015	727
DL2ARD/P	A	2,593,815	1587	735
*YB30SE	A	1,736,592	1237	484
OL5T	A	844,127	835	393
Z21Z	A	587,697	582	363
*RW9QA	A	578,695	612	307
SN9T	A	517,366	696	334
*OK1KZ	A	401,306	582	326
*JA1VKT	A	358,494	444	298
*SP5ELA	A	341,796	512	313
ZS5NK	A	312,738	388	282
*SP1AEN	A	305,472	401	344
*SP6CPF	A	277,771	482	299
*OM3YK	A	269,724	445	273
*SP6FBD	A	224,280	444	267
*DF2RM	A	206,248	353	254
*ER3ED	A	98,532	355	204
*T94P	A	98,000	283	196
KI7KA	A	75,650	221	170
*SP9XZA	A	48,910	165	146
*SP3IBM	A	36,387	142	117
SP9LDI	A	30,888	160	99
*EW4XA	A	28,728	125	108
*SP6SOX	A	24,893	240	57
OY1A	A	14,648	103	86
SP8PKQ	A	4,375	37	25
*SP2QCH	28	594	18	11

QRP/p
SP9HWN A 200,592 388 252
YL2KL A 15,295 101 95

*Denotes low power.

CJ6JO was winner of the Canada All Band Low Power Trophy sponsored by the Amateur Radio League of Alberta.
VX3WTO and X05SF should have been listed as low power entries.



Here is 40 meter champion TK5NN. Pat is the new European record holder on 40 meters.

on CQ WW WPX contest CW. Only 60 QSOs but I have enjoyed it . . . 7K1EQG. I love this contest. It's the great equalizer . . . 7Z50O. I have "Murphy" — after first night my antenna falling down . . . 9A2AJ. Where are DX? Only 26 stns outside of EU . . . 9A2CB.

Zero condx on Sunday, together with powercuts made WPX CW a frustrating experience this time around . . . 9Q2L. Participation was a last-minute thing. The Gulf and rest of the Middle East were mercifully quiet and Memorial Day weekend gave me an excuse . . . A92Q. Talk about "low sunspots." Lots of

QRN, no Europe, no Africa, and few South American and Asia, but still beat last year's score . . . AA7FK. The secret weapon is a wife that is supportive during contest weekends . . . AAØSQ. Had a blast. Second place last year. Maybe this will be a new USA record . . . AC4HB. Conditions were so-so. There was a shortage of copyable Europeans here. Had to listen to the East Coast run them all weekend . . . AD5Q.

The 40 meter delta loop gobbled up the 6 pointers and I was actually able to hold onto 7030 and 7007 for hours . . . AEØM. Condx were very good.

then my power cable failed (sob) . . . AE2N. Thank the ionosphere for the sporadic-E layer. It gave me many contacts and a lot of European prefixes . . . DAØIU. What a weekend: Family party, gardenwork, and in between—contest! . . . DK8NX. YLs and OMs, forget your linears and try with low power. It's just like Coke—you can't beat the feelin' . . . DL4FMA. Biggest thrill, at my age, still breathing after 19 cups of coffee and 12 cokes! . . . DU1KK. My first test. TNX for organization . . . EA3AHQ. It was a challenge to compete single 10 meter QSB and almost only Europeans. See you next test . . . EA5AAJ.

Lots of big guns forgot what QRL means . . . F6IIE. My first attempt at CQ WPX. I will be catching up on lost sleep from now until next year's contest . . . GØDEZ. Excellent contest, band condx good and plenty of stations to contact . . . G3ESF. Contests push band propagation to the limit. Even though it was mostly Europe, it was good to hear 10 meters open to somewhere . . . G3TXF. Eighty this year. Still a lot of fun . . . G5MY. High points were being called by VS6 and completing manual log entry . . . GW4BVJ. Good propagation, bad home antenna construction, at next time I make better ariels . . . HA8EK. Lots of sporadic-E on 21 and 28 MHz . . . HB9HFN. Glad to be back home for the WPX after moving to the USA . . . HI3JH.

It was fun. This was my first CQ WPX . . . HJ6WQH. It seems that propagation conditions granted enough blessing for the contest weekend . . . HZ1HZ. I like this contest very much because of no difference between JA and DX country. So I can be called from many stations . . . JE1SPY. My wife doesn't like my amateur radio. That is the question! . . . JFØSGW. I used only 6 ft. whip ant with 50 watts. Many stations caught my weak signal. They were so great . . . JL7PVR/1. Very interesting. My first WPX. Now I understand why the world is going crazy with different prefixes . . . KØOAM. Lots of hash from Radio Vatican all over 40 meter band . . . K3ZØ. First time I have entered this contest. Great fun! Will be back again next year . . . K4UK.

Never expected to break USA record! Condx not great, but the LF bands made up for it . . . K5ZD. The monster RTTY stations guarding their borders creates a surrealistic struggle between key and keyboard . . . K7NPN. Tired! . . . K7QQ. Condx not so great, but fun for the six hours that I got to operate, between mowing the grass, etc. . . K8DD. I was lucky to work a VE or my score would have been Zero. There was nobody on 160 . . . KA7T. Twenty meters was the place to be! . . . KA9FOX. Only part of the contest I could run while babysitting a 14 month old. Boy am I tired! . . . KD7EY. Nice contest from the "other side," unfortunately no opening to EU . . . KL7/DL8WEM.

The local packet cluster was hooked up with the

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New! 6:1 UnBalun



The B6-1.5K is a new 6:1 "UnBalun," made especially for "Off-center Fed" dipoles. It's the balun you've been waiting for. Build that OCF you want now. Or, even better, get yourself the real 80-10 meter performance leader—the CAROLINA WINDOM 80. You can't beat it!

Current Baluns

B1-2K	1:1	2 KW	80-10 m	General Purpose	\$18.95
B1-4K	1:1	4 KW	160-10 m	High Isolation	\$24.95
B1-5K	1:1	5 KW	160-10 m	Precision	\$29.95
Y1-4K	1:1	4KW	160-10 m	YagiBalun™	\$24.95
Y1-5K	1:1	5 KW	160-10 m	The YagiBalun™	\$29.95
B4-1.5K	4:1	1.5KW	80-10 m	General Purpose	\$22.95
B4-2KX	4:1	2 KW	160-10 m	4:1 Current Balun	\$39.95
B6-1.5K	6:1	1.5 KW	80-10 m	Unbalanced for OCF ants.	\$45.00
RemoteBalun™ High Power, Current-type, 4:1, 160-10 m					\$47.95



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4K-LI	4 KW	160-10m	SO-239 in, SO-239 out	\$19.95
4K-LIG	New! Grounded	4 KW	160-10m	\$25.95
4KRF-LI	4 KW	160-10m	PL-259 in, SO-239 out	\$25.95
4KV-LI	Vertical antenna Line Isolator	160-10 m		\$27.95
Terminator-3	Ultra Line Isolator for transmatch			\$27.95

May Specials - PL-259 Silver/Teflon \$1
200' 3/16" MilSpec Dacron Line with any \$50 purchase \$12
RG-8X Premium, 95% shield, per 100' \$14

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Antenna Wire and Parts

PL-259ST	Silver-Teflon, USA	\$1.29 or \$25/pkg of 25
PL-259GT	Gold-Teflon, USA	\$1.49 or \$30/pkg of 25
N/9913	For 9913, 9086, Flexi, etc.	\$3.25
N/9913S	As above but silver & Teflon	\$4.25
N-200	Silver-Teflon, installs like PL-259	\$3.25
CQ-8X	95% shield, Type IIA non-contaminating	23¢
CQ-8XMM	Solid dielectric, tinned, 95%, Type IIA	27¢
CQ-213	Enhanced RG-213, 96%+ braid	40¢
RG-213	95% Mil-type	35¢
CQ-Flexi	Flexible, 9913 type	60¢
R1 Rotator	8 conductor (2 x #18, 6 x #24)	22¢
R2 Rotator	8 conductor (2 x #16, 6 x #18)	37¢
R4 Rotator	8 conductor (2 x #14, 6 x #18)	48¢
#14 HD	Stranded, 7 x 22 hard-drawn	8¢
#14 CW19	19-strand, copper-clad, tinned	10¢
#13 CW	19-strand, copper-clad, insulated	16¢
450 Ladder	New! #14 stranded cond. poly, windows	26¢
450 Ladder	Stranded #16 cond., poly, windows	18¢
Ladder-Loc	Center insulator for ladder line	\$11.95
Delta-C Kit	ARC-PLUG center insulator & 2 end insulators	\$29.95

Coax & cable must be in 50-foot multiples for ad prices. Quantity pricing, too.

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' sp	\$15.95

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15 Meters

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15M6

10 Meters

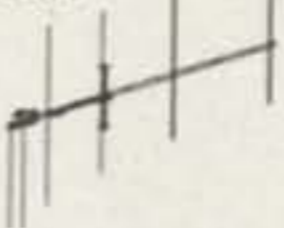
10M4
10M7

6 Meters

6M SLOOP
6M5
6M7
6M2WL
6M2.5WL

2 Meters

2M SLOOP
SLOOPSTAK
EB-144
2M4



2M7
2M9FM
2M9SSB
2M12
2M5WL
2M18XXX
2M8WL
2MCP14
2MCP22
137CP14
Dual Band
2M5-440XP
220 MHz

222-7EZ

222-10EZ
222-7WL
UHF
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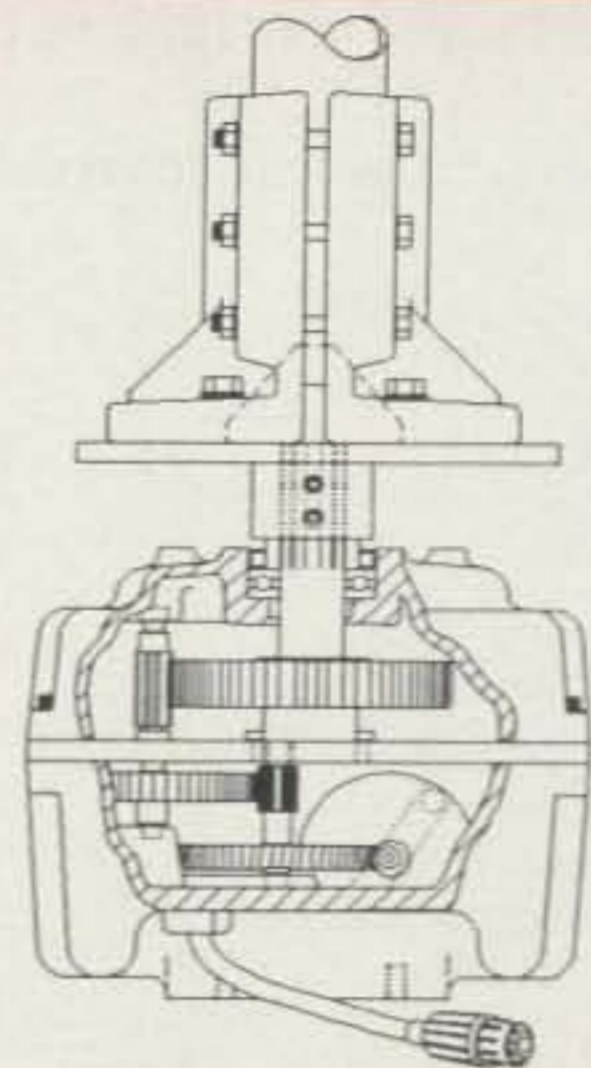


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COAX (50 OHM "LOW LOSS" GROUP)		100FT/UP	500FT
"FLEXIBLE" 9913 FOIL+95% BRAID 2.7dB @ 400MHz	58/FT	56/FT
9913 EQUAL FOIL+95% BRAID 2.7dB @ 400MHz	.....	42/FT	40/FT
LMR 240 DBL SHLD (8X SIZE) IIIA JACKET 1.7dB @ 50MHz	.....	41/FT	39/FT
LMR 400 DBL SHLD IIIA JACKET 2.7dB @ 450MHz	.....	58/FT	56/FT
LMR 400 ULTRA-FLEX DBL SHLD "TPE" JACKET 3.1dB @ 450MHz	.....	75/FT	72/FT
LMR 600 DBL SHLD IIIA JACKET 1.72dB @ 450MHz	.....	1.38/FT	1.32/FT
LDF4-50A 1/2" ANDREWS HELIX 1.5dB @ 450MHz	25FT&UP	.....	2.10/FT
FSJ-50 1/4" ANDREWS SUPERFLEX 2.23dB @ 150MHz	25FT&UP	.....	1.50/FT
COAX (50 OHM "HF" GROUP)		100FT/UP	500FT
RG213/U MIL-SPEC DIRECT BURIAL JACKET 1.5dB @ 50MHz	.....	36/FT	34/FT
RG8/U FOAM 95% BRD UV RESISTANT JACKET 1.2dB @ 50MHz	.....	32/FT	30/FT
RG8 MINI (X) 95% BRD BLK, UV RES JKT(GRY, CLR, or WHT JKT TOO)	.....	15/FT	13/FT
RG58/U SOLID CENTER COND 95% BRAID	.....	15/FT	13/FT
RG58A/U STRD CENTER COND 95% TC BRAID	.....	17/FT	15/FT
450 OHM SOLID 18GA CW LADDER LINE	.....	12/FT	10/FT
450 OHM STRD 16GA CCW LADDER LINE	.....	18/FT	17/FT
24GA SOLID 4/PAIR UNSHLD LAN CABLE "LEVEL 5" PVC JACKET	.....	16/FT	14/FT
RG214/U DBL SILVER SHLD MIL-SPEC	25FT&UP	.....	1.75/FT
RG142/U DBL SILVER SHLD MIL-SPEC "TEFLON"	25FT&UP	.....	1.25/FT
ROTOR & CONTROL CABLES		100FT/UP	500FT
5971 8/COND (2/18 6/22) BLK UV RES JKT. Recommended up to 125ft.	.....	20/FT	18/FT
4090 8/COND (2/16 6/22) BLK UV RES JKT. Recommended up to 200ft.	.....	35/FT	34/FT
1418 8/COND (2/14 6/18) BLK UV RES JKT. Recommended up to 300 ft.	.....	47/FT	45/FT
18GA STRD 4/COND PVC JKT	.....	20/FT	18/FT
18GA STRD 5/COND PVC JKT	.....	22/FT	20/FT
18GA STRD 6/COND PVC JKT	.....	23/FT	21/FT
18GA STRD 7/COND PVC JKT	.....	25/FT	23/FT
ANTENNA WIRE (UNINSULATED BARE COPPER)		100FT/UP	500FT
14GA 168 STRD "SUPERFLEX" (great for Quads & Portable set-ups etc)	.....	12/FT	10/FT
14GA 7 STRD "HARD DRAWN" (perfect for permanent Dipoles etc)	.....	08/FT	07/FT
14GA SOLID "COPPERWELD" (for very long spans etc.)	.....	08/FT	07/FT
14GA SOLID "SOFT DRAWN" (for ground radials etc.)	08/FT	07/FT
12GA 19 STRD "SOFT DRAWN" (broader bandwidth)	13/FT	11/FT
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COAX W/SILVER TEFLON PL259's EA END (soldered & tested)		PRICE	
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50FT "FLEXIBLE" 9913 FOIL+95% BRAID 2.7dB @ 400MHz	\$35.00/EA	
100FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5dB @ 50MHz	\$45.00/EA	
50FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5dB @ 50MHz	.....	\$25.00/EA	
100FT RG8/U FOAM 95% BRD UV RESISTANT JKT 1.2dB @ 50MHz	.....	\$40.00/EA	
50FT RG8/U FOAM 95% BRD UV RESISTANT JKT 1.2dB @ 50MHz	\$22.50/EA	
100FT RG8MINI(X) 95% BRD BLK UV RESISTANT JKT 2.5dB @ 50MHz	\$21.00/EA	
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LES NOUVELLES DX GROUP	68,318,449	GRUPO PORTUGUES DX	4,231,598
SLOVENIA CONTEST CLUB	63,248,332	ITALY DX GROUP DELTA MIKE MILANO	4,140,800
NORTHERN CALIFORNIA CONTEST CLUB	55,706,715	OREGON NOCTURNAL CHORDAL CORPS	4,083,795
POTOMAC VALLEY RADIO CLUB	53,152,994	FOX CONTEST CLUB	4,035,057
CROATIAN DX CLUB	51,683,119	RADIO CLUB VENEZOLANO	4,009,800
FRANKFORD RADIO CLUB	51,417,280	EASTERN CANADIAN DX ASSOCIATION	3,939,620
BAVARIAN CONTEST CLUB	39,931,182	NORTHERN ALABAMA DX CLUB	3,885,293
RHINE RUHR DX ASSOCIATION	39,026,645	NORTH TEXAS CONTEST CLUB	3,542,716
HA DX CLUB	38,099,500	TENNESSEE CONTEST GROUP	3,470,160
UKRAINIAN CONTEST CLUB	37,259,517	LOW BANDS CONTEST CLUB	3,440,514
ARAUCARIA DX GROUP	26,960,734	KANSAS CITY DX CLUB	3,431,177
RADIO CLUB ROSARIO	25,732,407	HARVARD WIRELESS CLUB	3,385,958
SOCIETY OF MIDWEST CONTESTERS	25,106,946	WOODBIDGE WIRELESS ASSOCIATION	3,376,965
SOUTHEASTERN DX CLUB	22,397,593	CAROLINA DX ASSOCIATION	3,330,128
SOUTHERN CALIFORNIA CONTEST CLUB	21,831,901	GUAYAQUIL RADIO CLUB	3,289,958
FOR DX GROUP	21,728,000	DAUBERVILLE DX ASSOCIATION	3,032,164
FLORIDA CONTEST GROUP	18,867,347	TOP OF EUROPE CONTESTERS	2,968,152
MAD RIVER RADIO CLUB	18,711,876	ALPHA FOX CONTEST GROUP	2,954,258
NICOSIA CONTEST CLUB	18,186,454	WESTERN NEW YORK DX ASSOCIATION	2,948,934
YU DX CLUB	17,936,019	THE NORHTERN LIGHTS	2,873,286
KAUNAS UNIVERSITY OF TECHNOLOGY RADIO CLUB	15,104,907	CONTEST CLUB VLAARDINGEN	2,809,300
CHILTERN DX CLUB	14,772,268	DPX DX/CONTEST CLUB	2,779,894
LITHUANIAN DX GROUP	13,795,920	CORBEIL CONTEST CLUB	2,748,592
MOSCOW DX CLUB	13,694,756	CONTEST NEWS ITALIA	2,689,372
DIXIE DX'ERS CONTEST CLUB	13,374,010	COUNCIL OF EUROPE RADIO CLUB	2,658,684
ASSOCIAO DE RADIO AMADORES DA REGIO DA MADEIRA	12,286,732	CZECH DX FOUNDATION	2,618,903
TEXAS DX SOCIETY	11,780,669	TUPY DX GROUP	2,615,982
SANTA CATARINA ISLAND DX ASSOCIATION	11,739,150	SOUTHWEST OHIO DX ASSOCIATION	2,605,932
GRUPO DX PANAMERICANO	11,731,365	ARI - 425 DX GANG	2,588,390
NORTH COAST CONTESTERS	11,676,461	CALGARY AMATEUR RADIO ASSOCIATION	2,439,977
CZECH CONTEST CLUB	10,578,954	CDXA	2,343,460
PORTUGESE DX GROUP	10,180,656	NORTH SHENANDOAH DX ASSOCIATION	2,306,283
KIEV I.U.C.A. RADIO CLUB	9,982,093	CENTRAL ARIZONA DX ASSOCIATION	2,168,369
ALASKA DX ASSOCIATION	9,666,509	SHIZUOKA DX RADIO ASSOCIATION	2,120,514
VOJVODINA CONTEST CLUB	9,078,778	NORTHERN CALIFORNIA DX CLUB	2,025,611
WESTERN WASHINGTON DX CLUB	8,937,444	CONTEST TEAM LUXEMBURG	1,913,624
CLUB FIVE	8,625,760	CAGAYAN AMATEUR GROUP	1,904,992
KEY CONTEST TEAM MONZA	8,326,000	CANBERRA DX CLUB	1,901,144
FRENCH DX FOUNDATION	8,298,000	CX/LU CONTEST TEAM	1,893,999
BATEA CONTEST TEAM	8,142,430	CRIMEAN CONTEST CLUB	1,887,088
MINNESOTA WIRELESS ASSOCIATION	8,010,451	ILMENAU CONTEST CLUB	1,762,199
CONTESTGROUP OUDE MAAS	7,776,842	K-TEAM	1,748,916
FRASER VALLEY DX CLUB	7,763,246	RADO CLUB URUGUAYO	1,688,568
LYNX DX GROUP	7,484,398	SXDXA	1,644,480
S50C DREAM TEAM	7,097,693	CENTRAL LAKES A.R.C.	1,643,140
LZ CONTEST GROUP	7,014,480	RADIO CLUB SAN JUSTO	1,630,470
RC540	6,933,752	MILE HI DX ASSOCIATION	1,599,577
CANTAREIRA DX GROUP	6,617,520	ENDLESS MTS ARC	1,580,904
SP DX CLUB	6,606,549	FRENCH CRAZY CONTESTERS	1,568,320
VARGINHA DXGROUP	6,532,974	APAU CONTEST GROUP	1,557,171
BRITISH COLUMBIA DX CLUB	6,337,832	ARI LISSONE CONTEST TEAM	1,540,662
UBC AMATEUR RADIO SOCIETY	6,317,729	RADIO AMATEUR SOCIETY OF THAILAND	1,534,858
LE GROUPE HF DE L'OUTAOUAIS	6,104,622	TESSELLO DX TEAM	1,459,712
SOUTH CHINA SEA DX TEAM	5,942,342	MARCONI AMATEUR WIRELESS SOCIETY	1,436,247
NYORE CONTEST TEAM KINCSEM	5,847,744	NORTHERN CORRIDOR RADIO GROUP	1,406,886
PETROVO CONTEST CLUB	5,750,479	CHESHIRE COUNTY DX	1,335,129
OKLAHOMA DX ASSOCIATION	5,702,442	SOUTH COAST WIRELESS SOCIETY	1,261,905
PAPERINO DX TEAM	5,421,300	B.A.R.A.	1,179,023
CENTRAL TEXAS DX & CONTEST CLUB	4,919,177	TWIN STATE RADIO CLUB	1,158,850
NORTHERN ALBERTA RADIO CLUB	4,732,931	MOTOROLA AMATEUR RADIO CLUB	1,127,751
BEEMSTER CONTEST CLUB	4,712,732	HOOSIER CONTESTERS	1,115,400
VENEZUELA DX CLUB	4,581,048	SOUTH WIRRAL CONTEST GROUP	1,096,188
REGINA COMMUNICATIONS CLUB	4,567,221	CENTRAL WISCONSIN RADIO AMATEURS	1,089,327

HF link and we kept getting spots from Europe. No wonder they call this single op distracted! . . . *KM0L*. Operated part-time from home using all low dipoles and had a blast. Felt funny using my own callsign (not KM1H) after all these years . . . *KQ2M*. Thanks to all the ops for listening and working me. Next year will be even better . . . *KW7K*. As always, I enjoyed a lot of fun during the contest . . . *LU1EWL*. Bad operator + poor propagation = very low score! . . . *LU2DW*. 5Z4FO on 160 meters was 99 country on top band. Beautiful contest. Lots of DX . . . *LY1DR*. There is no chance to operate on high bands with vertical antennas . . . *LY2MW*. First time I've tried a 40 meter low power entry. The new half square antenna made a big difference . . . *N4OT*.

First time in WPX contest. Had a ball, even if conditions didn't cooperate . . . *N4TO*. F1—"auto CQ

repeat" got a full workout. There was plenty of E-skip, but no one to work! . . . *N5NMX*. Lotta static in Round Rock. Summer storms and air conditioners! . . . *N5XUS*. Occasional neighborhood thunderstorms with many lightning stokes added to frustration caused by the poor propagation, but it was fun anyhow . . . *N8LM*. First WPX effort. With all those multipliers, it was fun watching the score grow . . . *N9WHG*. KL7Y was only North American worked. I went to play Finnish basketball on Sunday so my score is not competitive . . . *OH1NOA/OD5*. Tnx for a nice contest. Cond was really good . . . *OH3WS*.

Beautiful contest. I was trying to beat 1000 QSOs with my input 250 watts and long wire antenna only. I'm happy . . . *OL4M*. Hey, guys, you worked OS4ALW and not OH4ALW. Many had problems with the OS prefix . . . *OS4ALW*. This is my first participation in a

WPX CW contest. I was aiming for the European record, but fell short a few QSOs . . . *OT5T*. It is always a pleasure to join in this nice contest; see you next year . . . *PA53BEJ*. Where are everybody? Ten and 20 meters almost in silence! . . . *PW2N*. The strong pileup disturbed many stn copy me. Hi. The top band is the band! . . . *PY1BVY*. Have tried to jump to top ten this year. But should solicit more by CQ for this purpose . . . *RA3XO*. N6TR software is GREAT indeed! . . . *S50D*.

Age 13 years . . . *SM7UYS*. My first contest outside of Europe. What a difference how the score jumps up when working "only" EU! . . . *TA2ZW*. Nice to give each other #1 serial number with 9X1A . . . *TM6GG*. It was +32 C outside the shack and maybe +50 C inside. But it was even hotter on the bands. Anyway it was great . . . *UA3D*. Thanks to 5T6E.

BERGHEM CONTEST CLUB	1,085,201	NORTH JERSEY DX ASSOCIATION	177,530
U.F.T.	1,081,785	G.A.R.C.A.	176,813
RADIO CLUB ARGENTINO	1,050,877	NORTHERN ARIZONA DX ASSOCIATION	165,444
CRAZY DX GROUP	1,005,178	RED RYDER CONTEST CLUB	163,760
WARSAW DX CLUB	991,782	ANNE ARUNDEL RADIO CLUB	161,472
TEMUCO RADIO CLUB	960,540	SHENANDOAH VALLEY CONTESTERS	156,136
IZMAIL RADIO CLUB	957,549	BRUSSELS DX TEAM	150,784
RADIO CLUB CATULUNYA	909,932	OK QRP CLUB	150,766
GADX	881,892	CAMERON LABS DX CLUB	149,240
TAMPEREEN RADIOAMATOORIT	872,274	SOUTH JERSEY RADIO ASSOCIATION	140,975
NORTH SHORE AMATEUR RADIO CLUB	862,218	MCKEAN COUNTY ARC	132,572
PERUGIA DX CLUB	846,906	TOKYO INTERNATIONAL AMATEUR RADIO ASSOCIATION	123,405
RADIO CLUB CORDOBA	811,590	ACTIVITY GROUP OF BELARUS	115,118
LEFT COAST CONTEST CLUB	809,952	GCRC	112,068
KIWI CONTEST CLUB	795,218	MONTE CAPRA DX GANG	103,525
NORTHEAST CONTESTERS	776,130	REDWOOD EMPIRE DX ASSOCIATION	103,037
ROCHESTER DX ASSOCIATION	745,441	KETTLE MORAINA RADIO AMATEURS	101,826
TRENTO DX CLUB	739,970	STURDY MEMORIA HOSPITAL ARC	101,010
WICHITA AMATEUR RADIO CLUB	732,096	TALLAHASSEE AMATEUR RADIO SOCIETY	89,975
GRUPO DE CW DO DF	728,462	CENTRAL FLORIDA DX CLUB	88,400
CW PHILIPPINES	727,560	DANISH DX GROUP	86,580
ARTIC AMATEUR RADIO CLUB	727,182	CALLAWAY AMATEUR RADIO LEAGUE	85,995
SP CONTEST CLUB	718,468	LIMARC	80,808
WILLAMETTE VALLEY DX CLUB	663,305	SHASTA DX AND CONTEST CLUB	77,840
VHF & SHF CONTEST TEAM	661,200	U.R.E.	77,376
HUDSON VALLEY CONTESTERS AND DXERS	656,826	NORTH FLORIDA DX ASSOCIATION	74,433
MACEDONIA CONTEST GROUP	638,906	SAGINAW VALLEY ARA	72,046
BERLIN DX GROUP	627,228	CONTEST CLUB OPOLE	71,400
FRENCH CW UNION	592,790	LINCOLN ARC	71,393
KENTUCKY CONTEST GROUP	591,096	QUITO RADIO CLUB	69,336
LONE STAR DX ASSOCIATION	545,668	CENTRAL MICHIGAN AMATEUR RADIO CLUB	66,340
FALMOUTH AMATEUR RADIO ASSOCIATION	543,084	MAGNOLIA DX ASSOCIATION	66,096
CAMAYECA DX CLUB	539,608	EADX	60,131
VECIO PIAVE TEAM	537,372	SDXRA	60,030
LONG ISLAND MOBILE A.R.C.	509,517	WEARC	58,086
GENESEE COUNTY RADIO CLUB	481,882	UCLA AMATEUR RADIO CLUB	51,740
NORTHERN MARIANAS AMATEUR RADIO CLUB	465,340	ORANGE PARK AMATEUR RADIO CLUB	47,676
EU DX FOUNDATION	450,156	EASTERN IOWA DX ASSOCIATION	42,024
BOILED OWLS OF NY	445,228	PRIME ARC	40,200
GRUPO ARGENTION DE RADIOTELEGRAFIA	400,950	SOUTHERN CALIFORNIA DX CLUB	34,360
WVDC	399,630	LA DX GROUP	32,240
URE SAN SEBASTIAN	383,738	CENTRAL VIRGINIA CONTEST CLUB	29,715
ST. LOUIS AMATEUR RADIO CLUB	379,090	STERLING PARK ARC	27,927
KHARKOV REGIONAL RADIO CLUB	376,671	WIRELESS INSTITUTE OF AUSTRALIA	27,413
TARTU RADIOCLUB	376,424	NORTH COUNTRY ARC	25,910
REDE EMISSORES PORTUGUESES	369,538	PALOMAR AMATEUR RADIO CLUB	25,667
SALENTO DX TEAM	366,111	METRO DX CLUB	25,038
SALT CITY DX ASSOCIATION	351,302	VICKSBURG AMATEUR RADIO CLUB	18,618
AMSTERDAM DX CLUB	346,634	INDIAN RIVER AMATEUR RADIO CLUB	18,156
VIRGIN ISLANDS AMATEUR RADIO CLUB	325,780	CLUBE DE CW DO CEARA	17,017
KENWOOD ARC	314,280	RADIO AMATEURS UNION OF NORTH GREECE	15,900
SDXG	307,440	GRAND STRAND AMATEUR RADIO CLUB	13,468
RADIO CLUB DARUVAR	305,728	BURLINGTON COUNTY RADIO CLUB	11,526
PIKES PEAK RADIO AMATEUR ASSOC.	299,132	CUYAHOGA FALLS ARC	10,787
YV DX'PERTS TEAM	277,732	NORTHERN ILLINOIS DX ASSOCIATION	10,327
NOVIMAGUM CLUB	264,880	BRIGHTLEAF ARC	9,486
SOUTHEASTERN MICHIGAN DX ASSOCIATION	261,261	GSARC	9,120
FUKUOKA DX ASSOCIATION	246,168	YAHOO'S CONTEST CLUB	9,030
WEST PARK RADIOPS	239,815	WILLIAMSBURG AREA RADIO CLUB	8,503
OSOS DX GROUP	233,590	OLD BARNEY A.R.C.	7,854
SCHENECTADY AMATEUR RADIO CLUB	231,000	SOUTH WEST IDAHO DX CLUB	6,300
CARBON AMATEUR RADIO CLUB	210,645	U.R.S.C. TENERIFE	2,464
NORTHROP GRUMMAN ARC	197,210	FRESNO AMATEUR RADIO CLUB	1,326
R.A.A.G.	194,796	DAYTON AMATEUR RADIO ASSOCIATION	1,219
RADIO CLUB OF EGER	194,580		
BUCHAREST RADIO CLUB	184,260		

HP3/KG6UH, CQ3X, and lots of others for multipliers and great activity... *UT5UGR*: No solar disturbance the entire weekend. WOW!... *VE6BMX*: Operated from Morse code cottages on Grand Manan Island (IOTA NA-14) in the Bay of Fundy... *VE9/WA2ASM*: I'd like to suggest that each station be allowed to vote for up to 15 "lid" stations and any station getting 30 or more votes getting disqualified... *VF1L*.

Heard many Europeans who were S9+, but most of them could not hear me? Better luck next year... *VK1FF*: Contest good as always, but conditions limited activity... *VK2VM*: Thanks to CQ for your effort... *VQ9LW*: Nobodys serves up better food or has a better mountainside view than VS6WO—an amazing guest-op experience every time!... *VS6WO*: Glad to be back for another contest but felt that conditions were not very good. I am quite pleased with the

SUPER-DUPER contest logging program... *VU2PTT*: Really enjoyed the contest despite the power outage... *W1WEF*: Really enjoyed running relatively low power and working everything I could hear... *W4YN*: Tnx for a fun weekend. Got out of yardwork. More precisely "postponed" yardwork!... *W6TKF*:

I had too many interruptions and also too many US stations hogging frequency and drowning weak DX stations... *WBUMR*: Took me awhile to adjust to new rig. Lost valuable time helping a damsel in distress. Any extra time for being a good samaritan?... *WA6KUI*: Spent most of the contest copying signals that didn't even move the S-meter... *WA7BNM*: Band conditions at start of contest WWV = SFI 67, A10, K4... *WA7LNW*: Interrupted Sat. night due to drunk driving through fence and hitting tree. Missed tower by 8 feet... *WB5B*: Didn't work a single JA!... *WB9HRO*:

Tried my new "horse shoe" dipole. Heard more stations but still not much luck with the Europeans... *WB9ZPK*: Condx like pulling hen's teeth. My kingdom for 2 more dB! (or sunspots)... *WF3T*:

Why do some contesters continue to call at 30-35 wpm with no replies? There was more than one who missed my pts because I can't copy at those speeds... *WJ3N*: The WX didn't cooperate and kept me off a lot. I was surprised how well I did... *WN2R*: The 1/2-wax 40 vertical took a lightning hit Saturday night... *WX9U*: There is a possibility that this could be my last contest from here (VO1). Thanks to everyone for making it an enjoyable experience... *XO5SF*: Not only did I operate single band single operator, I was even restricted to the single frequency 21016 kHz... *XV7SW*: Nice to be again in WPX CW... *YU50BO*: Vy poor cdx, propagation nil. cu nx yr... *YV1OB*:

This year we have good condx to Japan. The new antenna system work so well! . . . Z3BM.

Conditions mostly good to States, moderate to Europe. European stations seem even worse than usual calling without listening . . . ZF1A. Had hard time. More than 90% of what I transmitted was nothing but my callsign . . . ZS6CAX. Conditions lousy, callsign too long, TVI presumably—got eggs on my window, a present from my back door neighbor . . . ZS95WRT. Did better than expected on 21 MHz . . . ZW2Z.

Station Operators Multi-Op Single Transmitter

4UBITU: HA2RX, HA2VR, HA6NL, HA6NY, HA6ZV. **9A1HBC:** Davor & Marijo. **9A6P:** 9A3ZD & 9A3EH. **9A7A:** 9A8A, 9A7V, 9A2ME, 9A4RX, 9A4PA, 9A3OS, 9A4IC. **AA6MC:** AA6MC & AA6KX. **AG6D:** AG6D, N4TQD, K2MM, WM2C. **CK7U:** VE7WRA, VE7WNA, VE7TTO, VE7HML, VE7IPW, VE7MDT. **CQ3X:** CT3EE, DL5MAE, DL6RAI. **DA8SAX:** DF5EN & DL1SBF. **DA9WCY:** Club Group. **DF8KW:** DL3DXX, DL5LYM, DL7UBA, DL7UTA, DJ7AA. **DL2HTO:** DL2HTD, DL6UST, DL8HWA. **EA3AIR:** EA3AIR, EA3ALV, EA3CWX, EA3GFA, EA3KU. **EA3FP:** EA3AEK, EA3AJM, EA3CKX, EA3EHE, EA3ADV, EC3AHO. **ED3HP:** EA3IW, EA3AJW, EA3CAC. **ED3PX:** Ops. **ED4ML:** EA4KA, EA4AFA, EA4AMC, EA4EMC, EA4CJA, EA4ET, EA4EKR, EA4EFJ, EA4AKU, EB4EPJ. **EG1RD:** EA1AU, EA1DD, EA1FBU, EA1GT, EA5YU/EA1, EA1NK. **EM7Q:** UR5QN & US5QNA. **F6KAR:** DL5YYM & DL2LSO.

G3XNZ: G3YBT & G3XNZ. **G85WW:** G3LZQ & G4BYG. **G86WW:** G4BUO & G8CKP. **GX0FUN:** G4WVX, G4WJS, G4DQW. **HA4KYV:** J. Boor, Z. Fulop, G. Fulop, J. Kemeny, S. Skutovics, J. Hizoh. **HB9DAI:** HB9DAI, HB9CFE, HB9CZK. **HG5M:** HA5EH, HA5B8C, HA1ZU, HA5WA, HA5MY, HA5BD. **HG6V:** HA6VH, HA6IAB, HA6WX, HA6GK. **HG6Y:** HA6DX, HA6OA, HA6OB, HA6OI, HA6OY, HA5BSW. **HG75BK:** HA1XU, HA1ZZ, HA1ZN, HA1DRR, HA3KW, HA1XO. **HS5OA:** YU7AU, YU7EF, HL1CAN, HS2JFW. **HV4NAC:** ZL1UY, ZL1VX, ZL1FVC, ZL1JBL. **IH9/OK1MM/P:** OK1CW, OK1DF, OK1FIA, OK1HH, OK1JTS, OK1MM, OK2GG. **I2K:** I2KHM, I2KUCK, I2KDEI, I2GKS Jr., I2KBUF. **I02L:** I2OKW, I2FGT, I2KJUB, I2KNC, I2KNU, I2KMLV, I2KPIG. **IR3X:** I3JTE, I3KHUK, I3QAR. **JA1YKX:** JQ1VNM, JH4OWG, JH9JFH. **JA2YKA:** AH0K, JK1GRI, JS2ERL, JI4RDO, JL7JRO.

JA7YAA: JET1AMC, JF1CKX, JF1SXL, JJ1CVH, 7M1JAS, JR0SPG, T. Odashima. **JE6ZIH:** JR6GKT, JI6BRB, JG4KEZ. **JH5ZJS:** JA5BJC, JA5FDJ, JA5JCC, JH5FXP, JR5PDX, JR5VHU. **JU1T:** JT1CD & JT1BL. **KB18OU:** KA1DWX & WA1TTE. **KJ1N/O:** KJ1N, N2IC, K0KR, AA0NC. **LA5M:** LA6MJA, LA6VJA, LA7AJA, LA9VDA. **LV1V:** LU1VV, LU1VK, LU2VD, LU4VZ, LU5VC, LU9VY. **LY3MR:** LY2BIL, LY2BK, LY3NFW, LY1FF. **LZ9A:** LZ1's JK, JY, UK, LZ2's CC, DF, HE, JE, PO, PS, UU; LZ3's BB, SM, LZ5JW, LZ2-F-319; Stefan. **N4WW:** N4WW, K0LUZ, NX4N. **N5OK:** N5OK, N5CG, NJ1V. **NB1B:** NB1B,

W1KM, W1FJ, K1JKS. **NJ4F:** NJ4F, K7SV, N4GUS, K5IMC. **NS0Z:** K4VX, W3XN, W9WI. **NT7Y:** W2MHS & K6XO. **OH8X:** OH2BCL, OH2BVF, OH2NRV. **OH1AD:** OH1MLZ & OH1WZ. **OH6WZ:** OH6MFN, OH6NIO, OH6WZ. **OH7AAC:** OH4LTK, OH6LNI, OH7KIR, OH7NHL, OH7WV.

OH8LO: OH8LQ, OH8MCT, OH8MDX. **OH8MDG:** OH8MDG & OH8MIZ. **OJ8/OH8AA:** OH8RJ, OH8EI, OH8LK, OH8PF. **OK2KOD:** OK2BDI, OK2BNX, OK2PID. **OL8OJ:** OK1AY, OK1CM, OK1DX, OK1FCJ, OK1MD, OK1RR. **OL5T:** OK1TE, OK1NR, OK1AMM, OK1MKI, OK1MIJ, OK1DNR. **OM3A:** OM7RU, OM8AM, OM8AW, OM8WR. **OM3RKA:** OM3TDP, OM5XX, OM5MZ, OM5TX, OM3TTZ, OM5NA. **OM7M:** OK2BFN, OM3TPG, OM3PA, OM3TPV, OM5RW, OM5ZW. **ON6AH:** ON4GO, ON4LZ, ON5PV, ON6AH, ON6QR, ON6VL. **PI4CC:** PA3BSQ, PA3EPD, PA3FVW, PB0AIU. **PI4ZLD:** PA3BTH, PA3EOB, PA3GCU. **PS2A:** PT2BW, ND3A, N4KW, PY2CJ, PT2NP, PT2GTI. **R3F:** RX3AQL, UA3-170-79, RX3APM, UA3-170-1169, RX3AEV. **RK10WZ:** UA1OZ, UA1OSS, UA1OIZ, RA1OHU. **RK2FWA:** UA2FC, UA2FB, UA2FF, UA2FX, UA2FZ, RA2FA. **RK9AWN:** RA9AA, RA9AX, RA9ALC, UA9AR.

RN4W: RU4WJ, UA4WGU, UA4WJF. **RU3A:** RA3AUM, RA3AUU, RN6MM/3, RV6HY/3, RX3DCX, UA5XGL/3, Mr. Urzhumtsev. **RU9D:** RW9DX, RW9CW, RZ9CC, UA9CBM, RX9DR, RX9DD, RW9CQ, UA9CSS. **RZ1AWO:** UA1AAF, UA1AQF, UA1-169-2391, UA1-169-1333, UA1-169-1400, UA1-169-1312, UA1-169-1227. **RZ4AYT:** UA4AY, UA4ALI, UA4-151-1051, UA9CQD, UA4AJ. **RZ9QWM:** UA9QCP, UA9CQ, RW9QW. **S50W:** S51M, S57KZ, S52SK, S51MA, S51NM, S52OP, S53DS, S51EP. **SJ9WL:** LA0GE & LA9WDA. **SK6AW:** SM6CDG, SM6CVE, SM6ERS, SM6GBM, SM6HCX, SM6ICD, SM6LJ, SM6MGZ, SM6MJ, SM6VAQ, SM6UJ. **SL0CB:** SM0TXX & SM0GNU. **SP3PFR:** CLUB GROUP. **SP9KRT:** Club Group. **TO9IS:** FY5YE, FY5CG, FY5GR, FY5FY.

UT7W: UR5WCW, UT7WZ, UT7WA. **UU5J:** UU2JQ, UU2JX, UU2JZ, UU3JD, UU5JR, UU0JX. **VK1DX:** Club Group. **WA7FAB:** WA7FAB & KJ7BU. **WD9FEN:** W9ILY & KA9ZZT. **WP3/WX9E:** WX9E, N0BSH, NP4Z. **YO2KJJ:** Club Group. **YT1R:** Club Group. **YU1AXY:** Darko, Ivan, Lasha. **YU7AL:** Ivan & Goran.

Station Operators Multi-Op Multi-Transmitter

KG1D: K1TD, KIKI, K1CC, W1OD, AA2Z, N1MM. **LY7A:** LY1DF, LY2AD, LY2BMX, LY2FN, LY2NK, LY3BN, LY3BLF, LY3DA, LYR 346, LYR 1751. **WZ1R:** WZ1R, KY1H, KB1W, W1MJ, NU1P, WM1K, K2ONP. **WD8LLD:** WD8AUB & WD8LLD. **NQ4I:** NQ4I, K2UFT, KB0G, KY2P, KC7V. **JA1YDU:** JH0NZN, JL2UW, 7N3JKR, JQ1BRW, JF7TFK, JG3AXP, JL7MYL, JP1CWU, JJ3PKB, JK2FGD, JR0UUI, 7L1XCM, JA9VDA, JR0XHL, JO1RUR, Hiyoishi. **OT5A:** PA3EZL, PA3GIP, DK3GD, ON4AML, ON4AWU, ON4AWV, ON4AID, ON4DB, ON4KLG, ON5UM, ON5SH, ON5OT, ON6KZ, ON9CGR, ON9ABL. **OZ5WQ:** OZ1BIZ, OZ3PE, OZ3ZW, OZ5WQ, OZ8AE. **YT50TY:** Bosco & Dusan. **9A1A:** K4XU, F2CW, 9A5W, 9A9A, IA2DQ, IA2EU, 9A2HO, 9A2LJ, 9A2NJ, 9A3GW, 9A3NR. **KL7Y:** KL7Y, NL7GP, N7DF, K0MVL, KL7AF, NL7VJ, KL7U.



Here are two of the ops at AG6D. In the front is John, K2MM, and in the back is Steve, N4TQO.

KU2Q: KU2Q & K5NA. **HG73DX:** HA1's T J, DAE, DAC, AH, HA2RX, HA5's GF, IW, OM, ML, TI, UA, AWH, CCC, HA6's NF, OQ, NY, ND PX, ON. **WW2Y:** WW2Y, N2NU, K2WI, N24K, KE2PF, K2ZS, KA2AEV. **OZ5W:** OZ1FTE, OZ1FTU, OZ1KRF. **JA1YXP:** JF1QOW, JM1GOT, JM1UW8, 7K1EWD, 7K1QOE, 7L1DGK, 7L1ETO, 7M1WGZ, 7N1WIY, JL7CMG. **PI4COM:** PA3ERC, PA3BBP, PA3GBQ, PA3EWP, PA3CAL, PA3GHS, K5RX. **OH1AY:** OH1JM & OH1WR. **WC4E:** W1CW, W1YL, K1ZX, WC4E, G4BK, WB4BBH, K7UPJ, V73C.

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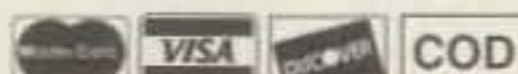
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The JPS Communications ANC-4 Noise Canceler

BY DOUG DeMAW*, W1FB

Local QRN—such as power-line noise, TV sync buzz, computer hash, and electrical motor pulses—haunt most radio amateurs at some time in their lives. Those who live in urban areas are particularly affected by constant or periodic manmade QRN. At times it can be impossible to copy CW or SSB signals that are weaker than, say, S9. Fortunately, JPS Communications provides a solution to this problem with its ANC-4 noise canceler. This small black box requires only +12 volts at 300 mA for operation.

How It Works

Noise is sampled by means of a sense antenna and the main station antenna. The noise from the sense antenna is reversed 180 degrees from the noise coming from the main antenna. These out-of-phase noise energies are combined and become canceled by virtue of their phase relationships. This is done with an active phase-shift network within the ANC-4. The out-of-phase signals are fed to a hybrid combiner, from which the "sanitized" desired signal is routed to the input of the receiver. A noise amplifier follows the phase-shift network. This stage has a gain control that permits the user to establish equal magnitudes of noise at the input of the hybrid combiner (necessary for cancellation).

Performance Notes

The ANC-4 can be used with a transceiver by inserting it between the station antenna, or tuner, and the transceiver. An internal RF-sensed T-R feature allows switching the main antenna around the circuit during TRANSMIT, thereby protecting the ANC-4 internal components. This is accomplished with a small DIP relay. The ANC-4 can accommodate up to 200 watts of RF pass-through power (PEP). Those who use linear amplifiers should install the ANC-4 between the transceiver and the input to the linear amplifier.

The manufacturer claims a noise reduction capability of 40 dB or greater. A 50 dB reduction of power-line noise was accomplished at W1FB with careful adjustment. Loss of desired signal energy should not exceed 6 dB (one S unit). This represents an acceptable performance tradeoff when man-made noise is virtually eliminated.

My observations indicate that the length of the sense antenna has a marked effect on performance at various frequencies within the MF/HF spectrum. Generally speaking, the lower the operating frequency, the longer the sense antenna must be for proper performance. The



JPS Communications' ANC-4 Noise Canceler.

ANC-4 comes with a short screw-in telescoping sense antenna. It was okay at 20, 17, 15, and 10 meters, but was ineffective below 14 MHz. A 3 foot length of hookup wire is also supplied for use as the sense antenna. It was too short for good performance at 75 and 160 meters. I found that clipping onto the center conductor of the coax cable that feeds my 2 meter antenna (about 60 feet long) provided an excellent sense antenna for the lower bands. The outer conductor of the coax line must be ungrounded for this application. Feed lines for other amateur antennas can be used in a like manner. I found also that a 30 foot length of wire outside the house worked nicely as a sense antenna. The manufacturer suggests using a 12 foot dipole type of sense antenna that is broadside to the noise source and 5 or 6 feet above ground. I did not try this scheme.

ANC-4 owners will be pleased to know that the noise canceler does not cause signals to sound distorted, nor is there any outward indication of degraded receiver dynamic range on strong signals. When noise is canceled ahead of a receiver (the proper place to do it), there are none of the displeasing effects that come with using a receiver internal noise blanker.

The ANC-4 and similar outboard devices operate from as low as 100 kHz to an upper frequency of roughly 80 MHz. The ANC-4 is rated for 500 kHz to 80 MHz. Despite this bandwidth it is necessary to readjust the controls when changing bands, or when making large

frequency changes within a given amateur band. This is especially true for the 75 and 160 meter bands.

Drop-out time for the internal T-R relay is 7 milliseconds. This means that the relay cycles between CW characters or words (depending upon the CW speed) and spoken words. There is no adjustable delay circuit. A resistor is supplied to shorten the relay attack and drop-out time for full QSK operation. An adjustable delay provision would be a worthwhile addition to allow typical VOX operation. The constant clicking of the control relay may be a distraction for some operators.

This unit may be used also as an active antenna with the short whip or 3 foot hank of wire. This might have appeal for those who travel and enjoy monitoring the amateur bands from motels.

The effectiveness of noise cancelers of this variety may be enhanced by orienting the sense antenna for vertical or horizontal polarity. This will depend largely upon the length of the sense antenna and the nature of the man-made noise. Some experimentation with the length and polarity of the sense antenna may be worthwhile.

If there should be two major sources of man-made noise, the ANC-4 will not null out both noises if they have different phases and amplitudes. I observed this condition after nulling an S9 power-line noise and suddenly hearing hash from our microwave oven. I could cancel

either noise, but not both. The ANC-4 may be used also for mobile operation.

Final Comments

The dimensions for the ANC-4 are 1³/₄"H x 6"W x 4³/₄"D. Despite this small size, the unit weighs 2 pounds, owing to its heavy chassis and cover. This is an advantage because it helps prevent the box from moving about during adjustment. The cabinet is black with white lettering. There are four adjustment controls on the front panel, plus an ON-OFF switch and an LED indicator. The main antenna jacks are SO-239 types. A phono jack is used for connecting the sense antenna.

Adjustment of the ANC-4 is similar to that of an antenna tuner when lowering the SWR. One must go back and forth between the controls to increase the null depth. This is best done with the receiver tuned to an unoccupied frequency near to the one of choice. Observation of the S-meter shows the progressive reduction in noise during adjustment. The buyer should be aware that the ANC-4 and similar noise elimination devices do not work on atmospheric noise (static crashes). However, I discovered that the atmospheric white noise common to the 160 meter band before daylight (sometimes S9 here) can be removed easily with the ANC-4. Likewise with precipitation static from rain or snow.

The manufacturer can supply a mating PN 1620-115121 +12 volt wall transformer for powering the ANC-4. It sells for \$16.

The manufacturer is JPS Communications, Inc., P.O. Box 97757, Raleigh, NC 27624-7757 (919-790-1011). ANC-4 price class is \$175. ■

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BY L. VANPROOYEN*, K8KWD

I tend to worry a lot. One of the things I used to worry about was how much work it would take to change the amplifier control device inside my fancy, expensive transceiver, should I manage to blow it up (assuming I could even get the parts). Mind you, this is a distinct possibility when using certain amplifier-transceiver combinations. The unmodified Heath SB220 series of amplifiers use a 125 (plus) volts-DC control circuit that your transceiver must switch, for example, which is considerably higher than many popular rigs like to deal with.

*8330 Myers Lake, Rockford, MI 49341

Most current transceivers include some kind of advisory in their instruction manuals stating, "Do not exceed xxx volts or yyy amps" in the external control circuit. To comply with such requirements and have flexibility of running any of my transceiver-amplifier combinations, I came up with a few isolation interface devices that may be useful to others. Use of such devices may or may not be necessary in all cases, but at least in my case it's one less thing I have to worry about.

Probably the best isolation device is an external relay. Use of an optical isolator is also a good choice, provided a suitable device can be found. A third, but nevertheless viable,

option is using a solid-state (transistor) switch.

This article will focus on using two of these isolation methods: the relay (specifically reed relays) and transistors (both NPN and PNP switch types). In covering these I hope to present enough useful information that you might recognize and be able to use similar techniques in a variety of ways other than these specific applications.

Relays

Using external relays has always been a standard option when connecting transceivers to amplifiers. However, I really didn't want any

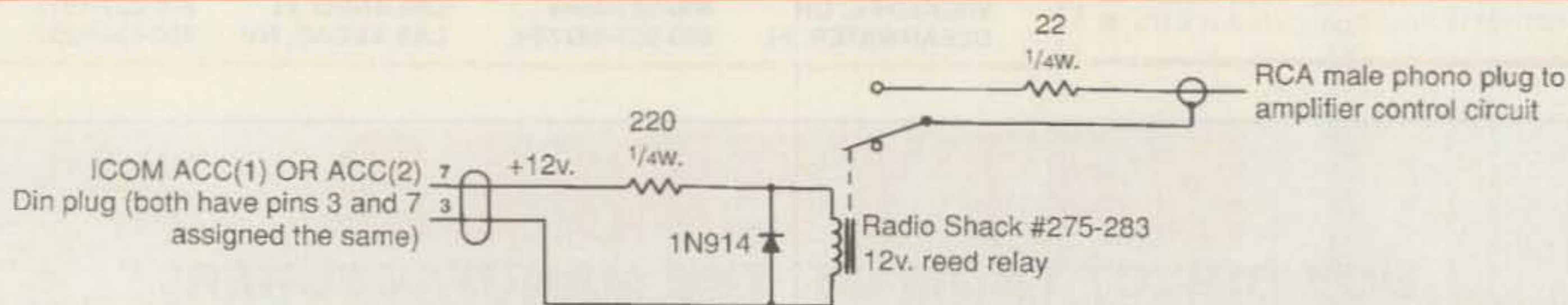


Fig. 1—ICOM 737A amplifier interface circuit using a reed relay. This circuit will work with many current ICOM transceivers.

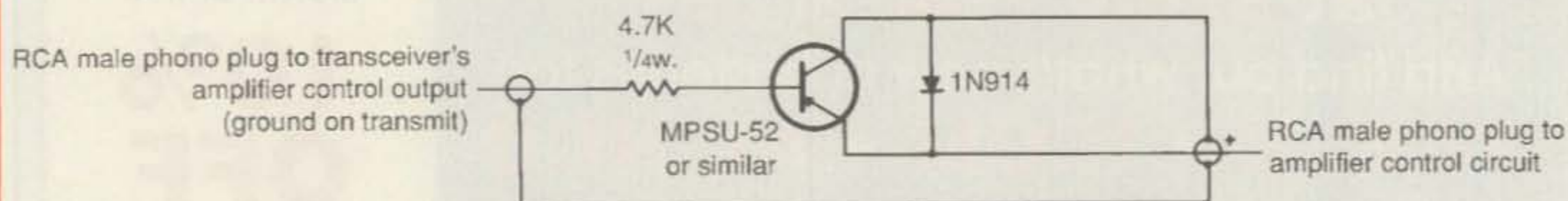


Fig. 2—Kenwood TS-50S (and similar radios) amplifier interface circuit using a PNP switch transistor.

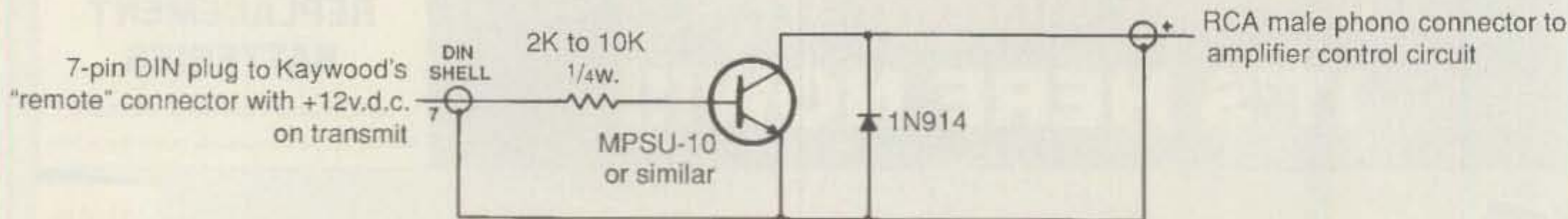


Fig. 3—Kenwood TS-440 (and similar radios) amplifier interface circuit using an NPN switch transistor.



Photo 1— Reed relay mounted on "perf-board" provides building block for various interface applications.

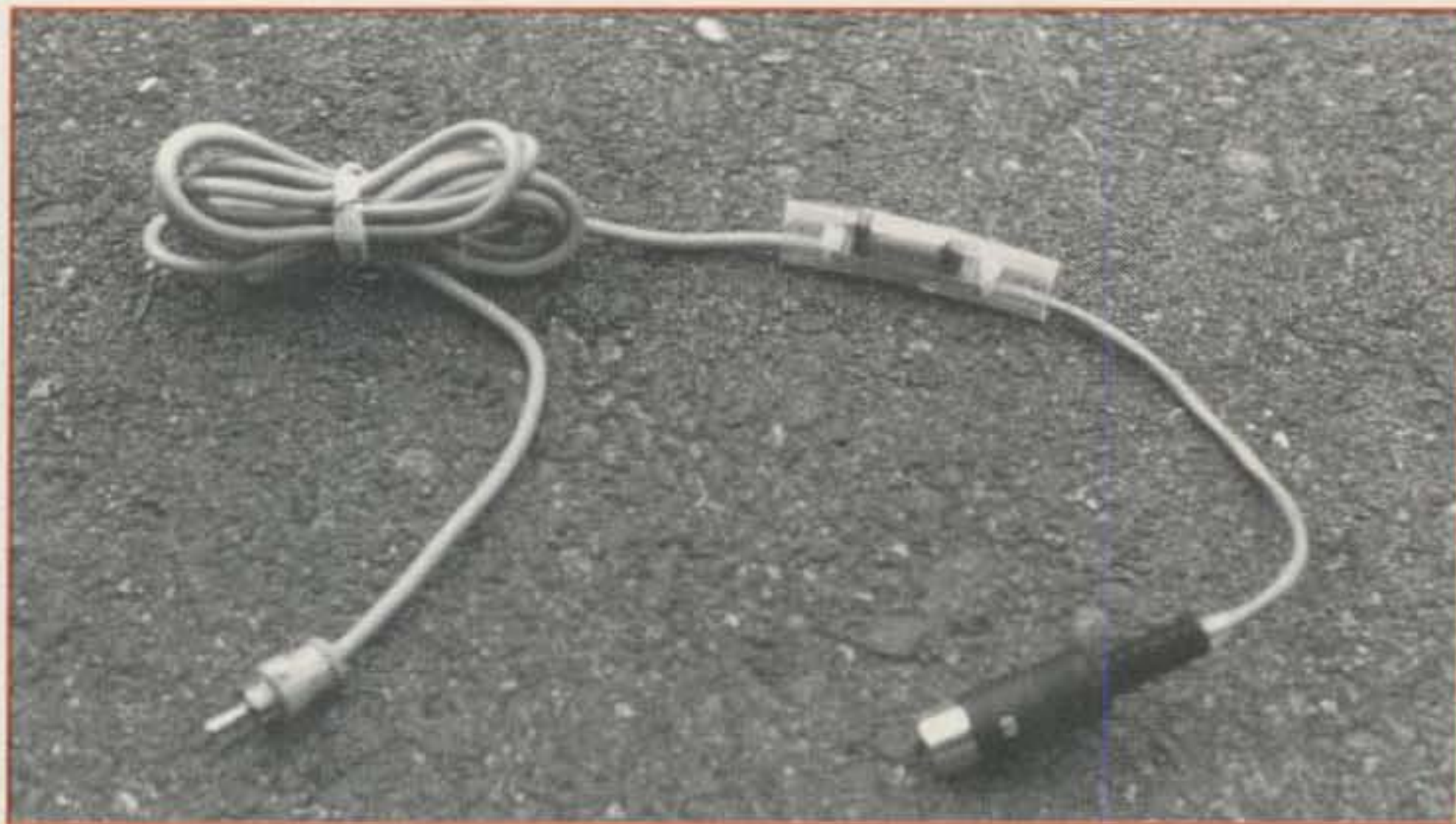


Photo 2— An "in-line" amplifier interface cable for many ICOM transceivers using a reed relay for isolation.

big, junky-looking gadget hanging off the back of my radio. Therefore, I looked into finding a suitable device that I could integrate into some kind of "in-line" cable assembly. The advantage here, at least in my mind, was that I could simply "plug it in" at each end when I wanted to use the equipment combination, then unplug it and roll it up when I was done. I also didn't want to have to remember stuff like having to connect the "red wire," say, to +12 VDC, etc. I wanted something basically "idiot proof."

Radio Shack has carried a couple of reed relays over the years—a 5 VDC @ 20 ma unit (cat. #275-232) and a 12 VDC @ 11 ma unit (cat. #275-233). Both versions have SPST contacts rated at 1A @ 125 VAC.

I've used both types in a variety of applications with few, if any, problems. The 5 volt relay does a good job at TTL levels, and I used one a while back to interface a VIC-20 to a teletype machine for RTTY operation. The 5 volt reed relay works fine at 12 volts also, if you use a 750 to 1000 ohm resistor in series with its coil. I've found the 12 volt version works quite reliably with voltages as low as 9 volts.

These relays are tubular shaped, about 1/4 inch in diameter by approximately 1 inch long, and they both have pin spacing ideal for "perf-board" mounting—in short, an ideal device for my "in-line" application. Photo 1 shows one of

these relays mounted on a piece of perf-board, ready to be connected to some application.

One specific transceiver-amplifier combination I wanted to interface was my ICOM IC-737A to either an Ameritron AL-80A or my Heath HL-2200 (the last of the SB220 series). ICOM includes a "SEND" jack on the 737A's rear panel, but includes the instruction "The specifications for the SEND relay are 16 VDC @ 2A. If this level is exceeded, a large external relay must be used." Hmm . . . Probably would work with my AL-80A, as it uses a 12 VDC control relay. But who knows what the in-rush current might be? Absolutely out of the question for the HL-2200 though.

If I wanted to use my 737A with either the Ameritron or Heath amplifier an external relay would be necessary. What I finally came up with is the cable shown in photo 2 and its circuit, shown in fig. 1. I decided to use the 12 volt reed relay due to its lower current requirement to take advantage of another scheme many ICOM radios use.

Many current ICOM transceivers have two DIN plugs on their rear panels—a 7-pin and an 8-pin. Both of these connectors provide a +12 volt source and a current sinking T/R input. And

the pins are redundant. The available current sink is limited to 10 ma, but by using a small series resistance, say 250 ohms, the 12 volt reed relay can be kept below this limit with no apparent operational difficulty.

I decided to use the 7-pin DIN plug because it will go into either rear connector on the ICOM and work the same. These connectors are called "ACC(1)" and "ACC(2)" on my 737A, by the way.

To complete the in-line relay cable design, I added a back-EMF spike suppression diode (1N914) as a precaution, and a small value resistor (22 ohms) in series with the contacts to limit the in-rush current across the relay's contacts. I also used a 220 ohm resistor in series with the relay coil to limit this circuit's current to 10 ma or less (see fig. 1).

In keeping with my "in-line cable" requirement, I built the entire assembly on a small piece of perf-board sized mainly to fit inside a piece of plastic tubing I got at a local hardware store. To give the entire cable assembly some mechanical integrity, I tied the input and output cable ends to the perf-board using small cable ties. What I ended up with is a neat, functional interconnect cable that works well. The

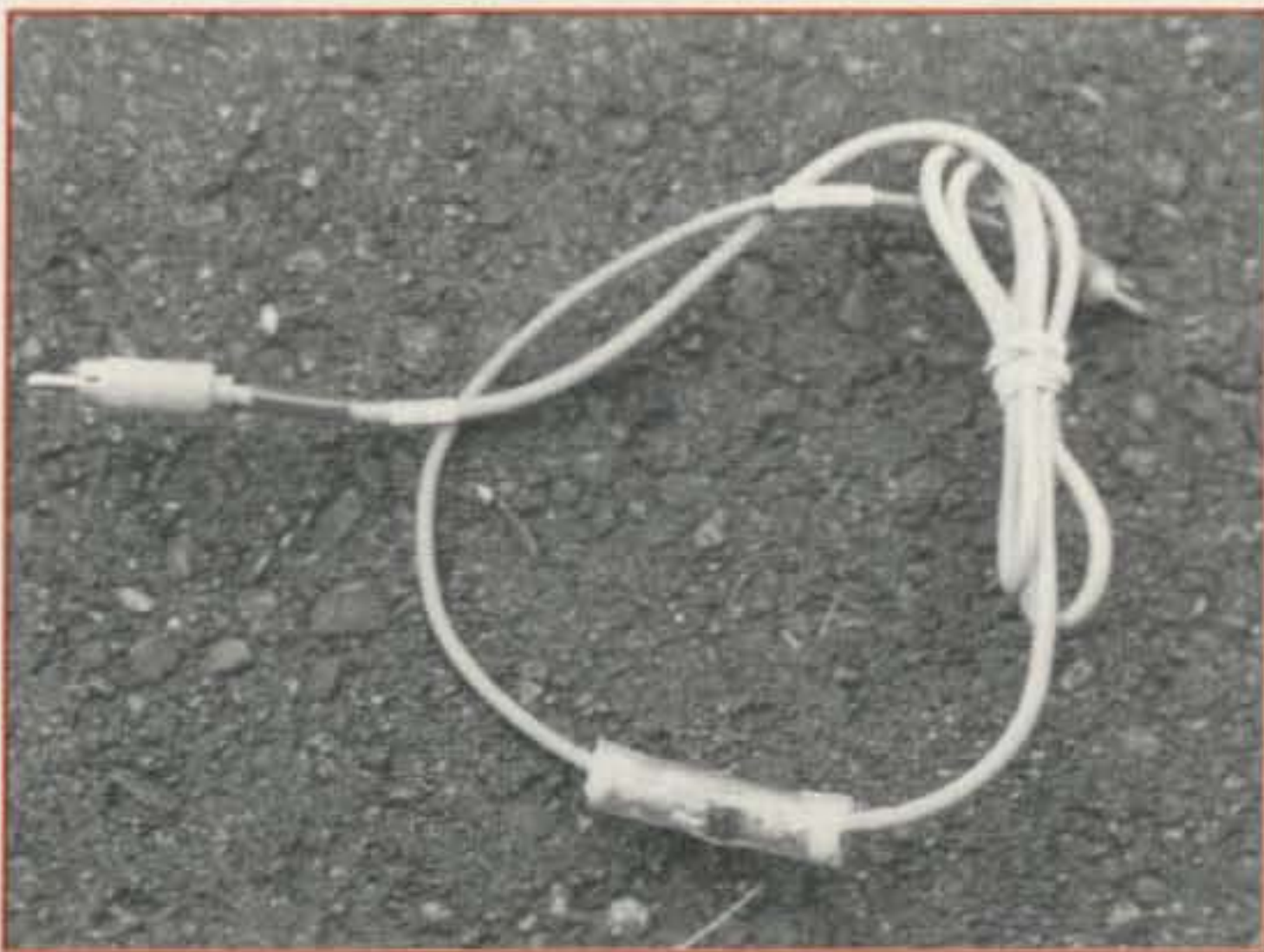
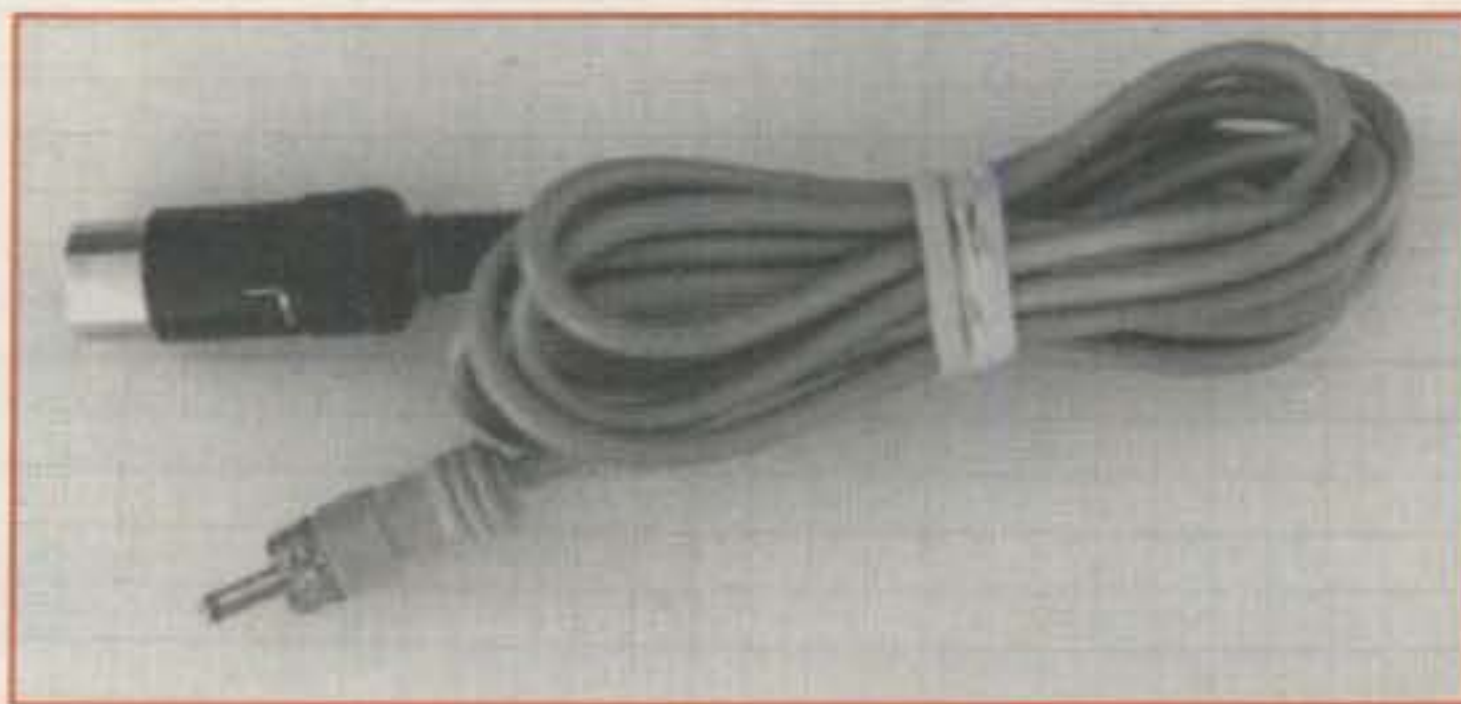


Photo 3— An "in-line" amplifier interface cable for the Kenwood TS-50S and similar radios using a PNP switch transistor for isolation.

Photo 4— Another Kenwood amplifier interface cable using a NPN transistor installed inside the DIN connector.



worst case I could expect in using something like this would probably be a welded or fried set of reed relay contacts, external to my transceiver, and the whole relay can be changed if need be for less than a couple of bucks.

PNP Transistor Switches

Some radios may present a different challenge than the ICOM. To use the circuit shown in fig. 1, you must locate a handy +12 VDC source. A somewhat different, but equally effective, approach can be the use of a switch transistor. PNP high-voltage types are generally best for use in these applications.

I used a Motorola type MPSU-52 to connect my Kenwood TS-50S to my various amplifiers, but a ECG 189 or similar type would also work okay. Photo 3 shows the cable I built for interfacing my TS-50S to my amplifiers using an "in-line" PNP switch transistor.

The reason for the change to a switching transistor in this interface application was in keeping with my single "in-line" cable requirement. Details of the circuit I used are shown in fig. 2.

Note that I used the same basic construction technique—i.e., perf-board packaged inside a 1/2 inch diameter piece of plastic tubing. For those with access to clear shrink tubing, that would work also. The use of plastic tubing does allow for easy access to the circuit should the need arise though.

An advantage in using a PNP transistor is that the entire interface uses a single line and ground to and from the interface board. The transceiver doesn't have to "source" anything except a ground-on-transmit contact to work. A disadvantage in using PNP types is they're harder to find in small packages with high (200+) voltage and current ratings.

Another trade-off when using transistor switches is that the isolation isn't as good as with a relay. To protect my transceiver's relay,

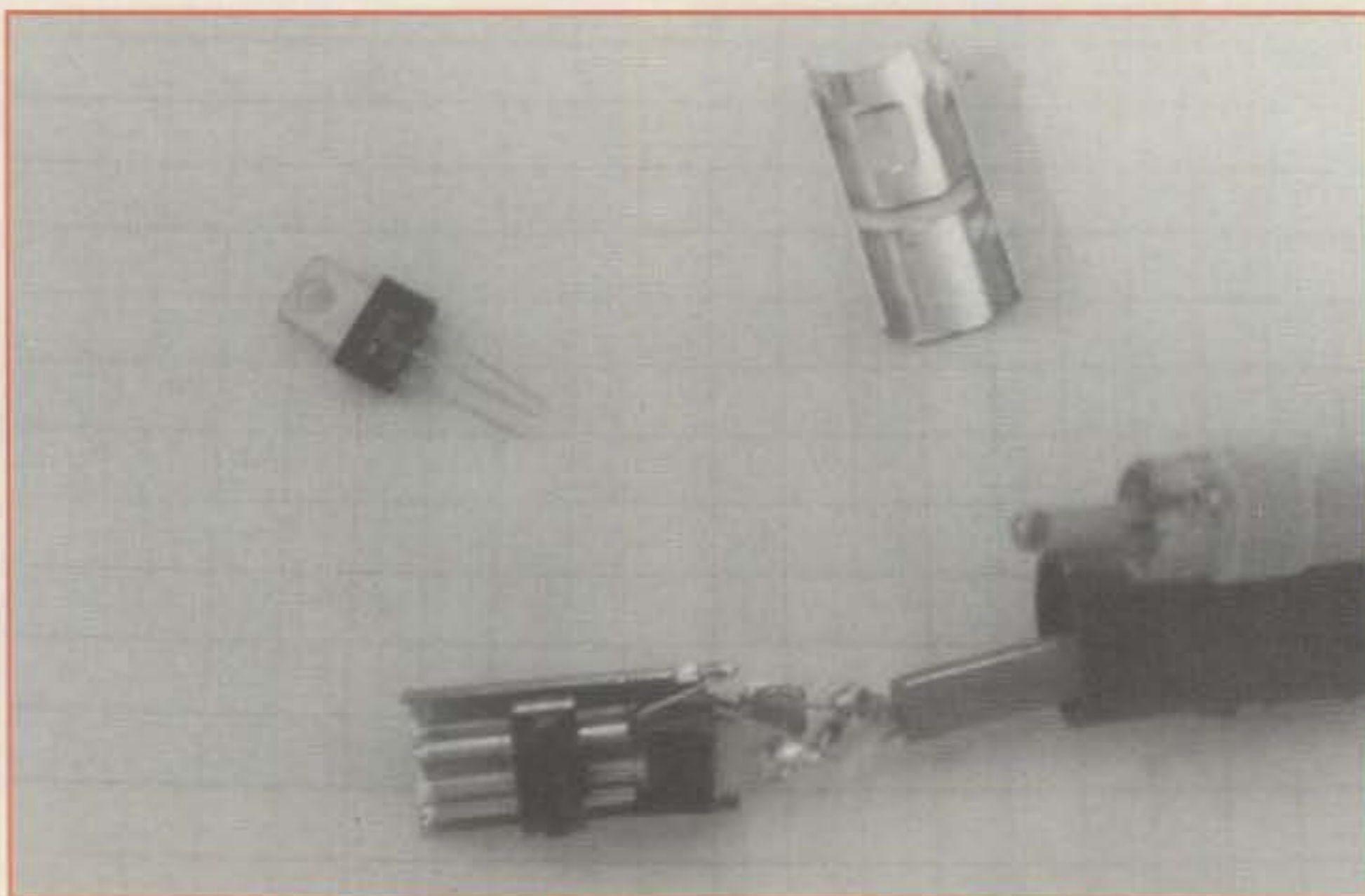


Photo 5— Installing a switch transistor inside a DIN connector's shell. This cable uses an NPN transistor for isolation and works with Kenwood TS-440's and similar radios.

I used a 4.7 K ohm base resistor. This gives a worst-case condition (assuming I'm switching a 125 volt load) of $125 \text{ V} / 4700 \text{ ohms} = \text{approximately } 27 \text{ ma}$. And that would be the case only if the transistor shorted.

The MPSU-52 transistor is rated at 80 volts emitter-collector (maximum), making its use with my Heath a little risky. Through the judicious use of suppression diodes, I've never had a problem. The worst case here most likely would be a "fried" external switch transistor.

NPN Transistor Switches

Another interface scheme I've used with sev-

eral Kenwood radios—e.g., the TS-440, 140, etc. (and would work with the 450 and 850 as well)—is an NPN switch. Photo 4 shows a cable I built for this group of Kenwood radios. I was able to install the entire switch circuit inside the DIN plug's shell. Details of this are shown in photo 5; the circuit I used is shown in fig. 3.

Using this circuit has an added advantage of being able to disable Kenwood's internal T/R relay (a jumper option), which many operators find annoying, as the relay is noisy.

This circuit is incredibly simple, using a transistor, a resistor, and a diode. I used a MPSU-10 type transistor with a 10 K ohm base current limiting resistor (which also provides radio isolation), but any value between 2K and 10K will work. Also, a Sylvania general-replacement type ECG-191 transistor or similar can also be used.

When building transistor switching circuits, be sure to include a back-EMF suppression diode if you expect to switch your amp more than once or twice. I typically use a 1N914, but its voltage rating is a little light for controlling 125 volt circuits. A 1N4002 or something similar could be substituted. Again, my 1N914s have held up fine.

Another thing to note is that I've omitted any base pull-up resistors (something like 40 K ohms or so from the base to the emitter), which is sometimes a standard practice in the design of such circuits. But again, I've never found this to be necessary.

Another note of caution; The unloaded base potential of a transistor tends to rise to near that of its emitter due to the internal base-emitter capacitance and diode action. If your rig is using some sort of open-collector switching scheme for its amplifier control circuit, you should check its maximum voltage rating and compare it to your amplifier's control voltage. If your amplifier's control voltage is much higher than your transceiver's voltage limit, you could "smoke it"—even with a 4.7 K ohm isolation resistor. It's not likely this could happen, but it is possible.



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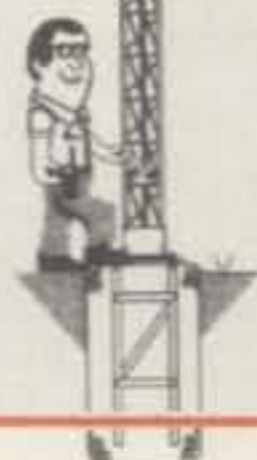
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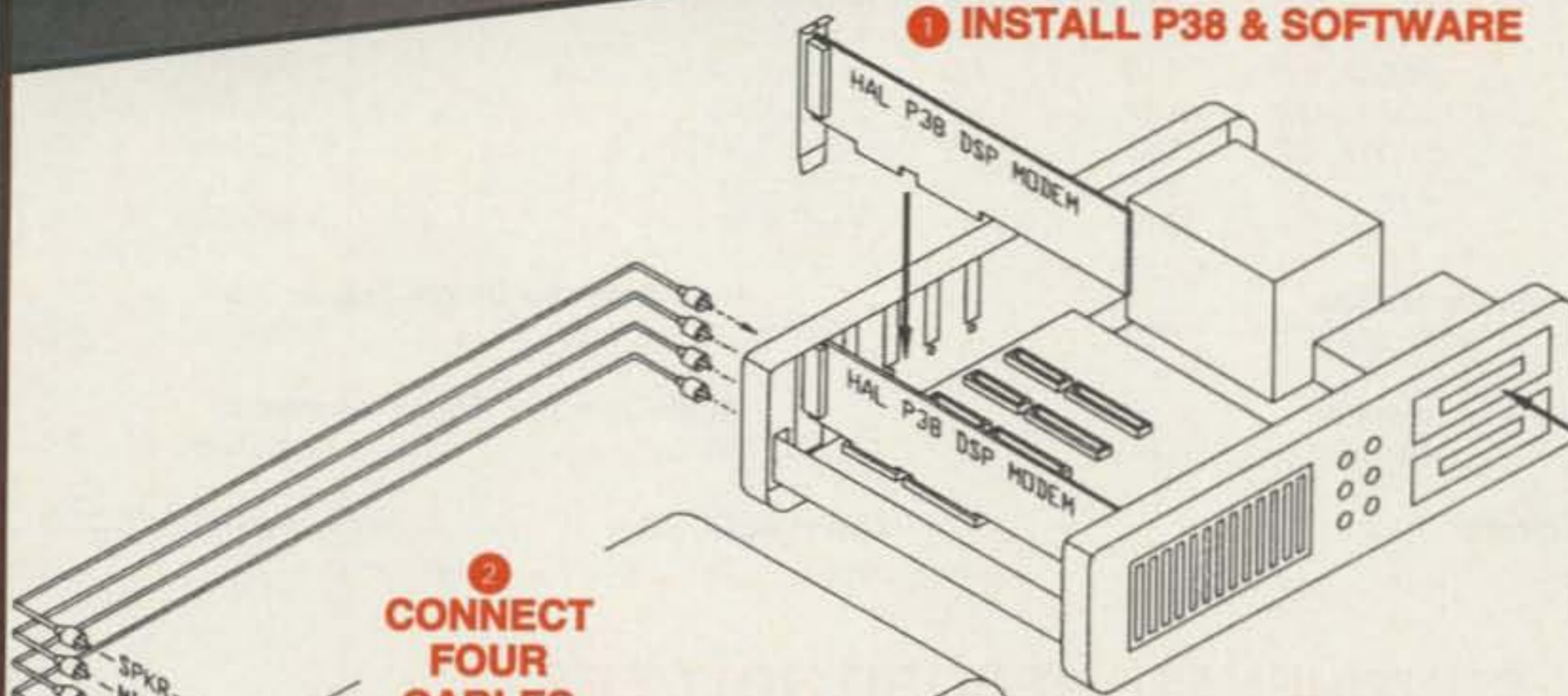
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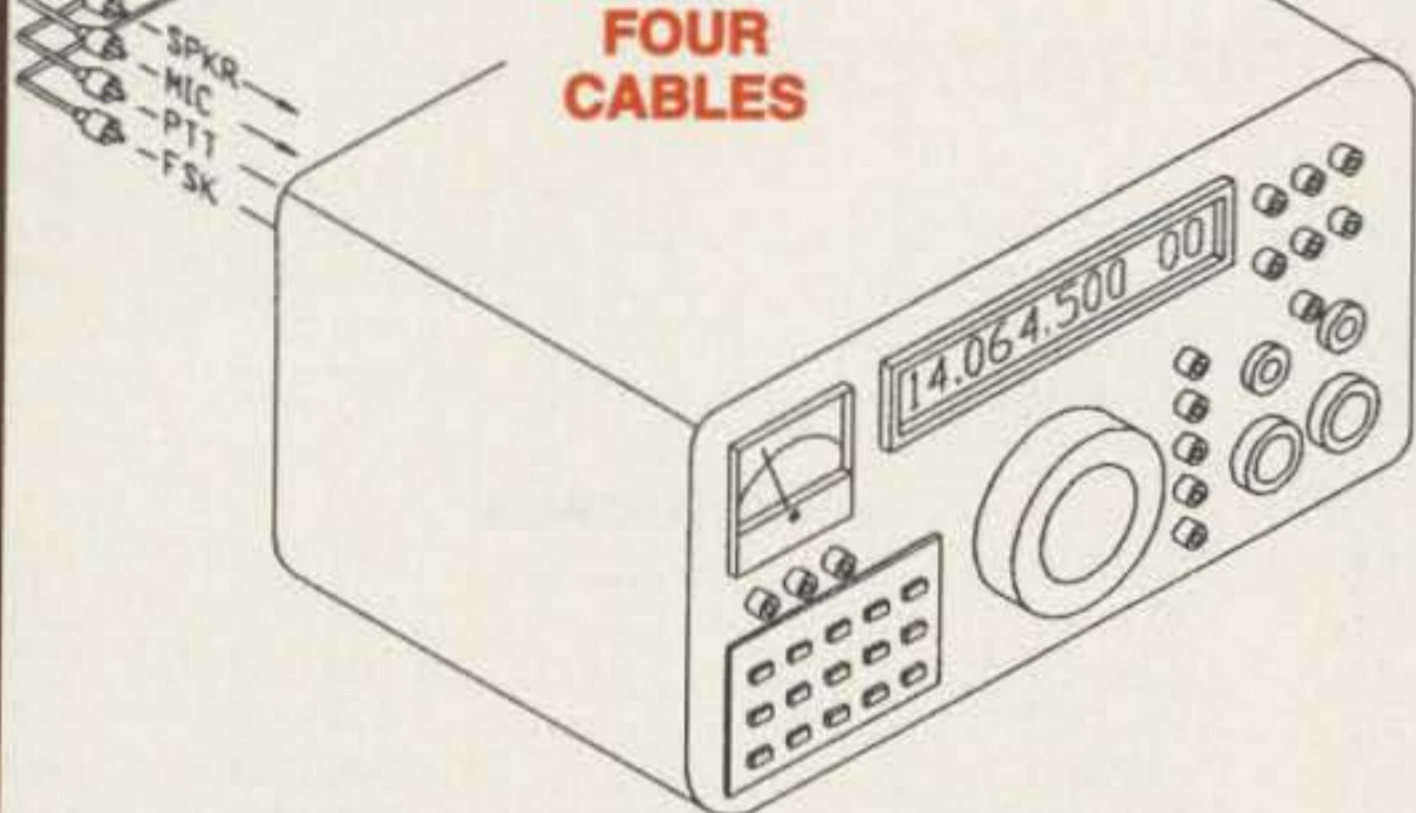
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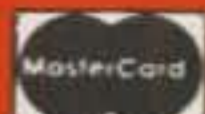
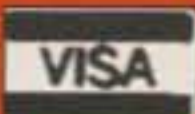
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The contest is held each year on the last full weekend of May. The All-Time Records will be updated and published annually. Data following the calls: year of operation, total score, and number of prefix multipliers.

WORLD RECORD HOLDERS

Single Operator

1.8	S5ØK('95)	219,880	239
3.5	YX3A('89)	1,004,060	305
7.0	VP2VCW('86)	4,641,120	586
14	YW1A('91)	4,617,456	732
21	ZD8LII('91)	5,118,527	743
28	ZS6BCR('91)	3,621,173	617
AB	P4ØW('94)	14,168,115	845

Multi-Operator Single Transmitter

CQ3X('95)	13,254,620	790
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Multi-Operator Multi-Transmitter

HG73DX('93)	16,543,420	1060
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CLUB RECORD

Northern California Contest Club ('92)	97,527,906
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U.S.A. RECORD HOLDERS

Single Operator

1.8	K1ZM('95)	40,446	107
3.5	K1ZM('93)	406,080	288
7.0	AC4HB('95)	2,092,800	545
14	K11G('95)	3,330,088	788
21	K6LL/7('88)	2,163,388	557
28	N5RZ('89)	162,134	259
AB	K5ZD('95)	5,746,790	742

Multi-Operator Single Transmitter

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

NSØZ('88)	10,870,380	922
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QRPp RECORD

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

HG73DX('91)	1120
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CONTINENTAL RECORD HOLDERS

AFRICA

1.8	ZS4FO('95)	4,464	24
3.5	EA8BR('95)	949,696	304
7.0	AM9TY('92)	2,007,990	404
14	ZD8LII('93)	2,687,580	567
21	ZD8LII('91)	5,118,527	743
28	ZS6BCR('91)	3,621,173	617
AB	EA8EA('93)	10,693,146	762

ASIA

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

EUROPE

1.8	S5ØK('95)	219,880	239
3.5	OK1DXS('94)	916,456	388
7.0	TK5NN('95)	3,333,040	610
14	CT2A('95)	4,231,598	826
21	4N4A('88)	2,585,460	615
28	9H1EL('88)	805,552	398
AB	CR7M('93)	5,645,267	751

NORTH AMERICA

1.8	VE3BMV('86)	43,428	77
3.5	XL7CC('94)	709,730	241
7.0	VP2VCW('86)	4,641,120	586
14	ZF1A('95)	3,871,500	725
21	FS5T('89)	4,552,470	702
28	HI8JKA('89)	891,242	374
AB	V27T('89)	9,408,672	819

OCEANIA

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

7.0	V7A('93)	2,205,922	373
14	N6VI/KH7('95)	3,103,932	606
21	N7DF/WH2('89)	3,243,450	525
28	KG6DX('81)	1,238,806	334
AB	DX1EA('95)	5,942,342	602

SOUTH AMERICA

1.8	YV1OB('86)	11,550	35
3.5	YX3A('89)	1,004,060	305
7.0	AZ4F('94)	4,496,980	590
14	YW1A('91)	4,617,456	732
21	LTØA('91)	4,290,988	686
28	CE3DNP('89)	2,857,038	582
AB	P4ØW('94)	14,168,115	845

MULTI-OP SINGLE TRANSMITTER

AF	CQ3X('95)	13,254,620	790
AS	YM5KA('90)	13,098,790	839
EU	R6L('93)	9,194,688	939
NA	KP2A('89)	12,843,135	835
OC	AG9A/AH2('91)	9,005,641	787
SA	ZXØF('94)	12,280,162	811

MULTI-OP MULTI-TRANSMITTER

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

QRPp

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

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Regulation	1%	1%	1%	1%	2%
Cooling Fan	NO	NO	NO	YES	NO
Size(inch.)	5x4x9	5x4x9	7x6x9	11x5.5x9	6x3x9
Weight (lbs.)	11	11	18	22	6
Meter	YES	NO	YES	YES	YES

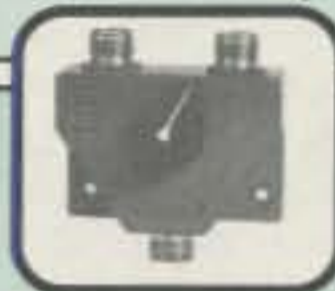
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The Standard C508A

2m/70cm Micro FM Handheld

BY DAVE INGRAM*, K4TWJ

Considering the wide variety of handheld FM transceivers available to modern radio amateurs, you might think another new unit could not be all that exciting. I might agree with you in some cases, but not when the unit is Standard's new C508A micro-micro FM dualbander.

This smallest-of-all talkies is the closest thing yet to a Star Trek communicator, and it is guaranteed to make you the envy of the 2 meter/70cm crowd—regardless of how many other rigs or handhelds you have! Introduced from a slightly different angle, the C508A is smaller and lighter than the slip-on battery pack supplied with many "compact" 2m/70cm talkies. It transmits a good signal and also tunes/scans an extensive range of non-amateur band frequencies with very good sensitivity and intermod immunity. How is this possible? Miniature "chip" components are used throughout, and two regular 1.5 volt "AA" batteries fit in the bottom of the C508A for power.

What are the trade-offs for such incredibly small packaging? Not performance, that's for sure. The C508A's receiver copies weak or fringe area signals like a champ. Since Standard transceivers are made by Marantz (a world-famous name in professional-grade sound equipment), you know the C508A's audio and overall quality are top-notch. Being so small, however, the C508A does not have a built-in DTMF keypad for autopatching. No problem: pocket-size autodialers that you just hold up to a telephone's handset (or the mic on an FM talkie) are available from various electronics stores. One company even sells an autodialing wristwatch.

What else? Since the C508A uses a pair of 1.5 volt "penlight" cells, it obviously has less power output than a "big talkie." How much less power? Power output is 280 milliwatts rather than 2 or 3 watts. Is the lower power a significant drawback? Several years ago when FM repeaters were lower in number and had limited receive range, I could have said yes. Today, however, there are repeaters in almost every neighborhood (and they have superb receive range) so I now say "no problem." In fact, many of today's FMers consistently use their handhelds on low power (500 milliwatt setting) or extra low power (30 to 100 milliwatt setting) for working through local repeaters, hamfest-communicating and/or crossband repeating through their mobile rigs. Standard's new C508A thrives on any of those applications, plus it beats many popular scanners in coverage of today's hot frequencies.

It's easy to become captivated by the



Standard's new C508A micro-micro 2m/70cm FM dualbander. The unit is loaded with features, includes extensive receiver coverage, and literally hides in the palm of your hand.

C508A, so let's step back and go over the unit's basic credentials.

The Straight Facts

The Standard C508A is enclosed in a dark-gray case measuring 3.3"H x 2.28"W x .98"D, and weighs only 5.6 ounces. It transceives from 144 to 148 and 438 to 450 MHz, and can be modified for MARS/CAP transmit. It also receives 100–180 MHz, 340 to 480 MHz (AM included for both aircraft bands), plus a fascinating range of frequencies between 800 and 900 MHz. It has a magnified frequency display with backlight, 60 "use for any band" memories, 2 call channels, CTCSS encoder and decoder, 4 battery-save rates, 3 auto shutoff times, and several scan modes. It also operates crossband—transmitting from the VFO on one band and receiving from a memory on the other band (not simultaneously). A wide variety of additional features/functions such as selecting squelch sensitivity, scan delays, skipping always-busy memories, etc., are available through the C508A's menu system

(you press "SET" and rotate the top tuning knob). A full list of SET mode functions is shown in fig. 1. This little talkie is loaded for fun!

Looking beyond "first glimpse" glamour, the C508A continues to sparkle. It is high on take-it-anywhere emergency preparedness, low on battery consumption, and scans almost everything on "high bands." It is as easy to carry in a shirt pocket as a set of keys, and its operation is not confined to a dedicated battery pack—nor are batteries supplied with the C508A. You just pop in a couple of alkaline "AA" cells, and it's ready to go. Battery life is quite good, as the C508A draws only 11 ma per hour (battery-save mode), 36 ma per hour when the receiver is squelched, and 280 ma per hour/5 ma per minute when transmitting. The usual current-delivering ability of "AA" cells is between 550 and 600 ma, so monitoring several hours (at 36 to 50 ma) and transmitting for a total of 10 minutes during that time (50 ma) would only deplete half of a fresh battery's charge.

More? Yup. If you like scanning "out of amateur band" activities such as police, fire, ambulance, and NOAA weather while staying in touch with the local group during emergencies, you'll love the C508A. It is similar to a mini communications center in your pocket.

Using The C508A

Just saying the C508A is the most impressive little handheld I have used in many years may not seem to have much merit, so let's start with a "qualifier" to that statement. I have been an avid FM handheld user ever since there was only one repeater and 19 FMers in our city. I started out with the first amateur-dedicated unit on the U.S. market—Standard's classic C146. I loved that radio! In fact, everyone nicknamed the C146 "the dedicated FMer's talkie" because it was so neat. As time passed, I moved on to a modified Motorola slimline, a 500 milliwatt Motorola like that used by the Secret Service, and continued through using almost every make and model talkie hitting the U.S. amateur radio market. I particularly like the new smaller dualband handhelds with extended receive capabilities. In my case, however, the hitch has been most handhelds proved a mite large and heavy for carrying on a continuous basis. As a result, the unit(s) spent more time in my briefcase or sitting on a seat in the house or car than they did in my pocket or turned on in my hand. The C508A changed that situation and resurrected my impromptu enjoyment of VHF/UHF FMing.

Last night, for example, the C508A went where my other handhelds have not gone before—to a business meeting in my lightweight sportscoat pocket. It was carried with-

*4941 Scenic View Drive, Birmingham, AL 35210

List of the Set Mode Functions

C508 serie SET MODE		Recall / Set	Function
★: can be stored in MYkey.		Select [M] + [M]	
Initial indication			Function
		PL OF	★ Setting the PTT lock. (P47)
		FL OF	★ Setting the frequency lock. (P21)
		Ft CH OF	★ Setting the rotary for use in the frequency lock. (P21)
St 5	★	bE EP ON	★ Setting the beep on/off. (P47)
F- St 10	★	rF S9L OF	★ Setting the RF-squelch. (P48)
rPt OF	★	bnd on	★ Setting the band on/off. (P22)
tS9 OF	★	m CLR	Erasing the memory. (P28)
CF 1000		CH OF	★ Displaying the memory address. (P30)
OF 000		m OF	★ Setting the memory scan memory. (P37)
SP 43300		bMS OF	★ Setting the block memory scan. (P38)
dUP OF	★	Scn P	★ Changing the scan type (P33)
SR OF	★	Rt Rm ON	★ Setting the auto AM reception mode (P48)
RPQ OF	★	Rm OF	★ Setting the AM reception mode (P49)

Fig. 1- List of SET mode features and functions for the Standard C508A micro-micro 2m/70cm FM dualbander. (See discussion in text.)

out telltale tugs or bulges all evening. The satisfaction and confidence of knowing it was immediately available when/if needed was terrific. Today, I often carry the C508A instead of a 2 meter mobile rig or "big handheld" when zipping between home and work or running chores. I use the C508A with its mating tiny ducky antenna (it uses a small screw-on connector rather than a BNC), and it works fine.

The secret is everything—including my home, office, shopping center, and the repeater—is within a five or six mile radius. Is your lifestyle similar? If not, might the C508A be a good mate for your crossband repeat-capable mobile dualbander? Use your ingenuity. The possibilities are unlimited with a C508A.

Two other handy attractions of the C508A are its built-in CTCSS decoder/pager and auto

power-off features. When the CTCSS decoder is switched on, you can silently monitor a busy repeater. A station can call you through the repeater (assuming it will pass CTCSS tones), however, by transmitting a preselected tone to open the C508A's squelch. Nice! I did not think twice about the auto power-off feature, as I have used talkies for years, and it's a natural reflex to switch them off after use. How could I forget, right? Well, the very first evening I used the C508A, I sat it on my desk, got busy on another project, and found it "on" (with batteries about one-third discharged) the next morning. I took a minute right then to set the auto power-off for activation after 30 minutes of nonuse!

Conclusion

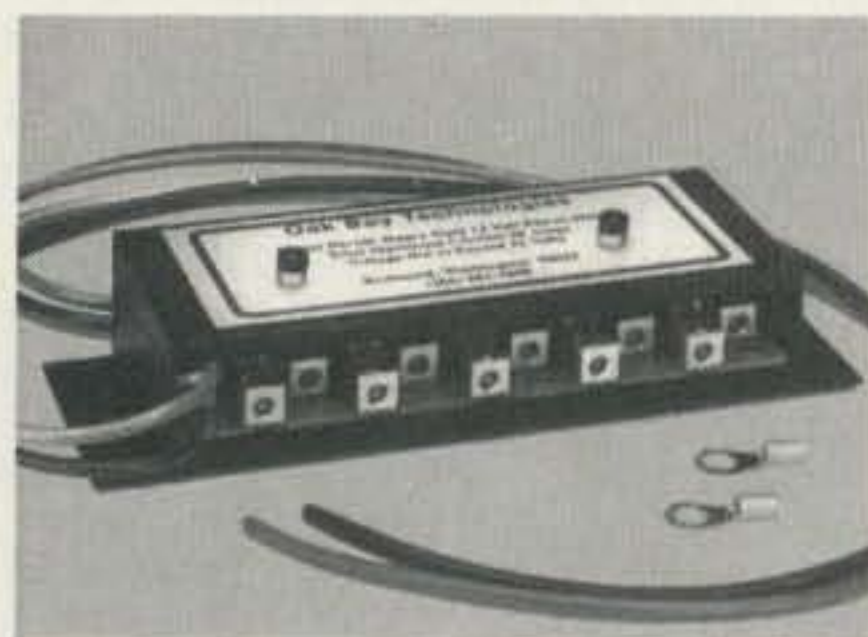
Overall, I think Standard's new C508A is a treat. It does not have high output power or work from fringe areas, but that's why you have a good dualband FM mobile rig. And that rig can also crossband repeat with the C508A. That beats carrying around a big handheld anytime.

Check out the C508A for yourself. You are in for a pleasant surprise. This world's smallest dualband handheld is priced at \$345.00. The C508A is complemented by a full line of accessory speaker mics, VOX units, ear mics, rechargeable battery packs, desk charger, and carry cases, and it is backed by a one-year warranty.

For more information on the C508A, contact Standard Radio Products, Inc., P.O. Box 48480, Niles, Illinois 60714 (telephone 312-763-0081, fax 312-763-3377).

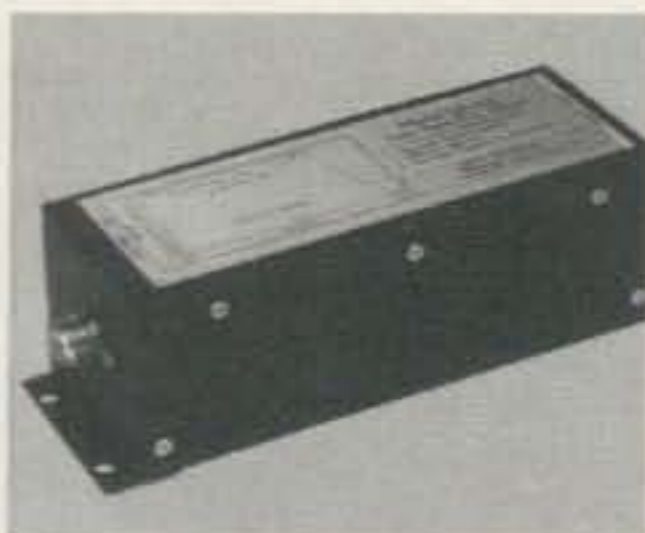
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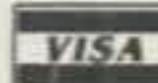
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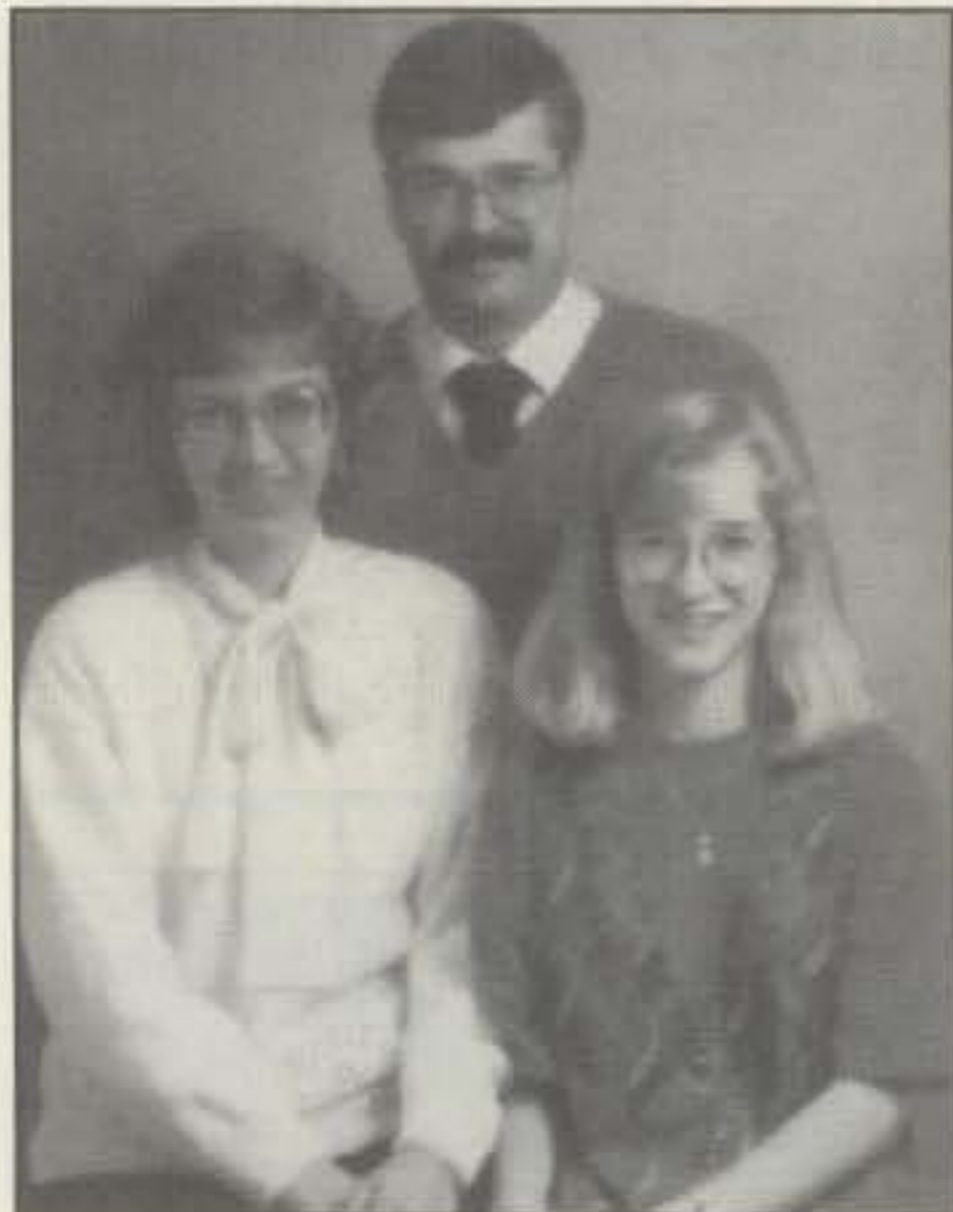
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AWARDS

NEWS OF CERTIFICATE AND AWARD COLLECTING

This month CQ salutes USA-CA award recipient Sterling Whitaker, WA7JHQ, USA-CA All Counties #895, 2-23-96.

Sterling grew up in southern Idaho and became interested in amateur radio as a Boy Scout. W7OSH was his counselor for the Radio merit badge, and he later also administered Sterling's Novice exam. When Sterling's ticket came in February 1968, he suddenly realized that he had no means of getting on the air, so he built a 3-band, 15 watt, crystal-controlled transmitter from salvaged TV parts and borrowed a Hallicrafters SX71 receiver.



Sterling Whitaker, WA7JHQ, USA-CA award holder #895, and his family.

Periodic trips to Boise and Salt Lake City to attend the FCC tests allowed Sterling to upgrade to Advanced before he became too involved in college. He interrupted his education to serve for two years as a Latter Day Saints (Mormon) missionary before graduating with a B.S. in electrical engineering from Brigham Young University in 1977. He then married Sylvia Sterling and went to work for American Microsystems Inc. in Pocatello, Idaho, where he designed custom integrated circuits ranging from digital micro controllers to switched capacitor filters. Unfortunately, becoming an EE ruined a good hobby, and amateur radio faded into the background. While at AMI, he finished his M.S. degree and all the course work for a Ph.D.

In 1985 the family moved to Moscow, Idaho so Sterling could write his dissertation. He stayed on as an assistant Professor at the University of Idaho and had the opportunity to design high-performance processor chips for NASA missions such as the Deep Space

Box 76, Pleasant Mount, PA 18453-0076

SPECIAL HONOR ROLL

Sterling Whitaker, WA7JHQ
USA-CA All Counties #895
February 23, 1996

Network, the Hubble Space Telescope, and the XTE explorer.

Shortly before moving to Albuquerque, New Mexico in 1992 to work as an associate professor at the University of New Mexico, the amateur radio bug bit again. Sterling purchased a new rig and upgraded to Extra class. He ran across the county hunters net on 14.336 MHz in October 1992, and KB3GN gave him his first county contact. A few weeks later N7BKW helped him put out Stevens, Kansas from his sister's driveway, and Sterling was hooked. Over the next three years, he collected counties and helped out on the net by putting out over 70 counties, as well as by spending over 100 hours as net control with 100 watts feeding a dipole. The summer of 1995 the Whitakers moved to San Diego to help a friend start up AKM DesignTek, where Sterling designs communications ICs. He slowly worked through the last 25 counties limited by CC&R restrictions to an attic loop antenna. On January 28, 1996, N4FTA drove to Spencer, Kentucky to give Sterling his last county.

Sterling thanks the many mobile operators, net controls, and net members who helped and encouraged him.

Awards Issued

USA-CA 500: Chris Black, N7MWL, #2899; Angelo Morineto, PY2VA, #2900; Jose F. Requena Ortega, EA5AT, #2901; Fco. Javier Garcia, EA9PB, #2902; Robert C. Brock, K9OSC, #2903; Dave Mueller, KE2PF, #2904; Pentti Ahola, OH5MBF, #2905; Manfred Eisel, HB9DAX, #2906.

Special Endorsement: Willard W. Waite, W8GDQ, USA-CA 1000 All SSB, 160 Meters.

Award News

The Whitman Amateur Radio Club Event. The Whitman ARC will operate K2BSA/1 at the Old Colony Council Boy Scout Camporee from 12:00 May 3 through 12:00 May 5 on 14.285 and 18.140 ±QRM. QSL with SASE to the Whitman ARC, P.O. Box 48, Whitman, MA 02382.

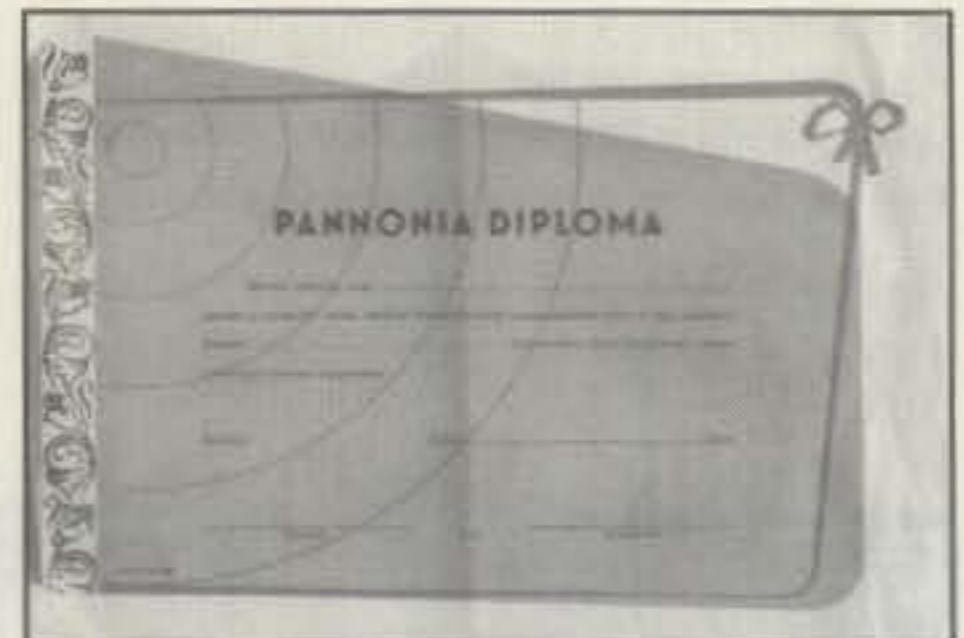
Pannonhalma Diploma. This award is issued by the MTTOSZ Radio Club of Gyor, for the 1000th anniversary of the establishment of the Pannonhalma Abbey.

The award is available to all licensed radio amateurs and SWLs who meet the following requirements: QSO with the HG1P special-event station, plus 5 QSOs with radio stations in Gyor-Moson-Sopron county. QSOs made between January 1, 1996 and December 31, 1996 are valid for the award, all amateur bands and modes, no band restrictions. It is not nec-

HONOR ROLL

500	
N7MWL .....2899	K9OSC .....2903
PY2VA .....2900	KE2PF .....2904
EA5AT .....2901	OH5MBF .....2905
EA9PB .....2902	HB9DAX .....2906

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



The Pannonia award certificate offered by the MTTOSZ Radio Club of Gyor, Hungary.

essary to send QSLs with the application, but the copy of the log has to be validated by two other licensed amateurs. The application may be sent not later than December 31, 1996. The fee is \$5.00 US or 10 IRCs.

Send your application to MTTOSZ Gyor Varosi Radioklub, H-9002 Gyor, Pf 79; Hungary.

Conquest Diploma. This award is issued by the MTTOSZ Radio Club of Gyor on behalf of Hungarian Radio Amateur Society for the 1100th anniversary of the establishment of Hungary.

The award is available to all licensed radio amateurs and SWLs who meet the following requirements: One QSO with the HG1H spe-



The Pannonhalma Diploma issued by the MTTOSZ Radio Club of Gyor for the 1000th anniversary of the Pannonhalma Abbey.



The Conquest Diploma issued by the MTOSZ Radio Club of Gyor on behalf of the Hungarian Radio Amateur Society for the 1100th anniversary of the establishment of Hungary.

cial-event station, plus 1 QSO with radio stations in each of the country's callsign regions (all together 11 QSOs). Any of the callsign regions can be substituted with one of the following "joker" stations: HG96HQ, HG1G, HG1P. QSOs made between January 1, 1996 and December 31, 1996 are valid for the award. There are no band restrictions. Valid modes are CW, SSB, and RTTY. QSOs through repeaters don't count.

The basic award can be applied for in any category of the above three modes. More categories can be requested if the requirements in those modes are met as well. It is not necessary to send QSLs with the application. The copy of the log must be validated by two other licensed radio amateurs.

The application must be sent not later than December 31, 1998. The fee is \$5.00 US or 10 IRCs. Extra categories are \$2.00 US or 4 IRCs. Send your application to: MTOSZ Gyor Varosi Radiaklub; IT-9002 Gyor, Pf 79; Hungary.

"Gyor—A 725-year-old City" Diploma. This award is issued by the MTOSZ Radio Club of Gyor for the 725th anniversary of the establishment of the city of Gyor. The award is available to all licensed radio amateurs and SWLs who they meet the following requirements: One QSO with the HG1G special event station plus five QSOs with radio stations in Gyor, or radio stations which belong to the city's radio club. These are HG1S, HG1IL, HG1P, HG1AC, HA1AG, HA1AH, HA1AL, HA1AQ, HA1AI, HA1AS, HA1TQA, HA1AC, HA1DAD, HA1DAQ, HA1DBO, HA1DBV, HA1BN, HA1DCD, HA1DAK, HA1DCY, HA1DDU, HA1KSA, HA1KTK, HA1SC, HA1SD, HA1SF, HA1SN, HA1AV, HA1SW.



The "Gyor—A 725-year-old City" Diploma issued by the MTOSZ Radio Club.

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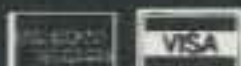
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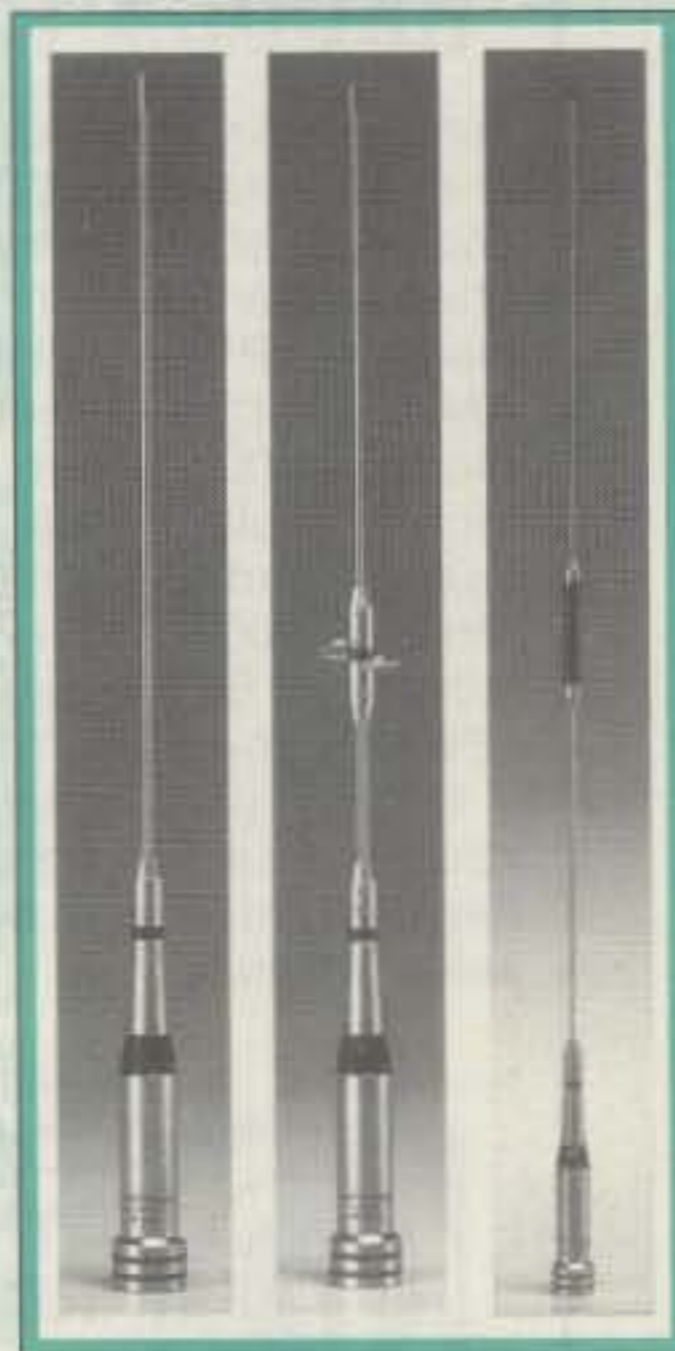
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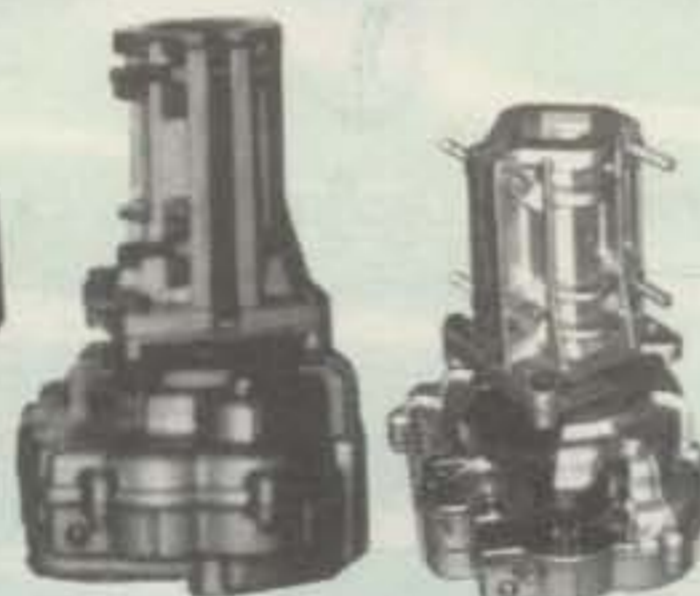
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Model	Roto Tq.	Brk. Tq.	Sq.Ft.	Vert. Load#
T2X	83ft#	750ft#	20	800
RC5A-2-3	116	1085	25	1540



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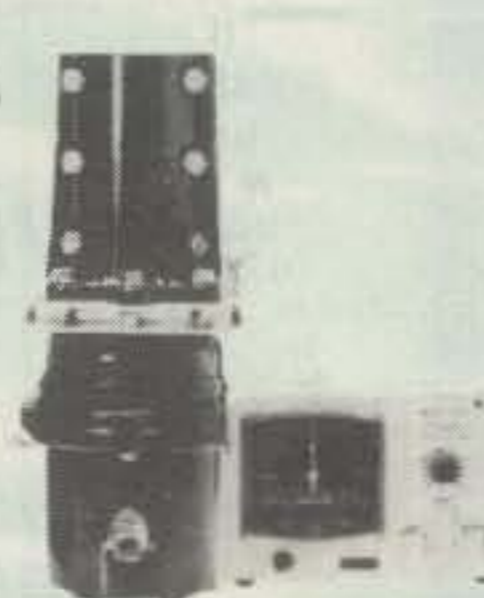
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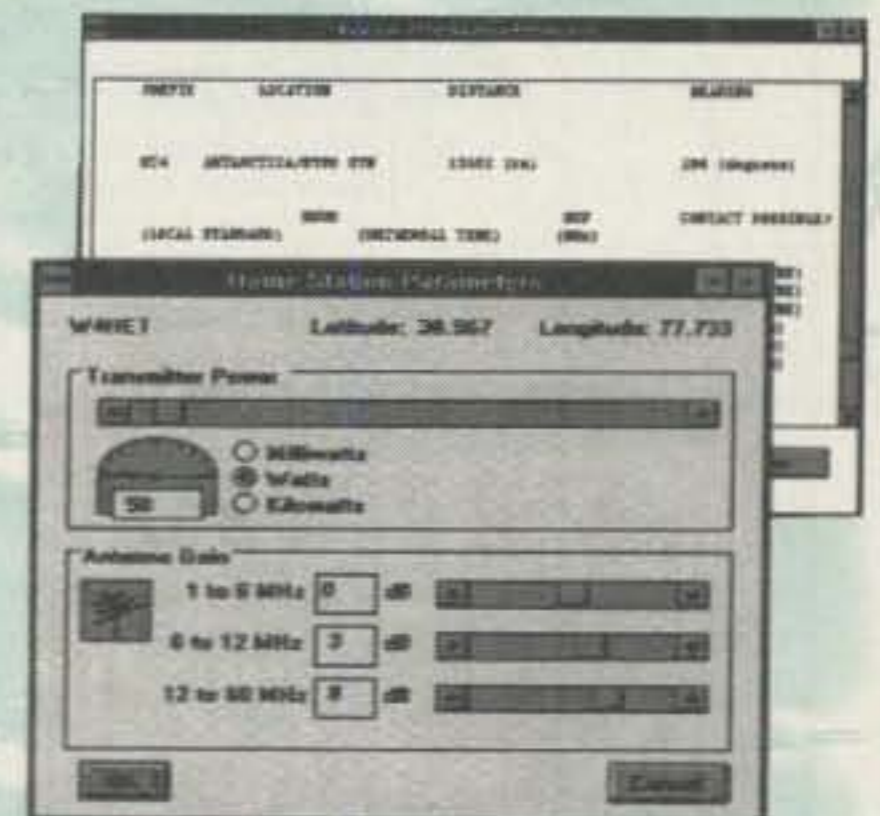


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QSOs made between January 1, 1996 and December 31, 1996 are valid for the award. All amateur bands and modes may be used, and there are no band restrictions. Again, it is not necessary to send QSL cards with the application, but a copy of the log has to be validated by two licensed amateurs. The application must be sent not later than December 31, 1998. The fee is \$5.00 US or 10 IRCs. Send your application to: MTTOSZ Gyor Varosi Radioklub; H-9002 Gyor, Pf 79; Hungary.

The Great Lakes Award. The Michigan Amateur Radio Alliance (MARA) has sponsored the Great Lakes awards for the past five years throughout the 50 states and all over the world. All licensed amateurs may apply. Any band or mode may be used, except repeaters. Contacts must be on or after August 31, 1991. There are eight states and Canada to confirm: MI, IL, IN, HI, OH, PA, NY, MN (state, call, date, mode, band); and Canada VE3 only (call, date, mode, band).



The Great Lakes Award, which is issued by the Michigan Amateur Radio Alliance.

Submit log and QSLs or photocopies (preferred). The award fee is \$6.00 (to cover printing and postage). Send your name, call, address, and the endoresment for which you are applying (CW, phone, QRP, etc.). Send the fee and QSLs (or photocopies) to MARA/GLA, P.O. Box 670, Comstock Park, MI 49321-0670. (Information received from Dwaome Modock, WA8MEM, NODXA Awards Manager.)

DARC Awards Program. Holger Hanne-mann, DL7VTM, has asked me to relay that the DARC is looking for a new stateside awards manager. He said that all award applications should go to the European Awards Managers assigned in the following rules.

General Rules. The official awards of the Deutscher Amateur Radio Club (DARC) are processed by the department for DX and HF Contesting. The awards are available to all licensed amateurs and SWLs. All contacts must be made from the same country, and all cards

must be in the applicant's possession. Any submission of forged or altered cards can lead to disqualification from the awards program.

Awards of any class may be endorsed YL Award, Via Satellite, or QRP, if the applicant submits the necessary credits. Awards for club stations may be applied for and will be issued under the club's name, not the name of the applicant.

To qualify for the awards, applicants from outside Germany must submit a GCR list—i.e., a list of cards verified by the applicant's local club or by an official awards manager. If there is any doubt, the manager may require the submission of some or all the cards for verification.

Applications should be sent to the respective award managers. New recipients of the awards will be published in the official journal of the DARC, CQ DL. The charge for any one of the awards is DM 15; for an application for one or more stickers DM 5; for any one of the plaques, if sent by mail, DM 40, or DM 25 if claimed personally at the amateur radio convention in Friedrichshafen, Germany (indicate your preference on your application form).

Rules. The country list and application forms can be obtained from the award managers by sending a self-addressed Label plus postage (stamps or IRC). It is recommended to use the official application forms issued by the DARC, but applications containing all the relevant data will be accepted. A complete set of application forms is available for DM 4 (stamps) or 5 IRCs from Eberhard Warnecke, DJ8OT, Postfach 10 12 44, Velbert, D-42512 Germany. US\$ and IRCs will be accepted at a rate of DM 1.50 each.

All decisions of the Department for DX and HF Contesting are final.

EU-DX Award. The basic idea of this award is a proportional combination of European and DX contacts in one calendar year. It is issued in the following classes: 2xCW, 2xSSB, and mixed modes. A minimum of 50 points is required for the EU-DX Award per year; 20 points must be obtained by contacts with European countries and 30 points by contacts with countries outside Europe. Each country counts one point, two points on 80 and 160 meters. All bands may be used. European countries are defined in the WAE country list; non-European countries in the valid DXCC list. Bonus points can be obtained for any additional block of four European and six non-European countries within the same calendar year.



The EU-DX-D Award, issued by the DARC.

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Each year's score may be added to obtain the EU-DX 500 badge. Stickers will be awarded for any block of 50 points, regardless of the annual scores. Example:

20 EU points in 1994 + 30 DX the same year = 50 points for that year.

28 EU points in 1993 + 42 DX the same year = 70 points for that year.

32 EU points in 1992 + 48 DX the same year = 80 points for that year.

Total: 200 (four stickers).

EU-DX 1000 Trophy. This plaque is awarded for a total of 1000 points, no matter in how many years. EU-DX Manager: Dietmar Kasper, DL3DXX, Birkenweg 3, Pirna-Jessen, D-01796, Germany.

Europe Award. This certificate is awarded for working or hearing amateurs in European countries for a total score of at least 100 points. Scoring: The idea is to work or hear as many as possible European countries on different bands in different calendar years. There are no restrictions as to bands or modes. For the annual score each confirmed European country counts one point per year on each amateur band. Only the current and the five prior years are valid; contacts older than five years no longer count. Total score: sum of the annual score for the year of application and the five preceding years.

Europe Award Honor Roll. Each certificate holder with an actual score of at least 300 points becomes eligible for the Honor Roll, which is published in *CQ DL*. Cards may be submitted every year, before December 1, to be considered for listing in the Honor Roll.

Europe 300 Trophy. Holders of the Europe Award may obtain the Europe 300 plaque. Applicants must achieve 300 country points, counting each country on each band only once in all the years. Examples:

50 countries on 6 bands = 300 points

10 countries on 9 bands + 20 countries on 6 bands + 15 countries on 5 bands + 5 countries on 3 bands = 300 points.

The Europe Award Manager: Franz Berndt, DL9GFB, Heinrich-Heine-Str. 1, Bad Doberan, D-18209, Germany.

Worked All Europe (WAE) Award. The oldest and most renowned of all DARC certificates is awarded for contacts with amateur stations in many European countries and on the European islands on different bands. Each confirmed country counts one point per band, with a maximum of five claimed bands per country. DX stations may count two points for contacts on 160 or 80 meters.

The award is issued in two divisions: two-way CW and two-way SSB/AM/FM. No mixed modes award. Classes are as follows:
WAE III—At least 40 countries and 100 points.
WAE II—At least 50 countries and 150 points.
WAE I—At least 55 countries and 175 points. (Holders of WAE I get a special WAE badge.)

New WAE Top Trophy. To qualify the applicant must have at least 70 countries and 300 points. Unlike for WAE I, II, III, deleted countries may not be counted for the WAE Top Trophy.

The WAE Award Manager: Michael Adaszewski, DL5ARX, Postfach, Suhl 3, D-98509, Germany.

73, Norm, WA3RTY

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Who Really Invented Radio?

I am sure many of you are aware of the material that has been published describing a 19th century Scottish experimenter, Mahlon Loomis, who is occasionally heralded as the "true inventor of radio." I am certain that all of you are aware of the role Marconi played.

Those who read the January 1996 "Math's Notes" column may also recall my views on the future of amateur radio and particularly my references to Marconi. This column led to an interesting letter from George Sadlon, WA2ZZJ, along with a copy of an article written for *CQ* by Julian Jablin, W9IWI, in July 1992. The whole subject struck a chord that was touched on in January, and as a result I would like to express my views on this subject this month.

First, though, I would like to apologize to those supporters of Mahlon Loomis for not at least mentioning his name in the January column. The fact that he made a contribution to the development of radio is certainly possible, but as to whether he did or did not invent radio is, to paraphrase an old saying, "in the eyes of the beholder."

In 1860, according to the information provided by W9IWI in the *CQ* article, Loomis began to experiment with "stealing" current from the atmosphere by using kites with metallic strings. This type of "power collection," as we all know, was popularized by Ben Franklin in his famous experiment to prove that lightning and electricity were one and the same, so it certainly was not totally unknown. Using atmospheric current, he succeeded in powering a 400 mile telegraph line. Since telegraphers were already beginning to use the earth as a return in their systems, to eliminate the second wire, the idea of eliminating the first wire by using the atmosphere could certainly have been within the realm of his thinking. Unfortunately, I do not have enough knowledge of what actually occurred to know if that was his chief goal.

In 1866 Loomis was ready to perform his critical experiment. As shown in fig. 1, he sent up two copper mesh-covered kites, tethered with over 600 feet of wire, 18 miles apart. Connected between each kite wire and ground was a sensitive galvanometer. When the connection to one galvanometer was broken at one kite's location, the galvanometer at the other kite's location registered a small change in current. This experiment was demonstrated to a few members of Congress and several scientists, so it probably did not go unnoticed. The rest of the article deals with Loomis's failure to obtain funds to continue development of his ideas, although a patent was eventually issued to him for "An Improvement in Telegraphing."

Whether the above achievement could be considered radio is, of course, the question. While it is true that an electrical change at one kite circuit affected a change at the other and was noticed, does not necessarily create an industry. This sort of "discovery" happens all the time and was a fundamental reason why the January column urged amateurs to "always keep

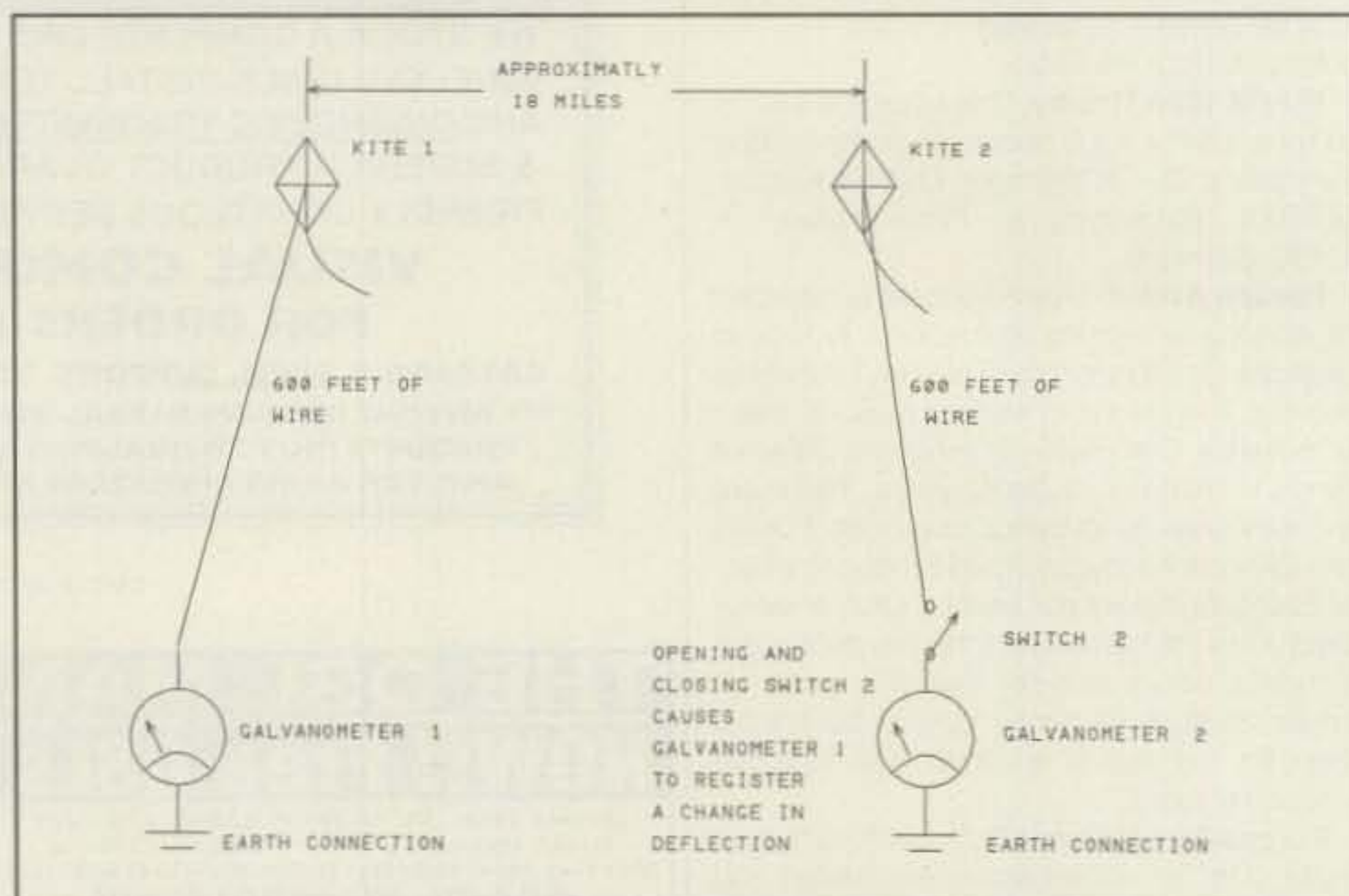


Fig. 1- "Schematic" diagram of Loomis's experiment.

their eyes and ears wide open!" Now consider the following.

Well before Edison's light bulb, the idea of passing current through a wire and causing it to heat to the point where it begins to give off light was well known. The problem was that the wire could only produce a reddish glow. Heating it further to try to produce a whiter light caused the wire to melt. The very first scientist who noticed a glowing wire is not credited as the inventor of the electric light, but the man who set out to perfect the light bulb, and did, is.

Speaking of Edison... While trying to improve the light bulb he noted that current only flowed in one direction between a filament and metal plate. He even documented this in his notebooks. This became, of course, the famous "Edison Effect." Edison, however, is not credited as the inventor of the vacuum diode. It was Alexander Fleming who promoted this device as a superior detector of radio waves, but it was Lee DeForest who got all the credit when he added a grid.

Even Henrich Hertz, who actually described and demonstrated "electromagnetic radiation," including the reflection and production of these waves, is not credited as the inventor of radio. In fact, Sir William Crookes went so far as to suggest, in an article he wrote for an 1892 issue of the *London Fortnightly Review*, that when a simpler and more stable way was found to generate "Hertzian Waves," they might be used for wireless communications. He also is not credited as the father of radio.

Prior to Marconi, as stated in the January column, even physics textbooks as late as the 1890s did not recognize electromagnetic radiation as a possible means of wireless communication, although many of the parameters of these waves—including vertical and horizontal polarization, wavelength, and reflection—were discussed.

What does all of this mean? The answer obviously is that simply because someone discovers a principle or unique characteristic of one sort or another, does not necessarily mean that he or she is the inventor of a technology.

Marconi's story began when he was 20 years old. While on vacation, he read of Hertz's death and immediately saw and specifically set out to use Hertzian Waves as a means to establish wireless communications. He cut his vacation short, returned home, and duplicated Hertz equipment and experiments. He then began work to not only increase the distance over which the rudimentary spark coils would transmit, but also to explore the best method of encoding those signals with information. Through careful experimentation he noted that an elevated "aerial" wire and a wire connected to the earth increased his transmission distance. He also carefully noted that his transmitting distance was a function of the height of the aerial wire. He experimented, pushed, demonstrated, and did everything within his power to publicize wireless transmission (and himself along the way). In 1901, as we know, he achieved "Father of Radio" status by succeeding in transmitting signals across the Atlantic.

Marconi certainly was not the first to transmit a wireless signal. People such as Loomis beat him to that punch by years. He was not the developer of electromagnetic theory, as James Clerk Maxwell beat him to that. He did not even prove any theory; Hertz beat him to that. What Marconi did was to publicize and fire the imagination of the public with wireless transmission at a time when the world was ready to accept it!

In the case of radio the answer is clear; Marconi deserves the credit. There are other cases such as those of Tesla and E. H. Armstrong that are not as clear, but that is another story.

73, Irwin, WA2NDM

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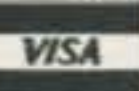
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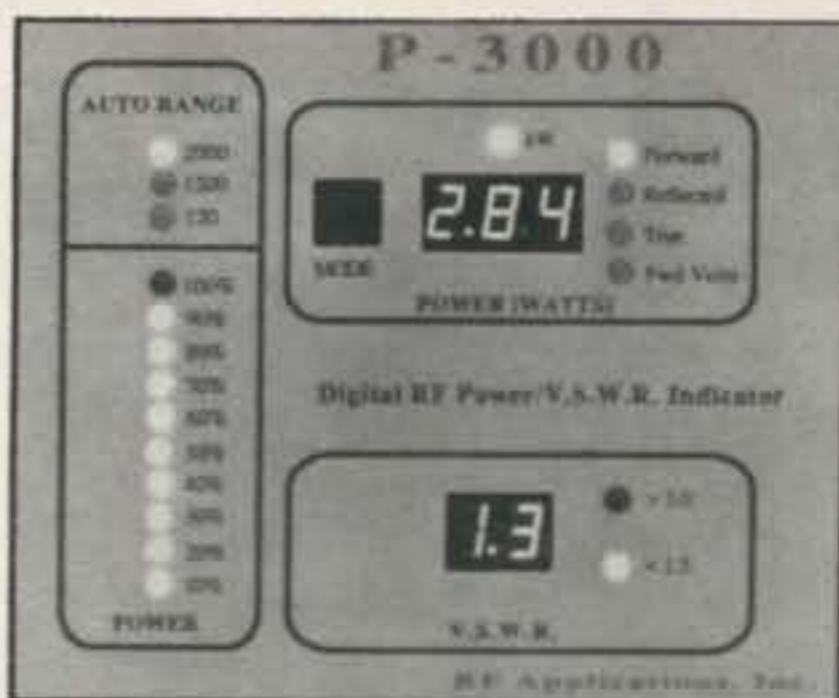
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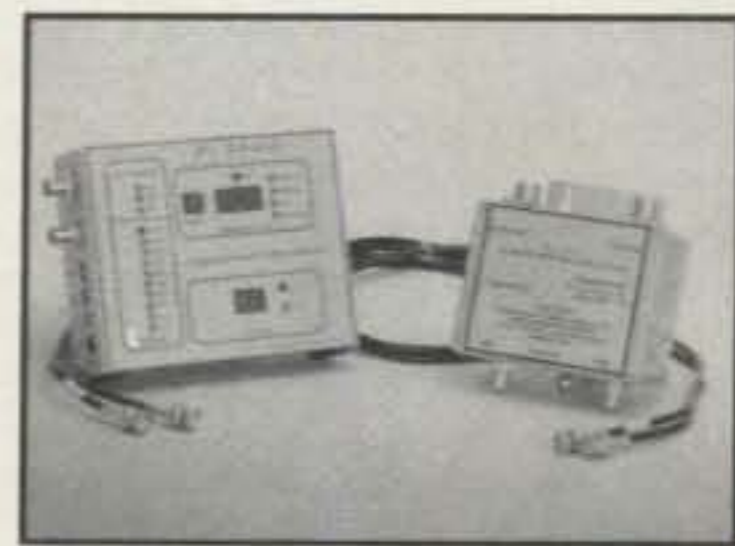
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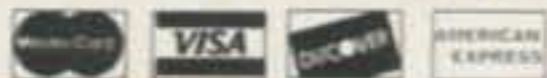
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Let's Continue To Talk 9600 Baud

Before we really get into this month's topic, we have a little "spring cleaning" to do to set the record straight.

In the past two columns I covered conversions to the General Electric (Ericsson) Phoenix SX and the Motorola MITREK commercial transceivers for use at 9600 baud. Referring back to the low-band 39-50 MHz MITREK, at the output of the limiter/detector IC I stated there is a 75,000 ohm (75K) resistor labeled R231. Not so! It is a 7500 ohm (7.5K) resistor. In either case, the R231 label is correct, so hopefully there was not a lot of confusion. Also in either case, the idea is to remove it and replace it with a 2700 ohm (2.7K) resistor.

For those who like to be a bit more daring, there are several 10.7 MHz crystal filters in the IF chain that limit the IF bandpass. If you care to, experiment (as I did) by removing a couple of these filters and look at what happens to the (wider) IF bandpass.

I removed the two filters Y203 and Y204. These filters are adjacent to the second IF cans (i.e., Y204 next to L206). These two filters are very similar in appearance to an HCU crystal, except that each one has a third, or center, pin (usually tied to ground).

Once the filters were removed, I installed a .001 µF ceramic capacitor in the two outside

holes where the crystal filters had been. DO NOT miss the "outside" hole(s) and use the center hole, or YOU ARE GROUNDED!

Sure, I am aware that I lose some selectivity. That's the idea. Remember that bit they used to teach in electronics school? "When you increase bandwidth, you sacrifice selectivity." Then there was the other axiom that stated, "When you decrease selectivity you increase sensitivity." If either of these statements is true, then we have accomplished our objective. The basic idea is to open (widen) the IF bandpass to allow the (17.5kHz wide) 9600 baud data an easier passband.

Again, as I made each change I performed tests to ensure that I was making positive progress. In each case I noted an improvement in the recovered 9600 baud audio, and thus improved data recovery.

Thirty-six Conversions In Eleven Weeks!

If you think that I sat down and wrote the last three columns without in-depth research, then look at the Southeastern Emergency Digital Association Networks (SEDAN) map shown later in this column as fig. 2. Since the beginning of 1996 I have converted and modified 36 of these commercial transceivers to perform as the RF portion of each of the nodes depicted in the SEDAN map.

As you will see, there are many node sites which support both the transport, keyboard-to-keyboard frequency (145.770 MHz), and a 9600 baud node. The 9600 baud node is designated as such by having the number "96" associated with its alias. An example of a SEDAN 9600 baud backbone node is seen at K4ABT-2/9600. Another is shown at Augusta, Georgia as AA4UA-9/9610, and so on. In every case where the numeral "96" is a part of the alias, there is an umbilical cable—figs. 1(A) and 1(B)—employed to (gateway) interface the RS232 ports of the 145.770 MHz keyboard (1200 baud access) frequency with the 9600 baud backbone node, 50 MHz frequency.

With my busy work schedule and my spending my evenings and weekends modifying these radios for 9600 baud operation, my time has become a premium to me and the family. It doesn't take a lot of problem solving and arithmetic to determine that 36 radios in 11 weeks is nothing short of a sheep-counting stampede during the short periods reserved for sleep. But wasn't it Benjamin Franklin who said, "Up sluggard, and waste not life; in the grave will be sleeping enough." I have Rick Card, KD4JKX, and Fred Roberts, WB4QOC, to thank for waking me just as I was about to doze off.

There is light at the end of the tunnel, however. It should not be much longer before the System Node Operators (SNO) of the SEDAN have completed the largest packet network

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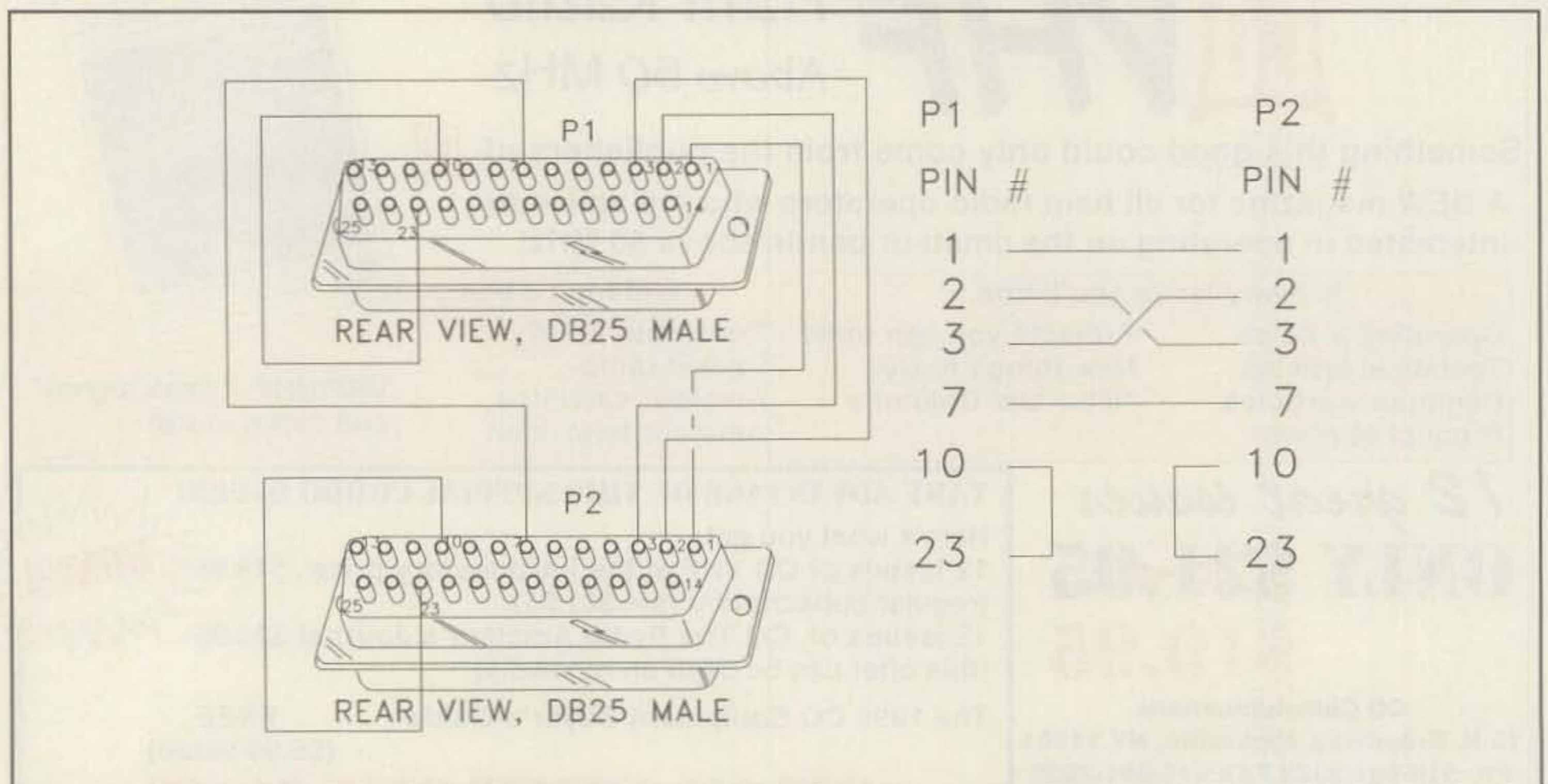


Fig. 1(A)—The method used to (gateway) interface node TNC that employs the DB25 connector on the RS232 port.

No More "Little Gun"

It used to be that using a tribander moved you into the "little gun" class for local competition. No longer.

Force 12 Classic 3-Band antennas are competitive with monoband installations because that is what they are. These antennas are three horizontally stacked and interlaced monobanders with a common driver cell. Each of the monobanders begins as a 2 element and is enhanced by the presence of the additional elements on the boom. To emphasize the effect of the design, the antennas have about 2.5dBd gain on 17 and 12 mtrs even though there are no elements resonant for bands. The driver is an improved open sleeve, developed and tested by **Force 12** in 1993. It excites 20-15-10 with a 50 ohm feedpoint and does not employ traps or phasing systems. This is the most efficient and simple multiband feed system ever used.

The Classic 3-Band series antennas average 4.5dBd gain on 20-15-10, more than the claimed higher numbers in trapped antenna specifications. For reference, a common 4 element 20 mtr monobander on a 26' boom has about 5.7dBd. When considering that the **C-3** has an 18' boom and the **C-3S** has a 12' boom, you can see these antennas provide a lot of gain for their size; not only on one band, but on all three. They have no traps to weather or blow up, no phasing lines to deal with and are rated at 5KW. They are also the lightest and have the lowest profile, while maintaining an 80 mph wind rating, with optional higher velocities. Average assembly time for a **C-3** is about 90 minutes and a **C-3S** is about 60. Everything comes ready to go with pre-aligned element-to-boom brackets, bundled elements and Easy-On™ mounting. All that is needed is simple hand tools and a hand riveter (available everywhere or from us). Slide the elements sections together with the supplied anti-oxidant, "pop" the rivets, bolt the elements on to the existing brackets and you are done. An RF choke or 1:1 balun should be used for the feedpoint.

The 40 mtr band can be added to either the **C-3** or **C-3S** to make the **C-4** and **C-4S**. The 37' 40 mtr dipole uses the **Force 12** linear loading system for highest efficiency and provides 130 kHz 2:1 coverage. A **C-4C** conversion is available for field upgrades. For those who would like 2 elements, the **C-4XL** is the core **C-3** with a 2el 40 on a 30' boom and the **C-4SXL** is the core **C-3S** with a 2el 40 on a 23' boom. There is also the **C-3XL**, which is a 3el 20, 3el 15 and 4el 10 on the same boom with three feedlines.

Stacking a pair of these antennas enables a physically small installation to compete with much larger monobanders. The computer model gives about 2.5dB more gain for the stack compared to a single antenna (27-35' vertical spacing); however, those who use stacks know the improvement is more dramatic. Taking into account only the 2.5dB, the stack is about even with a 40+' boomlength 20 mtr monobander; however, the added benefits of the stack, plus diversity in aiming makes a formidable installation. The photograph shows the **C-4SXL** for (2el 40 + 20-15-10) stacked above a **C-3S** (20-15-10). You might not need the 3 element 80 mtr in the middle! A rotatable dipole for 80/75 on the mast will be another eye-opener. They are available as the **EF-180S** (54' long), the **EF-180B** (66.5') and the **new EF-180C** (83').



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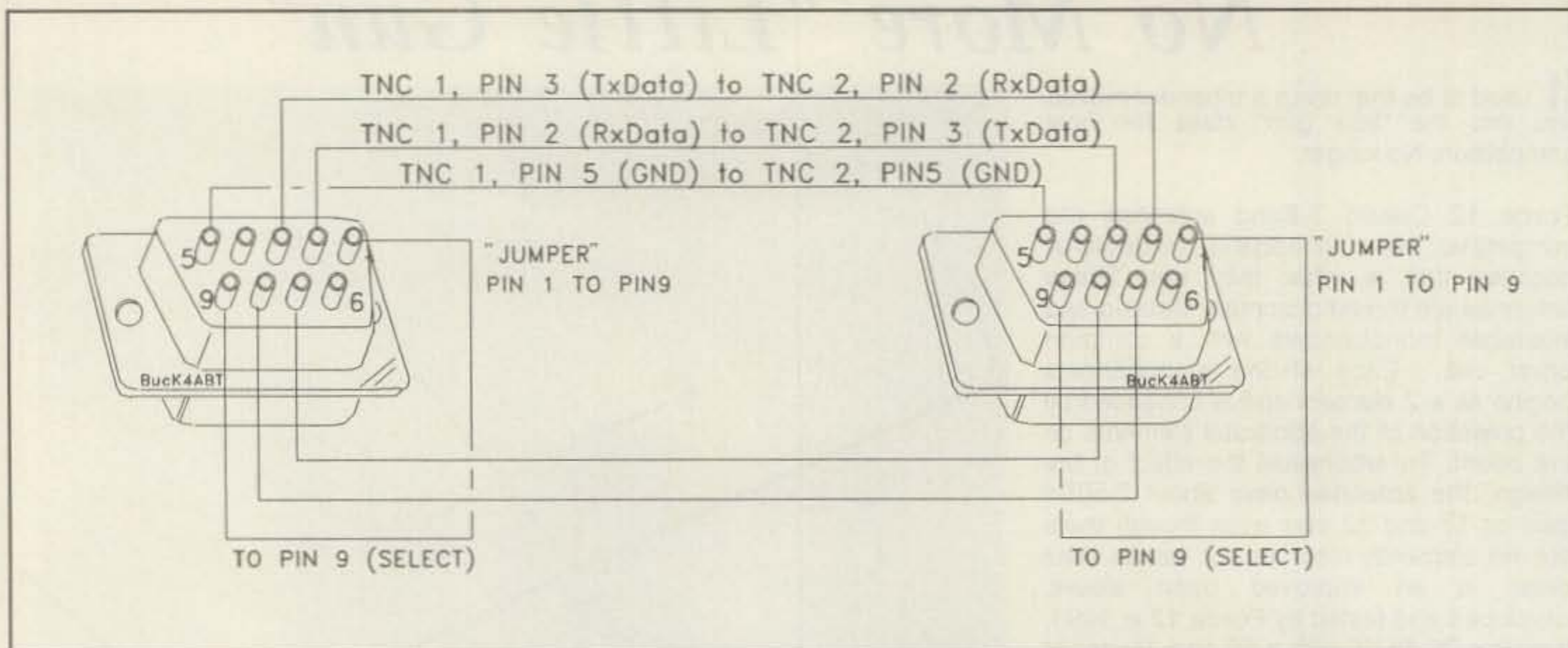


Fig. 1(B)– The port interface (gateway) configuration used when the RS232 port uses the nine pin (DE9) connector.

system in the world. I have to hand it to these guys and ladies. They've been 100 percent supportive (labor and financially) of this effort. They provide the crystals, the 9600 baud TNCs, the power, the sites, the antennas, and most important, their support.

The SEDAN represents what can happen when almost 200 SNOs join together in a concerted effort to implement a network that is dedicated to the primary purpose of saving lives and the protection of health and property. The SEDAN also functions in concert with

the RACES, ARES, Sky Warn, and Weather watch groups, and we fully support their activities during any emergency and/or disaster.

The idea that 200 packet operators are co-operating to make this network happen is only half the effort. There are over 2000 users of the SEDAN who keyboard across it daily and are just as protective of its objective as the SNOs.

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Time To Stop and Smell The Spring Air

Well, it's Dayton HamVention time (in mid-May this year), and for those who would like to discuss the activities, purpose, and direction of the SEDAN, I'll be in or near the CQ booth at Dayton. I, for one, am happy that they moved the Dayton HamVention forward a few weeks. It should make for warmer weather, and it gives Alan Dorhoffer, K2EEK, CQ's Editor, more opportunity to cruise the fleamarket in comfort. It is worth the trek to Dayton just to see what Alan can find that he just can't go home without! HI!

Working on The "Home Page"

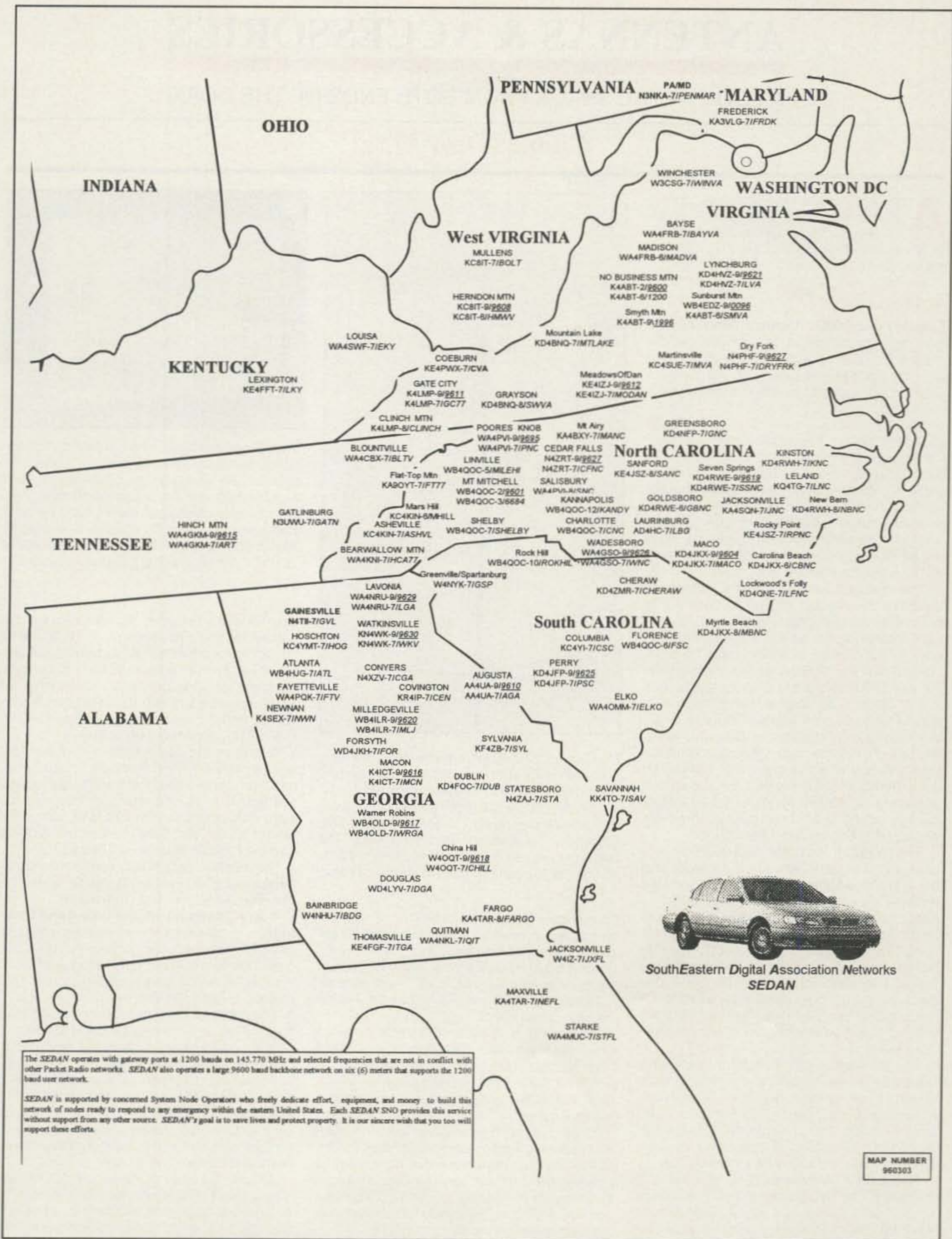
For the moment, in my spare time (ha, ha) I'm working on the SEDAN "home page." For those who want to send me e-mail, my e-mail address is buck4abt@usa.pipeline.com

PSI, or the "pipeline" group, has made my life easier by providing me with plenty of server space. It wasn't just for me. PSI does it for all their subscribers. Drop me a line and I'll reply with something. If there is an interface you need, I have tons of them that I've drawn and placed in my library of DWGs, GIFs, and jpegs. For those who have MS WORD 6.0, I can provide them as Word 6 documents, or WORD 7.0 if you are using Windows 95.

There is a caveat: If you are unable to access an "attached" file, then by all means use the U.S. mail, and be sure to include a self-addressed, stamped envelope. Be sure to include enough postage on the SASE. I will not add postage if you fail to provide enough for the return to you.

We are having fun at 9600 baud!

73, buck4abt@usa.pipeline.com



The SEDAN operates with gateway ports at 1200 bauds on 145.770 MHz and selected frequencies that are not in conflict with other Packet Radio networks. SEDAN also operates a large 9600 baud backbone network on six (6) meters that supports the 1200 baud user network.

SEDAN is supported by concerned System Node Operators who freely dedicate effort, equipment, and money to build this network of nodes ready to respond to any emergency within the eastern United States. Each SEDAN SNO provides this service without support from any other source. SEDAN's goal is to save lives and protect property. It is our sincere wish that you too will support these efforts.

Fig. 2- The Southeastern Emergency Digital Association Networks (SEDAN) map.

ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

Come What May

April flowers, May showers. Yes, spring is here, and many amateurs' thoughts naturally turn to antennas. Stay with us as we launch this month's column with the theme "Come What May."

Antenna Notes

Telex/Hy-Gain DX77 Vertical Windom. Hy-Gain has introduced a "no ground radials required," seven-band, multiband vertical antenna that's based loosely on the Windom antenna, long popular with amateurs as a multiband horizontal flattop.

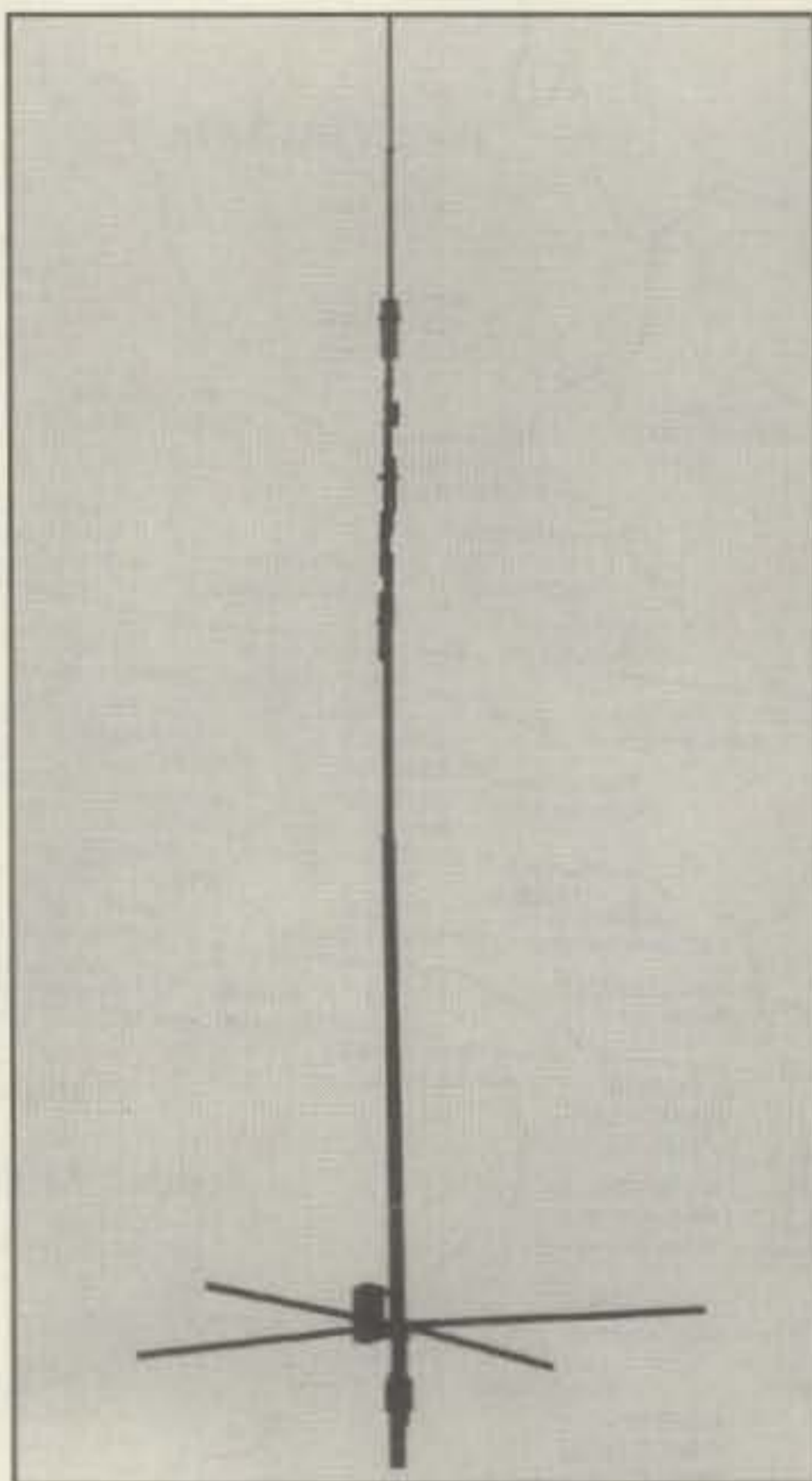
The 29 ft. vertical covers 10, 12, 15, 17, 20, 30, and 40 meters. It boasts excellent mechanical design, high power-handling (1 KW RF) capability, automatic bandswitching, a low angle of radiation, and good bandwidth, particularly evident on 20 and 40 meters. The antenna features double-wall tubing, steel mast clamps, and stainless hardware. A tilt mount offers chimney, pole, rooftop, or deck installation. The antenna is \$419.95.

The manufacturer indicates the antenna is based on the Windom design. In case you're not familiar with the classic Windom, it's a popular HF skyhook that waxes and wanes in popularity. The Windom is named after Loren G. "Windy" Windom, W8GZ, who developed it in the late 1920s and wrote it up for publication in the 1930s. (The original design may have somewhat older roots, however. Bob Decesari, WA9GDZ/6, reported some time ago in his *WorldRadio* column that a prototype Windom-style antenna was first designed in 1929 by John Byrne and Ed Brooke, two amateurs employed at the Bell Telephone Labs. Their design, which used a single-wire feedline, appeared in September 1929 *QST*.)

The Windom has the transmission line attached at a point between the middle and the end of the flattop. In its simplest form the antenna has a single wire feedline attached about 14-16 percent off the middle. Amateurs found they could use the antenna on multiple bands by making it an off-center-fed (OCF) dipole, inserting an insulator, and attaching a 300 ohm feedline about one third in from one end. Some Windom/OCF dipole aficionados report good results with a 6:1 balun at this point instead of an insulator, to use more convenient coax feedline.

For additional information on Hy-Gain's adaptation of the Windom to a vertical design, contact your Hy-Gain dealer or Telex Communications, Inc., 8601 E. Cornhusker Highway, P.O. Box 5579, Lincoln, NE 68505 (402-467-5321). A catalog of Telex and Hy-Gain antennas, towers, and rotators is available.

Raibeam™ Antennas. Two new lines of Raibeam™ HF and 6 meter beam antennas have been introduced by Chuck Smith, WA7RAI. Chuck is well-qualified as an anten-



Hy-Gain's DX77 seven-band vertical is loosely based on the Windom, long popular as a horizontal flattop. The 29 ft. antenna covers 10, 12, 15, 17, 20, 30, and 40 meters. It boasts a superior mechanical design, high power handling capability, automatic bandswitching, low angle of radiation, and excellent claimed bandwidth. (Photo courtesy Telex Communications.)

na developer, being the author of several antenna design programs we have highlighted. His programs include Yagi Antenna Designer, Quick Yagi, and Quick Yagi II. We discussed these programs several times, most recently in November 1991 and December 1993 when we highlighted Quick Yagi II.

According to Chuck, the "Mighty Mite" series of HF two-element beams makes use of what he calls a "bi-periodic dual-driving system." In it, the antenna doesn't employ a reflector but uses two critically coupled driven elements instead.

Chuck reports typically high gain (10 dBd) and excellent front-to-back (F/B) ratios (greater than 25 dB). The unique driving system he employs has both elements working in unison to phase-reinforce only the forward lobe, reportedly producing a clean, unidirectional pattern with a narrow vertical beamwidth.

His tests have shown that by itself, the dual-driver design produces greater than twice the



The Curry Communications CW495 1750 meter CW transceiver kit includes a receiver, pre-selector, RF Q-multiplier, noise limiter, and variable frequency and bandwidth filter. The transmitter is crystal controlled, but a variable frequency oscillator (VFO) also is available. The CW495 is shown installed in the optional cabinet. (Photo via Curry Communications.)

directional gain of a two-element Yagi with full bandwidth and F/B ratios of up to 30 dB or more. Chuck asserts that his beams perform as well as a three- or four- element Yagi, making them ideal for a minimal installation. Five single-band beams are offered to cover 10, 12, 15, 17, and 20 meters, ranging from \$199.95 to \$299.95, depending on band.

A similar "Raider" series of four-element beams covers 10 and 6 meters. These antennas also use two driven elements, but include two optimally placed directors. Claimed forward gain is greater than 14 dBd, with a F/B ratio of 30 dB. The 10 meter antenna is \$399.95 and the 6 meter antenna is \$249.95.

For details, contact Raibeam Antennas International, 2328 East Van Buren St., Suite 131, Phoenix, AZ 85006 (602-244-1913).

Curry Communications Low-Band Offerings. In recent columns we noted a pick up in interest in low-frequency operation. This is perhaps due to the ARRL requesting the FCC to establish a formal amateur band around 1750 meters, or 160-190 kHz.

Of course, at present 1750 isn't an amateur band at all: no license is required to use it. In fact, for many years a small but enthusiastic group of experimenters has been communicating on the FCC "Part 15"-based 1750 meter band, from 1874 to 1578 meters, or 160 to 190 kHz. These "LowFERS"—Low Frequency Experimental Radio Stations—have a surprising record, with many QRP beacon reception reports and QSOs to 1000 miles or more.

As yet, the likes of Kenwood, ICOM, and Yaesu don't offer much for 1750 meters, so some small suppliers handle this admittedly tiny but increasing demand. For the experimenter, David Curry, WD4PLI, at Curry Communications, offers a number of attractive and

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Perfect mate for Mirage BD-35 dual band amp. Whopping 6.3 db gain on 440 MHz and 2.6 dB gain on 2 Meters give you super long range. Free BNC adapter lets you also use your handheld. Stainless steel radiator. 12-foot coax.
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B-5016-G, \$299, for 25 to 55 watt mobile/base -- 160 watts out for 50 in. Low-noise GaAsFET preamp, automatic T/R, all modes FM/SSB/CW. **B-2516-G, \$299**, for 10 to 35 watt mobile/base -- 160 watts out for 30 in.

B-1016-G, \$379, dual purpose handheld or mobile/base amplifier -- 160 watts out for 10 in. **B-108-G, \$229**, 80 watts out for 10 in. **B-1016-G, B-108-G** for 0.2-15 watt transceivers.

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430-450	KP-1/440	KP-2/440

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70 cm Amplifiers (420-450 MHz)

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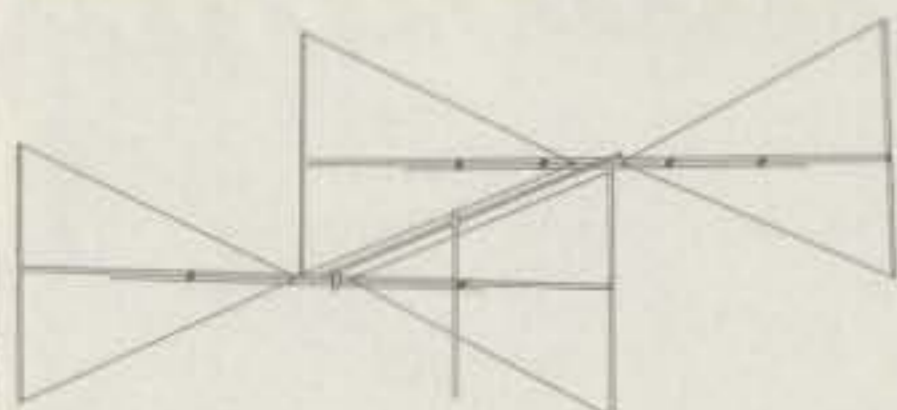
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HF9V-X 9 Band Vertical

- ◆ 9 bands, 80 thru 6 meters
- ◆ No-radial operation with CPK counterpoise
- ◆ 26 feet tall

More efficient than trapped designs or "halfwaves", Butternut's exclusive tuning system allows more of the antenna to be active on each band, providing superior performance!

HF2V Dual Band Vertical

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The action will be on 80 & 40 during the sunspot minimum - be prepared with the HF2V. The entire antenna is active on both bands for maximum performance.

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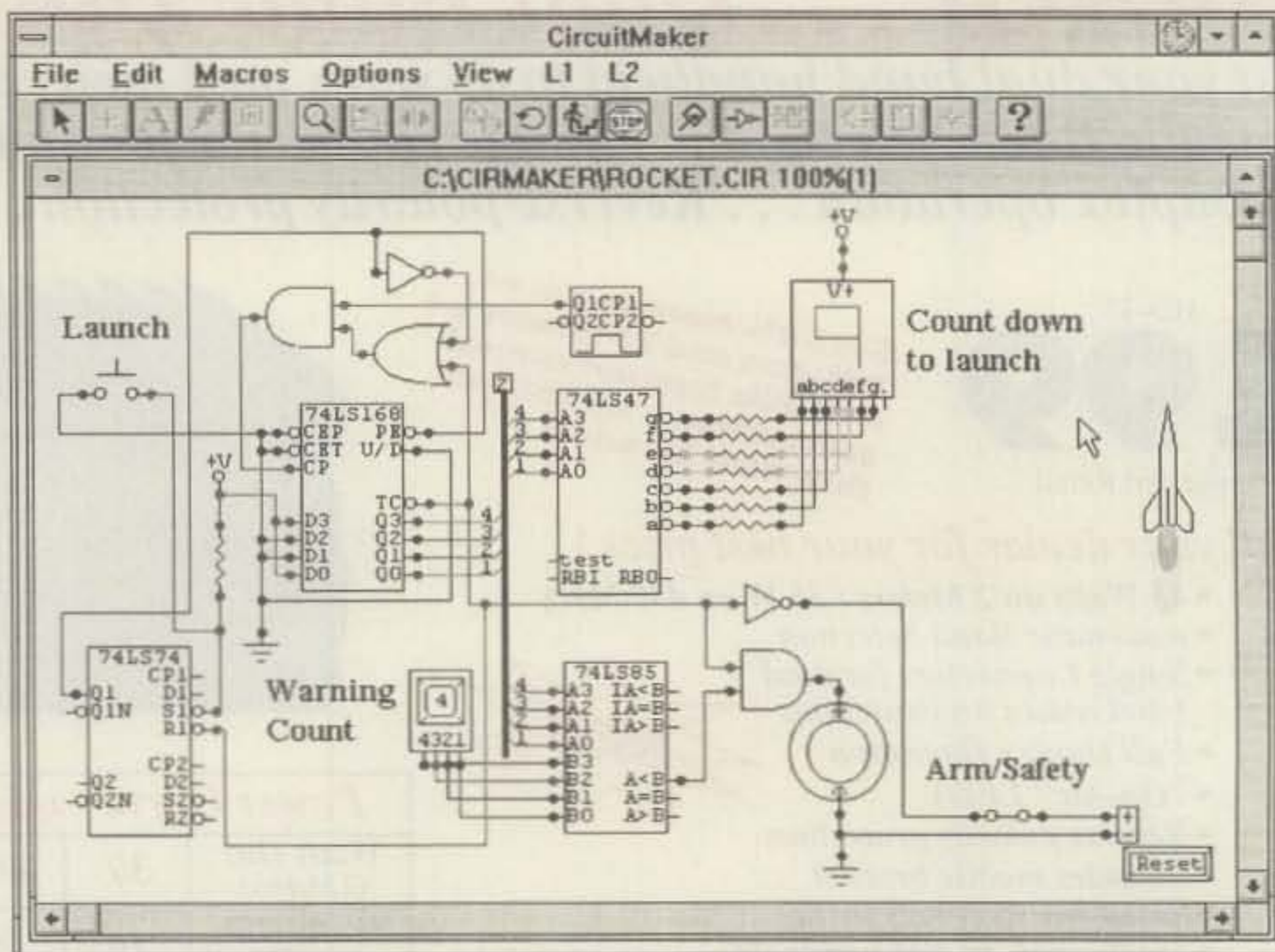


Fig. 1—MicroCode Engineering's CircuitMaker®, a top schematic capture and simulation software package described this month, includes several animated devices that can bring your circuits to life. For example, you can design and build the circuitry to count down and launch this virtual animated rocket. Other objects include race cars, a stepper motor, and windows (for a burglar alarm). Many example circuits that demonstrate how to use these devices are included.

practical accessories for the longwaves. These include VLF converters and preamps; active, longwire, and loop receiving antenna systems; and various other accessories.

A high-performance 1750 meter band CW transceiver kit (originally based on Dave's construction article, "Build Your Own Lower Transceiver," in April 1994 QST) also is offered. The \$95 CW495, a 1750 meter CW transceiver kit, includes a direct-conversion receiver, preselector, RF Q-multiplier, noise limiter, and variable frequency and bandwidth filter. The 5 to 10 watt MOSFET transmitter is crystal controlled, but an optional variable frequency oscillator (VFO) is available.

Dave also offers a 1750 meter transverter kit, the SAM-1, at \$59.95. It allows any amateur with 80 meter capability to operate on 1750. The unit includes a receiver upconverter and a transmitter downconverter that takes an 80 meter signal from a conventional amateur transceiver and converts it to a 1750 meter signal; it also receives on 1750 and converts the signals to amateur frequencies. Dave expects to have a 1750 meter SSB transceiver, an LF synthesizer, and an audio receiving processor ready in the near future, possibly by the time you read this.

For a catalog, send an SASE to Curry Communications, 737 North Fairview St., Burbank, CA 91507 (818-846-0617).

NEMAL 1995/1996 Cable and Connector Selection Guide. In the March 1990 and May 1994 columns we mentioned the free Nemal Cable and Connector Selection Guide. As we noted then, you can use the guide as a standard reference that provides detailed electrical and physical specs on well over 1000 cable, connector, and interconnect products. In addition, many readers find useful the back-

of-the-book indexes of selected military specifications, relevant NEC articles, and NEMAL part numbers.

The most recent guide has been expanded to some 45 pages, depicting more than 100 new products, including sections on 75 ohm BNC connectors, adapters, RF terminators, and attenuators. The guide also includes comprehensive performance data on a wide range of coaxial cables, along with charts for quick selection of connectors and tooling. Also included are details on fiber-optic products, cable ties, patch panels, heat-shrink tubing, wire and cable, adapters, and cable assemblies.

The updated 1995/1996 guide is from Nemal Electronics International, Inc., 12240 N.E. 14th Ave., North Miami, FL 33161 (1-800-522-2253). You can obtain their data sheets on the Internet from their Web site at the URL <http://www.csz.com/nemal/>.

Butternut: Spell it "Bencher." Ray Hibnick, WA9YYY, of Bencher, Inc., sent us news of the merger of the antenna manufacturing firm Butternut Electronics Company into Bencher.

Ray's firm is best known in the amateur community for its high-quality, single-lever and iambic keyer paddles and hand keys. However, the firm also offers the ZA-1A balun for 3.5-30 MHz use. This is a heavy-duty, no-ferrite balun rated at 5 KW peak power. A second popular Bencher antenna product is the 1 KW+ YA-1 lowpass filter, which works over 1.8 to 29.7 MHz and offers a minimum 80 dB harmonic attenuation at TV channel 2 and higher.

Bencher continues to offer these products and also several Butternut products. These include the HF2V 40 and 80 meter vertical; HF6V-X six-band vertical; HF9V-X nine-band

vertical; HF5B, two-element, five-band reduced-size beam; HF5B compact butterfly beam for 10 and 11 meters; and a variety of accessories for these antennas.

Interestingly, for over 10 years I have used a dependable, roof-mounted Butternut 2MCV two-collinear-section vertical antenna for two-meter work. My 2MCV took a serious "hit" in Hurricane Opal, but I don't see either the 2MCV or the three-collinear-section model, the 2MCV-5, in the new lineup. Oh, well.

A brochure with specs on all Bencher and Butternut products is available from Bencher, Inc., 831 N. Central St., Wood Dale, IL 60191 (708-238-1183).

ACE Communications Catalog. The ACE Communications catalog has expanded considerably since we last perused it in the December 1993 column. ACE is best known for its Trident and several other lines of hand-held, mobile, and base-station scanners, spectrum analyzers, and various other receivers.

Their frequently issued catalog also includes antenna accessories of interest to readers of this column, especially scanner buffs looking for an antenna. These include the MA300 and AS300 wideband omnidirectional antennas covering 25-1300 MHz; the Scanmaster DA301 "super wideband" vertical; and several mobile and handheld radio antennas.

Contact ACE Communications, 6975 Hillside Ct., Indianapolis, IN 46250 (1-800-445-7717). ACE also offers a FAX-back service ("FAX Facts") for information on its products; it's at 317-849-8683. They also operate a BBS at 317-579-2045.

Software Notes

CircuitMaker. There's a big market for electronics software of various types. A big seller is software that lets you draw schematics, breadboard circuits, and lay out PC boards on your desktop computer. Schematic drawing or capturing, simulation, and circuit analysis software is especially popular in electronics labs and in technical training schools, and it's rapidly gaining ground in the home workshop—although it's still relatively pricey.

Recently, I had the opportunity to use MicroCode Engineering's CircuitMaker®. This easy-to-use Windows program, at \$299, is for the serious hobbyist who mainly wants a schematic capture program that will let him use the PC as an electronic breadboard, including working with "virtual" tools and test equipment such as signal generators, power supplies, meters, and oscilloscopes. The program includes editing features that minimize the time and task associated with drawing a schematic and ensuring a professional-looking final product.

CircuitMaker also is strong on circuit simulation—analogue, digital, and mixed mode. Its simulation features are integrated into the overall package and let you confirm your circuit designs both accurately and easily in a computerized electronics lab.

Especially nice is the fact that you have a practically unlimited number of "indestructible devices" you can unleash in your circuit; these let you try all those "what if" scenarios at no cost or risk. Other features include several animated devices (such as rockets and race cars) to help bring your circuits to life, as well as sophisticated fault injection capabilities to create meaningful troubleshooting exercises. A companion PC board layout program, Auto-

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50Ω:200Ω	Folded Dipole, Log Periodic Beam	4:1-HBM200 \$49.95
50Ω:200Ω	Off Center Fed Antennas	4:1-HB/U200 \$69.95
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50Ω:450Ω	Twin Lead/Ladder Line	9:1-HB450 \$89.95
50Ω:600Ω	Rhombic & V-Beam Antenna	12:1-HB600 \$199.95

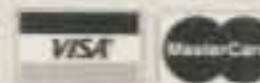
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2:1-HDU50	50Ω:22Ω & 25Ω	\$49.95	9:1-HU50	50Ω:5.56Ω	\$49.95
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1.5:1-HU75	75Ω:50Ω	\$49.95	1.56:1-HDU50	50Ω:32Ω & 18Ω	\$49.95
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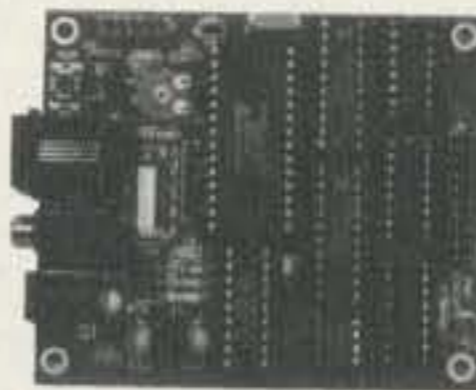


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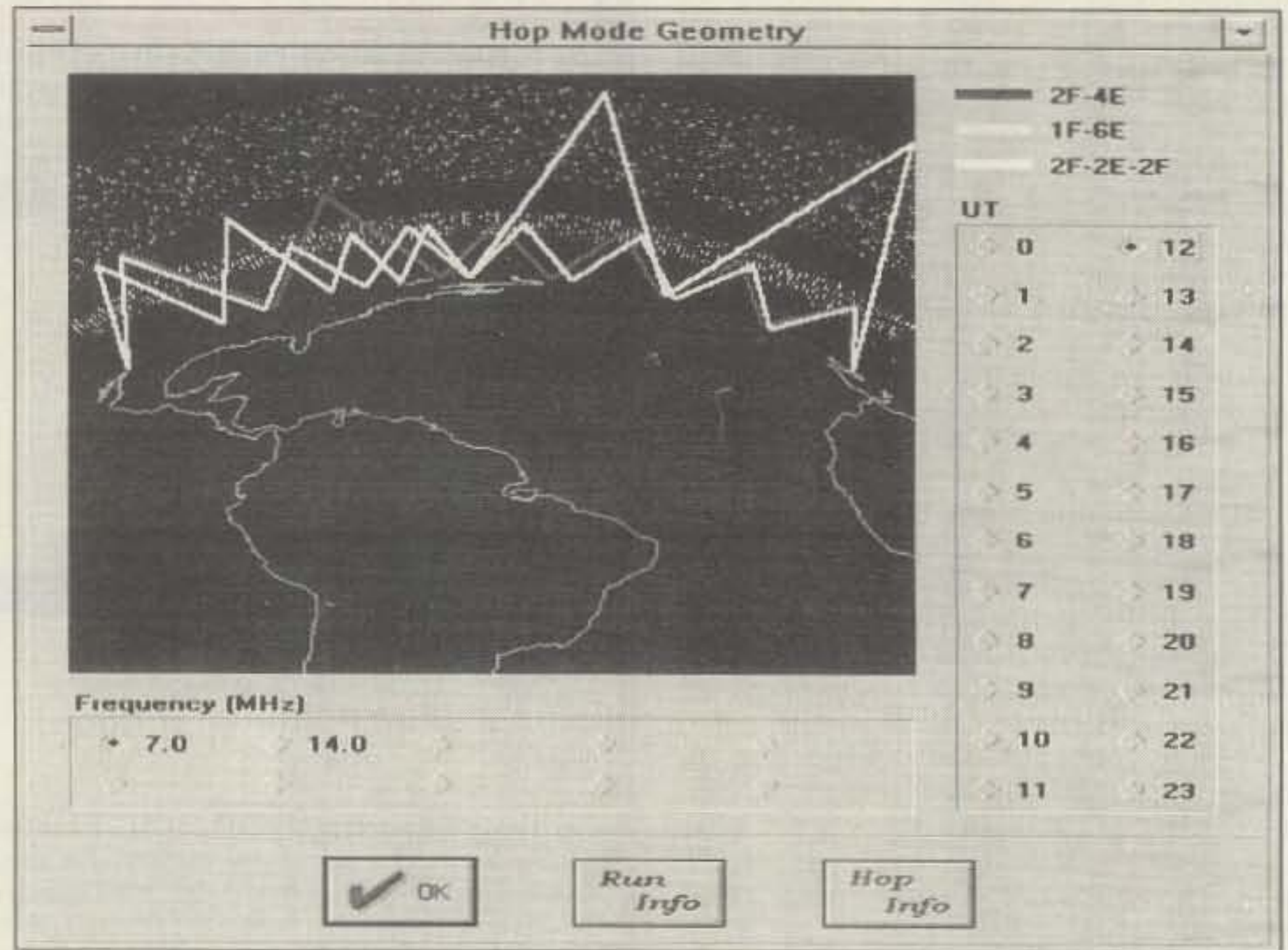


Fig. 2— From Pacific-Sierra's HFX propagation prediction software, the HFX Hop Mode model generates field strength, mode, availability, and signal-to-noise ratio (SNR) for a given date, transmitter/receiver pair, frequency, and antenna type. The program displays the data in several formats. Shown here is a graphical representation of skywave ionospheric hops between transmitter and receiver.

trax, also is available at extra cost and can be used in conjunction with CircuitMaker.

A free functional demo of CircuitMaker is available from CompuServe (GO MICROCODE), or via the Internet at the Web URL <http://www.microcode.com/>. You also can buy the demo directly from MicroCode for \$10.

Contact MicroCode Engineering, 573 W. 1830 N., Suite 4, Orem, UT 84057 (1-800-419-4242).

HFX. Amateur radio and electronics software has been slow to move from DOS to Windows, but programs such as CircuitMaker (above) and HFX™, a \$129 Windows-based HF propagation tool, are boosting the trend. The manufacturer bills HFX as "an interactive Windows™ solution to your HF skywave prediction needs."

HFX calculates ionospheric skywave signal strength from 1 to 30 MHz, presenting you with an attractive graphical user interface (GUI) that makes it easy to input, manipulate, and interpret propagation parameters. The central feature of the interface is the Interactive Map. You can use it to display a variety of information, including subsolar position, day/night terminator, great-circle signal path, major cities, and high-latitude "auroral ovals." You can select transmitter and receiver locations with the click of a mouse and choose your own user location as the default transmitter location.

HFX offers three different models. The Global MUF model generates a map of Maximum Usable Frequency (MUF), Frequency of Optimum Traffic (or Transmission, FOT), and Highest Possible Frequency (HPF) for a worldwide grid of locations for a given date, time, and station location. Using this model, you can determine the best frequencies to reach any part of the world.

The Hop Mode generates field strength, mode, availability, and signal-to-noise ratio (SNR) for a given date, transmitter and receiver pair, frequency, and antenna type. HFX displays the data in several formats. These include an ASCII table for all modes found at each frequency at one-hour intervals, a graphic of skywave ionospheric hops between transmitter and receiver for each frequency at one-hour intervals, and a plot of field strength and mode availability versus time for each frequency. Also available is a table of the virtual heights and ranges of the hops, and a SNR plot at a given frequency.

The Temporal MUF model generates a plot of MUF, FOT, and HPF at one-hour intervals for a given date between a transmitter and receiver pair. With this model, you can determine the best frequency to reach a given location at a given time, or the best time to reach a given location using a given frequency.

Contact Pacific-Sierra Research Corporation, 2901 28th Street, Santa Monica, CA 90405 (310-314-2300); or click on the Web URL <http://www.psrvc.com/hfx/>.

RITTY 1.0 DSP Radioteletype System. Brian Beezley, K6STI, publishes a line of respected PC antenna-modeling software. But Brian also cranks out a variety of other less well known, non-antenna-related software. One new program he offers is the RITTY 1.0 DSP Radioteletype System.

RITTY combines a high-performance FSK modem with a terminal program to let you transmit radioteletype (RTTY) signals on your PC. What's unique about the terminal program is that its digital signal processing (DSP) algorithms do not require DSP hardware. Instead, RITTY uses your sound card for analog input and output.

RITTY 1.0 uses your Creative Labs Sound-Blaster SB-16 sound card. The program uses a linear front end, optimal matched filters, automatic threshold correction (ATC), a numerical flywheel (to lock timing of incoming characters), and other advanced techniques to recover RTTY signals that most terminal units can't copy. RITTY has colorful, high-resolution displays, including a graphical FFT tuning indicator; demodulated-signal display; timing analysis; continuously variable frequency shift; and precision audio frequency shift keying (AFSK). The program has a simple, intuitive interface with pop-up menus.

Brian was kind enough to send me an evaluation copy of RITTY 1.0, but unfortunately it does require a SB-16 sound card. I have a card that the program doesn't recognize. But if you have, or are willing to acquire, an SB-16 card, RITTY 1.0 looks like a viable and sophisticated, software-based RTTY solution.

For more details, contact Brian Beezley, 3532 Linda Vista, San Marcos, CA 92069 (619-599-4962).

DXtreme. Bob Raymond, NE1I, wrote to tell us about his new logging program, the DXtreme Amateur Radio Station Log System™. Bob says he developed DXtreme™ for two reasons: to learn more about programming concepts, and to provide himself and his son with a logging program that they both could use.

While there certainly is no shortage of IBM-PC logging programs on the market, Bob sees the need for a simple but powerful program that lets the DXer simply log his contacts and track his station's DXCC performance. Easy to use, organized, and affordable, the \$29.95 program provides logging functionality but

without a packet interface, rig control capability, or data conversion routines, typically features of more costly programs.

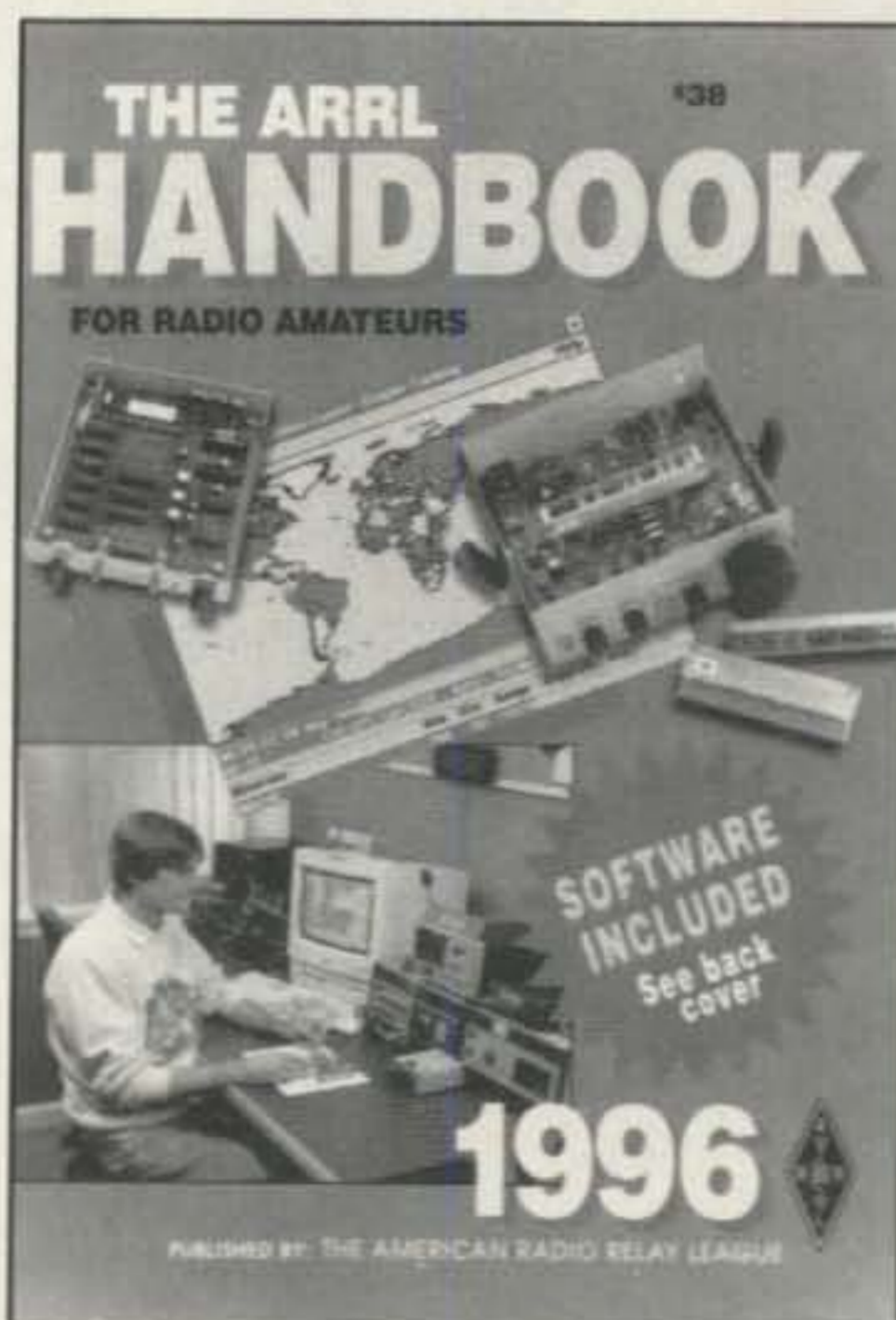
After entering contacts, you can immediately scroll or search through the program's Country Master File to view for each country the total number of contacts, whether the country is verified, and whether the country is worked or verified on each band and mode. You also can immediately access summarized DXCC information for all countries. The program offers many reports to print appropriate DXCC and contact-specific information.

In this age of minimal documentation for many software programs, DXtreme is impressive in that it comes with a well-written, professionally-printed, 152-page user's guide. You can purchase it separately for \$9.95 for evaluation purposes. Contact Bob Raymond, NE1I, DXtreme Software, 26 Langholm Drive, Nashua, NH 03062.

From the Bookshelf

Two More from the ARRL. We'd again like to direct your attention to two ARRL books. The first is *The ARRL Handbook*, which we first reviewed in July '92. At the time, we mentioned that the 1992 edition probably was the most comprehensive and definitive amateur radio sourcebook you could buy.

While the new 73rd Edition is no larger, topping out at 1168 pages in some 30 chapters plus an index, it still is the definitive amateur radio sourcebook. The book is organized into five major parts (an introduction, fundamental theory, practical design and projects, construction techniques, and operating prac-



The new 73rd Edition of The ARRL Handbook tops out at 1168 pages in some 30 chapters plus an index, and as such is the definitive amateur radio sourcebook. This year's 1996 edition also is the first time in Handbook history in which it includes a companion disk of software, one that most readers should find quite useful. The book is available from the ARRL, or it may be ordered from CQ Communications. (Photo courtesy the ARRL.)

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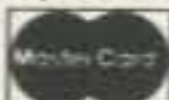
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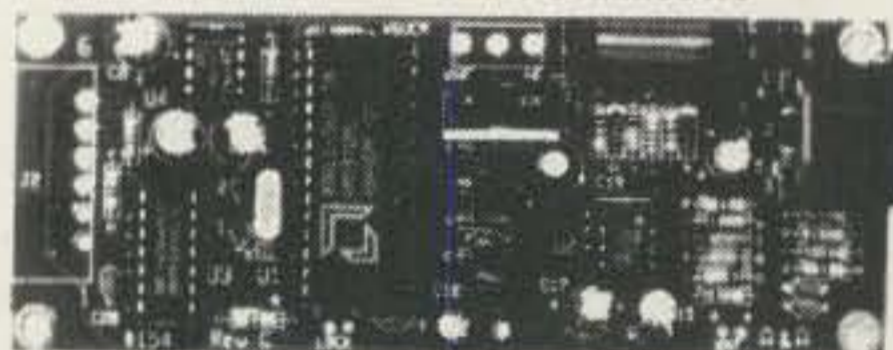
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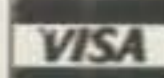
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tices), and each chapter is a "mini-book" addressing a vast array of material. This year also marks the first time in which the *Handbook* includes a companion disk of software.

Besides the applications software on pi-networks, slow-scan TV (SSTV), antennas, filter and coil design, and more, the *Handbook* includes TISFIND, a Windows database that expands on the parts suppliers, manufacturers, publishers, and others that appear in the book's reference chapter. TISFIND makes it easy to search for data, making available the names and addresses of more than 900 vendors and organizations in more than 200 different categories.

While antennas are not covered as thoroughly as in the *ARRL Antenna Book*, one chapter is devoted to antennas and projects (73 pages), another to transmission lines (18 pages), and a third (24 pages) to propagation. As yet, no single chapter covers software. The book, edited by Bob Schetgen, KU7G, is \$38 in softcover.

Vertical Antenna Classics, at \$12, also compiled by KU7G, is a 1995 collection of 35 published articles on the vertical antenna from various ARRL publications, mostly *QST*. Chapters include theory and modeling, VHF and UHF, HF, directional arrays, reduced-size antennas, and radial and ground systems. (The *Classics* book makes a nice companion to *CQ's* own *Vertical Antenna Handbook*, by Paul H. Lee, N6PL, still available from *CQ* for \$9.95.)

The League books are from the ARRL, 225 Main Street, Newington, CT 06111-1494 (860-594-0200).

The Complete World Wide Web Reference. Are you *still* not enjoying the Internet, specifically the World Wide Web (WWW)? That's where the action is, and this new Osborne title puts the Internet at your fingertips. Written by Rick Stout, co-author of the best-selling *Internet Yellow Pages*, the 593-page book offers an up-to-date view of the latest Web developments and an extensive comparison of the newest and most popular Web browser software and Internet connections. The book covers getting started with the Web, creating Web pages yourself, and a variety of advanced topics. It's \$29.95.

Contact Osborne McGraw-Hill, 2600 Tenth St., Berkeley, CA 94710 (1-800-227-0900).

Two from Macmillan. How many of you reading this column are really "into" personal computers (PCs), but find that your spouse is afraid to get his or her feet wet? *The Big Basics Book of PCs*, a 598-page, large-format Que book by Lisa Buck, et al., may be the answer, as it has just about everything new users need.

The book features "how to do it" sections with picture-by-picture steps, "do-it-yourself" sections that take you through hands-on projects, and 101 "quick fixes" to computer problems. It covers working with disks and files, using Windows, and more. My XYL, Millie, KD4SHM, says it's well worth \$19.99. She also has more patience with the book than with me as the teacher!

Then there's the *Computer & Internet Dictionary*, Sixth Edition. It's a 574-page Que gem that saves me time looking up computer terms while I write and read technical articles. The new edition, by Bryan Pfaffenberger, Ph.D., covers the latest in computer technology, with more treatment of Internet terms, acronyms, and jargon, with over 3500 definitions.

Contact Macmillan Computer Publishing

USA, 201 West 103rd St., Indianapolis, IN 46390 (1-800-858-7674) for a catalog.

A Bevy of Scanner Books. I'm continually surprised by the number of licensed radio amateurs who also are shortwave listeners (SWLs) and scanner enthusiasts, and I find myself listening a good deal more than I transmit. In this regard, while researching an article on radio scanner monitoring, I came across eight recent and not-so-recent scanner books in which many readers of this column may well be interested. Here they are:

AIR SCAN Guide to Aeronautical Communications, Sixth Edition. This 1995 book is a comprehensive guide to monitoring 26-896 MHz aeronautical communications. Its author is Tom Kneitel, K2AES, former editor of *Popular Communications* magazine. The new aero comms book is published by CRB Research Books at \$18.95.

Les Mattson's Dictionary of Scanner Terms, Slang and Abbreviations. This 110-page alphabetical directory is a roundup of on-the-air scanner terms, slang, jargon, and abbreviations. Police, fire, emergency medical, military, and federal terms are covered. The 1993 book is published at \$12.95 by DX Radio Supply.

Scanners & Secret Frequencies. This 1993, 318-page handbook by Henry L. Eisenson is a sourcebook for scanner users that covers practically every aspect of monitoring. Its large reference section lists numerous scanner resources of various types. It's published at \$19.95 by INDEX Publishing Group.

The Scanner Listener's Handbook. Ed Soomre, N1BFF's 1989 book, though now seven years old, still shines as a good "how to" overview of scanning from 25 to 2100 MHz. The 130-page book is in large format and is published at \$14.95 by Tiare Publications.

The Scanner Modification Handbook, Volumes 1 and 2. In these two books modification maestro Bill Cheek shows how you can make relatively simple equipment modifications and changes for a much-enhanced scanner. Each of these books is published at \$18.95 by COMMtronics Engineering.

The Ultimate Scanner. The third scanner modification guide by Bill Cheek, this 1995 book's goal is to tell you how to cover all bands and channels with your scanner and how to have complete control over everything that comes from your radio's speaker. The book is \$29.95 from INDEX Publishing Group.

Scanner Radio Guide. Larry M. Barker's 1993 book is a general introduction to scanning that gives you much good advice on choosing a scanner. The 148-page book is published at \$14.95 by HighText Publications.

The "Top Secret" Registry of U.S. Government Radio Frequencies, Eighth Edition. Tom Kneitel's reference book is an authoritative source of sensitive government frequencies in the range 30-420 MHz. The exhaustive guide to federal monitoring is published by CRB Research Books at \$22.95.

While these eight scanner titles are from a variety of publishers, all of them are available from CRB Research Books, Inc., P.O. Box 56, Commack, NY 11725 (1-800-656-0056). Many of these same titles also are on hand at Radio Bookstore, P.O. Box 209, Rindge, NH 03461-0209 (1-800-457-7373).

New from N1KPR. In the August 1994 column we highlighted Bob Betts, N1KPR's book *The Code Book: Morse Code Instruction Manual*. As we noted, it's a combination instruction

book and course-of-study manual for entry-level Morse students and upgrade candidates. Now, Bob has introduced the second edition, with more than twice the study and guidance material. At 82 pages and again in large format, the new book is \$19.95 postpaid.

Bob also has a completely new large format book, a companion to *The Code Book*. It's *HAM Stories*, a 70-page compilation of personal human accounts, experiences, and achievements of students pursuing the challenges of licensing and upgrading. It consists of 15 short stories illuminating the experiences of 15 very different students and their Elmers. Each story shows the reader how the student conquered his or her obstacles to learning. The book is \$9.95 postpaid.

For copies, contact R.W.B./C.G. (Publishing), 8 Little Fawn Drive, Shelton, CT 06484 (203-924-1120).

We Get Letters

Once again we're running out of space, so we'll wrap up this month's column shortly. But we would like to acknowledge some of the many folks who have written, FAXed, E-mailed, or otherwise communicated with your columnist over the past several months. A tip of the hat goes to Mark Hoersten, N8VEA; Mark W. Beighey, KE6DPE/HL9MBT; Bob Raymond, NE1I; and Press Jones, N8UG, among others. Thanks for corresponding.

Looking Back Five

Now you know what the column looks like in May 1996. But what were the hot topics in May 1991? This column was "From the Bookshelf."

We started off with books that month. These included the classic, *Antennas*, by John D. Kraus, W8JK; the *Radio Log-Master Resource and Computer Toolkit*, by Frank A. Vacanti; a personalized beam-heading list offered by Harry A. Tracy, Jr., WB5YLT; the *Radio Frequency User's Guide to the Space Environment Services Center Geophysical Alert Broadcasts*; *Fine Tuning's Proceedings 1990*; and *The DXer's Directory*, by Fred Osterman.

We also highlighted the *Top Secret Registry of U.S. Government Radio Frequencies*, Seventh Edition, by Tom Kneitel, K2AES (see this column for the Eighth Edition). We also introduced CQ Communications' then-new *Communications Quarterly* magazine and several computer books from Osborne McGraw-Hill.

Equipment-wise, we highlighted the Navy Special antennas, mobile whips from Tony Allen, GW4YY; the Palomar Engineers PT-340 Tuner-Tuner transmatch; and Rutland Arrays Yagis. Soft-wise, we discussed Brian Beezley, K6STI's MN 3.5 antenna analysis software, and the QEdit series of text editors from SemWare.

In the same column we did a tongue-in-cheek revisiting of Murphy's Engineering Laws, presented tips for eliminating cable TV RFI, and discussed a sobering study of lightning conducted by Richard Orville of the State University of New York (SUNY).

Wrap-Up

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

Overheard: Famous last words: We don't care. We don't have to. We're the telephone company. 73, Karl, W8FX

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.

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DOUG'S DESK

CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORY

Some Lab and Workshop Tips

There are many established short cuts and cost savers associated with homemade radio equipment. Old timers, especially, keep many of these secrets locked away in their heads without the thought of sharing these routine procedures and kinks with amateurs who are just starting to explore the fascinating world of "home brewing." This month I will pass along some of the techniques I use for keeping the cost of my projects within the means of my hobby budget.

Inexpensive Meters

New, commercially manufactured DC meters cost more than all of the other parts for many projects. Furthermore, cutting large, round holes in panels in order to accommodate the meters can be time consuming. The price associated with suitable hole punches for meters is generally prohibitive today, especially if the punch is to be used only a few times over a spread of years.

Many dealers of surplus electronics components offer edgewise-mounting FM tuning meters for less than \$5. Surplus S-meters for CB transceivers are frequently available for a similar low price. Photo 1 shows a CB meter that I installed in a Murch antenna tuner when the original instrument became defective. Although the meter has an S-meter scale, it is a simple task to pop off the plastic cover for the meter, remove the existing meter face, and replace it with a homemade SWR scale, or one that is calibrated from, say, 1 to 10. The new meter face can be drawn to twice or greater scale, then reduced to scale by means of a photocopy machine. The reduction tends to disguise the flaws in one's artwork. The meter face is pasted over the original one. Rubber cement is good for this task. The photo 1 example shows that the replacement meter was smaller than the original one. Therefore, an adapter plate has been glued to the inside of the panel. It would appear less intrusive if I had painted it the same color as the panel. Most tuning- or S-meters of this variety have a basic DC movement of 200 microamperes.

Beating The High Cost Of Cabinets

If you can tolerate a modicum of "ugliness coefficient," it may be worth your while to consider homemade equipment enclosures made from wood. Even the smallest of commercially manufactured project boxes cost enough to make a traditional Scotsman cry himself to sleep. I grew weary of trying to impart a commercial look to some of my projects, owing to the prohibitive cost of large cabinets. I chose wood and Masonite as the materials I use. Photo 2



Photo 1—Photograph of an inexpensive tuning meter for use as an SWR indicator in a Murch antenna tuner.

illustrates how $\frac{1}{4}$ inch plywood and $\frac{1}{8}$ inch Masonite can be combined to form a chassis and panel. The photographic example shows a receiver I built for 160 meters. The primary PC board is mounted vertically at the right. The small, flat PC board at the center is a preamp that can be switched in when needed. A home-built 12 volt DC power supply is at the far left.

The outer perimeter of the plywood chassis has $\frac{3}{4}$ " \times $\frac{3}{4}$ " white pine strips that are screwed to the plywood. These strips provide an anchor point for attaching the wooden cover for the assembly.

Surely the question about cabinet shielding will arise. This can be solved inexpensively by gluing aluminum Reynolds Wrap or thin hobby

copper to the inside of the chassis, cover, and panel. Bronze window screen is an alternative worthy of consideration.

Needless to say, smaller homemade equipment enclosures can be made quickly and cheaply from sections of single- or double-sided PC board material—my choice 90% of the time. The seams are joined with solder while using a 30 watt pencil iron.

A Source For Ferrite Rods

The cost of a single ferrite rod today is phenomenal! Furthermore, they are difficult to find. A solution to this problem is sometimes so obvious that it is overlooked. Photo 3 shows an assortment of ferrite bars and rods that I removed from junked AM BC-band transistor radios. Discarded radios of this type are frequently sold at flea markets for as little as \$1. Not only are the ferrite loop antennas worth far more than the price of the radio, but a wealth of other parts can be gleaned for future use. Disc ceramic capacitors, resistors, and 455 kHz IF transformers are among the useful parts you can add to your cache of components.

Most AM radio ferrite rods and bars have a permeability of approximately 125 (equivalent to Amidon Assoc. no. 61 ferrite mix). I have been able to rewind these rods for use from 160 through 40 meters without observing a significant degradation of the inductor Q.

A bundle of same-dimension rods or bars can be glued together with epoxy cement to form a ferrite core which can handle large amounts of RF power. These bundles may be used as cores for solenoidal-wound balun

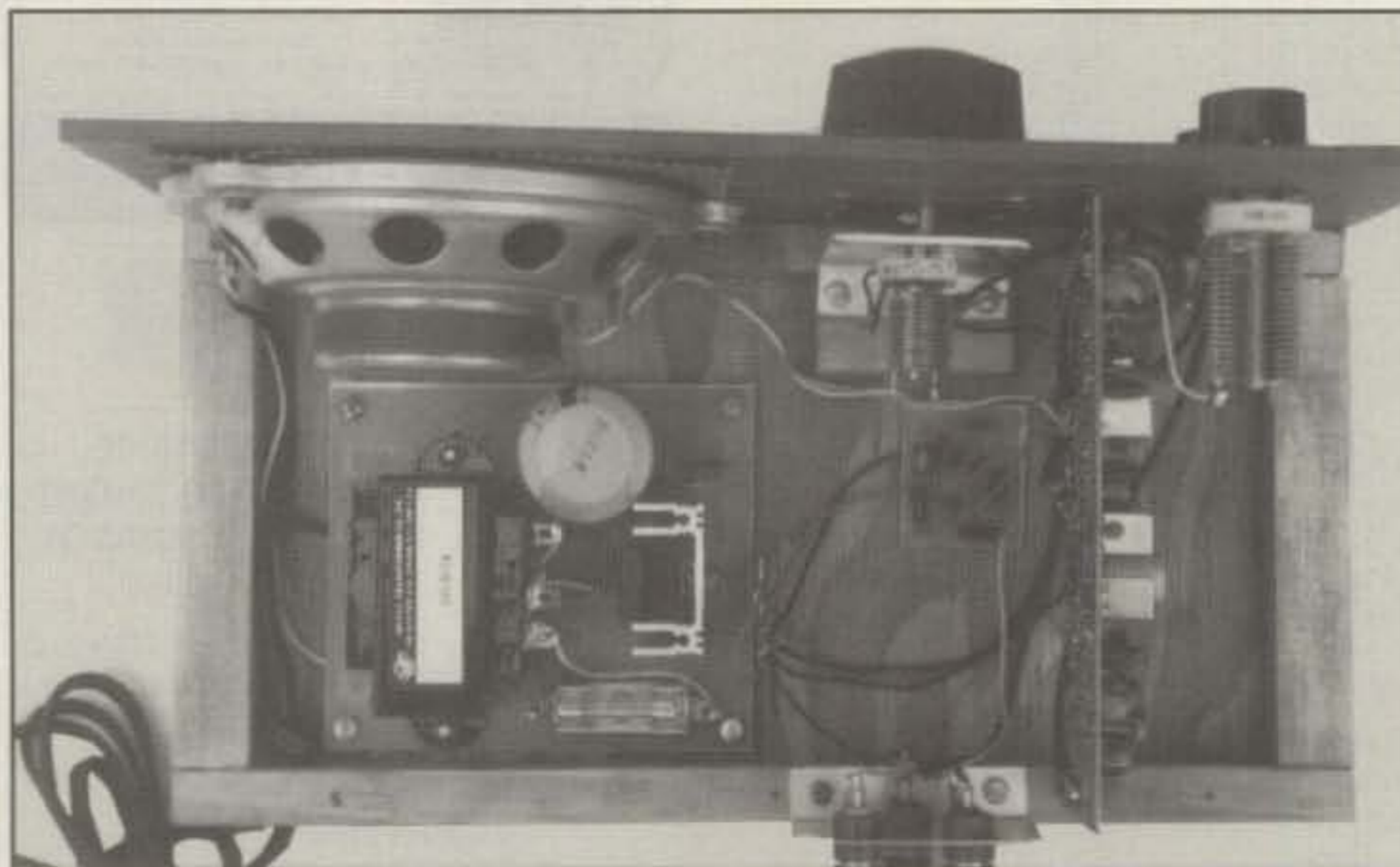


Photo 2—A homemade chassis and panel can be made inexpensively from Masonite and plywood, as seen here.

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transformers. They may be used in a like manner for filament chokes in linear amplifiers.

Tracking Down Power-Line Noise

Although some amateurs use AM BC-band transistor radios for pinpointing the source of line noise and other forms of manmade QRN, the task can be tedious because of the bidirectional response of the built-in ferrite loop

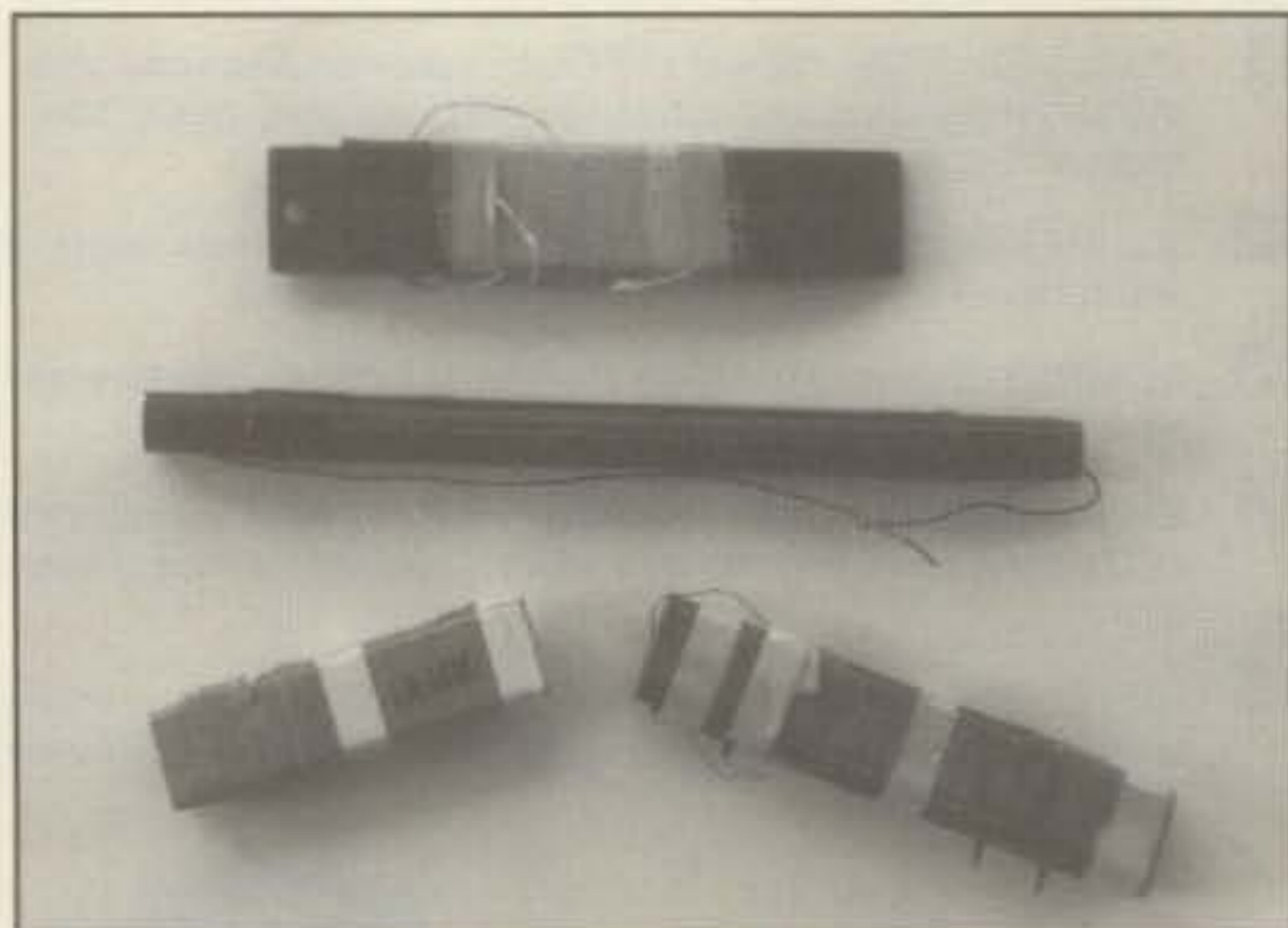


Photo 3— An assortment of ferrite rods and bars from discarded AM BC-band radios. These rods have many applications in amateur radio.

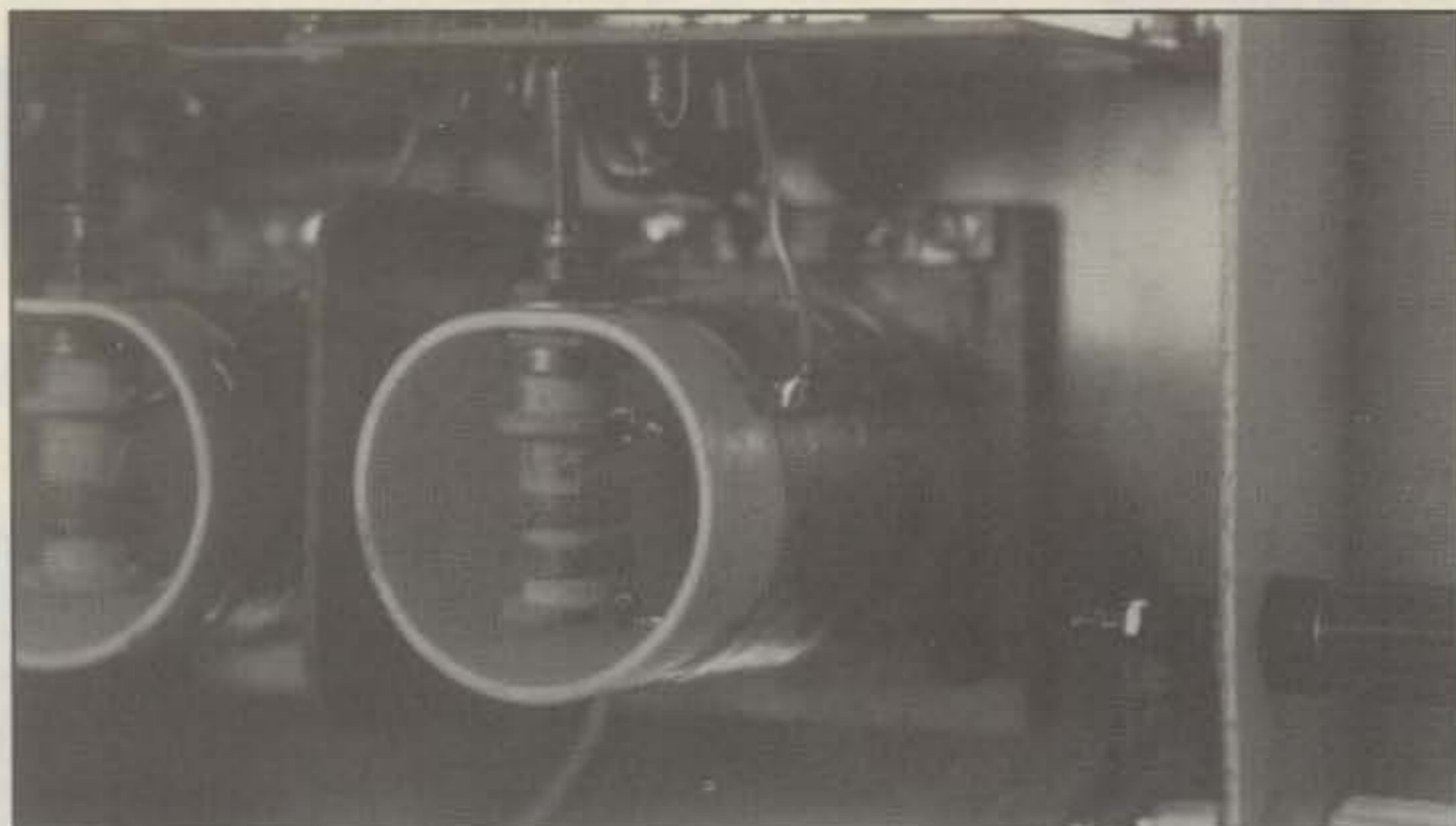


Photo 5— Slug-tuned coils can be used in series with large high-Q coils to allow adjustment of overall inductance. This provision is sometimes required for receiver tracking adjustments.

antennas. Manmade noise can be found more quickly when using a VHF AM receiver and a portable two- or three-element Yagi beam.

Ramsey Electronics (793 Canning Pkwy., Victor, NY 14564; 716-924-4560; catalog available) has the solution to this problem with its aircraft VHF AM receiver kit, model AR-1. An assembled unit is shown in photo 4. An S-meter can be connected to the receiver for observing changes in noise level. This requires connecting an IF amplifier (MPF102, for example) and a rectifier diode to the last IF transformer. A tuning meter of the type shown in photo 1 is suitable. An audio amplifier (2N3904, for example) and rectifier diode, plus a meter, can be used at the receiver headphone jack for visual observation of the noise level. Disabling the AGC in the AR-1 is a good idea, as this makes the observed changes in the noise level more pronounced.

Large Coil Inductance Adjustment

There are times when it is desirable to vary the values of large high-Q fixed-inductance coils. I needed to do this in a homemade 160 meter

receiver I built. In order to get proper tracking versus dial calibration, it was necessary to adjust the coil inductances along with the padders across the coils.

Photo 5 provides a view into the tops of two large hand-wound coils. J.W. Miller 42 series slug-tuned inductors have been mounted on the walls of the polystyrene coil forms. The slug-tuned coils are in series with the windings of the larger coils.

It is important to use the least inductance practicable for the smaller coils. Their Q factors will be substantially less than for the large coils. Therefore, the smaller the additional inductance the less effect the slug-tuned coils will have on the overall or aggregate inductance.

Closing Remarks

These are but a few suggestions for making your workshop endeavors less complex, while keeping your wallet from being needlessly raided for radio parts. There are probably better ways to achieve what has been described here. Your ideas can be shared through a CQ magazine article with your own byline. Please give this some consideration.

73, Doug, W1FB

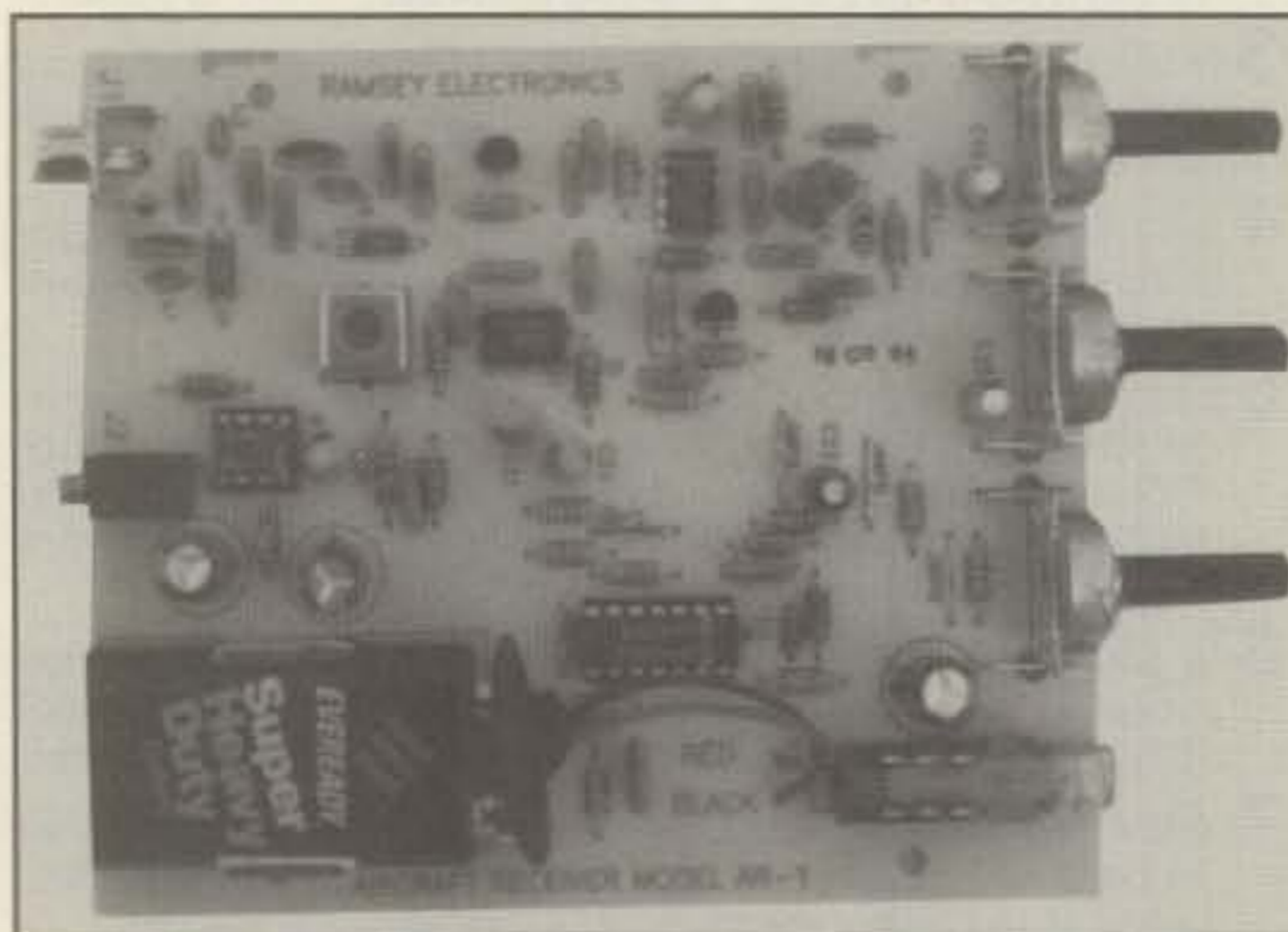


Photo 4— An assembled Ramsey Electronics model AR-1 VHF AM aircraft receiver. This unit is suitable as the heart of a receiver for tracking down manmade noise (see text).

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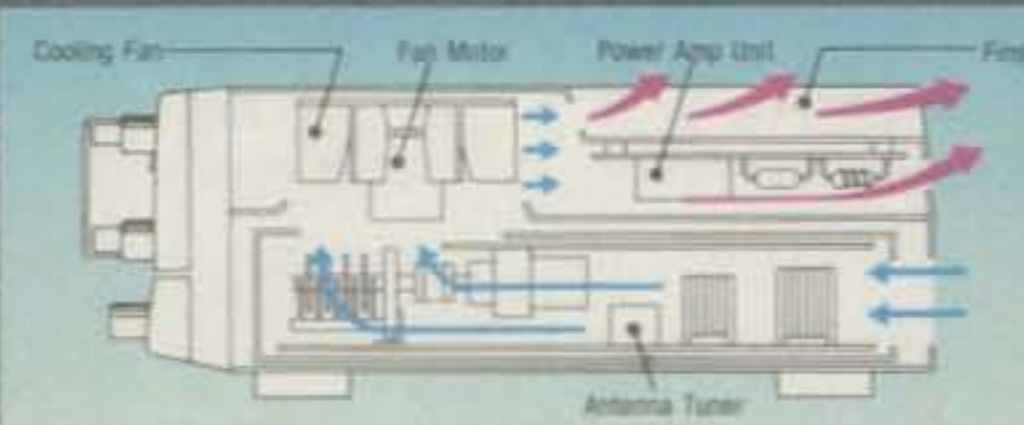


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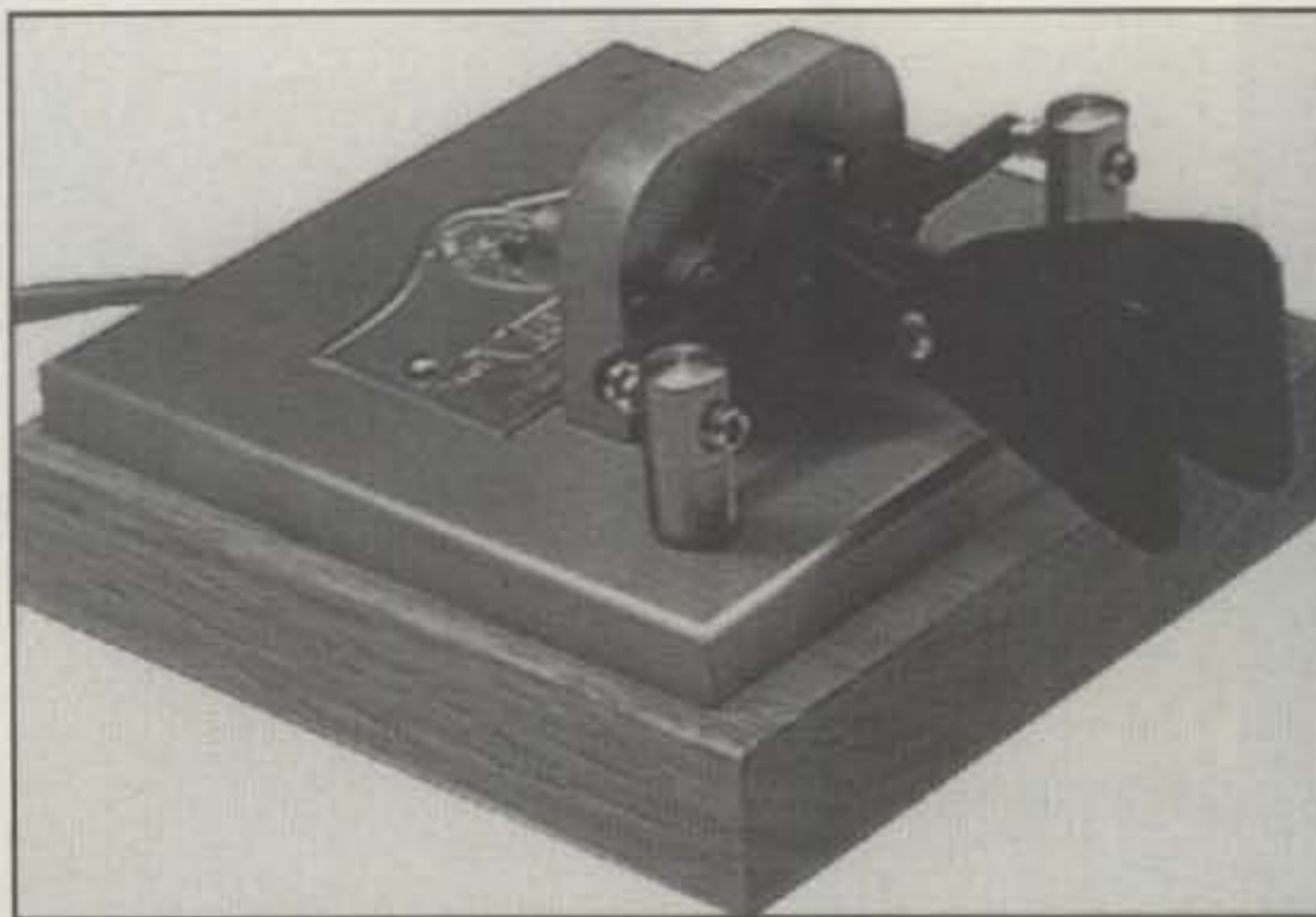
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WORLD OF IDEAS

A LOOK AT THE WORLD AROUND US

QRP '96: Milliwatts and Micronauts—Part II

What, more QRP? You bet! Last month's column seemed complete when I sent it to CQ's offices. Then I talked with more fellow QRPers, built some new Sescor Micronaut kits, went bonkers over microminiature homebrewing, and the excitement started all over again. Why stop when you're on a roll?

Let's face it, gang. QRP is a pursuit (fever!) that gets in your blood, even if you only start with it on a casual basis. Yes, and shooting big guns out of the saddle with low power is only half the fun. Homebrewing simple projects for "sport QRP" is a world of its own. That's where last month's column comes into the picture. Hopefully, it inspired newcomers to build that very first amateur radio project and also provided amateurs of all license classes with a low-cost introduction to homebrewing with surface-mount components.

Microminiaturization is the wave of the future, and to the best of my knowledge, this is the first time it has been featured "hands-on" style in any major amateur radio magazine. Now that's exciting! Last month's column was filled with facts, however, and there was precious little room left for including "go for it" guidance and encouragement. That theme has thus been carried over to this month's column with a "show and tell" format. Enjoy, start building and photographing your own Micronaut, and let's see your results.

But First . . .

Before getting started, I would like to share the to-date results of my January CQ column on "Helping Amateur Radio Grow." First, I must say the response was extensive. Good! We must take action to save amateur radio soon! The overall opinion (80 percent being old-timers, 20 percent being newer amateurs) ran 5-to-1 in favor of helping newcomers get closer to the mainstream of amateur radio activity. How? By lowering code-speed requirements to 5 WPM for the General class license, but leaving the Advanced and Extra class license (with its 20 WPM code requirements) unchanged. That makes sense. Requesting sacrifices without offering rewards seldom works. New Zealand amateurs recently proved that fact with their proposal to drop all code requirements for obtaining an HF license. The proposal was defeated (annihilated) almost immediately. Surprising? Not really. In order for any proposal to succeed, it must represent a win-win situation. A creditable number of U.S. phone operators do not work CW, but they are serious about new amateurs passing a code exam to "ensure good on-the-air discipline." New amateurs want to uphold that heritage, so the logical solution is integrating a 5 WPM code test and a "good phone operating technique"

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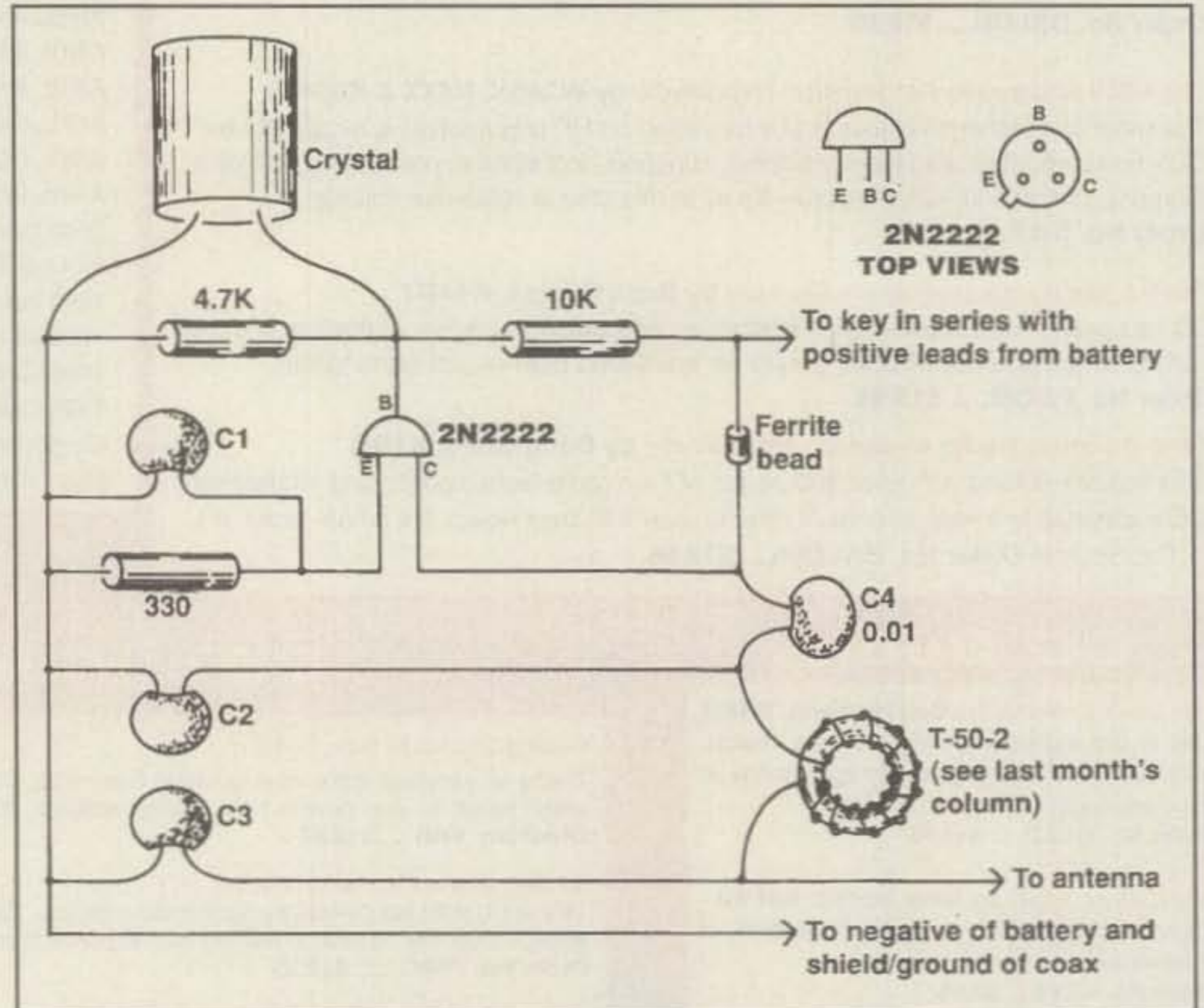


Fig. 1—Pictorial diagram of "made from scratch" Micronaut illustrating parts layout and wiring of basic homebrewed Micronaut. (Discussion in text.)

exam into a General Voice test. If that licensee later wishes to work CW, he/she must pass a 10 or 13 WPM Morse code exam. Why test on an area an operator is not going to use and overlook an area an operator will use, right?

So what steps do we take now? Obviously, getting endorsements from big amateur radio groups is vital. Let me know what you think.

Remember last month's true-life tale of QRP reeling in the DX during our present low point in the sunspot cycle? It happened again last night! Once again I was curled up in my den chair while tuning 30 meters with my little Index Labs QRP PLUS transceiver, writing a couple of paragraphs for this month's column, and Paco the parrot was watching everything from my shoulder. There was not one signal audible on the band. I quickly checked 40 meters; signals were few and weak. It was 9 PM on Monday night, so I just tuned to the Northwest QRP Club's net frequency of 10.123 MHz and let the rig play. Sure enough, within 5 or 6 minutes, a surprisingly strong signal emerged calling CQ: LU6Z in Argentina. I quickly answered his call and received a 459 reply. No one called him after our QSO (was he truly in Argentina?). Then OA4DBO/QRP in Peru began calling CQ down 1 kHz. Wow, the band really was open!

These guys were legit! Once again I answered the CQ with full confidence, and once again I received a 459 in return. Ah . . . but the main point is this was a two-way QRP QSO. Both of us were running only 5 watts! We exchanged a few words to prove we actually were copying each other, congratulated each other on QRP success, and then signed off.

QRP did it again! We could continue these "true tales of QRP" several more pages, but our Micronauts are calling. It's time for more life in the fun lane!

Homebrewing A Micronaut "From Scratch"

Since the basic Micronaut makes a perfect first project for new amateurs, let's start (continue) this month with more "how to" notes on circuit assembly and soldering. A pictorial diagram of the little transmitter is thus shown in fig. 1. The parts are mounted on a small (1 or 1.5 inch) piece of perfboard, with their wires inserted through holes on the perfboard. The large dots at wire junctions indicate solder points. Crimp or twist (only once) together all connecting wires at each of these points. Then use a small 15 or 25 watt iron and thin (PC-type) resin-core

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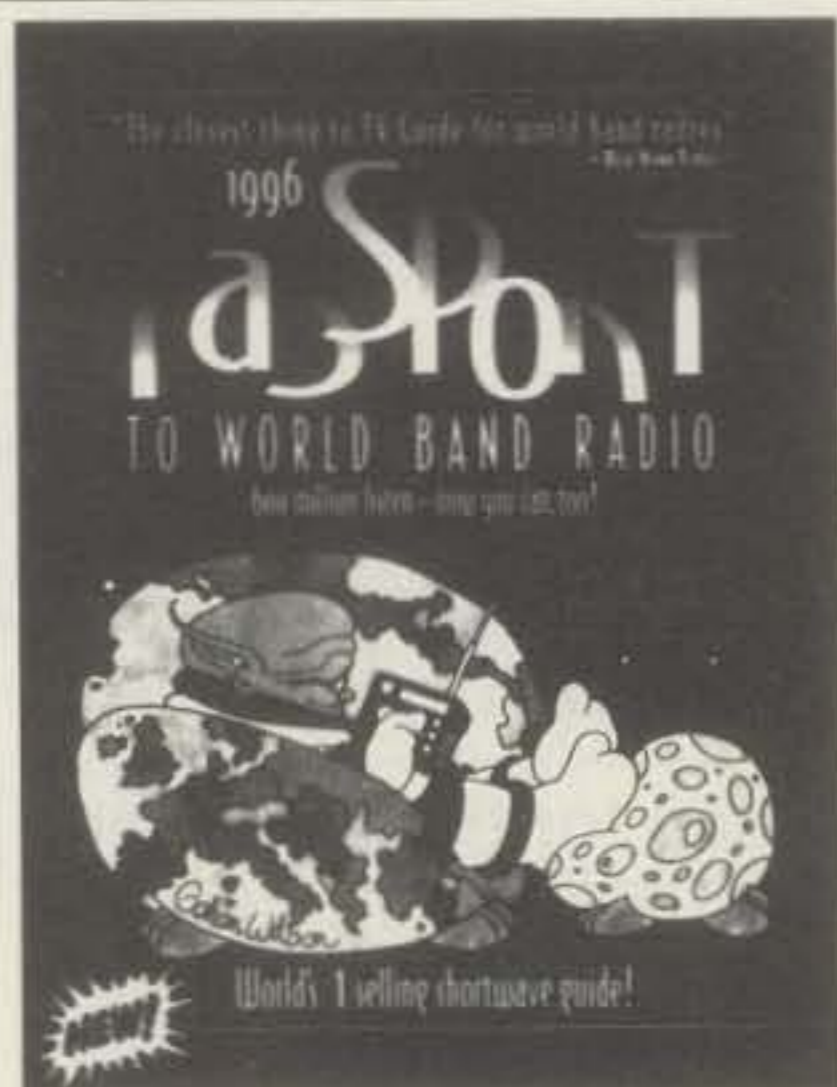
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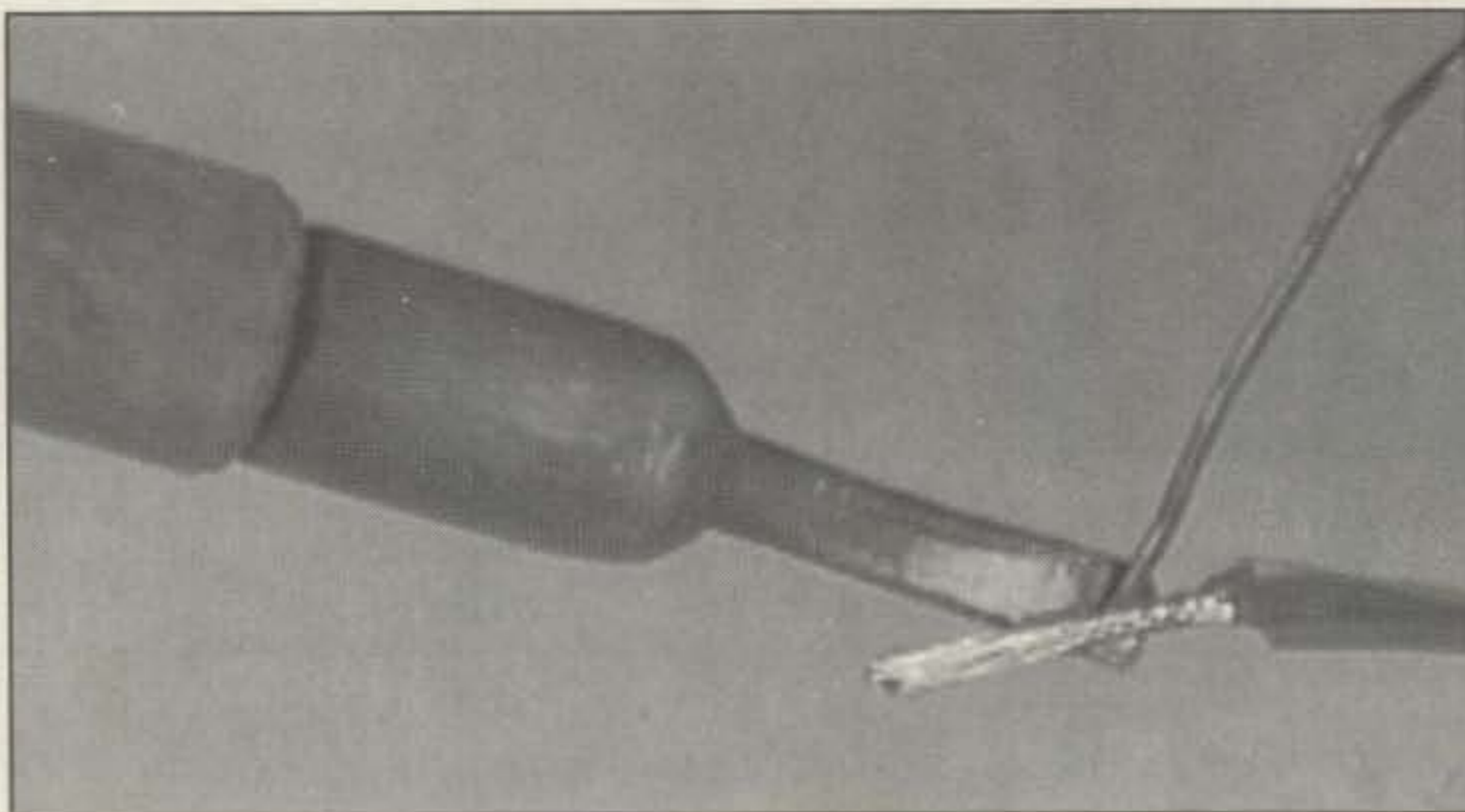


Fig. 2—Soldering wires involves first twisting them together for solid electrical contact, then heating junction with soldering iron. Apply solder to junction, allow it to heat and spread, and then remove iron. Cut off excess wire ends after solder cools. (Photo courtesy Sescom, Inc.)

solder to make the junction permanent. The transistor and crystal are sensitive to excess heat, so hold/clamp each wire of these components with your needle-nose pliers when soldering them. Example: clamp the emitter's wire, solder its end while letting the pliers block heat from conducting through the (hot) wire to the transistor, and then let the soldered junction cool. Wait a few seconds more, and then move to the transistor's base and repeat the procedure. Clip-on heat sinks such as those sold by Radio Shack nationwide can be substituted for pliers, if desired.

Two case styles or "shapes" of 2N2222 (or PN2222) are popular today, so pin connections for both types are included in fig. 1. Note these are top views. The emitter and collector "swap places" when viewed from the transistor's bottom.

Have you ever wound a toroid coil? Start by cutting a 4 foot length of number 28 or 30 enamel-coated copper wire and threading one end

through the core's center. Wind a turn around part of the core, again thread the wire through the core's center, and then continue winding turns 3, 4, 5, etc., as specified in last month's column in a similar fashion. Pull each turn tight as you go, space the turns evenly around the core, and remember it's perfectly acceptable to start all over with fresh wire after you get the hang of toroid winding (first tries are always the worst). Finally, remember to scrape the enamel coating off the wire ends (using a small knife) and double check for good conductivity with your VOM before soldering the coil into the Micronaut's circuit.

Your Micronaut will probably work great right from first power-up, but if it does not, here are some points worth remembering. The basic circuit should work ("oscillate" or transmit a carrier signal) without the output filter circuit or an antenna connected. In other words, just R1, R2, R3, C1, the transistor, and the crystal (plus a battery, naturally) make up a working

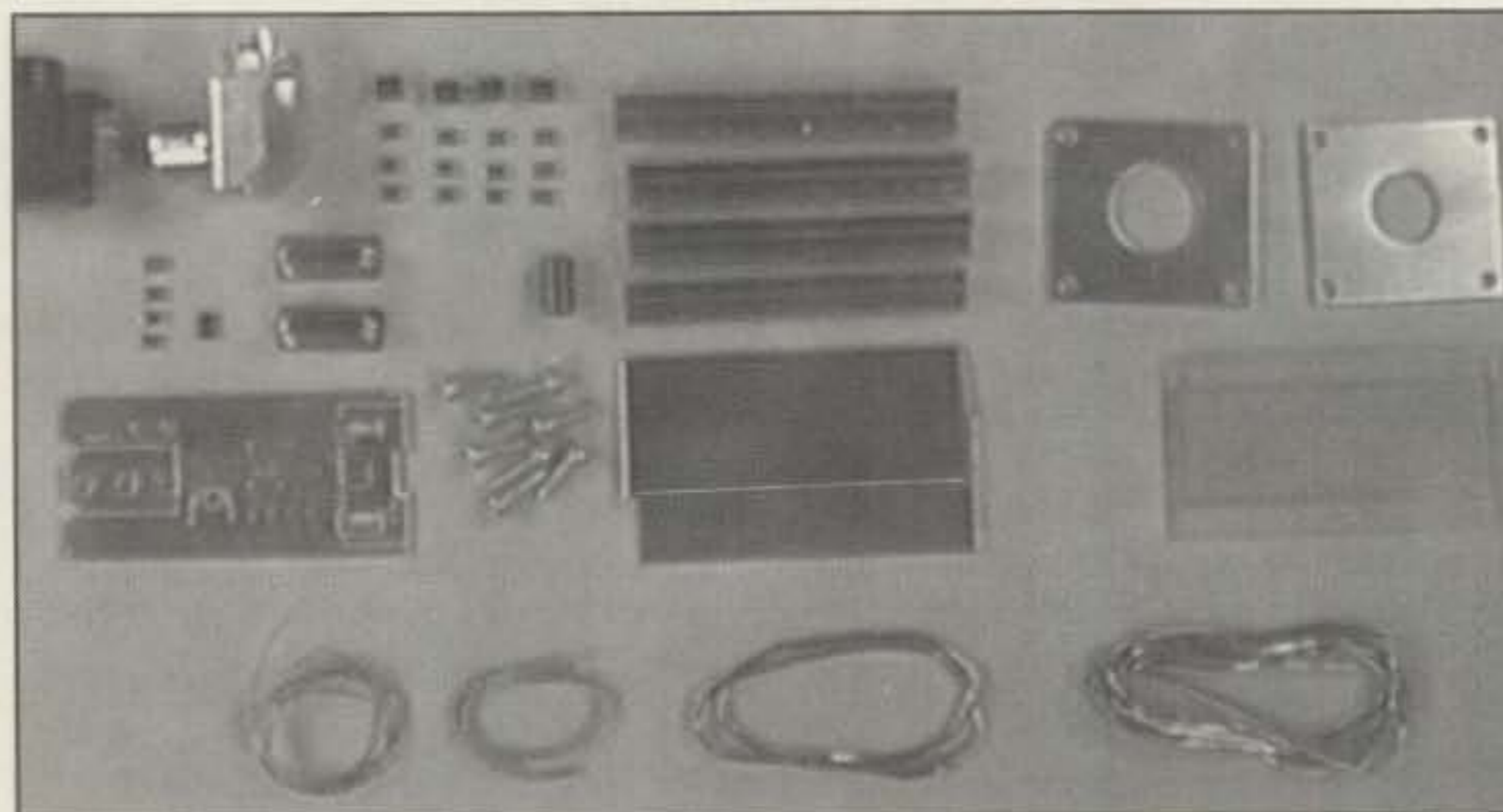


Fig. 3—The complete surface-mount kit as received from Sescom. Below sockets (on left) are the three resistors, collector capacitor, transistor, and crystals for 3.58 and 14.318 MHz. To the right of sockets are surface-mount inductors and related capacitors for 80, 40, 30, and 20 meters. Case parts are on the right side of photo. Solder, wire for RF choke, and desoldering wick are on the bottom. (Photo courtesy Sescom.)

unit. If you cannot receive that bare unit's signal, try using a 2 or 3 foot unshielded wire as a receiving antenna. Place it near your Micronaut, and then tune your receiver ± 10 kHz of the crystal's frequency while sending code. After your Micronaut is working, add the output filter section and an outdoor antenna, if you are ready for "serious Micronauting." Alternately, just use a short, dangling wire as a mini antenna for around the hamshack or hamfest fun and games.

One final note pertains to both "junkbox-homebrewed" Micronauts and Sescom's full kit Micronauts: get either type working and perking in fine style using 3 volts for power (such as two AA batteries or two watch batteries) before using bigger batteries. If that concoction does not work at power-up, you will then know which item is at fault, and you can experiment with homebrew battery ideas to your heart's content.

If you are a newcomer to the technique of soldering, here are a couple of suggestions to help you. First, never touch the iron's metal end. It gets very hot, and burned skin is painful! Let the iron warm up a few minutes, then touch a little solder to its tip for "tinning" (making a fine coating of solder on the tip to aid in soldering). Let the solder sit and smolder a few seconds, and then wipe the tip with a damp sponge or moist cloth (rather briefly to avoid burns) to remove excess solder. Now for practice, twist two or three discarded wires together so they "hold," place the iron's tip to the junction, hold it there a couple of seconds, and then apply solder to the junction (fig. 2). When the junction gets sufficiently hot, the solder will heat and flow over the wires ends. Perfect. If solder does not flow immediately, there is a tendency to apply it directly to the iron's tip and then "wipe it" on the junction. No, that step can produce a "cold solder joint" that may not conduct current after it cools, or may stop conducting after a few days. Now let's talk about Sescom's Micronaut kits.

The Sescom Kits

Frank Miller and the group at Sescom, Inc. (2100 Ward Drive, Henderson, Nevada 89015-4249; phone 1-800-634-3457, fax 1-800-551-2749) did an outstanding job of putting together Micronaut Kits (see figs. 3, 4, and 5). They include all the parts for various bands, miniature crystals for 3.58 and 14.318 MHz, solder, desoldering wick, sockets, and the enclosure, and the price is still less than \$15.

What is the significance of 3.58 and 14.318 MHz crystals? They are components used in TVs and computers, and are thus readily available. You can, of course, save the crystals for another project and telephone-order your own specific-frequency crystal from JAN, etc., as discussed in last month's column. Getting all the output filter components with the kit, however, really minimizes parts-hunting hassles. Sescom also realized these Micronaut kits are genuine "conversation items" that will be shown off as much as they are used, so two sides of the enclosure are clear plastic for viewing the circuit.

Sescom's "full size" kit has a predrilled and ready-to-solder 1.8 by .6 inch printed circuit board that fits in a 2.0 by .75 inch enclosure. An RCA phono socket on one end is used for the antenna connection, and a 3.5 mm jack on the other end inputs key-interrupted voltage for



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Fig. 4— Top and side view of Sescorm's "full size" kit assembled and ready for action. Unit is supplied complete with all parts, circuit board, case, and "Micronaut" nametag. (Photo courtesy Sescorm, Inc.)



Fig. 5— Sescorm's miniature/surface-mount kit. This little delight is also supplied complete with all the pieces, and measures only 1.4 by .8 inch. (Photo by Sescorm, Inc.)

power. A couple of watch batteries probably could have been squeezed in the case, but Frank and I agreed that opting for a socket so various power sources could be used was a better idea. Hmm . . . I wonder who will be the

first QRPer to series-wire some grapefruits (punctured with zinc and copper nails for negative and positive terminals) to power their Micronaut. As I said earlier, this is a fun project to pique your creative thinking. My "first

shot" at assembling a Micronaut kit, incidentally, took only about 30 minutes, and it worked like a little champ.

Sescorm's micro-component/surface-mount Micronaut kit is a special treat. It, too, is sup-

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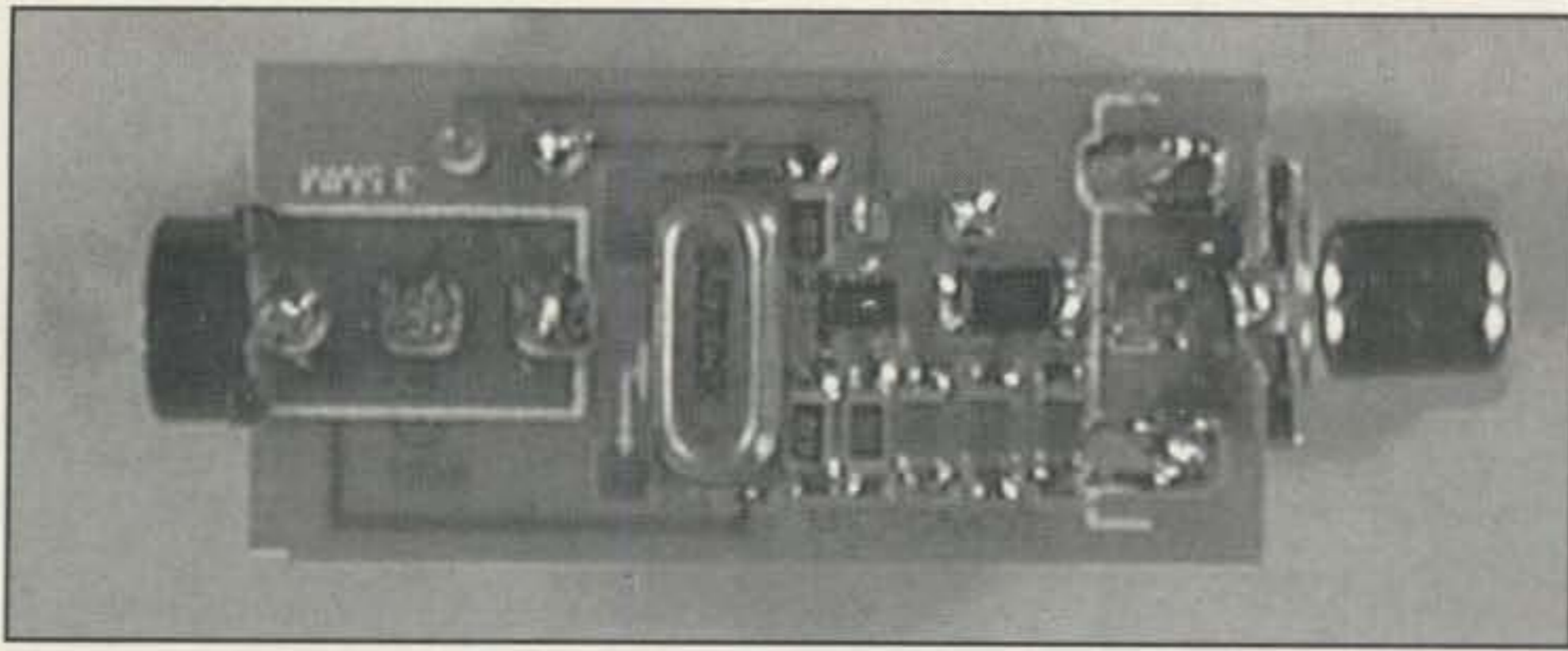


Fig. 6— Top view of surface-mount Micronaut assembled and ready to install in case. Power socket is on the left; crystal is beside it on right. Transistor is on right side of the crystal in the board's middle. Filter coil (in surface-mount case) sits to the right of the transistor, filter capacitors are below the coil, and antenna socket is on the right. Special thanks to Sescom, Inc. for photos (which, incidentally, were "shot" with a camcorder, converted to high-resolution Mac computer data, stored on a 3.5 inch disk, and printed out at CQ.

plied with all the parts, two tiny crystals, and a "see the circuit inside" enclosure. Building one of these little gems truly escalates one's "radio enthusiasm" 10 dB! A photo of an assembled unit ready to install in its case is shown in fig. 6. The board measures 1.1 by .6 inch, and the case is 1.4 by .75 inch. Although not shown, a "Micronaut" nameplate is also included. Add a metal retaining clip to the enclosure's corner or top, and you have a super-unique key fob. Some of you may be hesitant to try home-

brewing, especially with miniature surface-mount components. What's the worst that could happen? You could make a soldering mistake or botch up a board, right? That's the beauty of these kits; they are ultra low cost—almost "pocket change"! (And yes, you can get another board from Sescom.) So go ahead and take a shot at it. Live a little! That's how you learn about new areas!

The key to working with surface-mount components is using the right tools—namely, a 15

or 20 watt soldering iron filed to a pencil point tip, ".020" diameter solder, eyebrow tweezers to handle parts, and a large magnifier to see the micro-parts. I use a self-supporting and illuminated magnifier so both hands are free for assembly. I move components into place one at a time, tack-solder one connection for "holding in place assistance," and then solder the other connection. Later I go back and resolder "tacked joints." A number of better ideas and guiding suggestions are possible in this new area, so Sescom put together a superb "how to" video for helping amateurs. The video walks you through assembling surface-mount projects in plain language with views such as looking right over a technician's shoulder. The video's cost is surprisingly low (\$9.95), and I heartily recommend it. Sescom's video order line is 1-800-634-3457.

Conclusion

Let's wind down this month's coverage of the Micronaut with some just-for-fun challenges. Who will be the youngest/newest licensed amateur to build a working Micronaut? Who can dream up the most unusual enclosure? Who will work the longest distance with a Micronaut? Hint: 30 meters often opens long path to Australia from the eastern U.S. around 2045 GMT daily. Who will spill their micro parts on the floor and spend the longest time retrieving them? Okay, now go for it, and remember to include an SASE when sending me letters or photos with your inquiries or results. Have fun, fellow Micronauters!

73, Dave, K4TWJ

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Bill Tynan, W3XO, Ham of the Year

AMSAT President, Bill Tynan, W3XO, has been named Ham of the Year by the Dayton Amateur Radio Association. His award will be presented to him at the banquet at the Dayton Hamvention later this month. The following is the text of the award courtesy the Dayton Amateur Radio Association and Newsline On-line.

"William A. (Bill) Tynan, W3XO, has championed the cause of VHF/UHF enthusiasts worldwide. He has been contributing editor for *QST* magazine's "World above 50 MHz" column for eighteen years, providing a medium to nurture new communication techniques, encourage DX performance and improve contesting rules on the VHF/UHF bands. He pioneered the establishment of the Radio Amateur Satellite Corporation (AMSAT). From the founding days of the first OSCAR-6 launch to his present post as President of AMSAT, Bill has sacrificed much of his personal time, talent and resources to the promotion and development of the amateur satellite program. His vision continues with the advent of the Phase 3-D project, scheduled for launch in December, ushering in an entirely new dimension of amateur radio operation."

It was around five years ago that I saw Bill at HamCom, the Dallas-Fort Worth area hamfest held each June. I told Bill that *CQ* and I were talking about my restarting the VHF column in this magazine. He could not have been nicer to me in encouraging me to become the editor of this column.

It was a few months later that I again saw Bill, again in Arlington. It was the occasion of the Microwave Update conference. I was awed by his ability to freely converse with the technical biggies. I said to myself, "No wonder he is such a good columnist."

By this time I had published just a few columns. At a break, Bill made a point to come up to me and tell me what a good job I was doing, and he did so in front of a number of those biggies. His mental pat on the back at that time gave this novice columnist a tremendous boost.

Bill and I have continued to keep in touch over the years. He has supplied me with many pieces of information that I have eventually used in this column.

Bill has been and continues to be a doer. What was not mentioned in the Dayton write-up was that one year Bill was president of the Central States VHF Society, president of AMSAT, and the columnist for *QST*. During that year he and his wife, Mattie, hosted an excellent conference for Central States, and still managed to juggle everything else. At that conference a few of the guys, Bill included, twisted my arm to host the CSVHF conference

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VHF Plus Calendar

May 1	ARRL 70 cm Sprint (<i>see text for details</i>).
May 3	Full Moon.
May 3-5	West Coast VHF Conference (<i>see text for details</i>).
May 5	Poor EME conditions.
May 6	Lowest Moon declination.
May 7	Moon Perigee.
May 10	Last quarter Moon.
May 11	ARRL microwave bands Sprint (<i>see text for details</i>).
May 12	Good EME conditions.
May 17	New Moon.
May 17-19	Dayton Hamvention.
May 18-19	ARRL 50 MHz Sprint.
May 19	Highest Moon declination. Poor EME conditions.
May 23	Moon Apogee.
May 25	First quarter moon.
May 26	Moderate EME conditions.

*EME conditons courtesy W5LUU.

in Oklahoma City the following year. Behind the scenes, Bill and Mattie gave my fiancée, Carol King, K5CPZ, and me a tremendous amount of support and encouragement which enabled us to put together our conference.

Bill continues to be extremely active in AMSAT circles. He is currently babying the Phase 3D satellite through all of the problems that it has been having and continues to encounter on its way to next year's launch. Additionally, he continues to be a watchdog when it comes to technical aspects of the VHF+ frequencies. In this latter capacity, in March he authored AMSAT's response to the ARRL's Spread Spectrum petition to the FCC. In that response he pointed out that AMSAT shares the League's desire to encourage this mode of operation, but with strong reservations, particularly regarding the 70 cm band, where the increased noise floor caused by this mode could severely affect certain types of weak-signal operation, particularly EME.

Because of his weak eyesight, Bill is affectionately known as "Mr. Magoo," after the old television commercial cartoon character who couldn't seem to dial a correct telephone number. Perhaps because of this limitation, Bill is particularly sensitive to people with disabilities, a sensitivity that Carol (who is blind) has observed many times.

As mentioned above, Bill was *QST*'s VHF columnist for over 18 years. Bill took over after several different columnists succeeded Ed Tilton, W1HDQ. In that capacity, among other activities, Bill championed the cause of the weak-signal calling frequency on 6 meters. Thanks largely to his efforts, foreign stations now have a chance to get through the state-side QRM.

Bill's accomplishments are way too numerous to mention in this short write-up. And it is inadequate to say here that he richly deserves the award. Nevertheless, I stand tall in saying

that I add my most sincere congratulations to Bill for having been chosen Ham of the Year.

The IC-706 Phenomena

ICOM tantalized us with this radio about this time last year at Dayton. It wasn't until late last summer, however, that they completed jumping through all the FCC hoops to get it accepted by them and into the marketplace. Then the dam broke!

Sales for the IC-706 have been non-stop. I've talked with several dealers across the country, and they all say that it is singly the hottest selling radio. One dealer at the Charlotte Hamfest even sold the radio out of his car when he ran out of inventory at his booth.

Ironically, a couple of years ago people were wondering if ICOM was going to leave the amateur market. It appears that with this radio they will be around for a long time.

The radio is selling well for many good reasons. We in the weak-signal community like the idea that two VHF bands have been included on an HF radio. Additionally, the 6 meter band has a full 100 watts output, thereby eliminating the need for a linear.

ICOM has billed this radio as one for any amateur. And it nearly is that! With the optional voice synthesizer (UT-102), it also opens up its use to the visually impaired.

The radio has received much publicity, both by way of two reviews (*QST*, March 1996, and *CQ VHF*, April 1996) and by way of the Internet. There has been considerable discussion on all the forums sponsored by the various on-line providers, as well as on the Internet reflectors and the world-wide web. Suffice it to say, these discussions have not stayed away from the controversial modifications to the radio.

Controversial Mods: Originally billed as a radio with continuous coverage to 200 MHz, the present ads don't boast of that extended

coverage. However, some publicity boasts coverage to 120 MHz, plus 144-148 MHz. Nevertheless, the manual still shows receive capabilities from 300 kHz to 200 MHz, with the caveat that they guarantee the specifications only on certain frequencies (all of the included amateur bands, but none of the non-amateur VHF frequencies).

So what's a harm going to do with a radio that tunes certain frequencies but is not supposed to be able to receive on those frequencies? Find out why it can't and "fix" the radio! Hence, the infamous "yellow wire" mod.

Regarding this modification, the reviewers each have taken a different approach to it. Rus Healy, NJ2L, author of the *QST* review, shies away from it, commenting only on how poorly the radio performs on the VHF frequencies outside 2 meters. On the other hand, Gordon West, WB6NOA, the *CQ-VHF* reviewer, devotes a sidebar to it, telling the reader exactly how to make the mod and even including a color picture clearly showing the yellow wire.

What happens if you clip the wire? From an inquiry on Compuserve, Gary Fiber, KF7XV, the ICOM service tech who knows the most about the radio, made the following comments in response: "Clipping the yellow wire coming from pin 4 of J4 on the PA board of the IC-706 causes the 2 meter receive filter to be active all of the time in receive above 60 MHz. This changes the characteristics of the receiver sensitivity curve to enhance the sensitivity around the 135 to 160 MHz range.

"Advantages: reception from 148 to 157 MHz is below 1 microvolt; and the air band receive frequency from 122 to 136 MHz is below 2 microvolts.

"Disadvantages: the FM broadcast band receiver sensitivity goes to around 50 microvolts; immunity to interference from TV channels 7-13 is reduced about 50 dB, or more; and [most important in this editor's opinion] the base of the affected transistor is floating and may cause erratic operation over the temperature range of the unit."

Tom Snellings, WB7ONU, ICOM's senior tech, states that they are aware of the various modifications floating around the country. He adds that as designed, the radio meets the FCC requirements for acceptance. Any modifications to the radio may or may not cause it to no longer meet the FCC's requirements, and ICOM will not check out customer-made modifications to see whether or not they may or may not continue to meet these FCC requirements. However, he also realizes that amateur radio operators are amateur radio operators and they will want to experiment.

In that regard, Tom points out that ICOM has a generous repair policy. If the broken radio comes to them under warranty, they will do everything they can to repair it. However, if it is obvious that modifications will take some time for repair, they will have to charge the customer. Tom gave one extreme example of an owner who cut out all the matrix diodes and added dip switches to the rear of the radio in an effort to see just how many different ways it could be configured. This modification obviously took quite some time to repair.

Nevertheless, in spite of these modifications there are good reasons to pop the covers of the radio. There are three optional devices to be installed inside. They are the previously mentioned voice synthesizer, optional filters for either CW or SSB, and a high-stability crys-

tal unit (CR-502). Of these three, the last is the most difficult, requiring the exact placement and soldering of the device. Additionally, there are selection switches that must be set if you are using ICOM's AT-180 antenna tuner.

Regarding the filter, there is room for only one. You must choose from one of the four available: two CW narrow (500 or 250 Hz), a wide (2.8 kHz) SSB, or a narrow (1.9 kHz) SSB.

What about MARS operations? Tom stated that ICOM techs will tell the customer how to make such modifications, provided the customer has a valid MARS license, adding that if the customer does not feel comfortable doing them himself, he can usually find a dealer or a technician at major hamfests who will, for a fee, perform the modifications. While the HF mod

is quite simple, if you are planning to use this radio on the VHF MARS frequencies, you might want to consider consulting a technician.

Using the IC-706: As with the compactness of this radio, there are, invariably, compromises. Most of them show up in the "menu." One button (MENU) shifts the control of three other buttons (F-1, F-2, and F-3) to different functions. Sometimes you have to remember what you did in the previous menu before you perform a function in the next. For example, you can't switch between VFOs (M1) when you are in the "memory" mode (M2).

The other compromise is in band switching. Changing bands is accomplished by pushing the "TS" button and rotating the frequency knob. Once you have accomplished the band

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change, you have to push the "TS" button one or two more times, depending on your preference of tuning speeds.

These compromises are what cause some people (particularly the visually impaired) to have problems with the operation of the radio. The only announcements the voice synthesizer makes are mode and frequency. There is no announcement of the various functions on the menu. Nevertheless, when going around the four menus, you hear a short tone, except when you arrive back at the first menu (M1). There the tone is noticeably longer. For the visually impaired person to use the radio, he or she must memorize the functions of each of the three function keys (F-1, F-2, and F-3) as they relate to one of the four menus. Even then, there is a bit of an aid in that a different pitch (lower) and longer length tone is sounded when you try to perform an operation that is not allowed.

It is possible to work around the frequency changes by making liberal use of the 99 memories available on the radio. These memories are surprisingly simple to program, even for split operation on 2 meters (it uses both VFOs, assigning one to the primary frequency and the other to the offset frequency), with one caveat. The "duplex shift" frequency is preset at -600 kHz. In order to change the offset, you must go through a bit of a programming routine, involving turning the radio off and back on. For the one repeater that I use which requires a + (positive) offset, I found it simpler to set both VFOs manually and then program them into one of the memories. One other note concerning operating on a repeater frequency: When doing so, it is advisable to lock the

dial by hitting the "LOCK" button. Otherwise, you can change the frequency by turning the frequency knob, either in receive or transmit.

As equipped, the radio has two antenna ports: one for HF, plus 6 meters, and the other for 2 meters. So what if you need to operate different antennas on HF and 6 meters, which is most often the case? Bruce Stwertnik, N6BCM, of NGC/Comet, advised me that they supply a duplexer, model CF-360B, that will split the output into two ports. This duplexer is available from your local dealer for around \$70. If you choose to purchase this duplexer, be sure to note the "B" in the part number. Their other model, CF-360A, has the connectors reversed and will not work on the IC-706 without three adapters.

The disadvantage of this duplexer is that the cutoff frequency for the high port is 48 MHz. Therefore, if you are trying to track band openings up to 6 meters, you will not be able to use the duplexer effectively, in which case you can use a two-position coaxial switch. Daiwa's model CS-201a will suffice for this application, as it is rated from DC to 600 MHz.

Why the lower power on 2 meters? ICOM uses the Motorola MRF 255 FETs as output transistors. These 12 volt devices are rated only to 50 MHz. Presently there is no device that operates at 12 volts and linearly up to 144 MHz. Manufacturers using the high-power, higher frequency devices operating on 28 volts have to include a voltage-doubling circuit. One look inside this radio will reveal that there is no more room for anything else!

As with many compact radios, this one comes with a detachable head. Upon receipt

of proof of purchase of your radio, ICOM will send you (while supplies last) the OPC 581 separation cable. The head is easily detached, and with the cable, you can locate your radio just about anywhere in your car. You can permanently mount the head or stash it in the glove compartment or your briefcase while you are away from your car. A separate speaker is accommodated by plugging it into the headphone jack in the front, but only after setting the selection switch on the back of the head for "SPEAKER."

What about the noise blanker? Using this radio in my 1982 Ford van that needs a tune-up, I judged the noise blanker as adequate. Ignition noise is way down with the noise blanker activated. However, even with its shortcomings, I am not that concerned, because if I were using this radio in a rover operation, I would do so with a deep-cycle battery and the engine turned off, thereby eliminating that noise problem.

All this discussion about mobile operation brings me to my one objection about the radio. The supplied mic doesn't come with a DTMF pad. If you want to use an autopatch on the repeater, you must obtain ICOM's HM-77 mic, or its equivalent. Because I use this radio every week going back and forth to Dallas for school on both HF and VHF (on 2 meters for repeater operation), I need the versatility of being able to make phone calls with it. I found that the very next day after I acquired my IC-706, I was back at Oklahoma Comm Center asking for a different mic.

In preparing this mini-review, I really appreciate the assistance of Craig Boyer, AH9B, and Mike Crews, N5DDB, of Oklahoma Comm Center; Janet Margelli, WA7WMB, of HRO Anaheim; Gordon West, WB6NOA, of CQ-VHF; and Rick Lindquist, KX4V, of the ARRL.

CSVHF Issues Call for Papers

The following is from the VHF reflector on the Internet.

"This is a call for papers to be published in the 1996 Proceedings of the Central States VHF Society. The conference will be held July 25-28 in Bloomington, Minnesota. Papers should be of interest to Society Members and to amateur radio in general. Topics should be on VHF, UHF, Microwave, and related subjects. Here is a chance for you to publish information on that neat project that you have been working on.

"Submissions: Send an e-mail or letter to Jon, KØFQA, at liebe009@maroon.tc.umn.edu with a suggested topic and a brief description of the paper you would like to submit. The cut-off date for papers is May 1, 1996.

"For more information about the Central States VHF Society and about the conference, check our web page at the following address: <http://www.umn.edu/nlhome/m042/liebe009>."

Current Conferences

West Coast VHF Conference: The following is from Gracie Hastings, KK6CG: "The West Coast VHF Conference will be held May 3-5, 1996 at The Gateway Plaza Holiday Inn, 14299 Firestone Blvd., La Mirada, California. Special hotel rates are \$62 per night, double occupancy, plus local taxes. For reservations call 310-739-8500 or fax 310-523-9886. Do NOT call the 800 number. Please mention the conference by name.


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"Conference registration is \$1; the banquet is \$20; the breakfast is \$10, and a copy of the Proceedings is \$10. For more information contact Gracie, KK6CG, or Bob Hastings, K6PHE, c/o the Southern California Six Meter Club, P.O. Box 10441, Fullerton, CA 92635; telephone 714-990-9203, fax 714-990-1340, or e-mail at rhasting@ix.netcom.com."

Dayton Hamvention: This year's Dayton Hamvention has been moved to May 17-19. The VHF program is not available at the time of this writing. However, seminars will be held on Saturday from 9-11 AM. The AMSAT forum will be held on Saturday from 1-3 PM.

For you early birds, the VHF gathering that used to be held at the Barnsider Restaurant on Thursdays has been moved to the Radisson Downtown in the Ballroom A, Crystal Ballroom on Friday, May 17, from 7-10:30 PM. To get to the Radisson, take I-75 to the 3rd Street exit. The hotel is one block away. You can park in the hotel's parking garage, on the street, or in a nearby parking garage.

This gathering used to be a banquet, but the number of VHFers showing up just forced it into larger quarters. Now it is a reception/social hour. Drawings for prizes will be held at 9 PM. There is a \$5.00 entrance fee that will be used to pay for the room, munchies, and, if any is left over, for more prizes. For tickets, contact Tom Whitted, WA8WZG. Tickets presumably will be available at the door.

Current Contests

The 70 cm, microwave bands, and 6 meter ARRL Sprints are scheduled for 1 May, 11 May, and 18-19 May, respectively. See last month's column for more information.

First US-Guantanamo 2 Meter QSOs

The following is partially from an e-mail by Dave Collins, K2LME. According to Rene, WB4MJE, he and Dean, KE4NJM, worked KG4LL and KG4CM over a path of 518 miles on 2 meters on 28 February. Rene runs 4X16 plus 1 KW, Dean runs 1X3219 and 125 watts.

Lurene Lewis, KG4LL, and her husband, Cory Lewis, KG4CM, are running 125 watts from an IC-271H through two lengths of Radio Shack RG58 coax to a 4-element Yagi on a clothesline pole at about 10 feet and aimed into the 1000 foot plus mountain range. Dave states that the south Florida gang is working on improving their station.

Long-Term DXpedition To Jan-Mayen Underway

The following is via the Internet from Per-Einar Dahlen: "I am going to Jan Mayen 12 April 1996 and will stay until October. The current plans are to use two 18-element beams plus 1 kW for 144 MHz, a five-element beam plus 100 W for 50 MHz.

"I do not have any equipment for higher frequencies (sri). The operation will take place from IQ50 and IQ51 (maybe even IQ41). As usual, I am going to make as many EME and MS QSOs as my free time allows."

And Finally . . .

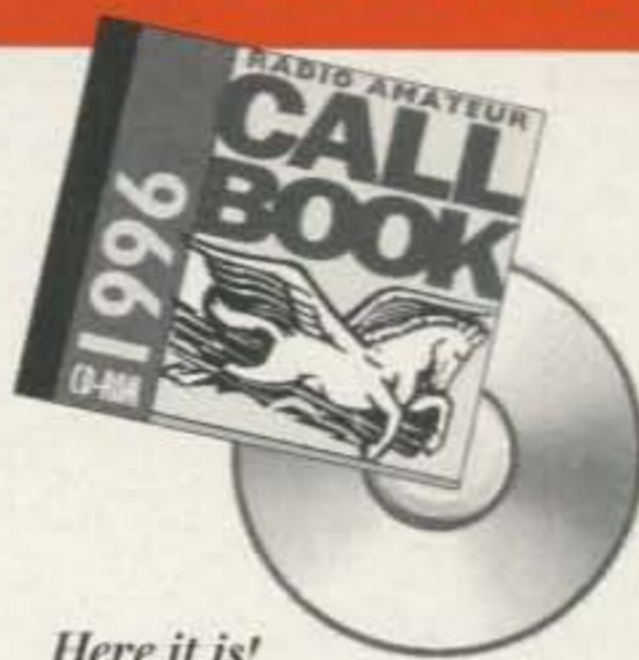
It's time for Dayton, that magical hamfest that brings out so many amateurs from all over. It's time to see what new radios are now available.

It's time to spend some of that saved cash on the hobby. But most important, it's time to renew old acquaintances and meet new friends. I am looking forward to seeing many of you, my old friends there again this year. In person, you will be able to brag to me about your latest accomplishment or your new radio. And perhaps I will be able to work your story into this column.

If you can't make it to Dayton and you have a story to tell, you can send it via all the familiar routes. Among them are e-mail, fax at 405-528-0746, voice at 405-528-6625, or the post office at the address at the beginning of this column. However you get your story to me, I am looking forward to hearing from you. Until next month . . .

73, Joe, N6CL

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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Getting Started—Part I

Here is the concluding part of this five-part article. Back issues of this magazine can be purchased from CQ.

QSL Cards

New amateurs are very anxious to receive confirmation (QSL cards) of their two-way contacts with other amateur radio stations. Unfortunately, most new amateurs don't order their own QSL cards until they finally realize that you have to send cards to have a better chance of receiving them. It is unwise to delay getting a supply of QSL cards until after you have upgraded and obtained a different callsign. Get a plentiful supply (500–1000) of top-quality QSL cards as quickly as possible, and send confirmations as you work stations. Good cards are said to generate a better response ratio than junk ones, and postage costs are so high that you may as well mail good cards. Many operators consider the QSL to be an integral part of each contact with a station they have not previously worked on the air. Some operators send many cards, while others send very few. Good operators usually record cards sent and received in their logbooks and make it a practice to be sure they have at least sent a QSL in response to each card received.

Advertisers usually have your callsign on material they send you even before you get your license from the FCC. It is a good practice to send a card to each station when you work it for the first time. Don't pull the old routine of telling the other amateur that you will send a card after you get her/his card. One doesn't have to be a genius to realize that no cards would ever be exchanged if all amateurs waited to get one before they sent one. Cards received during Novice band operation count towards operating awards you may seek after you have upgraded to higher class tickets. The QSL is part of any good contact. Properly (and completely) address each card you're sending via our domestic (U.S.A.) Postal Service. Improperly addressed cards often wind up in the Dead Letter Office.

It is wise for every new amateur to send their name and address to anyone who requests this information. Don't assume that every amateur has the latest callbook, because the average amateur uses one that's a bit ancient. When you have become a bit experienced, get in the habit of addressing each USA card as you are working the contact. If the other fellow's address is not in the callbook (or if it disagrees with the one she/he gave you), you can get correct information before you finish the contact. Indicate sent and received cards in your station log and do not file a received card



This is the first year of operation on the amateur radio bands for Raymond-Marc Dussault, VE2ZEP, who lives in Beauharnois, Quebec Province, Canada.

until you check your log to make sure that you did send your QSL.

Display. Most amateurs like to display some of the QSL cards they receive, and the best way to display them is in clear plastic holders. These QSL display holders are advertised in amateur radio magazines, and their use eliminates any need to damage prized QSL cards with tape or thumbtacks. It is also easy to rearrange cards being displayed in these holders. Similar clear plastic holders are available to conveniently display any operating certificates you earn.

DX Cards. Before leaving the subject of QSL cards, I want to advise you that almost all DX QSL cards being sent to American amateurs are received through the ARRL Incoming DX QSL Bureau. It takes too much time for a busy DX (foreign) operator to look up the name and address of each station worked and to write this information on each card. No name or address is required on cards sent through the bureau, saving a lot of time and effort for busy operators.

Relatively large groups of cards are packaged for shipment to each bureau, which is much cheaper than individually mailing each card. The foreign (DX) operator almost always routes QSL cards through the bureau system, and you must have self-addressed, stamped envelopes (SASEs) on file with your call-area DX QSL bureau to receive your incoming DX cards. Call-area DX QSL bureaus are listed in the domestic (U.S.A.) and foreign (DX) amateur radio callbooks advertised in amateur radio magazines. Get your envelope in to your bureau as soon as you start to operate, particularly if you operate in the 10 and 15 meter Novice bands, where it is common to work foreign stations. One of the many benefits related to ARRL membership is almost free use of their outgoing DX QSL Bureau. It is efficient, economical, and easy to use. Incoming DX

QSL cards are handled at no charge for all U.S.A. amateurs, whether or not they are members of the ARRL.

Instruction Manuals

Regardless of how simple or complex your station is, you owe it to your equipment and yourself to carefully read each instruction manual. Learn how the equipment functions and the exact purpose of each control. Whenever you purchase used gear, ask the previous owner for the manual. If you don't get a manual with a piece of used equipment, try ordering one from the company that built it. Sit down in front of your equipment with the manual and really learn what you have to work with. If all else fails, the *Sams Photo Facts* may provide a schematic and parts list.

Logbooks and Legal Considerations

FCC rule changes have almost eliminated our logging requirements, but many amateurs still prefer to maintain accurate and detailed station logs. It is advisable to obtain a full-size (not mobile type) station log and to record all station activities in a logbook.

Logging. It is best to record only four-digit 24-hour (0000–2400) UTC time in your log. Why use a local time which means nothing to other amateurs you work all over the world? Do your logging and scheduling per UTC and you will eliminate an unnecessary area of confusion. Maintain an accurate station log. Fill in your name, callsign, and location on the inside front cover. Do not write your own callsign in the log for each contact. Just use an "X"; this makes it easier to spot the callsigns of the stations you have worked. Do not repeat entries such as the emission type, input power, date, and frequency when they do not change from one contact to the next; just use quotation marks (or a line) to show that there was no change. This minimizes clutter and makes it easier to spot the changes which were made as you operated.

Indicate the month and year vertically at the upper left corner of each log sheet and just write the day in the blank space to the left of the contact entry line in your log. Enter a new date only when you are operating during a different day; this will again help keep your log free of useless clutter. Equipment changes should be indicated in the station log, along with all information related to your station/operator's license and your station's operation. Purchase a pair of #20 binder clips at a stationery store and attach one to the bottom edge of the logbook on both sides. These binder clips will prevent the log pages from getting dog-eared and torn. Your logbooks provide an excellent history of your amateur radio operation, and they deserve reasonable care. Most amateurs keep their logbooks as long as they live.

45527 Third Street East, Lancaster, CA 93535-1802

Current Address. Don't be fooled by FCC rule changes related to easing modification requirements for relocated stations. The FCC must still be able to reach you at the mailing address you listed on your Form 610 amateur radio station/operator-license application. You have trouble if the FCC can't reach you at your stated mailing address, so keep your address current. It is a good code practice to exchange names and addresses on the air, if you have been licensed less than a year, but amateurs do not like to do this if they have been listed correctly for several years in callbooks. It is also impractical to exchange addresses during contest contacts. If your finances will allow you to do it, get a current domestic callbook.

Rules and Regulations. Each amateur should maintain a current set of Part 97 of the FCC rules and regulations. This part covers our amateur radio service, and we are required to know these rules and regulations. Amateur radio is dynamic and this causes frequent changes to Part 97. An up-to-date copy of Part 97 can be obtained from the Superintendent of Documents, Government Printing Office, Washington, DC 20404, as part of FCC Rules and Regulations, Volume VI. I believe it is better to buy the current issue of the *ARRL FCC Rules Book*, which includes explanations of regulations and operating practices.

Third-Party Agreements List. Maintain a current list of countries (by their call signs) with which we have third-party agreements permitting the exchange of non-commercial messages between amateurs in different countries. It is possible that a DX contact will ask you to handle a message for her/him, and you should know whether or not it is legal to perform this service.

Identification. Normally, identification is only required at the end of each transmission. If a transmission exceeds 10 minutes in duration, identification is required at least at 10-minute intervals. If you're making a series of short transmissions in which no transmission is 3 minutes long (or longer), identification is just required at least every 10 minutes during such a series. Current FCC regulations just require us to identify our own station, but it is still good operating practice to identify both stations. Both stations involved in the contact are required to be identified only when international third-party traffic is being handled.

Interference

You may become aware of interference problems when you start operating. Contrary to what you may be thinking, it is much more likely that you will be bothered by interference than that your station operation will cause interference. Past experience in a major city's interference (elimination) committee taught me that any electric or electronic device can cause interference. It is common to trace interference to commonplace things such as fluorescent lights, light dimmers, neon signs, hair dryers, refrigerators, freezers, electric motors, electric drills, TV sets, electric blankets, heating controls, air conditioners, electric fans, computers, and just about anything else you can name. Interference commonly enters the receiver through the AC power line or the antenna input. It takes patience and effort to isolate and eliminate each source of interference.

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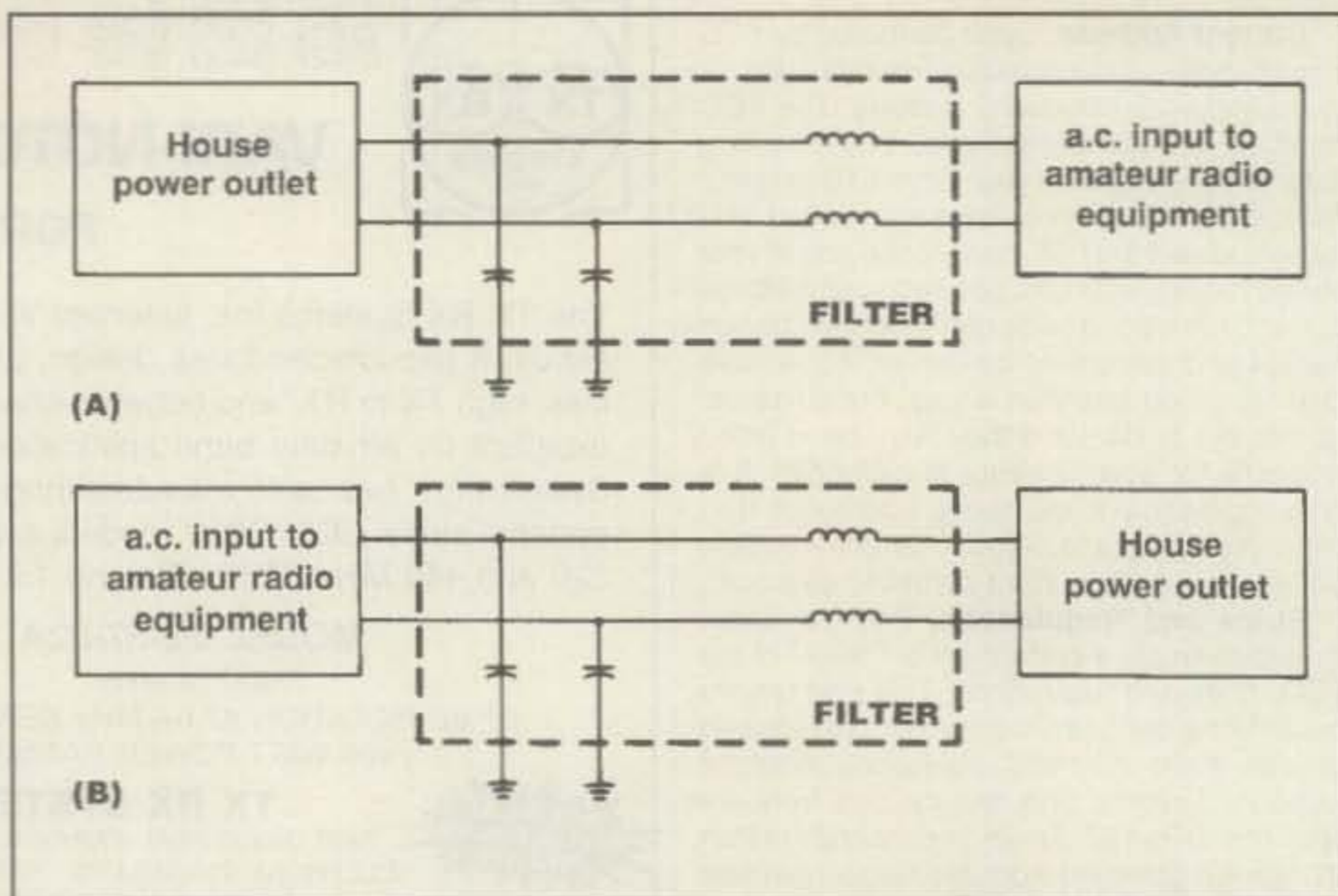


Fig. 1- Power-line low-pass filter connection. (A) Configuration used to keep household electrical interference out of amateur equipment. (B) Configuration used to keep amateur station interference out of house power line.

tive to eliminate or minimize power-line interference by installing a low-pass filter between the house-power electric outlet and the electric power input to the station equipment. If a power-line filter is being installed to reduce interference to the receiver, the filter configuration should be as shown in part (A) of fig. 1. If you have a particularly troublesome source of interference in your home, it is advisable to install a low-pass filter between that unit and its electric power input. The configuration of this type of filter should be as shown in part (B) of fig. 1. If a station is causing interference through the electric power wiring, the filter configuration shown in part (B) of fig. 1 should be used to eliminate this problem.

Radiated Interference. If your station causes interference due to radiated energy, it can be reduced or eliminated, but this is not always easily accomplished. A good low-pass filter in the transmitter RF output line can help eliminate radiated interference, particularly in a case of television interference (TVI). The low-pass filter is built into the transmitter output section of modern transceivers. Adding a high-pass filter between the TV antenna and the TV set can further minimize TVI, but the filter should be mounted directly on the TV tuner (channel selector) to be most effective. Do not install filters or other interference reduction devices on anyone's home entertainment units because that would make you liable for their future equipment repairs, even though the later problems may be completely unrelated to the changes you made. Be cooperative, friendly, and helpful in assisting neighbors resolve any interference problems, but do not touch their equipment.

Helpful Attitude. Very few interference complaints against amateur radio stations are found to actually be the fault of amateur stations. Nevertheless, it is very important to go out of your way to cooperate with any neighbor who reports interference. Very few people

are experts on interference, and the extent of their knowledge is usually that they have no problem except when you operate your station. Frankly, there is no reason to expect your neighbors to know what causes interference or how to eliminate this problem. Patience and understanding can help the two of you resolve any difficulty, can keep you on good terms with your neighbors, and can help keep your station on the air without interruption. Amateur radio has long enjoyed a favorable image with the general public, and it is worth the effort to maintain this situation.

Precautions. The possibility of your station causing interference can be minimized by using properly designed equipment, establishing an excellent station ground, using properly matched monoband antennas, and taking care to operate the transmitter correctly. Interference possibilities increase with higher RF output power, and it is often possible to minimize or eliminate a critical interference problem by reducing transmitter RF output power. In any case, it is best to operate the rig at less than its maximum rated RF output power.

Cable Television Interference. It is important for you to know that cable TV is required by law to be a closed system, which means it must not be susceptible to RF interference, and it must not cause interference to other radio/TV services. Simply stated, it is up to the cable TV outfit to eliminate any interference problem that occurs.

Perspective. Don't let an interference problem of any type cause you to panic and stop operating. Most problems are easily resolved. There are excellent books and magazine articles that can help you solve any problem. Stores have very effective low-pass and high-pass filters for sale. There are also many experienced amateurs who can discuss interference problems with you, and they should be able to suggest ways to isolate and eliminate interference. However, if you have an interfer-

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ence problem, you are the person with the most interest in finding an effective solution.

Broadcast interference (BCI), television interference (TVI), and telephone interference are usually much easier to eliminate than interference to unshielded high-gain audio amplifiers and other electronic home entertainment equipment.

Frequent contacts with active licensed amateurs disclosed that many of them have received a report that their operation caused interference. Most of the problems that do occur concern equipment in the amateur's own home. Almost all interference is mentioned in this article because it can occur, and you may have to take steps to eliminate it. Although very few amateur stations cause interference, almost all of them are bothered by interference. Even dirty insulators on electric power utility poles can ruin reception at your station.

Station Location

Decide the best location for your amateur station. You will be almost completely motionless for long periods of time as you operate, which makes it very important to select an area that is warm in the winter and is cool in the summer. Do not set up your station in a garage, cellar, or attic. If you can possibly avoid it, don't set up your station in someone else's room, as this would limit your operating opportunities.

Try to select a comfortable and readily accessible area in your home as your station location. Your operating position must be as close as possible to where your RF ground will be established and it should be reasonably close

to where your antenna transmission lines will enter your home.

Operating

Learn to keep each CQ call (general call to all stations) brief and to listen very carefully for answers before you start sending another CQ call. Good operators expect replies to their calls and listen for them, rather than immediately making another call. After making a CQ call, tune slowly above and below your own transmitting frequency and listen for an answer. Most replies are spotted within a few kiloHertz of your sending frequency, so don't tune too far or too fast.

Don't shortwave listen after you send a CQ call; if a station you hear sends even one character that isn't part of your callsign, tune past it and listen to the next one. Slowly tune above and below your transmitting frequency a couple of times as you listen for a reply. If you don't hear a response within 60 to 90 seconds, repeat your CQ call again and repeat the above tuning procedure. A series of short CQ calls is far more effective than one long CQ call. It is easier to send from written material until you become experienced enough to send out of your head. You have enough troubles as a new operator without worrying about what to send. You can use the following typical transmissions to help you out until you get some experience. Just substitute your own callsign in place of KB6RXU in these examples.

Initial Call

CQ CQ CQ CQ CQ DE KB6RXU

CQ CQ CQ CQ DE KB6RXU KB6RXU
CQ CQ CQ DE KB6RXU KB6RXU KB6RXU

Typical Answer

KB6RXU KB6RXU KB6RXU DE W6DDB
W6DDB W6DDB K

Typical Opening Comments

W6DDB de KB6RXU BT TNX FER DE CALL
BT UR RST 579 ? 579 HR IN LANCASTER, CA
? LANCASTER, CA ES NAME IS MARK ? MARK
BT HW ? W6DDB DE KB6RXU K

The typical opening comments effectively say, "Thanks for the call. Your signal is perfectly readable, moderately strong, and has good tone here in Lancaster, California, and my name is Mark. How do you copy? Usually these opening comments are kept brief because you don't know how well the other station is hearing you. When the other operator responds, he or she will give you the same type of information and should then open up the conversation to any subject that comes to mind. You're welcome to discuss anything you find interesting in subsequent transmissions.

That First Contact. When new amateurs make their first contact on the air, they usually are very nervous and make mistakes. I've seen new operators get so panic stricken by the first answer that they've turned off their gear. There have been other cases in which new amateurs didn't wait to turn off anything before they ran out of the shack. Just do your best and keep contacts short until you become more experienced and relaxed enough to enjoy chatting with other amateurs on the air. The Novice bands were established for begin-

ners, so don't be concerned if you sound like a beginner when you use these bands.

Operating Schedule. Set a reasonable operating schedule and stick with it. You should operate (not just listen) at least 7 hours each week while you are a Novice or a Technician-Plus licensee. An hour per day every day is more beneficial than a couple of long operating sessions a couple of days per week. You don't need an amateur license to be a short-wave listener; if you have a license, use it. Many improvements have been made and others are still possible. You should appreciate this excellent opportunity. Operate courteously, legally, and frequently. Be an asset to your community, club, country, and the Amateur Radio Service. Continue the long-established practice of welcoming and helping a fellow amateur whenever you meet one. Modern technology is

opening doors to fantastic communication breakthroughs. The best is yet to come.

Theory Advancement

It is more difficult to get ready to pass the theory part of the General exam if you have to teach yourself. Nevertheless, many amateurs have done this, and you can also make the grade. Don't spend a lot of money on textbooks. Local libraries have electronics and communications books which you can borrow for backup reference. All you really need is a license manual and a reference manual of your own. My recommendation to someone teaching him- or herself is to get an up-to-date license manual and a dictionary of electronic terms which provides simple but thorough explanations of all common electronic terms.

Classes. The best way to obtain the theory knowledge needed to pass a General exam is to attend a local licensing course. Most of these courses are advertised, and they are known to local amateurs and electronics distributors. Such courses help the prospective amateur, and they can also help a sponsoring club because many of the resultant new amateurs may join the club as active new members.

Examination Scope. Today's theory exams are more comprehensive than those used in the past. Long-licensed amateurs may have become expert due to commendable efforts, but they passed much simpler theory tests than you will have to pass. Modern exams cover many facets of electronics which were not known (or used) just 10 to 20 years ago. Don't assume that every amateur is technically able to help you, but don't be afraid to at least ask for help if you have a problem. Learn your material well and you won't care how the questions and answers are written in the FCC theory exams.

Upgrading. Passing FCC exams is not a matter of luck. It is a simple matter of having sufficient knowledge of required subjects. There is a great difference between the General and Advanced theory tests. However, since both have the same 13 wpm code test, you should apply for the Advanced license. If you pass the code test and the General theory exam, you'll get your General ticket, even if you should fail to pass the Advanced theory test. Some of our students have moved right up to the Advanced ticket from the Novice license. However, the General class license provides you with the use of 87% of all the high-frequency spectrum that is available to Extra class licensees. Upgrading to the Advanced class ticket increases this percentage to 95%.

Summary

This article provides useful introductions to accessories, antenna tuners, baluns, clocks, clubs, code, custom consoles, desk/table needs, dummy loads, equipment considerations, headphones, instruction manuals, interference, legal matters, lighting, magazines, operating, QSL cards, receiver characteristics, rules and regulations, stacking equipment, station location, SWR/power meters, transmission lines, and upgrading. If you want a copy of any of the previous four issues they can be purchased from CQ. If you know new amateurs, you could let them know about this source of information.

Photographs Wanted

Photographs of new amateurs in their shacks provide introductions to a few of the newer licensees. Photograph size is unimportant, but good definition, contrast, and subject matter are important. Color pictures can be used, but black-and-white photographs are preferred. Operating activities and achievements, plus a self-introduction, are needed with each picture. Send an SASE if a picture must be returned. A free one-year CQ subscription (or renewal) is awarded to the one amateur whose picture I select as the winner for the month. If you are a subscriber, please enclose the mailing label (or copy) from your latest CQ issue. One award is made each month, no matter how many photographs are printed. DX amateurs, who frequently work the American Novice bands, are also urged to submit photographs.

73, Bill, W6DDB

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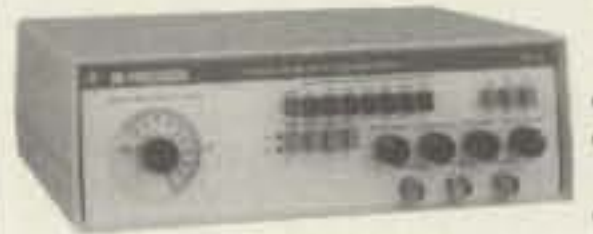
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Kermadec Islands

Six DXpeditioners plan an ambitious, major operation from the remote Kermadec Islands this month. Under the leadership of Ken Holdom, ZL2HU, the multi-national team will assemble four complete stations and operate as **ZL8RI** around the clock, May 4-14.

The team members include Chris Hannagan, ZL2DX, a veteran of previous Kermadec and other DXpeditions; Ron Wills, ZL2TT, the DX editor of the New Zealand radio society; Lee Jennings, ZL2AL, who organized the 1993 ZL7AA Chatham Island DXpedition; Al Hernandez, WA3YVN, organizer of the 1995 VP8SGI South Georgia DXpedition; and Bin Tanaka, JE3EMU, contester and RTTY operator. This experienced and talented team has the skill and dedication to make the 1995 Kermadec operation a great success.

The Kermadec Islands lie about 600 miles northeast of Auckland, New Zealand. They sit on the edge of the Kermadec Trench, a geologically active area. Frequent earthquakes rattle the islands, which are themselves the tips of volcanoes. In fact, the island was evacuated in the 19th century due to volcanic activity.

The main island, and DXpedition site, is Raoul Island. It is about 7200 acres in size, mostly steep volcanic mountains rising to about 1700 feet. There is no harbor, and landing on the exposed rocks at the foot of high cliffs is difficult. A small crane lifts equipment and supplies from small boats just offshore. Then an extended tramway runs up the cliff face to a small, relatively flat meadow that is the site of a permanently staffed meteorological and geologic station. Five young scientists run the station, sending regular reports by radio back to New Zealand. Supply ships stop by a few times a year with food and gear, but otherwise it is a lonely existence.

The island group was noted by the British navy in the 1870s, and formally annexed by New Zealand in 1886. It is one of many far-flung New Zealand territories that range from Kermadec near 30 degrees south to Ross base on Antarctica, only a few hundred miles from the South Pole. Small groups of settlers have tried living on Raoul at various times without much success, despite a moderate climate and ample rainfall.

Kermadec was the 14th Most Wanted country in the world on the 1995 *The DX Magazine's* survey, dropping fractionally from 11th position the previous two years. Kermadec has not always been so difficult to work. At times, one of the staff members has been an amateur and has handed out thousands of contacts during a typical one-year tour of duty. ZL3AFH operated in 1984 as ZL8AFH, for example. When his tour began, Kermadec ranked 17th Most Wanted. By the time he left the island, it was no longer in the top 100. (He was assisted in the effort by a major DXpedition lead by Ron Wright, ZL1AMO, who, joined by ZL8BQD,



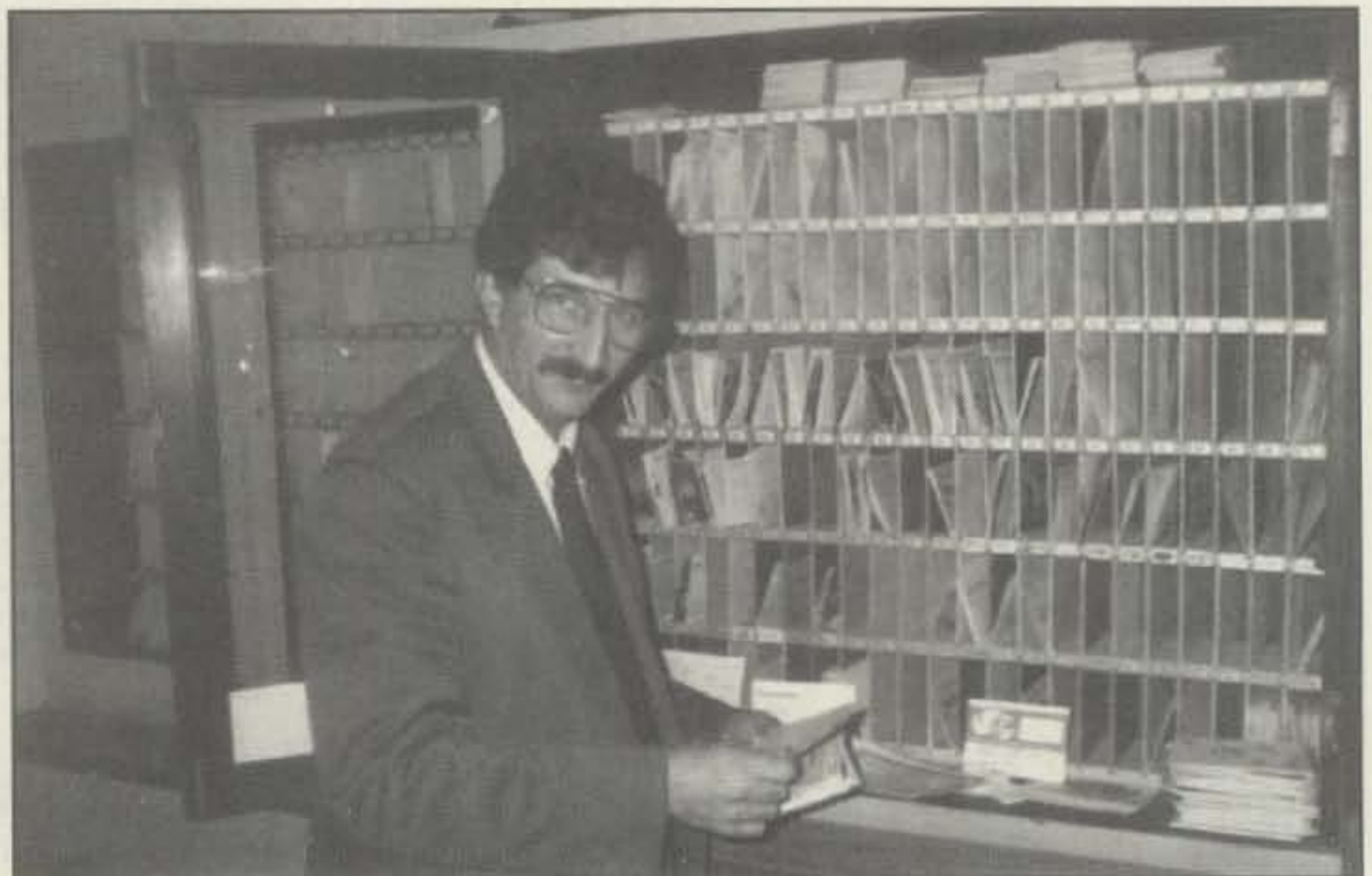
Barry, ZS1FJ, and the Kermadec Island crew on Raoul Island.

ZL8AAS, and ZL0AJW/8, made many thousands of contacts in March of that year.)

Since 1987 Kermadec has been moving steadily up the Most Wanted survey, until last year. Barry Fletcher, ZS1FJ, went to Kermadec last May, operating as G4MFW/ZL8. In nine days he made about 6000 contacts on SSB. However, he was limited by the terms of his permit to daytime operation. Each night he had to walk back to the beach and spend the night

on his boat. The round trip took three hours and severely limited low-band operation and paths into Europe.

Kermadec is especially rare in Europe. New Zealand lies near the antipodes to Europe, and propagation, especially at the bottom of the sunspot cycle, is very limited. In fact, Kermadec has been one of the three Most Wanted countries in Europe for the past four years. The 1996 ZL8RI team will be paying particular



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SL-11R	•	•	7	11	2 ⁵ / ₈ x 7 x 9 ³ / ₄	12
SL-11R-MC	•	•	7	11	5 ³ / ₄ x 7 ¹ / ₄ x 9 ³ / ₄	13
SL-11R-GE	•	•	7	11	5 ³ / ₄ x 7 x 9 ³ / ₄	13
SL-11R-RA	•	•	7	11	4 ³ / ₄ x 7 x 9 ³ / ₄	13
SL-11R-EFJ	•	•	7	11	5 ¹ / ₈ x 7 ¹ / ₄ x 9 ³ / ₄	13
SL-11MG	•	•	7	11	5 ¹ / ₈ x 7 ¹ / ₈ x 9 ³ / ₄	13
SL-15R	•	•	12	15	2 ⁵ / ₈ x 7 x 9 ³ / ₄	13
SL-15R-GE	•	•	12	15	5 ¹ / ₈ x 7 ⁵ / ₈ x 9 ³ / ₄	14
SL-15R-RA	•	•	12	15	4 ³ / ₄ x 7 ¹ / ₄ x 9 ³ / ₄	14
SL-15R-EFJ	•	•	12	15	5 ¹ / ₈ x 7 ¹ / ₈ x 9 ³ / ₄	14

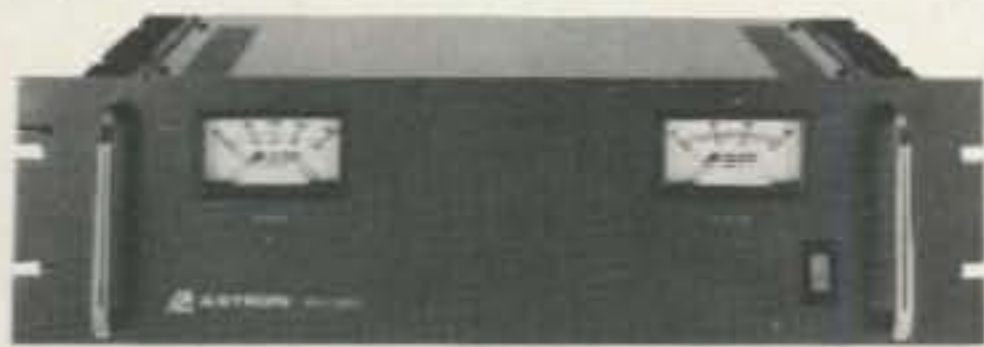
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RM SERIES



MODEL RM-35M

- 19" RACK MOUNT POWER SUPPLIES

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

RS-A SERIES



MODEL RS-7A

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

RS-M SERIES



MODEL RS-35M

MODEL	Continuous Duty [Amps]	ICS* [Amps]	Size [IN] H x W x D	Shipping Wt. [lbs]
RS-12M	9	12	4 ¹ / ₂ x 8 x 9	13
RS-20M	16	20	5 x 9 x 10 ¹ / ₂	18
RS-35M	25	35	5 x 11 x 11	27
RS-50M	37	50	6 x 13 ³ / ₄ x 11	46
RS-70M	57	70	6 x 13 ³ / ₄ x 12 ¹ / ₈	48

VS-M AND VRM-M SERIES



MODEL VS-35M

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

MODEL	Continuous Duty [Amps]			ICS* [Amps]	Size [IN] H x W x D	Shipping Wt. [lbs]
	@13.8VDC	@10VDC	@5VDC			
VS-12M	9	5	2	12	4 ¹ / ₂ x 8 x 9	13
VS-20M	16	9	4	20	5 x 9 x 10 ¹ / ₂	20
VS-35M	25	15	7	35	5 x 11 x 11	29
VS-50M	37	22	10	50	6 x 13 ³ / ₄ x 11	46
VS-70M	57	34	16	70	6 x 13 ³ / ₄ x 12 ¹ / ₂	48
• Variable rack mount power supplies						
VRM-35M	25	15	7	35	5 ¹ / ₄ x 19 x 12 ¹ / ₂	38
VRM-50M	37	22	10	50	5 ¹ / ₄ x 19 x 12 ¹ / ₂	50

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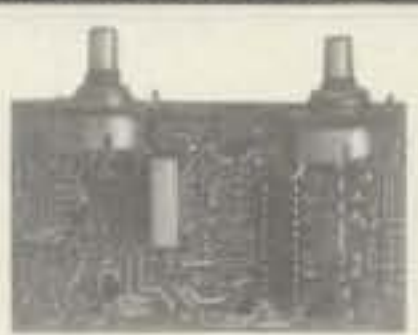
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2562	S52FB	2567	EA7EBO
2563	BV7GA	2568	EA2ABM
2564	EA5KT	2569	WA3TXR
2565	EA7HDR	2570	K2EK

CW

2902	WA3TXR	2906	EA1FDY
2903	KB1ALE	2907	K2EK
2904	WZ2H	2908	JH8CZB
2905	LU3DSI		

Mixed

1727	WA3TXR	1731	EA5KT
1728	S52FB	1732	DF2IS
1729	N7DQU	1733	K2EK
1730	JH4NPP		

Mixed: 450 WA3TXR, S52FB, JA1-9894, EA5KT, EA3FBO, K2EK, 500 S52FB, EA3FBO, WA3TXR, K2EK, 550 S52FB, EA3FBO, WA3TXR, K2EK, 600 S52FB, EA3FBO, K2EK, 650 S52FB, EA3FBO, K2EK, 700 S52FB, EA3FBO, K2EK, 750 S52FB, EA3FBO, K2EK, 800 S52FB, EA3FBO, K2EK, 850 S52FB, K2EK, 900 S52FB, K2EK, 950 K2EK, 1000 K2EK, 1050 K2EK, 1100 K2EK, 1150 WA3GNV, K2EK, 1200 KP4FP, K2EK, 1250 K2EK, 1300 K2EK, 1350 K2EK, 1400 K2EK, 2300 N4UH, 2500 I2EOW, 2550 I2EOW.

SSB: 350 OA4QV, ZS6Y, EA7ABL, EA7EBO, EA2ABM, K2EK, 400 OA4QV, ZS6Y, EA7ABL, EA7EBO, EA2ABM, K2EK, 450 OA4QV, ZS6Y, EA7ABL, EA7EBO, EA2ABM, K2EK, 500 OA4QV, ZS6Y, EA7ABL, EA7EBO, EA2ABM, K2EK, 550 OA4QV, ZS6Y, EA7ABL, EA7EBO, K2EK, 600 OA4QV, ZS6Y, EA7ABL, EA7EBO, K2EK, 650 OA4QV, ZS6Y, EA7ABL, K2EK, 700 OA4QV, ZS6Y, K2EK, 750 OA4QV, ZS6Y, WA3GNV, NK8S, K2EK, 800 OA4QV, ZS6Y, K2EK, 850 OA4QV, ZS6Y, K2EK, 900 OA4QV, ZS6Y, K2EK, 950 OA4QV, K2EK, 1000 OA4QV, WD6CKT, EA3EJI, 1050 OA4QV, KF7IQ, EA3EJI, 1100 OA4QV, EA3EJI, 1150 OA4QV, EA3EJI, KF4FP, 1200 OA4QV, EA3EJI, 1250 OA4QV, EA3EJI, 1300 EA3EJI, 1350 EA3EJI, 1400 EA3EJI, EA5DL, 1450 EA3EJI, EA5DL, 1500 EA5DL, 1550 EA5DL, 1600 EA5DL, 2300 I2EOW, 2550 EA8AKN, 2600 EA8AKN, 2650 EA8AKN.

CW: 350 WA3TXR, LU3DSI, EA5KT, K2EK, JH8CZB, 400 S52FB, LU3DSI, WA3TXR, K2EK, 450 S52FB, LU3DSI, IK4TVQ, K2EK, 500 WD6CKT, S52FB, LU3DSI, IV4TVQ, K2EK, 550 WD6CKT, S52FB, LU3DSI, IV4TVQ, K2EK, 600 S52FB, LU3DSI, F5TFS, IV4TVQ, K2EK, 650 S52FB, LU3DSI, K2EK, 700 S52FB, LU3DSI, K2EK, 750 S52FB, LU3DSI, K2EK, 800 LU3DSI, K2EK, 850 LU3DSI, K2EK, 900 I2EOW, LU3DSI, K2EK, 950 I2EOW, K2EK, 1000 K2EK, 1050 K2EK, 1100 K2EK, 1200 JA7FFN, 2550 K9QVB, 2600 K9QVB, 2650 N2AC.

10 Meters: K2EK
15 Meters: S52FB, LU7EAR, EA7ABL, K2EK

20 Meters: S52FB, NK8S, K2EK
40 Meters: S52FB, K2EK
80 Meters: EA2ABM, K2EK
160 Meters: S52FB, WA3TXR, K2EK

Asia: S52FB, IK4TVQ, K2EK
Africa: LU7EAR, K2EK
No. Amer.: WA3TXR, IK4TVQ, K2EK
So. Amer.: K2EK
Europe: WA3TXR, S52FB, EA7ABL, EA2ABM, K2EK
Oceania: K2EK

Award of Excellence: W9IL

Award of Excellence Plaque Holders: I8YRK, W4CRW, SM8AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE8DXM, DK4SY, UR2OD, AB9O, FM5WD, I2DMK, W4BQY, I8JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, H18LC, KA5W, K8JN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMO, EA7OH, K2POF, DJ4XA, IT9TQH, WB1LC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB8G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YL/W4, NN4Q, KA3A, YB8TK, VE7WJ, VE7IG, K9QRF, YU2NA, N2AC, W4UW, NX8I, W9NUF, N4NX, SM8DJZ, DK5AD, WB4RUA, DK5AD, WD9IIC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VEFXR, N4MM, K7EM, ZS6BCR, CT1YH, IV3PVD, KA5RNH, ZP5JCY, F1HWB, KC8PG, NE4F, VE3MS, K9LJN, ZS6EZ, YU2AA, I1WXY, IK2ILH, DE8DAQ, LU1DCW, N1IR, IK4GME, WX3N, KC6X, N6IBP, W5ODD, I8RIZ, I2MQP, I5ZJK, JA8SU, S51NU, K9XR, W8ULU, HB9DDZ, F6HMJ, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, K8IFL, IN3NJB, WT3W, IN3NJB, S50A, UT5-186-2.

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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.



Tony Selmes, A45ZN, operates the A47RS club station in Oman.

5 Band WAZ

As of January 31, 1996, 432 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

SP5EWY	RA3AUU
11ZXT	UA3AB
IK1MJL	

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)	UY5XE, 199 (27)
AA4KT, 199 (26)	NN7X, 199 (34)
K7UR, 199 (34)	DL3ZA, 199 (31)
NA8Y, 199 (26)	SM6AHS, 198 (12, 31)
W8PGI, 199 (26)	UA3AGW, 198 (1, 12)
W2YY, 199 (26)	VO1FB, 198 (19, 27)
W9WAQ, 199 (26)	EA5BCK, 198 (27, 39)
W1JR, 199 (23)	KZ4V, 198 (22, 26)
VE7AHA, 199 (34)	K4PI, 198 (23, 26)
W1FZ, 199 (26)	G3KDB, 198 (1, 12)
IK2GNW, 199 (1)	DK2GZ, 198 (1, 24)
W9CH, 199 (26)	KG9N, 198 (18, 22)
AC8M, 199 (34)	KM2P, 198 (22, 26)
IK8BQE, 199 (31)	GM3YOR, 198 (12, 31)
JA2IVK, 199(34,40m)	OE6MKG, 198 (12, 31)
KA5W, 199 (26)	DK8EE, 198 (19,31)
K1ST, 199 (26)	K8SR, 198 (22, 23)
AB8P, 199 (23)	YO3APJ, 198 (29, 35)
KL7Y, 199 (34)	OH2DW, 198 (1, 31)

The following have qualified for the basic 5 Band WAZ Award:

K8DEQ, 167 Zones	EA5BY, 182 Zones
IK1MJL, 200 Zones	K2UVG, 150 Zones

US1IDX, 190 Zones	RA3AUU, 200 Zones
SP5EWY, 200 Zones	UA3AB, 200 Zones
11ZXT, 200 Zones	OH2DW, 198 Zones
N1QY, 181 Zones	

Endorsements:

992 Stations have attained the 150 Zone level as of January 31, 1996.

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.

attention to the brief openings to Europe, especially just before sunrise on Raoul (1815Z) on 40 and 30 meters. This is near sunset in central Europe, and European DXers will closely monitor this grayline path.

U.S. DXers will be considerably better off. Kermadec ranks only 44th on the Most Wanted list for west-coast DXers, for example. While the path from the US east coast is more difficult, the significant overlap of darkness between the east coast and Kermadec should provide for some good low-band possibilities. Eighty, 40, and 30 meters should be available during mutual darkness (05-1000Z). There should also be a good 20 meter opening to the east coast from 02-0500Z. With the sunspot cycle near its minimum (see last month), openings on the higher bands will be rare. Fortunately, the 1996 team was able to win permission to overnight on the island, thus permitting low-band operation.

When the more difficult paths are not available, the ZL8RI DXpeditioners can always work Japanese and west-coast DXers.

Some details: The team plans to depart

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PB-32 - 600mah 6v	CNB-414 - 600mah 12v
PB-34 - 600mah 9.6v	

ICom	Yaesu
BP-7 - 600mah 13.8v	FNB-12 - 600mah 12v
BP-8 - 800mah 8.4v	FNB-27 - 600mah 12v
BP-132 - 600mah 12v	FNB-38 - 600mah 9.6v
	FNB-41 - 600mah 9.6v

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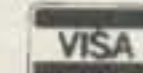
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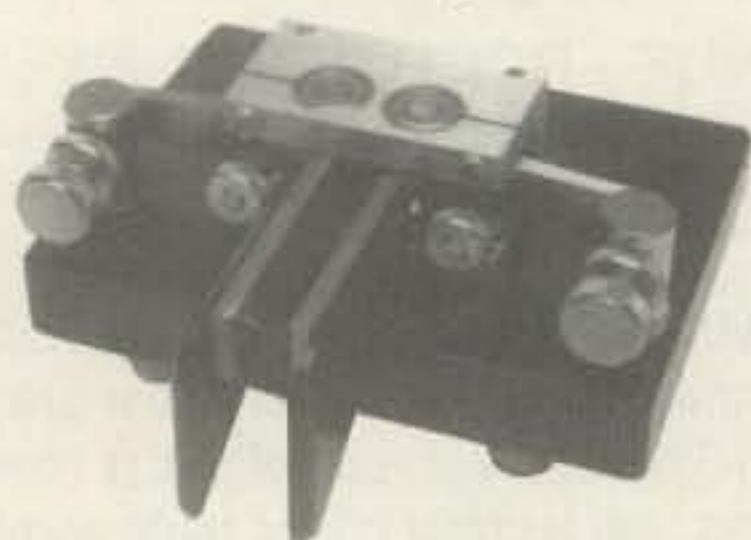
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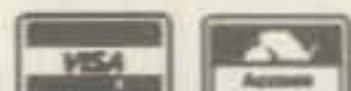
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New Zealand on April 30, arriving at Raoul on May 4. They will sail on the 75 foot, two-masted yacht *Evohe*, which can accommodate 20 people. This ship should easily handle rough weather, always a possibility in the region. The team members can even watch WA3YVN's videos of previous DXpeditions on the color television on board! With satellite navigation, they will have no problem finding Raoul.

Once at Raoul, they will have to off-load all the gear, including generators, rigs, antennas, etc., and wrestle it up the cliff to the meteorological station. They won't be packing any amplifiers, however, as the power limit in New Zealand is 120 watts! Probably their greatest problem, once they have the gear at the meteorological station, will be setting up the antennas in such a way so they don't interfere with the seismic equipment at the station. ZS1JX had several problems with interference and had to point his antenna away from Europe to reduce the problem, disappointing many European DXers. Fortunately, the meteorological station is on the northeast side of Raoul, permitting a good take-off over the Pacific toward Europe at 350 degrees.

As with any such major undertaking, fund-raising is a prime consideration. Stateside DXers can help by sending contributions made out to SGI DXpeditions—Kermadec Project, P.O. Box 235, Melbourne, FL 32902-2235. DXers in other parts of the world can send their contributions to the team leader: Ken Holdom, ZL2HU, P.O. Box 56099, Tawa, Wellington, New Zealand. (This is also the QSL route.)

Upcoming DX Activities

Malcolm, VK6LC, plans an Islands On The Air DXpedition from Lacepede Island off the coast of western Australia this month. This will be a New One for IOTA, if Malcolm is successful. Fund raising is via the Diamond DX Club, c/o Gianni Varetto, I1HYW, P.O. Box 1, 10060 Pancalieri, Torino, Italy.

Another amateur is slated to spend a one-year tour of duty on South Africa's Marion

The WAZ Program Single Band WAZ

15 Meter SSB

488 JH9PJL 489 IK2PZG

20 Meter SSB

978 VE2TVU 979 IK2PZG

40 Meter SSB

63 IK2PZG

10 Meter CW

150 9A3SM

15 Meter CW

265 9A3SM

80 Meter CW

47 NR1R

All CW

87 IK2PZG

All Band WAZ SSB

4316 IK1MJL 4318 F5PCX
4317 F5RBB

CW/Phone

7644 AB6BT 7648 AA5GY
7645 K2MP 7649 DJ4EN
7646 IK1MJL (CW) 7650 YU1WD (CW)
7647 JH6TYD (CW)

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.

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 326 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 326	KD8V 326	DL8CM 326	W6DN 324	DJ2PJ 322	VE7CNE 316	OH3NM 310	WA4DAN 301	LA7JO 289
K1MEM 326	9A2AA 326	IT9TOH 326	G4BWP 324	W1WAI 321	W3BBL 315	HA5NK 301	HA5NK 301	YU1AB 288
W9DWO 326	N4KG 326	N5FW 326	W0HZ 324	AA5NK 321	N4AH 315	WG5G/GRPP 301	WG5G/GRPP 301	NI4H 288
N4MM 326	OK1MP 326	N6AR 325	W0JLC 324	ON4QX 321	IK2ILH 315	W6YQ 301	W6YQ 301	DJ1YH 288
K2FL 326	W0IZ 326	K8NA 325	N7RO 324	K9QVB 321	K2JF 314	K4JLD 309	YU1TR 300	YU7FW 286
DL1PM 326	PA0XPQ 326	WA4IUM 325	W7OM 324	WA5DA 321	AA2X 314	VE9RJ 309	YU2TW 299	KH6CF 284
K3UA 326	W2FXA 326	KZ4V 325	W7ULC 323	HA5DA 321	4N7ZZ 314	I1EEW 307	YV5ANT 299	F6HJM 284
K9BWQ 326	SM6CST 326	KB8DB 325	WA4JTI 323	IT9ZGY 320	W5OG 313	N1HN 307	N4OT 299	KF5PE 282
K9MM 326	N4JF 326	WA8DXA 325	W4OEL 323	K1HDO 320	KA7T 313	N3DQO 306	CT1YH 298	G4MVA 281
K2ENT 326	W2UE 326	EA2IA 325	KU0S 323	KB4HU 320	K2JLA 312	WB4DBB 306	HB9DDZ 297	I2EOW 278
K2OWE 326	W9WAQ 326	I1JQJ 325	AG9S 322	WB5MTV 319	K9DDO 312	I4LCK 305	W7IIT 296	HB9AFI 278
K4CEB 326	AA4KT 326	N7MC 325	W7CNL 322	N5FG 319	WB4UBD 311	N5HB 304	K0HQW 296	W4UW 277
I4EAT 326	K9IW 326	F3TH 324	K4IQJ 322	N6AV 318	K1VHS 311	OZ5UR 304	K7EHI 293	KB8O 276
K6JG 326	YU1HA 326	KB1JG 324	NC9T 322	N6CW 316	G3KMO 311	G2FFO 303	KE5PO 293	WG7A 276
K6LEB 326	I5XIM 326	IT9QDS 324	DL3DXX 322	KA5TOF 316	WA8YTM 311	K7JYE 302	K8JJC 290	LU3DSI 275

SSB

K4MZU 326	W9OKL 326	W4NKI 326	WB6OKK 325	KC5P 323	I4SAT 320	WA9RCO 315	TI2TEB 306	DJ2UU 291
K2TQC 326	9A2AA 326	KZ4V 326	VE2PJ 325	WD0GML 323	IBLEL 320	IBSGF 315	VE3DLR 306	WA3KKO 290
K2FL 326	KD8V 326	VE3GMT 326	IBLEL 325	WW1N 323	K4JLD 320	N3ARK 315	W3YEY 306	N5QDE 290
W9DWO 326	DL6KG 326	K9BWQ 326	K7LAY 325	K4SBH 323	WE2L 320	KA4RAW 315	KFBUN 306	OE7KWT 290
W9SS 326	KZ2P 326	W0YDB 326	PY4OY 325	WB2JZK 323	EA3EQT 320	KE3A 315	XE1MDX 305	4X6DK 290
WA4IUM 326	DL9OH 326	OZ3SK 326	IT9ZGY 325	CE7ZK 323	VE2GHZ 320	K2AJY 315	W6SHY 305	IK2PZG 289
DJ9ZB 326	KS0Z 326	W4EEE 326	IT9TOH 325	K2ARO 323	W59V 319	K7TCL 315	KQ4GC 305	KF7VC 288
WB1DQC 326	W6EUF 326	KE4VU 326	K6LEB 325	LU7HJM 323	ON5KL 319	AB7AU 314	DL3DXX 305	OK1AWZ 287
XE1AE 326	OE3WWB 326	AG9S 326	K8CSG 325	KA9I 323	WA4DAN 319	N0AMI 314	NU4Y 305	IK2DUW 287
EA2IA 326	W2FXA 326	WA4WTG 326	I2EOW 325	4N7ZZ 323	KI3L 319	OE6CLD 314	EA5OL 305	W5OXA 287
K2ENT 326	SM6CST 326	W7OM 326	IK1GPG 325	N5FG 323	VE3HO 319	OH5KL 313	G4NXG/M 304	IK8BMW 286
OZ5EV 326	K6YRA 326	WD8PUG 326	I1JQJ 325	WN5IJZ 322	XE1MD 319	WD0DMN 313	KJ6HO 304	NM5O 285
KA3HXO 326	N4KG 326	W2CC 326	K1UO 325	YV5IVB 322	KB1JU 319	F6BFI 313	VE3CKP 304	CT1YH 285
CX4HS 326	K3UA 326	VE2WY 326	VE7WJ 325	XE1CI 322	OE7SEL 319	KD9CN 313	WB2NQT 303	EA1AYN 285
F9RM 326	OK1MP 326	WB4UBD 326	AIBS 325	WB4PUD 322	WD0BNC 319	K1VHS 313	WA9BDX 302	EA3BT 285
I4EAT 326	W6DN 326	IT9TGO 326	KC8EU 324	LZ1HA 322	WA5HWB 319	OA4QV 313	WABMEM 302	KJ5LJ 284
KB8DB 326	I2QMU 326	AA4KT 326	NAKELM 324	ZS6A00 322	YV1AJ 319	EA2AOM 313	KD4YT 302	LU3HBO 284
VE3XN 326	PA0XPQ 326	PT2TF 326	IK8BOE 324	K1HDO 322	K9QVB 318	W1LOQ 312	RA2YA 301	EA3CWF 283
YU1AB 326	N4JF 326	KM2P 326	W3GG 324	N2WV 322	KB5FU 318	K4LR 312	W2LZX 301	KE6CF 283
VE1YX 326	KB4HU 326	N5FW 326	AA5NK 324	TI2JJP 322	AA4AH 318	ZL1BOQ 312	XE2DU 301	N6CFQ 283
N4MM 326	KC4MJ 326	I1EEW 326	K2JF 324	WB4DBB 322	G4GED 318	N6RJY 312	AB4NS 301	YC3OSE 282
N7RO 326	OE2EGL 326	K9HDZ 326	WB5TED 324	W5XQ 321	W6NLG 318	ZS6BBY 311	WP4AFA 300	VE7HAM 281
YS1GMV 326	SV1ADG 326	WA3HUP 326	W2FGY 324	KA5TOF 321	IK8GCS 318	WA9IVU 311	YU2TW 300	WN6J 281
K9MM 326	CX2CB 326	W6BCQ 326	YV1CLM 324	TI2HP 321	W6MFC 318	IN3ANE 311	AB4UF 300	YU1TR 280
4Z4DX 326	K5OVC 326	LA7JO 326	YV5CWO 324	I8XTX 321	KF5AR 318	F1OZF 311	WB4UHN 300	KK4TR 280
ZL1AGO 326	W4UNP 326	VE7DX 326	W5LLU 324	I8YRK 321	I8IYW 318	EI6FR 311	KB6NTY 300	KN4RI 280
KF7SH 326	TI2CC 326	YV1CLM 326	IBKCI 324	K4POV 321	NI5D 318	WA2FKF 311	WB6GFJ 299	WB1KD 279
ZS6LW 326	WA4ECA 326	N6AW 326	I1POR 324	KS2I 321	KU9I 318	KD5ZD 310	VE3CKP 299	WZ3E 279
VK4LC 326	I0ZV 326	WB3DNA 325	VE4AT 324	OA4OS 321	WA8YTM 318	KA5RNH 310	EA3CB 299	EA3CWT 278
YV5AIP 326	I4LCK 326	AA6BB 325	DU9RG 324	W7ULC 321	CT1EEB 318	I2MQP 310	DK5WQ 299	WN5MBS 277
ZL3NS 326	K7EHI 326	K5TVC 325	KD5ZM 324	W3AZD 321	WB6PSY 317	N5HSF 310	EA5GKE 298	VE2DRN 277
K9IW 326	IK8IOL 326	I8ACB 325	K0HQW 324	W8LULU 321	WB3CQN 317	HA6NF 310	KJ8N 298	G0LRX 277
K6JG 326	K2JLA 326	N6AR 325	W7FP 324	KB8O 321	9H4G 317	EA5RJ 309	KB5WQ 294	KC6AWX 276
WA6OET 326	IT9TGO 326	WD8MGQ 325	KA5TTC 324	LU1JDL 320	WA6DTG 317	XE1MD 308	IT9VDO 293	OA4EI 276
WA4JTI 326	ZL1HY 326	K8LJG 325	KE5PO 324	KF8VU 320	PY2DBU 317	I4CSP 308	KG6LF 293	NC3C 275
YV1AJ 326	XE1L 326	K8NA 325	KB7VD 324	I0AMU 320	XE1XM 316	CT1AHU 308	TI2LTA 292	F5NBX 275
YV1KZ 326	YU1HA 326	IK8CNT 325	K8YVI 323	K4CXY 320	W8AXI 316	K4JDJ 308	K2EEK 291	VE2AJT 275
N6AHU 326	VE3MR 326	A18M 325	NC9T 323	G4ADD 320	W6SHY 316	AB4IQ 307	N6ITW 291	
EA4DO 326	VE3MRS 326	W4UW 325	K9HQM 323	I4WZK 320	KV2S 315	N6AV 306	YB1RED 291	

RTTY

K2ENT 320	WB4UBD 291	K3UA 276	I1JQJ 273	KE5PO 263	NI4H 252	W4EEU 250	KB8DB 242	G4BWP 222
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Island, beginning this month. Chris, ZS5IR and ZS6RI, expects to operate as **ZS8IR** from the remote Antarctic island. QSL to ZS6EZ.

Birgit Berger, DL7IQ; Holger Hannemann, DL7IO; and several other German amateurs will operate from Malta May 17-31. They will use **9H3TZ** and **9H3TY** and plan two complete stations, including log-periodic arrays for the lower bands. This should be an excellent opportunity to work Malta on the lower bands. They will attempt to operate the WPX CW Contest May 25-26 from Comino Island using a special 9H8 callsign. QSL to DL7VRO. Birgit and Holger are active young DXpeditioners with trips to the Pacific and Africa to their credit.

The Association of Radio Amateurs of the Republic of Mexico invites amateurs to attend their 36th annual convention July 18-20 at the

Plaza Uruapan Hotel, Uruapan, Mexico. Rooms are US \$21.50-\$26.90. Flights to Uruapan are out of Mexico City on American West, Aero Mexico, and Aeromar. More information is available from Sergio Valdes Sada, XE2RJ, at 5283-35-3368, 5283-35-7113, or 5238-35-3476.

DX Club Officers

The **River City Contesters** of Sacramento, California have elected Randy Wagaman, AA6WJ, president; George Steinert, N6ZS, vice-president; and Chris Moore, N6IYS, secretary/treasurer.

The **Southern California DX Club** has elected Rich Bongeorne, WU6T, president; Larry Shapiro, KJ6HO, vice-president; Len Svidor,

W6AUG, treasurer; Shel Shallon, W6EL, secretary; Mark Weiss, K6FG, Joe Locascio, K5KT, and Harvey Shore, K6EXO, directors; and Bob Karon, AA6RK, membership chair.

The **Virginia DX Century Club** has elected Al Bianchi, KG4O, president; Jim Wise, W4PRO, vice-president; and Chuck Harding, NW3K, secretary/treasurer.

The **North Jersey DX Association** has elected Orion Arnold, W2HN, president; Bill Keller, W2RQ, vice-president; Bill Hudzik, WA2UDT, secretary; and Gene Ingreham, N2BIM, treasurer.

The **Southern Arizona DX Association** has elected Larry Pace, N7DD, president; Russ Jordan, N7BSA, vice-president; and Karen Sasek, WA0NNC, secretary/treasurer.

The **Central Arizona DX Association** has

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4A1C to XE1BEF
4K6DFT to UA9AB
4K8F to UA9AB
4L4KK to SV2AEL
4L8A to OZ1HPS
4U50UN to W8CZN
5B4ADA/HH2 to 9A2AJ
5H1HW to I5JHW
5N0/OK1MU to OK1DCH
5N0BHF to OE6LAG
5N0T to F2YT
5N3/SP5XAR to SP5CPR
5N35/OK1MU to OK1DCH
5N35T to F2YT
5T5SN to F5RUQ
5U7AA to HH2HM
5V7GL to EA5WX
5X4F to KB4EKY
7Q7A to JH1ORL
7Q7EH to W1EH
7Q7JL to G0IAS
7Q7SB to AB4IQ
7X2VZK to OM3CGN
7Z1IS to SM8DFG
8P9DX to VE3ICR
8P9FW to DK7IH
9A7C to KA9WON
9G1BJ to G4XTA
9G1YR to G4XTA
9G5BQ to PA3GBQ
9G5MF to KC7V
9G5SX to G3SXW
9J2CW to JF2XTZ
9J2SZ to SP8DIP
9K2JH to KE4JG
9K2MU to WA4JTK
9K2ZC to KC4ELO
9L1MG to NW8F
9L1PG to NW8F
9M2T0 to JA0DMV
9M6TF to F6BFH
9Q5TR to 4Z5DP
9R1A to PA3DMH
9U/EA1FH to EA1FFC
A41KJ to N5FTR
AP2N to AP2MMN
C31LJ to VE3GEJ
C53HG to W3HCW
C94AI to CT1CKP
CN2EME to F6BGC
CN8TM to JR2ITB
CZ0/N0AFW to WA0PUJ
D2EV to DL3KBQ
D68SE to F6FNU
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HL9DC to N7RO
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J20RAD to F5LBM
J28JA to F5PWH
J3J to K9AJ
J55UAB to F6FNU
J67AK to NP2EG
J77A to K8SN
JT1FAU to K6VNX
JW1CCA to LA1CCA
JW5NM to LA5NM
JX4CJA to LA4CJA
JY60ZH to JY6ZZ
KE6GEM/5N6 to K4ZLE
KG4CM to N5FTR
KG4ML to WB6VGI
KG4MN to WB2YQH
KG4NA to KD4D
KG4SH to N4KHQ
KG4TJ to W3JT
KG4ZE to K4SXT
LU6Z to LU6EF
LX9UN to LX1NJ
LY96SD to LY2ZO
LZ0A to LZ1KDP
NP3/AA3BG to N2YXA
O0/N4ISV to N4JR
OH0LQK to OH3LQK
OM7DX to W3HNK
OY5IPA to OZ5AAH
P40E to CT1AHU
P40J to WX4G
P40WA to K9UWA
P43JB to OH6ZS
P49I to K4PI
PJ9JT to W1AX
PQ5L to PP5LL
PY0FZ to PY7ZZ
PZ5JB to N3BTE
R1FJZ to DF7RX
R1FJZ/FJL to DF7RX
RA0FU to W3HNK
S01MZ to EA2JG
S79JD to F6AJA
S92PI to F6KEQ
S02WDX to SP2FAX

S08HW to SP8AG
SP5GRM to SP5ES
T32BE to WC5P
T32Z to N7YL
T77BL to T78A
T77GM to I8MWI
T92A to S57MX
T93M to K2PF
TJ1PD to N5DRV
T05M to K9GS
TT8SS to F6FNU
TY5RF to GM3YTS
TY5VT to K5VT
UA0AZ to W3HNK
UA3YH/KC4 to UA3XBY
UN7JX to N2AU
UR4WWT to WR3L
V26TS to KF3P
V31ML to N5FTR
V44KJ to WB2TSL
V51E to K8EFS
VA9DH to VE9DH
VK9FN to DK9FN
VP2EFO to K8MFO
VP2EHF to KA3DBN
VP8CQS to SP2GOW
VP8CSA to DL1SDN
VQ9MG to K7MG
VR2RJ to JH1BED
WP2AHW to WD5N
X5BYZ to YU7KMN
XL2MCG to VE2OK
XT2DM to F5RLE
XT2DP to WB2YQH
XT2JF to N5DRV
YN2EJG to WD5IQA
YS1XS to WD4PDZ
YS1ZV to KB5IPQ
YT9N to YU7FIJ
Z24JS to W3HNK
Z32XX to KM6ON
Z37DRS to YU5DRS
ZA1AB to OH1MKT
ZA1AJ to OK2ZV
ZA1TAG to IK2HTW
ZA5B to WA1ECA
ZA9B to KE7LZ
ZB2X to OH2KI
ZC4DX to G8MRF
ZD7JP to N5FTR
ZD8Z to VE3HO
ZD9CR to KA1DE
ZF2CA to I4ALU
ZF2SQ to WA8JTB
ZF8AA to W7VWR
ZK1ATV to LA1TV
ZK1DI to DK1RV
ZK1NJK to LA9JX
ZL7PYD to K8PYD
ZS64RI to KA1JC
ZSM6A to WA3HUP
ZX6C to PT2GTI
ZY3T to PY3TD

elected Gary Capek, K8BN, president; Frank Smith, AH0W, vice-president; Paul Playford, W8AEF, secretary; and Fred Hules, N7PNK, treasurer.

QSL Notes

QSL ZW5IZ to PP5VB, P.O. Box 13, Imbituba SC, 88780-000, Brazil.

QSL PY0TI to PY1UP, Rua Alfredo Becker 536, Bloco 5, Apt. 1101, Sao Goncalo RJ, 24452-000, Brazil.

QSL HP2CWB to Jose Mg Lee, WT3B, Disney International PTY-201, P.O. Box 02-5275, Miami, FL 33102-5275.

The new address of ZS1QD is Ian W. B. Emslie, 5 Alleyne Yeld Crescent, Silverlea Fish Hook, 7975 Republic of South Africa.

The correct address of K3BYU, QSL manager for PZ5DX, is John Mantell, P.O. Box 2137, Brevard, NC 28712.

QSL HS7AS via Kasem, HS1CDX.

VU2PAI says he doesn't want to get US\$1 because of foreign currency restrictions in

India. He prefers stamps for his collection.

QSL PY3ZYM/PY0F, PS7NA/PY0F, PY0ZFB, PY0ZFF, PQ1J, CE0Y/JH2MRA, and CE0Y/JR2AIU via Hirotaka Asaoda, JH2MRA, direct or via the Japanese bureau.

The new address of LU5UL, manager of AZ9W, is Alex Cozzi, P.O. Box 12, 9120 Puerto Madryn, Chubut, Argentina.

QSL 9L1MG and 9L1PG via NW8F, and not via WN8F.

QSL 8Q7SS via K5GO, and not via N5GO. QSL YV5A via Ollie Rissanen, OH0XX, 1313 S. Military Trail, Suite 599, Deerfield Beach, FL 33442.

QSL OY1IPA via Ben Jakobson, OZ5AAH, 9 Knoldager, DK-2670, Greve, Denmark.

QSL CY0UP via Wayne King, VE1CBK, 63 Brook St., Lake Fletcher, NS Canada, B2T 1A5, direct with US\$1 or one IRC or via the Canadian bureau.

QSL A61AF via Micah Greenbaum, N1QMM, 250 Standish St., Duxbury, MA 02332.

73, Chod, VP2ML

CQ DX Awards Program

SSB

2179 W5OXA 2181 WB6RDK
2180 F5UKW 2182 YU7FW

CW

932 HL5CL 934 LU3DSI
933 I2EOW 935 F5MQW

SSB Endorsements

320 W2CC/326 310 YV1AJ/319
320 KSBZ/326 310 N6RJV/312
320 N6AW/326 275 W5OXA/287
320 K5TVC/325 150 YU7FW/160
320 KB7VD/324

CW Endorsements

310 N5FG/319 275 LU3DSI/275
275 YU7FW/286 150 HL5CL/151
275 I2EOW/278

Total number of active countries is 326. 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.

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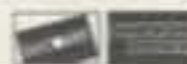
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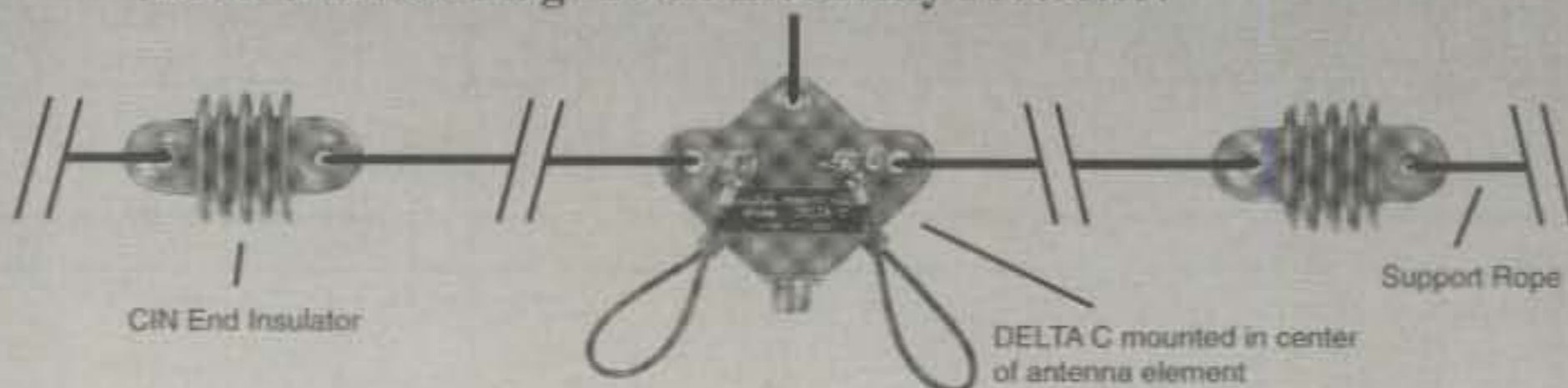
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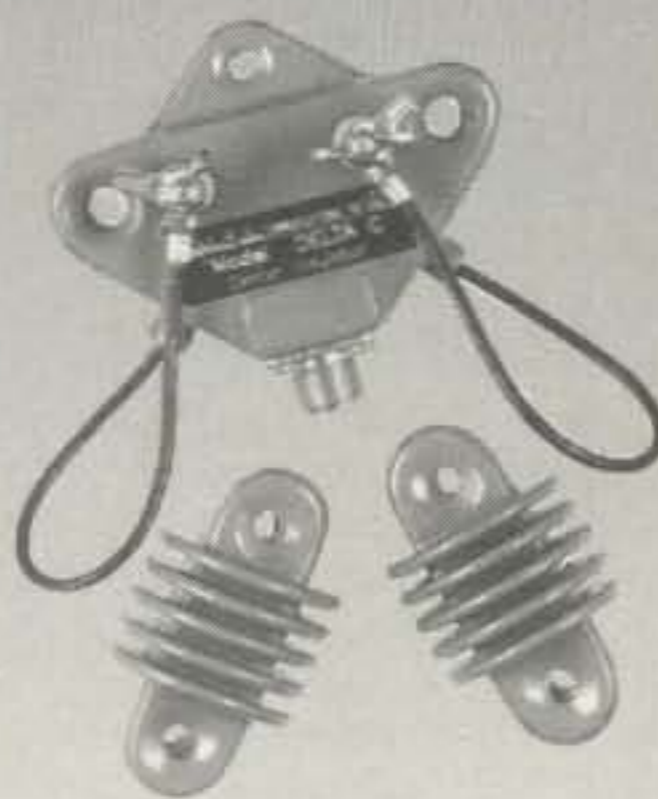
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CONTEST CALENDAR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

What Makes A Contester Great?

May's Contest Tip of the Month

Practice curing yourself of the bad habit of writing down callsigns and exchange information on scrap paper while operating. This adds unnecessary overhead to your operating style and has become especially pointless with the advent of computer logging. The best way to reduce your "paper-dependence" is simply to eliminate any access to note paper altogether. Remember: if you wanna walk, you gotta get rid of your crutch! (trx, K1ZX)

If I were to think about the most common question I get asked by other testers, it would be something like "What are the secrets of winning?" or "How are some testers able to consistently place so high in the standings?" Put another way, what are the real factors that make a contest operator great?

A few weeks ago there was an incredible e-mail thread on this topic on the contest reflector (CQ-Contest@tgv.com). So much valuable information came across that I couldn't resist summarizing it and sharing the highlights with you this month. If you've already seen some of this, it won't hurt to review it again. If not, get ready to take some notes.

From Some of The Best

What follows is "down to earth," practical advice on contesting greatness.

Trey Garlough, WN4KKN/6 (also HC8N)

In my view, this is one of the true dilemmas of radio contesting. You, as the hypothetical "apprentice," do not have the knowledge or experience to be able to appreciate the skills I have developed that make me the hypothetical "major league tester." And similarly, I take for granted many of the fundamental skills that are necessary for you to advance to the next level.

I would like to offer up two quotations that sum up my general beliefs on the topic. The first is from someone in my peer group, and the second is from someone whom I would categorize as a personal contesting hero from my formative years in contesting, although I doubt he actually knows this.

"With experience comes knowledge and cunning. I can't stand here and tell you the secrets, as many of them are second nature to me now."—KRØY/5

"The best of the best gained their winning edge practicing the basics over and over in numerous forgettable events, often using inadequate radios and second-rate antennas. Discovering how to overcome such obstacles includes lessons never forgotten."—NCJ profile of N6RO.

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Calendar of Events

Apr.	25-26	Int'l HF Contest/Chernobyl Memorial
Apr.	27	QRP To The Field Contest
Apr.	27-28	Helvetia (HB9) Contest
Apr.	27-28	Nebraska QSO Party
May	4-5	ARI International DX Contest
May	4-5	Connecticut QSO Party
May	4-5	Texas QSO Party
May	4-5	Massachusetts QSO Party
May	4-5	MARAC CW County Hunters Contest
May	4-5	Ten-Ten Spring CW QSO Party
May	11-12	Nevada QSO Party
May	11-12	Volta RTTY DX Contest
May	11-12	CQ-M DX Contest
May	18	European CW Sprint
May	18-19	Baltic Contest
May	25-26	CQ WW WPX CW Contest
June	8-10	ARRL June VHF QSO Party
June	22-23	ARRL Field Day
July	1	RAC Canada Day Contest
July	13-14	IARU HF World Champ./WRTC '96

And now for a bit of a digression. I have observed many "second tier" (and others down through the neophyte ranks) testers who think that there is some set of winning "tricks" that the "first tier" testers use to beat them, and if only someone would let them in on these highly guarded secrets, they would become first-rate testers themselves. These people are setting themselves up for disappointment, because I'm going to let them in on the biggest secret of all: "There are no secrets!" It turns out, as with most things in life, that skill and hard work pay the most reliable dividends in the long run.

Now for some specific advice. None of these things are mandatory to win, but collectively they really add up.

- Know the code. 50 WPM conversational is a nice milestone. (Note: don't try this at home with pencil and paper.)

- Know the bands. Nothing like knowing the right band to be on to improve your score.

- Know your station. Knowing whether or not your station has the gusto to run people or crack pile-ups under given conditions on a given band is a real time saver.

- Stay in the chair. You can't be the loudest station on the air if you are not on the air.

And now for some general advice:

- Operate a lot. Experience is king. I learn something every time I operate.

- Solicit advice from a variety of experienced people. Some of the "experts" will be more compatible with you on a personal level than others, so shop around and get a variety of points of view.

Steve London, N2IC

Here are a few more thoughts that I'd add to what Trey has summarized.

- My CW dies somewhere between 45 and

50 WPM. What is really important is to be able to copy a callsign—the first time—in your head at speeds of up to 40 WPM.

- With the current state of the sunspot cycle it isn't too hard to be on the right band. Once the sunspots come back, however, it's easy to make serious mistakes. That's the time to consult others for advice!

- Never underestimate you or your station's ability to run.

- Know the callsigns of stations in the target area. This is strongly related to the "operate a lot" advice. Familiarity with common callsigns is a big plus.

- When you're running, really dig for the weak ones. Don't get lazy, no matter how tired you are. The inability to pull out a calling station is a personal defeat!

- Even when conditions stink, don't give up. Consider it to be a learning experience that will reap dividends in the next contest.

Dave Hachadorian, K6LL

Here are some contest "secrets" originally prepared for a pre-SS training session of the Southern California Contest Club.

Before the Contest

- Make a checklist like this one, but one that is customized to your needs.

- Set your computer to the exact UTC time.

- Set up all the computer files, CW/voice memories, keyboard overlays, etc.

- Simulate a few QSOs on the computer, with the rig interfaced.

- Get the latest propagation forecast and create Miniprop runs.

- Review past contest logs and magazine results.

- Update all labeling and check for RFI at 1500 W.

- Make sure your contest eyeglasses are handy.

- Keep lozenges handy for phone contests.

- Make sure your coffee-cup heater is working and in place.

- Verify that your rig's attenuator, AIP, notch, noise blanker, and split VFOs all are off.

- Make sure your computer boots cleanly with no unnecessary TSRs.

- Have your telephone and high-pass filters ready for handout. Brief your XYL on what to say on the telephone to a neighbor.

- Verify VOX delay setting.

- Have contest rules handy and be sure to review them.

- Prepare a sheet with suggested frequencies.

- Prepare an off-time sheet (if necessary).

- Check receiver noise with the computer on. Does turning the antenna slightly help?

- Establish a difficult but achievable goal for the contest.

- Look at last year's rate sheet to fine-tune your strategy for band changes and other operating decisions.

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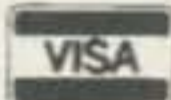
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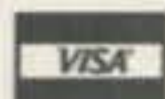
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CIRCLE 46 ON READER SERVICE CARD

Results of the 1995 Poisson d'Avril Contest

Call	Category	Score
K1DG	"I can't believe I won again"	infinity plus 1
AA7BG	"Not stated"	infinity
W2PA	"Singularity transmitter, married operator"	infinity-1
KD2NT	"Zero-operator fully automatic"	infinity-1
W9SZ	"Physicist"	5.0E93
AA4NC	"Multi-op with Sharon Stone and Tracie Lords"	2.97x10e10
AA3JU	"Single op delusional"	2,436,000,000
KØHB	"Single Op, unassembled"	809,963,064
WA6SDM	"Beetle Valley Single-op"	485,295,382
NF1J	"Single operator diabetic, insulin dependent"	190,651,230
K1XM	"Single op, married"	10,000,000
N9TNL	"Multi-op single transmitter, no mic, no final tubes, no driver, no passenger, no antenna"	9,228,771.095
K1YRP	"O.J. trial addict"	2,314,222
VE3VET/BS	"Single-op divorced"	1,999,999
VE3ZD/mm	"Single-op hired gun"	1,500,000
AA7RW	"Single-op (widowed and looking), air transmitter"	1,000,000.5
K1ZX	"Married filing jointly"	1040
AC6IA	"Single-op I missed the whole contest"	3.141592653...
G4BKI	"I don't surf the Net. I sail it"	1 (une)
W7LZP	"Good to excellent"	slightly less than 1

During the Contest—General Advice

- Ignore other people's numbers and interim results.
- Use short pauses between CQs so no one can turn past while the frequency is silent.
- Bad operating: Who was the Yankee Zulu? Good Operating: Yankee Zulu, you're 5905.
- Maintain accuracy. Remember, every QSO is important.
- Absolutely no alcohol.
- Use the highest band open during daylight hours.
- Think of motivation techniques that will work for you.

During the Contest—CW

- Start the contest at higher speeds and slow down as the rate or circumstances dictate.
- If your pile-up grows, increase your speed until it begins to thin out.
- Try turning off your AGC and riding the RF gain.
- Always use your RIT and tune +/- 400 Hz after CQing.
- Go high in the band sometimes and try slower CQs to attract the casual participants.
- When in S&P mode, tune from high to low in the band to maximize collisions.

During the Contest—SSB

- Attract casual callers with plaintive CQs. Make callers say the entire contest exchange. Don't assume anything.
- Use Fast AGC to protect your ears. Ride the RF gain control to avoid compression.

Doug Allen, W2CRS, on Winning

Don't leave out one of the most important qualities of contest operating, one that is very difficult to teach because it's a personality trait and is not based on knowledge, data, or information. In any sport, success is based in large part on the desire to win! A famous athlete was quoted once as saying, "There are two types of competitors—those who make excuses and those who make commitments."

Fifty WPM conversational CW is a nice milestone. I'd like to be there, because it would make me a better contester. Do I have the motivation to practice, practice, practice? No!

Becoming a world-class operator starts with

a love affair. Joseph Campbell exhorted us all to "follow your bliss." The few who do become the heroes who inspire us all!

Some Humor from Kris Mraz, AA5UO

Here are the secrets of the really major-league contesters who are too modest to talk about themselves.

**The Top Ten Secrets
of Big-Time Contesters**

10. Send the wife and kids to Disneyworld for the weekend.
9. When buying a house, instead of "location, location, location" it's "conditions, covenants, and restrictions."
8. Attend the "Seven Habits of Successful People" seminar.
7. Don't learn your logging program during the contest.
6. Take sleep breaks only when there won't be any new multipliers on.
5. Get a big-time contester to guest op, using your call.
4. The contester's best friend: F1.
3. Work as many people as you can as fast as you can.
2. Can you say "two holer?"
1. Three words: 50 gallon barrel.

**Results of the 1995
Poisson d'Avril Contest**

By Doug Grant, K1DG

Well, here they are, the long awaited results of the 1995 Poisson d'Avril Contest. As usual, last year's event was won by K1DG. The complete results are listed below. Scores skyrocketed to record levels, with the top scores hovering around infinity—and all near the bottom of the sunspot cycle!

Most of the entries were received by Internet, and as a result, the rules will only be published on the Internet this year, possibly even before the contest (which will take place on April 1, 1996). If you can't find them, don't worry; make up your own. We aren't picky. Logs will "only" be accepted over the Internet (poissondavril@aol.com). And don't give us any of that "but I don't have a computer" whining. Get

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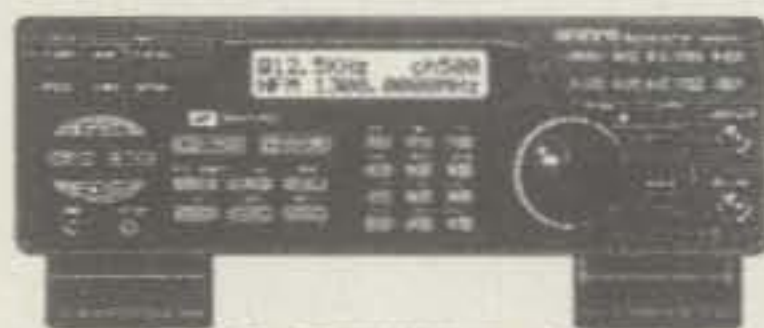
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Cobra 2010GTLWX-U SSB base with weather alert	\$379.95
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Uniden GMR100-U GMRS handheld transceiver	\$144.95
Uniden WASHINGTON-U SSB CB Base (t \$25.00 shipping)	\$199.95
Uniden GRANTXL-U SSB CB Mobile	\$139.95
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with the program (so to speak). The box shows the actual results. Following are some of the comments we received from participants.

Soapbox Comments

My score may not be very high, but it sure has a lot of decimal places to it . . . AC6IA. Operation was from Scarborough Bluffs overlooking Lake Ontario near Toronto, not Scarborough Reef. Thank you anyway for all the IRCs and green stamps . . . VE3VET. Even had time to take dog for a walk . . . N9TNL (and WB9IKN). Used my own logging program, "BS," written in the "B" programming language . . . KD2NT. Took on water in heavy seas. Ship went down. Tremendous loss, but saved the log . . . VE3ZD/mm. Weather was far too nice to operate in the shack, so I operated "air" mode (as in "air guitar") from my lawn chair, as you can see from the attached drawing . . . AA7RW ("Radio Wench"). I was at the Metropolitan Opera for the last part of the contest period. I don't know if this is a bonus multiplier or not (Sure, why not?—ed.) . . . NF1J. In my tireless efforts to introduce amateur radio (and contesting) to new people, it made sense to involve two of Hollywood's finest ladies(?), Tracie Lords and Sharon Stone. I added extra multipliers for "special" eyeball QSOs between the guest ops and the station owner, and the lingerie multiplier . . . AA4NC. I hereby claim myself winner solely on the basis that I am the only FRC member who has posted a score. Thus, I must be the winner (Guess again. P d'A HQ is in YCCC country—ed.) . . . AA3JU. We worked zero stations via delayed echo. We're hoping for improved condx next year. Can't wait to see how we faired . . . AA7BG. Contest,

quelle contest? . . . G4BKI. I'm not even going to post my score. AA4NC has won hands down, and even the contest committee (who is supposed to win) will have to concede defeat (Nahhh.—ed.) . . . WB4IUX. Station was a Heath HW-8, unassembled, driving a pair of 1N914 in grounded grid. I hereby certify that I am not aware of any rules . . . K0HB. Our cat, Melody, jumped on my lap and started licking my hand, so I didn't call CQ again . . . K1XM. I just got back from Ft. Collins, Colorado. I was one of the finalists being interviewed to be the new disk jockey for WWV . . . K1YRP. For the first time I have won a single op competition! ILTHRS! (Nope. You forgot to tell us your score. Better luck next year.—ed.) . . . KR2J. You guys who are using CT for this contest are limiting yourselves. The TR Logging Program has always supported this contest (after all, a significant portion of the program was written while I was living in France) . . . N6TR. QRM from local gaseous felines really stunk up our score. Wish I could remember this contest . . . Team Flatulence (N7AVK/W7AA/OZZ1E). I'll brush up on my French for next year! HI HI!!! Halfway through the contest my shoe became untied!!!!!! Please put more exclamation points into the contest exchange and score calculation!!!!!! (OK!!!!!!—ed.) . . . W2PA. Since operating time was limited to 43 nano-seconds this year, my RF was barely able to escape my property line before time was up . . . W7LZP. Hey, I didn't even know about this contest! My score is the approximate energy density in grams/cm³ of the zero-point energy, as measured by several physicists . . . W9SZ. After a careful reading of the rules you will understand that only the contest commit-

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My Most Memorable Contest Experience

"My first experience at N4AR comes to mind, using Bill's killer phased Bobtail curtains on 80 meters. It's 2355Z on Sunday in the CQWW CW and SU2MT shows up for the first time. All the East Coast powerhouse stations are calling (i.e., N2RM, W3LPL, K1AR, etc.). I figure it's hopeless, but after a few half-hearted calls, he answers me and I have a double mult in my log!

"We got our butts kicked that year, but the victory of that one battle was bittersweet. In the midwest, you live for wins like that!"

—KJ4VH

tee can win. The best you can hope for is second place (You got a problem with that? Then start your own contest on your birthday!—ed.) ... WA6SDM, I hereby declare myself winner of the "single operator I bought everything they had at HRO last weekend" category based solely on my call ... WB9HRO.

Final Comments

That's it for this month. Please remember to provide any submissions for the August Contest Calendar to me by June 1st.

The warm weather has finally arrived. Now's the time to get those antenna projects going. Stay safe while you're up the tower!

73, John, K1AR

ARI International DX Contest

2000Z Sat., May 4 to 2000Z Sun., May 5

This is the annual edition of the Associazione Radioamatori Italiani's international DX Contest. The ARI DX Contest is managed by veteran contesteer I2UIY and should offer a significant amount of activity. Stations are allowed to work each other worldwide.

Classes: Single operator SSB, CW, or RTTY; single operator mixed; multi-single mixed; and SWL mixed.

Frequencies: 160 through 10 meters (no WARC bands) according to the IARU band plans (RTTY is 80-10 meters). All stations (including single operator) must adhere to the standard 10-minute rule.

Exchange: Italians send RS(T) and province; all others send RS(T) and serial number.

Points: QSOs within your own country count only for multiplier credit. Count 1 point for QSOs inside your own continent, 3 points for QSOs outside your continent, and 10 points for Italian QSOs. Stations can be worked once per band and mode (e.g., 15 CW, SSB, and RTTY).

Multiplier: Italian provinces (103) and DXCC countries (not I or ISØ). Credit multipliers only once per band.

Scoring: Final score is sum of QSO points times the sum of multipliers.

Awards: A plaque will be offered to the highest scoring station in each class. In addition, a certificate will be awarded to the top two to five placing stations as well as the leading scorers in each DXCC country.

Special Award: Two very attractive, large plaques will be awarded by the Santa Barbara Contesters in memory of IN3ANE. They will be assigned to the best OM score under 21 years of age and the best SWL score under 18 years of age.

Free logging software is available for the ARI

Contest. You may obtain your copy directly from the contest manager (\$5 or 10 IRCs for expenses). Entries may be submitted on diskette in N6TR, K1EA, or ASCII format. Logs must be mailed within 30 days of the end of the contest and addressed to: ARI Contest Manager, I2UIY, P.O. Box 14, 27043 Broni (PV) Italy.

Texas QSO Party

1400Z Sat., May 4 to 2200Z Sun., May 5

Here's a fun event sponsored by the Texas DX Society with an unusual set of prizes for the winners. Be sure to check it out! As with most QSO parties, Texas stations work everyone; others work Texas stations only. You may work stations once per band and mode. Expedition stations (i.e., mobiles) may be worked in each county they activate. Multipliers only count once regardless of the number of bands/modes worked.

Classes: Single operator; multi-single; Texas Armadillo Expedition—all mixed mode, only.

Exchange: QSO number and Texas county and/or state/province.

Scoring: Credit 2 points/QSO for SSB contacts and 3 points for CW. Final score is total QSO points times the multiplier (counties or states/provinces). DX contacts count for QSO points only.

Awards: Texas wine baskets and plaques will be awarded to the top-class finishers. Other special awards will be offered to Texas clubs with the most entries, expeditions, multi-single operations, etc. A commemorative cap will be sent to anyone working at least 50 Texas counties. Work all 254 Texas counties and receive free airfare to the 1996 Houston Ham Convention!

Send all logs within 30 days to: TDXS, P.O. Box 540291, Houston, TX 77254 or via e-mail at <KB5YVT@aol.com>.

MARAC Country Hunters CW Contest

0000Z Sat., May 4 to 2400Z Sun., May 5

The Mobile Amateur Radio Awards Club is pleased to sponsor the 30th annual County Hunters CW Contest. Mobile and fixed stations from every county in the U.S. are invited to participate. Mobiles may be worked each time they change counties and must identify by signing "/M" after their callsign. Mobiles are defined as capable of being in motion at all times while transmitting and receiving with no connections to stationary power sources or antennas.

Exchange: RST, county, and state for US (province/DXCC country for others).

Scoring: Fixed-station QSOs are worth 1 point. Mobiles and DX QSOs are worth 15 points. W/VE to DX QSOs are worth 5 points. Final score is total QSO points times the total number of US counties worked.

Frequencies: 3575, 7040, 14050, 21050, 28050 kHz.

Awards: Certificates will be awarded to the winning fixed stations in each state, province, and DXCC country (1000 points minimum). Other certificates are available to the winning mobile in each state operating from three or more counties (10 QSOs/county minimum). Plaques will be awarded to the two top-scoring mobile and North American fixed stations, and DX station.

Completed logs, summary sheets, and

county lists (required for entries with over 100 counties) must be received by June 7th. Send your logs to: Norm Beavers, W3DYA, 3320 McMillan Drive, Tyler, TX 75701-8239. Include a #10 SASE for contest results.

Connecticut QSO Party

2000Z Sat., May 4 to 2000Z Sun., May 5
Rest Period: 0400-1200Z, May 5

This annual event is sponsored again by the Candlewood Amateur Radio Association and is opened to any amateur. The object is to work as many Connecticut stations as possible on 160-2 meters.

Classes: Single Operator—fixed, mobile, Novice, QRP (5 W), and multi-single or multi-multi stations.

Exchange: Single report and county or state/province/DXCC country.

Frequencies: CW—40 kHz up from lower band edges. Novices operate 25 kHz up from lower band edges. SSB—1860, 3915, 7280, 14280, 21380, 28380 kHz. VHF—50150, 144200, 146580 kHz.

Scoring: Credit one point per phone QSO, two points for CW/RTTY. QSOs with club station W1QI and ARRL HQ station W1AW count 5 points. Final score is total QSO points times the number of stations/provinces/DX (DX only counts as a single multiplier) worked. Others use Connecticut counties as the multiplier.

Awards: Plaques and certificates (100 point minimum) will be awarded to category winners. A special certificate will be sent to anyone working all eight Connecticut counties. Send your results no later than June 5th to: CARA, P.O. Box 3441, Danbury, CT 06813-3441.

Massachusetts QSO Party

1800Z Sat., May 4 to 0400Z Sun., May 5
1100Z Sun., May 5 to 2100Z Sun., May 5

The Massachusetts QSO Party is sponsored by the Framingham Amateur Radio Association and is open to all amateurs around the world.

Classes: Outside MA, MA single-op, multi-op, portable, MA team (5 MA single ops), MA Novice/Technician, MA club.

Exchange: RS(T) and QTH (state/province/DXCC country/MA county).

Scoring: Credit 1 point for SSB and 2 points for CW/Digital/Video contacts.

Multipliers: MA counties (maximum of 14 per band) for non-MA stations and states, provinces or DXCC countries for MA participants worked per band. Final score is total QSO points times total multipliers.

Frequencies: CW—1810, and 50 kHz up from lower band edge. SSB—1850, 3890, 7290, 14270, 21390, 28390. Novices—3705, 7130, 21130, 28130.

Awards: Certificates will be awarded for the highest scores in each contest class, state, province, and DXCC country, and to entrants working all 14 Massachusetts counties.

Logs must be postmarked by June 6th and sent to: FARA, P.O. Box 3005, Framingham, MA 01701.

Nevada QSO Party

0000Z Sat., May 11 to 0600Z Sun., May 12

Here is a chance to work this rare state by participating in the Nevada QSO Party, sponsored by the Frontier Amateur Radio Society.

The rules were rather sketchy, but operation is planned on 160-6 meters. Look for Nevada stations on CW, 15 kHz up from the bottom of the General band and 25 kHz up on SSB.

Exchange: Signal report and Nevada county or state/province/DXCC country.

Scoring: Credit 2 points for CW contacts and 1 point on SSB. One contact is allowed per band and mode. Final score is multiplier (usual counties/state routine) times total QSO points.

Awards: Certificates will be sent to all winners. Send your logs before June 15th to Jim Frye, NW7O, 4120 Oakhill Ave., Las Vegas, NV 89121.

Volta RTTY DX Contest

1200Z Sat., May 11 to 1200Z Sun., May 12

The SSB and RTTY club of COMO and the Italian Amateur Radio Association (A.R.I.) announce the 30th A. Volta RTTY DX Contest. This event is designed to promote interest in the field of RTTY and to honor the Italian discoverer of electricity, Alessandro Volta.

Classes: Operating categories include single operator (all band/single bands), multi-single, and SWL.

Exchange: RST, serial number, and CQ Zone.

Scoring: There is a complicated exchange points table used for calculating QSO points. Contact A.R.I. via the address below for more details. A multiplier is defined as a DXCC country. Credit one additional multiplier for every country that is worked on at least four bands. Final score is total QSO points times multiplier times total QSOs.

Frequencies: All amateur bands 160-10 (excluding WARC frequencies).

Awards: A special trophy will be awarded to the top stations in each class. Certificates with category stickers will also be available.

The mailing deadline for logs is July 31st. Logs should be sent to: Francesco Di Michele, I2DMI, P.O. Box 55, 22063 Cantu, Italy.

1996 Baltic Contest

2100Z Sat., May 18 to 0200Z Sun., May 19

The aim of this one, sponsored by the Lithuanian Radio Sports Federation, is to promote radio sport in the Baltic countries. Participants in Estonia, Latvia, and Lithuania will be actively looking for others around the world.

Classes: Single operator—mixed mode, CW only, SSB only; multi-single and SWL.

Exchange: Single report and serial number. Stations may be worked once on each mode and band.

Scoring: For Baltic stations—European QSOs count as one point, QSOs with another continent count as two points. European stations—all QSOs count as one point. Stations outside of Europe may credit each QSO with two points. There are no multipliers in this one. Final score is simply the total number of QSO points.

Awards: Certificates will be issued to the leading stations in each category/geography. In addition, special trophies will be awarded to winners of Europe CW, Estonia, Latvia, Youth (under 16), and Lithuania CW. Logs must be sent by July 1st. The mailing address is: P.O. Box 210, LT 3000, Kaunas, Lithuania or they may be sent via e-mail in ASCII-only format to <gediminas.daubaris@rf.ktu.lt>.

CQ WPX CW Contest

0000Z May 25 to 2400Z May 26

Complete rules were in the January issue of CQ. Rules and summary/log sheets can be obtained from CQ Communications, 76 N. Broadway, Hicksville, NY 11801. Check the current rules for the current trophy list. As with all CQ contests, be sure to indicate the mode of operation on your envelope when you mail your logs. Results of the 1995 contest can be found elsewhere in this issue.

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WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

New Telecommunications Act Eliminates Unnecessary Amateur Radio Rules

On February 1, 1996 the House and Senate overwhelmingly approved historic telecommunications legislation that deregulates local and long-distance telephone, radio, cable, television, and satellite. The primary goal of the bill is to break down the regulatory barriers that separate the nation's telecommunications industries. Now each will fight tooth-and-nail for its place on the information highway, which will have many forms and on-ramps. Instead of single-lane roads, the highway will be a multi-faceted communications turnpike, as telecommunications companies enter additional businesses. It will be hard to know in which vehicle you're traveling.

Of interest to consumers is a provision which requires TV sets to contain a "V-chip" allowing parents to block out violent and inappropriate programming. And it became illegal to transmit indecent content to minors using any telecommunications device, including computers. This especially impacts the Internet. The bill even deregulates amateur radio license examination procedures.

Telecommunications Reform And Amateur Radio

First a little background. On February 1, 1995 Mary Beth Richards, the FCC's Special Counsel on Reinventing Government, published a report entitled "Creating a Federal Communications Commission for the Information Age." She had been appointed to spearhead a year-long review on how the FCC should streamline processes and reduce regulatory burdens.

Appendix "A" of that report contained a list of recommended changes to the Communications Act. Recommendation No. 32 concerned Amateur Radio Examination Procedures. Richards suggested that burdensome conflict of interest, record keeping, and financial certifications be eliminated. Her recommendation could not be implemented though until a change was made to the Communications Act.

Tucked away in Section 403 of the massive telecommunications-deregulation bill was the amateur radio legislation that Richards asked for. The Communications Act changes that apply to amateur radio examinations only took up a couple of paragraphs in the rewrite. They were in the form of a list of added and deleted words and paragraphs to Section 4 of the Act, which covers miscellaneous provisions. Few people reading the new regulations will know what they really mean.

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443)

Communications Act of 1934

Among other things, the Communications Act created the Federal Communications Commission more than 70 years ago. The purpose of the FCC is to regulate interstate and foreign wireline and radio telecommunications.

The Act has been amended so many times, that much of it is a hodge-podge of added regulations. Section 4 primarily states the make-up of the Commission and the miscellaneous guidelines under which each of the five Commissioners must operate.

Included in Section 4 is also a provision for the FCC to utilize private organizations to assist them in four stated areas:

1. amateur and commercial radio operator license examinations,
2. amateur and citizens band violations monitoring,
3. commercial radio technician certification by user groups, and
4. "... providing radio club and military-recreational callsigns."

The FCC has, of course, implemented programs to utilize the services of private groups to prepare and administer all radio operator license examinations, and it endorses commercial radio technical certification programs by various professional organizations. However, personal radio violations monitoring is largely ineffective. The FCC entered into an agreement with the ARRL's field organization to create an Amateur Auxiliary, but it is essentially an advisory program without any authority to issue sanctions or take any enforcement action. The CB radio violations monitoring program does not exist at all. Even though empowered to delegate the assigning of club and military-recreational callsigns, the FCC has never implemented this authorization.

Amateur and Commercial Radio Examinations

The Communications Act is the underlying Congressional law from which the Part 97 (Amateur Radio) and Part 13 (Commercial Radio) rules are enacted by the Federal Communications Commission. There is a very big difference in the Act wording that covers amateur and commercial radio license exams.

One would think that the law would be more demanding on commercial radio operator examinations since the safety of life is involved. Amateur radio is, after all, a hobby. But such is not the case. The legislation involving amateur radio testing is more stringent. It is that way because that is the way the American Radio Relay League wanted it when the legislation was being crafted in the early 1980s.

Here's what the Communications Act says

about radio operator license examination fees:

Amateur radio volunteer examiners (VEs) and volunteer coordinators (VECs) may be reimbursed for out-of-pocket expenses. The maximum amount was set (in 1984) at \$4.00 and is "... adjusted annually every January 1 for changes in the Department of Labor Consumer Price Index" (i.e., inflation). The current maximum fee is \$6.07, but most VEC organizations charge \$6.05, since that number is easier to work with.

Commercial Radio examiners "... may recover from examinees such fees as the Commission permits, considering such factors as public service and cost estimates submitted ..." Thus, while license examination fees are statutorily set at a maximum amount in the Amateur Service, there are no set examination fees imposed on Commercial Radio Operator license examinees.

To implement privatized Commercial Radio Operator examinations, the FCC asked each organization applying to administer Commercial examinations what its fee would be, and then approved it. As a result, Commercial Radio Operator examination fees vary widely.

A Commercial Operator License Examination Manager (COLEM) is the commercial counterpart of the Amateur Service's Volunteer-Examiner Coordinator (VEC). There are eight COLEM organizations that administer Commercial Radio Operator examinations (and 18 different VEC organizations). Some COLEMs charge a fee for each examination element administered, while others charge one testing fee per license regardless of the number of examinations.

Our National Radio Examiners commercial division charges \$35 per license, since that is what the FCC charged before Commercial Radio Operator testing was turned over to private COLEM groups. Commercial Operator examination fees can range from \$25 to over \$100 depending upon the organization conducting the exams.

Conflict of Interest and Record Keeping

Amateur radio testing has several conflict-of-interest, examiner-qualification, and record-keeping rules that do not exist in Commercial Radio testing. These include a requirement that the amateur radio license examiner hold a higher class license than the examinee or, "In the case of examinations for the highest class of amateur station operator license, the Commission may accept and employ such services of any individual who holds such class of license."

There is no statutory requirement that an examiner even hold an FCC license of any kind

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in order to conduct a Commercial Radio Operator license exam. And in fact, most Commercial Examiners do not. They merely conduct the exams for their COLEM, who is held responsible for the integrity of the examination. Some COLEMs are strictly testing (and not radio) organizations who conduct a wide variety of state, corporate, and federal (including civil service) examinations.

Since the W5YI Group is both a VEC and a COLEM (National Radio Examiners), we basically have the same examiner requirements for both. That is, only licensed examiners may conduct either the amateur or Commercial Radio operator examinations. We require our Commercial examiners to have either an amateur Extra Class, a Commercial General Radiotelephone, or a 1st/2nd Class Radiotelegraph Operator ticket. This is a decision we made, not the FCC.

The Communications Act also required that amateur radio license examiners not own "a significant interest in or be an employee of any company engaged in the manufacture or distribution of equipment used in connection with amateur radio transmissions, or in the preparation or distribution of any publication used in preparation for obtaining amateur station operator licenses . . ." While this might seem reasonable on the surface, it actually presents a hardship to the amateur testing program. For example, employees of firms that made (or stores that sold) radio equipment, or those people who developed or distributed study manuals, were statutorily unqualified to be a VE.

Amateur radio license class instructors were also prohibited from acting as volunteer examiners due to the statutory prohibition on passing out (distributing) license preparation material. While university professors certainly dole out lesson material and administer course ending examinations, amateur radio instructors could not. It is all kind of ridiculous when you think about it!

What is interesting, is that there are no parallel conflict-of-interest Communications Act requirements imposed on Commercial Radio examiners whatsoever. The Part 13 Commercial Radio rules do, however, preclude the use of compromised examinations and administering exams to relatives.

One of the most burdensome requirements on amateur radio testing was the necessity that " . . . individuals shall maintain records of out-of-pocket expenditures and shall certify annually to the Commission that all costs for which reimbursement was obtained were necessarily and prudently incurred."

Again, that might not seem difficult, but it necessitated VECs collecting these certifications and sending them to the FCC at the end of the year. It was a big job for us, since the W5YI-VEC has close to 20,000 VEs. The Commission really did not do anything with them. They merely "filed" the certifications the VECs sent them.

VE and VEC Requirements

While we are on the subject, we probably should point out that VE and VEC qualification requirements are different. VEs, as we mentioned, were prohibited from distributing radio transmitting equipment and license preparation material. This is specifically stated in Part 97.509(b)(5). Volunteer-examiner Coordinators, however, have slightly different rules.

Section 97.521(e) of the Amateur Rules says that VECs must not be engaged in the production or distribution of radio transmitting equipment or study material (and here is the different part) " . . . unless a persuasive showing is made to the FCC that preventative measures have been taken to preclude any possible conflict of interest."

Both the ARRL and W5YI Group distribute radio study books, videos, and audio cassette tapes, and both made the required "showing" by establishing separate examination and distribution divisions within their organizations. Furthermore, personnel in our W5YI-VEC Office never have had access to exam material.

1996 Telecommunications Reform Act

On February 8th, President Clinton signed the Telecommunications bill into Public Law 104-104. On February 28th, the FCC released an Order " . . . revising our rules for the Amateur Radio Service, consistent with the statutory mandate of the 1996 Telecommunications Act to remove unnecessary and outdated regulations.

"This Order removes the conflict-of-interest provisions pertaining to administration of amateur operator license examinations. Additionally, it eliminates the requirement that volunteer examiners (VEs) and volunteer-examiner coordinators maintain records of out-of-pocket expenses and annually certify those expenses to the Commission.

"Prior to the enactment of the 1996 Telecommunications Act, Section 4(f)(4)(B) of the Communications Act precluded any person who owns a significant interest in, or who is an employee of, any entity engaged in the manufacture or distribution of amateur radio equipment, or who prepares or distributes any publication used to obtain an amateur operator license, from administering amateur license examinations. The underlying purpose of the conflict-of-interest requirement was to prevent an employee from favoring examinees who purchased manuals or equipment produced or distributed by the VE or the VE's employer. Our rules contain analogous conflict-of-interest requirements.

"Section 403(a)(2) of the 1996 Telecommunications Act, however, removed the statutorily-imposed conflict-of-interest requirement. As a result, we conclude that Sections 97.509(b)(5) and 97.521(e) of our rules which are patterned after the previous statutory requirement should be eliminated. We further conclude that other provisions of our rules, combined with current amateur radio license examination procedures, will sufficiently protect against the potential for abuse initially contemplated by the Communications Act.

"In this connection, Section 97.523 of the Commission's Rules requires that VECs cooperate in maintaining one question pool for each written examination element. As a result, all examination material and manuals must draw from these standard pools of questions, which are widely available to the public through numerous publications and computer disks.

"Additionally, each examination is administered by three VEs and is coordinated by a VEC in the manner contemplated by the Communications Act. Twelve years of experience with the VEC system has shown that any breach of trust by the VECs and VEs can be

dealt with swiftly and immediately by discrediting the offending VEs or rescinding the VEC agreement. Thus, we believe that the conflict-of-interest requirement in our rules is no longer necessary.

"In addition, the Communications Act, prior to the enactment of the 1996 Telecommunications Act, required that VEs and VECs keep records pertaining to expenses incurred in the administration and coordination of amateur operator examinations and also mandated that they annually certify that the expenses incurred were necessary and prudent.

"Similarly, Section 97.527 of our rules requires retention of certain records and certifications concerning reimbursement of expenses associated with amateur radio license examinations.

"Section 403(a) of the 1996 Telecommunications Act eliminates the record retention and certification requirements although it preserves the ability of VEs and VECs to recover from examinees reimbursement for actual out-of-pocket costs. Also the maximum allowable examination reimbursement fee permitted by the Communications Act (\$6.07 for 1996) is *de minimus*. We conclude that the record retention and reporting requirements regarding reimbursement also should be eliminated from the Commission's rules because they were an outgrowth of the previous statutory requirements.

"We believe these rule changes will make our rules consistent with the requirements of the 1996 Telecommunications Act. We also believe that they will further the public interest because they eliminate unnecessary regulatory burdens.

"We find there is good cause for noncompliance with the general notice and comment provisions of the Administrative Procedure Act. The rule changes that we adopt today merely implement the intent of Congress in enacting Section 403(a)(2) of the Telecommunications Act of 1996, are noncontroversial in nature and, therefore, are unlikely to generate public comment. Accordingly, we find that notice and comment is unnecessary.

"Accordingly, pursuant to Sections 154(i) and 303(r) of the Communications Act of 1934, as amended, IT IS ORDERED that Part 97 of the Commission's Rules, 47 C.F.R. Part 97, IS AMENDED as set forth in the Appendix below effective 30 days after publication in the Federal Register. (About April 15th)

Appendix

Part 97 of Chapter I of Title 47 of the Code of Federal Regulations is amended as follows:

Part 97—Amateur Radio Service

Section 97.509 is amended by removing paragraph (b)(5).

[This rule previously precluded VEs (volunteer examiners) from being engaged in the manufacture or distribution of amateur station transmitting equipment or the publication or distribution of license preparation materials.]

Section 97.521 is amended by removing paragraph (e).

[This rule previously precluded (VECs) volunteer examiner coordinators from being engaged in the manufacture or distribution of amateur station transmitting equipment or the publication or distribution of license preparation materials "... unless a persuasive showing is made to the FCC that preventative mea-

asures have been taken to preclude any possible conflict of interest."

Section 97.527 is amended by removing paragraphs (c), (d), (e), and (f).

[This rule previously required VEs and VECs to keep out-of-pocket expense records for a period of three years and to file a written certification annually with the FCC verifying "... that all expenses for the period from January 1 to December 31 of the preceding year for which reimbursement was obtained were necessarily and prudently incurred." VECs were required to disaccredit any VE who failed to provide this certification and to so advise the FCC.]

There are no longer any regulatory prohibitions preventing VEs or VECs from distributing license preparation (study) materials to anyone or from being employed by a company that manufactures or sells amateur radio station equipment. Volunteer examiners may now teach amateur radio license classes, distribute study material to their students, and conduct the course ending license examinations as a VE.

We have updated all of the Part 97 FCC Rules and Regulations and have published them in a booklet. Cost is \$3.95 (postpaid) from The W5YI Group, Inc., P.O. Box 565101, Dallas, TX 75356. 73, Fred, W5YI

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Solar Cycle Progress

Sunspot Cycle 22 is slowly reaching its end. According to the Royal Observatory of Belgium, the mean sunspot count for January 1996 was 10. A high of 48 was recorded on January 5th, but the sun was absolutely spotless from the 11th through the 20th, and again on the 22nd and 23rd.

The January mean level results in a 12-month running smoothed sunspot number of 17 centered on July 1995. This is a drop of one point since the previous month. The smoothed number is an average of the mean values for the past twelve months and is the basis for measuring the solar cycle. A smoothed number of 11 is forecast for May 1996.

How much longer will Cycle 22 continue? According to the latest sunspot predictions made by the Solar-Terrestrial Physics Division of the National Geophysical Data Center in Boulder, Colorado, Cycle 22 is expected to end by late 1996 with a smoothed sunspot number of approximately 7. On the other hand, predictions made by the Space Environment Services Center of the National Oceanic and Atmospheric Administration (NOAA), also located in Boulder, is that Cycle 22 may end as early as May of this year with a count of approximately 6. Among the experts there seems to be little doubt that Cycle 22 has but a few months of life left. Don't quite jump for joy as yet, however. It will take the new cycle, Cycle 23, at least a year to climb to a count of 30, which arbitrarily marks the end of the low period of sunspot activity. Therefore, it looks as if we will have to wait until at least mid-1997 before we begin to see an improvement in propagation conditions on most of the HF bands!

Solar Flux Values

The Dominion Radio Astrophysical Observatory of Canada, located at Penticton, B.C., reports an adjusted mean value of 75 for the January 1996 level of 10.7 cm solar flux. This results in a 12-month running smoothed solar flux level of 77 centered on July 1995. A level in the low to mid 70s is likely for May 1996. Solar flux levels are directly related to sunspot counts, but are a more accurate and more convenient method for determining solar activity.

Solar Terrestrial Dispatch On World Wide Net

One of the most interesting and extensive sources of propagation information available on the Internet is the Solar Terrestrial Dispatch (STD) home page on the World Wide Net. It provides near real-time information regarding the state of the Sun and its effect on the Earth and the space environment near the Earth.

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	(4)	(3)	(2)	(1)
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High Normal: 1, 8, 11, 14, 19, 21-22, 24, 27	A	B	C	C-D
Low Normal: 3-7, 9-10, 12, 15, 17-18, 26, 28, 30-31	B	C	D	D-E
Below Normal: 2, 16, 25, 29	C	C-D	D-E	E
Disturbed: None	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S9 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any date of the month. For example, an opening shown in the charts with a propagation index of 3 will be good (B) on May 1st, fair-to-poor (C-D) on the 2nd, fair (C) from the 3rd through the 7th, good (B) on the 8th, etc.

- Global Maximum Usable Frequency Maps
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- Global Maps of E-Layer Critical Frequency
- Global Maps showing F2-Layer Maximum Height
- Global Maps of Solar Zenith Angles

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- Daily summaries of Auroral activity and sightings for the past 24 hours and forecasts for the next three days.
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Much of the data presented is updated every three hours and presented in colorful graphics imagery. The www home page for the Solar Terrestrial Dispatch is as follows: <http://solar.uleth.ca/solar>. More complete in-

formation concerning the Solar Terrestrial Dispatch can be obtained via e-mail from COLer@Solar.Stanford.Edu.

May Propagation

The following is an overall picture of HF amateur band conditions expected during this month. For specific times of DX openings refer to the DX Propagation Charts which appeared in last month's column. This month's column contains Short-Skip Propagation Charts valid for May and June, as well as charts centered on Alaska and Hawaii. The Short-Skip Charts contain propagation forecasts for openings varying in distance between 50 and 2300 miles. For day-to-day propagation conditions expected during May see the Last-Minute Forecast, which appears at the beginning of this column.

In May optimum frequencies for DX propagation are lower during most of the daylight hours—but higher during the late afternoon, early evening, and nighttime hours—than were observed during the winter months. A considerable increase is expected in sporadic-E ionization during the month, and this should result in more frequent short-skip openings on the HF bands, and on 6 meters as well. A seasonal increase in the static level is also normal for May.

10 Meters: Very few DX opportunities are expected on this band during the present period of very low solar activity. An occasional opening may be possible towards South America during the afternoon hours, when conditions are High Normal or better. However, frequent short-skip openings between distances of approximately 750 and 1400 miles should be possible on many days.

12 Meters: Much the same pattern as on 10 meters is expected. Since this is a lower frequency range, the band can be expected to open a bit more often than will 10 meters and stay open for an hour or so longer.

15 Meters: A seasonal decrease in DX openings on this band is normal for May and the summer months, but some fairly good openings to many parts of the world still should be possible during the hours of daylight. The afternoon hours should be best for DX possibilities. Numerous short-skip openings between approximately 600 and 2300 miles should be possible on many days.

17 Meters: The propagation pattern should be similar to 15 meters. With decreasing solar activity and summertime propagation conditions in the northern hemisphere, the somewhat lower frequency range of this band may well prove to be a propagation asset. On many days when conditions will not permit 15 meters to open, check this band for openings. When 15 meters does open, expect the same opening on 17 meters, but the band should remain active up to an hour after 15 meters closes. When compared to 20 meters, daytime openings may be similar, but often signals will be stronger on 17 meters.



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CQ Short-Skip Propagation Chart May & June 1996 Local Daylight Savings Time At Path Mid-Point (24-Hour Time)

Band (m)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	08-09 (0-1) 09-13 (0-2) 13-17 (0-1) 17-21 (0-2) 21-23 (0-1)	08-09 (1) 09-13 (2) 13-17 (1-2) 17-21 (2) 21-23 (1) 23-07 (0-1)	08-09 (1-0) 09-21 (2-0) 21-23 (1-0) 23-07 (1-0)
15	Nil	07-09 (0-1) 09-13 (0-2) 13-17 (0-1) 17-21 (0-2) 21-00 (0-1)	07-09 (1-2) 09-13 (2-3) 13-17 (1-2) 17-19 (2-3) 19-21 (2) 21-00 (1) 00-07 (0-1)	07-09 (2-0) 09-13 (3-1) 13-17 (2-1) 17-19 (3-1) 19-21 (2-0) 21-07 (1-0) 23-07 (1)
20	Nil	07-09 (0-2) 09-12 (0-3) 12-17 (0-4) 17-19 (0-3) 19-23 (0-2) 23-07 (0-1)	07-08 (2) 08-09 (2-3) 09-12 (3-4) 12-17 (4) 17-19 (3-4) 19-20 (2-4) 20-21 (3) 20-21 (2-3) 21-23 (2) 23-07 (1)	07-08 (2) 08-09 (3-2) 09-15 (4-2) 15-17 (4-3) 17-20 (4) 20-21 (3) 21-23 (2) 23-07 (1)
40	08-10 (0-2) 10-16 (1-4) 16-18 (2-4) 18-20 (1-3) 20-22 (0-2) 22-08 (0-1)	08-10 (2-4) 10-15 (4-2) 15-16 (4-3) 16-19 (4) 19-20 (3-4) 20-22 (2-3) 22-08 (1-2)	08-09 (4-3) 09-10 (4-2) 10-15 (2-1) 15-16 (3-1) 16-19 (4-2) 19-20 (4) 20-22 (3-4) 22-01 (2-4) 01-03 (2-3) 03-08 (2)	08-09 (3-1) 09-10 (2-1) 10-16 (1-0) 16-19 (2-1) 19-20 (4-3) 20-01 (4) 01-03 (3) 03-06 (2) 06-08 (2-1) 08-08 (2)
80	08-10 (4) 10-18 (4-3) 18-20 (4) 20-22 (3-4) 22-00 (2-4) 00-06 (2-3) 06-08 (3-4)	08-10 (4-1) 10-16 (3-0) 16-18 (3-1) 18-20 (4-2) 20-00 (4) 00-06 (3-4) 06-08 (4-3)	08-09 (1) 09-10 (1-0) 10-16 (0) 16-18 (1-0) 18-20 (2-1) 20-22 (4-3) 22-02 (4) 02-06 (4-3) 06-08 (3-2)	08-09 (1-0) 09-18 (0) 18-20 (1-0) 20-22 (3-2) 22-02 (4-3) 02-06 (3-2) 06-08 (2-1) 02-06 (4-3) 06-08 (3-2)
160	06-09 (4-1) 09-10 (2-0) 10-19 (1-0) 19-21 (3-1) 21-23 (4-2) 23-06 (4-3)	06-09 (1) 09-19 (0) 19-21 (1-0) 21-23 (2-1) 23-01 (3-2) 01-04 (3) 04-06 (3-2)	08-09 (1-0) 09-21 (0) 21-23 (1) 23-01 (2-1) 01-04 (3-2) 04-07 (2) 07-08 (1)	08-21 (0) 21-01 (1) 01-04 (2) 04-06 (2-1) 06-07 (1) 07-08 (1-0)

ALASKA Openings Given In GMT

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	Nil	00-02 (1) 02-04 (2) 04-05 (1) 12-14 (1)	07-10 (1)	Nil
Central USA	00-02 (1)	01-03 (1) 03-05 (2) 05-06 (1) 13-15 (1)	08-12 (1)	Nil
Western USA	00-03 (1)	00-02 (1) 02-04 (2) 04-06 (3) 06-07 (2) 07-08 (1) 14-15 (1) 15-18 (2) 18-20 (1)	08-09 (1) 09-14 (2) 14-15 (1)	10-14 (1)

HAWAII Openings Given In HST

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	12-15 (1)	06-08 (1)	19-20 (1)	21-00 (1)
Central USA	10-14 (1)	14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	20-23 (2) 23-00 (3) 00-01 (2) 01-02 (1)	Nil

Central USA	12-14 (1) 14-16 (2) 16-17 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-17 (3) 17-18 (4) 18-19 (3) 19-21 (2) 21-22 (1)	19-20 (1) 20-21 (2) 21-01 (3) 01-02 (2) 02-04 (1)	21-21 (1) 21-00 (2) 00-02 (1) 22-01 (1)*
Western USA	13-17 (1)** 09-14 (1) 14-17 (2) 17-18 (1)	05-06 (1) 06-07 (2) 07-09 (3) 09-11 (2) 11-16 (3) 16-18 (4) 18-20 (3) 20-21 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-22 (3) 22-02 (4) 02-04 (3) 04-05 (1) 04-05 (2) 05-07 (1)	19-20 (1) 20-22 (2) 22-03 (3) 03-04 (2) 04-05 (1) 22-03 (1)*

See explanation in "How To Use Short-Skip Charts," which appears in the box at the beginning of this column.
*Indicates best time for 160 meter openings.
**Indicates best time for 10 meter openings.

Note: The Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart. For 12 meter openings interpolate between 10 and 15 meter openings. For 17 meter openings interpolate between 15 and 20 meter openings. For 30 meter openings interpolate between 40 and 20 meter openings.

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.

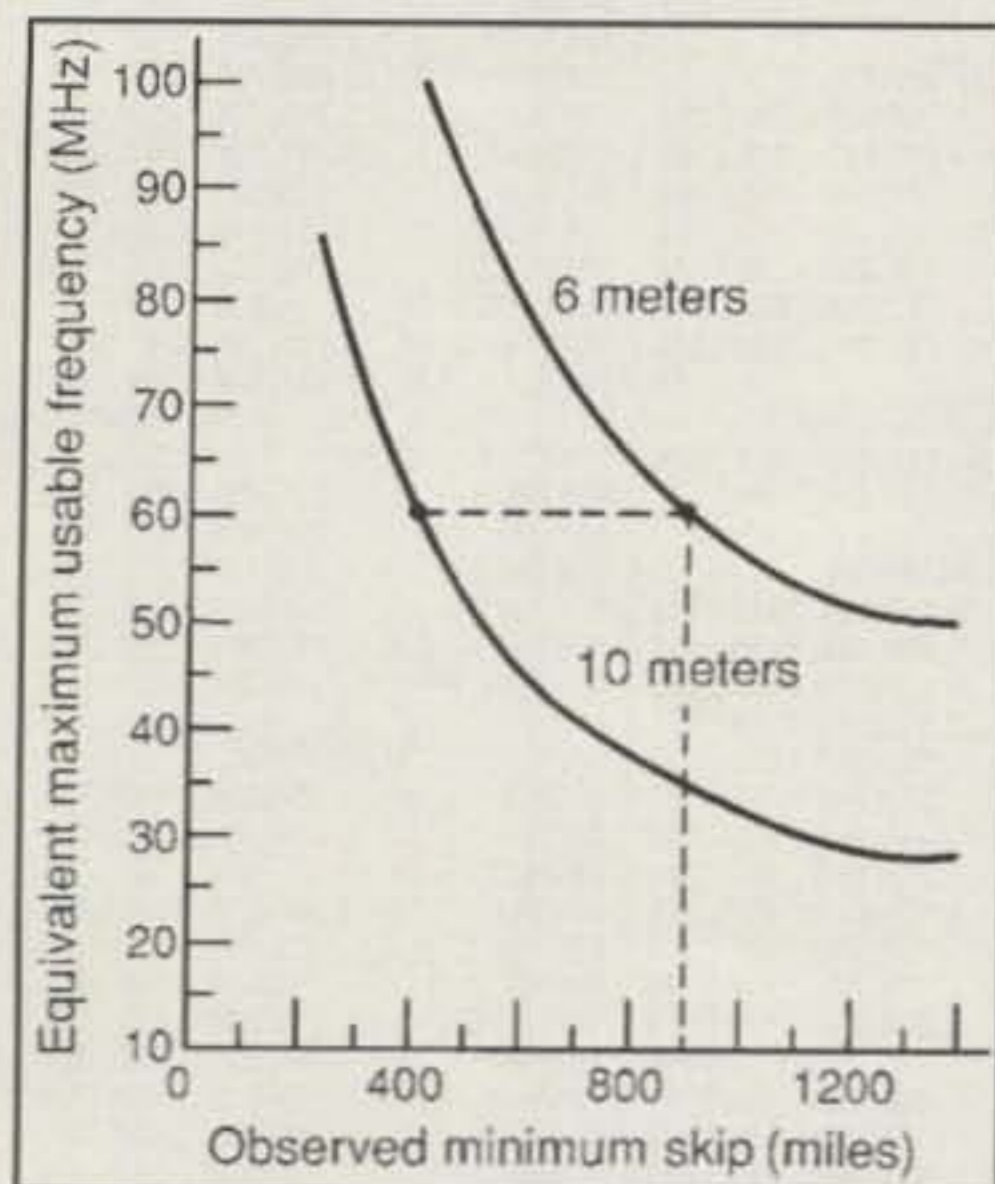


Fig. 1—A graph showing how to predict 6 meter short-skip openings.

20 Meters: This is expected to be the best band for DX during May. Opening shortly after sunrise, good DX conditions can be expected to one area of the world or another through most of the daylight hours and well into the hours of darkness. Peak conditions are expected during the sunrise period and again during the late afternoon and early evening. Expect excellent short-skip conditions, often with exceptionally strong signal levels, between distances of approximately 350 and 2300 miles. Quite often, particularly during the late afternoon and early evening, optimum conditions will exist for both short and long skip, and stations a few hundred miles away will be heard at the same time as DX stations several thousand miles away, causing considerable QRM!

30 Meters: This can be another propagation asset during summer months. Peak openings are expected during the nighttime hours, much like 40 meters, but often with higher signal levels and somewhat lower noise levels.

40 Meters: Fewer DX openings are expected because of the shorter hours of darkness and the higher levels of static expected in the northern hemisphere during May. However, some good openings to many areas of the world should still be possible from an hour or two before sunset, through the hours of darkness, until an hour or two after sunrise. Good daytime short-skip openings also should be possible for distances ranging between approximately 150 and 750 miles, with nighttime openings extending up to the one-hop limit of 2300 miles.

80 Meters: A considerable decline in DX possibilities is expected during May because of the shorter hours of darkness and seasonal increase in static levels. Some fairly good DX opportunities should continue to occur, however, for openings to many areas of the world during the hours of darkness and the sunrise period. Weak signals will often be masked by high static levels. Excellent short-skip openings should be possible during the daylight hours over distances of approximately 50 to

250 miles. During the hours of darkness short-skip openings should increase up to approximately 2300 miles. Short-skip propagation also may often be marred by high static levels.

160 Meters: Propagation conditions on this band have passed their seasonal peak and will be on the decline until early fall. Openings up to distances of at least 1000 miles should still be possible during the hours of darkness, and over considerably greater distances at times when static levels are low.

VHF Ionospheric Openings

Sporadic-E ionization should increase considerably this month, and some fairly good 6 meter openings should be possible between approximately 1000 and 1400 miles. These openings are most likely to occur between 10 AM and 2 PM and between 6 and 10 PM local daylight time, although they can also occur at other times. During periods of intense and widespread sporadic-E ionization, two-hop openings considerably beyond 1400 miles may occasionally occur on 6 meters, and openings between approximately 1200 and 1400 miles may be possible on 2 meters!

Here is a useful tip for predicting 6 meter short-skip openings from observations made on 10 meters. The geometry of propagation is such that as the skip distance decreases on 10 meters, the highest frequency that will be reflected by sporadic-E ionization increases. By observing the *minimum* skip heard on 10 meters, and using the relationship shown in fig.

1, it should be possible to tell whether or not 6 meters is open and over what distance.

For example, if the minimum skip heard on 10 meters in a south-westerly direction is observed to be 400 miles (it's the distance to the *nearest* skip station that counts, not others), from fig. 1 the intersection between 400 miles and the 10 meter curve corresponds to an MUF of 60 MHz. This means that there is a very good chance that 6 meters should also open in the same general direction. The minimum skip distance that can be expected on 6 meters can be found from fig. 1 by locating the intersection between 60 MHz and the 6 meter curve. The resulting distance is found to be 900 miles. A useful rule of thumb to remember is that when skip stations are heard less than 500 miles away on 10 meters, the chances are very good that 6 meters will also open in the same general direction.

The *Eta Aquarids* meteor shower should intersect the earth's atmosphere between May 5th and 7th. This is a major meteor shower, and it should reach maximum intensity during the afternoon of May 6th, with a predicted hourly meteor count in excess of 20. Chances are good for meteor-burst openings during the period of the shower.

While there is generally little auroral activity during May, some displays could occur during periods of radio storminess. Check the Last-Minute Forecast at the beginning of this column for those days that are likely to be Below Normal or Disturbed during May.

73, George, W3ASK

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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."

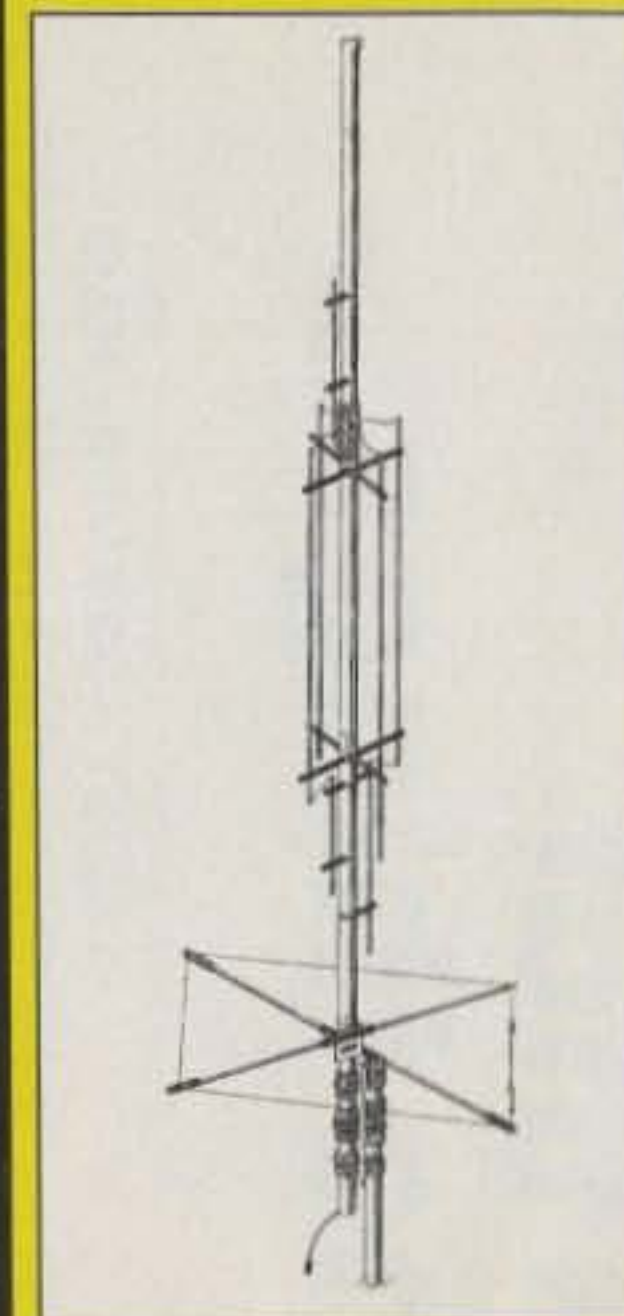
73—This is a real DX antenna, much quieter than other verticals."

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 it is fed in the center."

IEEE—"Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole): it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."

New Release: **TITAN DX**



This all purpose antenna is designed to operate 10m-80m, WARC bands included. It sits on a 1-1/4" pipe and can be mounted close to the ground or up on a roof. Its bandwidth and no tune feature make it an ideal antenna for the limited space environment as well as a terrific addition to the antenna farm.

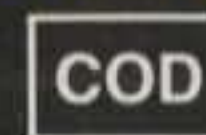
MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	\$259
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	\$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	\$289
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	\$399

Just Released

GAP

ANTENNA PRODUCTS INC.
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Vero Beach, FL 32967

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Set of 4 Order No. 93S\$7.00

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Order No.	Description	Color/Size	Quantity	Cost Ea.	Total
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By fax 516-681-2926

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 76 North Broadway, Hicksville, New York 11801
 Sales Tax: NY State residents add applicable sales tax.

T Shirt Sizes Ts come in L, XL and XXL (add \$2.00 for XXL)

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Shipping and handling charges are as follows: \$2.00 s/h for orders under \$20.00, for orders of \$20.00 to \$50.00 add \$4.00, Free shipping on orders of over \$50.00.



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GRIP IT. LIVE IT!

New Dual Band!
Wide band HT!
C508A

STANDARD

has done it again!

Great radios come in small packages. First came the C108A - the tiniest 2m radio - operates on 2AA batteries and fits in your shirt pocket.

Next, GREATNESS evolved into the C508A the DUAL BAND big brother to the C108A - it too, fits in your shirt pocket and operates on 2AA batteries, and more... The C508A has 280mW of output (comparable to low power of most HT's operating on a nicad battery pack) adequate power to hit most local repeaters with its helical designed antenna.

Take it anywhere.

The C508A is perfect for HAMFESTS, picnics, hiking, or while using your mobile rig in cross-band repeat mode, for quick access to a distant repeater. Be confident that your carrying the BEST amateur radio - you've got a STANDARD. STANDARD has exceptional RF features, incredible extended receive capabilities and solid transmitting performance.

Specifications

- Frequency Coverage: 100-180 MHz
Approx. 340-400 MHz
400-480 MHz
- AM programmable for aircraft
- 60 memories + 2-VFO, 2-Call
- CTCSS 39 tones-Encode/Decode
- 22 menu selections
- RF squelch
- Freq steps, 5, 10, 12.5, 15, 20, 25, 30 and 50
- Scan types: Busy, Pause or Hold
Scan: 1 MHz, Entire band, Program, Memory, Specific memory frequencies, Block and CTCSS
- PTT and Frequency lock
- Keyboard lock
- Tone burst: 1750 Hz
- APO: Auto Power Off
- Battery save: 4 steps
- Auto power off: adjustable
- Output power: 280 mW
- Operates from 3V "2-AA"
- Size approx: 2.28" W, 3.35" L, 0.98" D
- Weight approx: 5.65 oz

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ACCESSORIES

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- CHP150 VOX microphone
- CLC502 Standard soft case
- CMP111 Speaker microphone
- CMP113 Tie pin microphone
- CMP115 Mini speaker microphone
- CMP123 Ear speaker/mic
- CNB401 NiCad battery pack
- CSA401A NiCad battery charger

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* Modifications for MARS/CAP transmit require an appropriate license.

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EASILY OPERATED
VOLUME CONTROL

TRUE PORTABILITY
WITH TWO AA
BATTERIES

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C108A

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C508A



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OWN THE WORLD'S BEST FOUR-WHEEL-DRIVE BASE STATION

Add a QMS Antenna Tuner System to your SSB.

\$895.00

The QMS is an SGC SmartunerSM automatic antenna coupler, an SG-303 extended full-range antenna, and the special exterior—waterproof—mounting package, all in one.

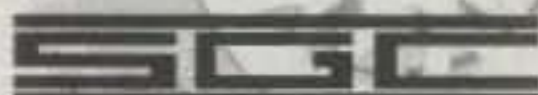
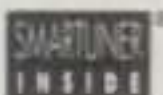
The QMS is that large box strapped to the side. We admit, at first glance it looks a little unusual. But once you use it, you'll find an almost unbelievable jump in reception and transmitting range (3-20 db). The QMS makes a typical HF-SSB perform like it's never performed before. Match it with a cutting edge SGC HF-SSB and it will blast holes through major mountain ranges and probably some laws of physics. Power and focus are everything in HF-SSB ham rigs. Buy this and own the best base station on-or-off-the road.



Mounting the tuner and antenna on the outside reduces engine noise and eliminates power-draining antenna wire runs between the antenna and tuner.

QMS. It's the look of focused power.

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The SGC Building P.O. Box 3526 Bellevue, WA 98009 USA (206) 746-6310 Fax: (206) 746-6384

KA5W	*	369,240	529	362	OM3A	3,449,682	2231	662
WA3WJD	*	340,990	438	305	OM7M	3,440,514	2307	677
AA3HM	*	287,592	381	276	OH8LQ	3,411,120	2159	699
KC1F	*	251,968	382	254	OH6WZ	3,410,253	2286	703
K80D	*	134,469	260	201	R3F	3,338,700	2309	718
AD6E	A	118,737	229	167	OL80J	3,319,739	2226	641
K8CV	*	61,754	177	154	RU3A	3,062,635	2161	685
N4XR	A	29,493	91	87	DA8WCY	3,040,722	2050	646
K5EC	*	12,714	87	78	SL8CB	2,895,180	2164	661
N1NQD	*	2,520	45	45	DL2HTD	2,880,330	1853	670
KF2D	*	1,242	18	18	PI4CC	2,809,300	1769	555
WF3T	14	1,162,308	1063	548	OM3RKA	2,772,410	1939	635
W1BIH	14	235,770	337	290	IR3X	2,598,750	2203	630
KC8EI	14	75,348	226	207	ON6AH	2,460,158	1763	641
N10PZ	*	2,844	36	36	EM7Q	2,439,024	2094	588
NA5Q	7	309,260	557	329	UT7W	2,270,520	1802	630
KN6EL	7	77,840	181	139	S50W	1,920,240	1706	560
*K04EW	A	337,464	602	344	ED4ML	1,877,174	1873	527
*WT3P	A	71,610	205	154	OH8MDG	1,837,550	1571	550
*WR3L	14	151,641	300	261	GB5WW	1,809,423	1326	539

DX

S58D	A	2,596,000	1765	640	LY3MR	1,613,360	1667	536
					(Op: S57AD)			
					GX8FUN	1,557,171	1662	539
KH6RS	A	2,025,611	1255	469	ED3PX	1,403,488	1556	488
					(Op: N6HR)			
					RK1OWZ	1,326,864	1305	528
DL4MCF	A	1,714,104	1616	537	PI4ZLD	1,199,826	1346	459
S56A	*	1,599,920	1401	560	G3XMZ	1,147,125	1237	483
F5NBX	A	1,544,485	1500	515	IO2L	1,104,952	1249	472
IK8HBN	A	858,690	934	406	OL5T	1,062,334	1235	449
F6IRA	*	592,790	962	374	SK6AW	1,004,640	1031	460
G3TXF	A	572,182	822	373	F6KAR	974,688	1078	426
IK5TSS	*	522,928	750	368	ED3HP	909,932	1200	436
OZ5MJ	A	67,734	211	159	RZ4AYT	893,412	1099	468
DK9DA	*	62,475	213	175	OK2KOD	802,197	1001	407
DL1MFL	*	48,416	200	136	YO2KJJ	721,105	1019	385
IK3SCB	*	39,530	184	134	SP3PFR	596,824	604	488
IV3GCN	*	7,936	73	62	9A6P	430,107	706	307
JH3AIU	A	4,736	38	27	SP9KRT	411,492	625	318
HA8DU	14	2,033,152	1492	704	YU1AXY	352,272	783	358
OH3NXW	14	635,262	900	443	SJ9WL	334,044	706	324
PY2DP	*	219,454	217	179	YU7AL	331,608	650	337
*OM6TX	A	481,194	804	342	DA8SAX	257,472	600	298
*OK2ON	A	64,722	235	161	EA3FP	251,512	498	298
*JH8KYU/1	A	59,052	180	133	HG6V	194,580	400	230

MULTI-OPERATOR SINGLE TRANSMITTER

UNITED STATES

NB1B	5,198,250	2336	725
N4WW	4,275,555	2115	745
NS8Z	3,751,326	2050	762
NJ4F	3,376,965	1741	697
KN5H	2,794,969	1756	673
AG6D	2,709,432	1591	622
KJ1N/D	2,673,693	1920	717
AA6MC	2,513,502	1588	622
N5OK	2,399,412	1747	708
NT7Y	1,254,957	1192	561
WA7FAB	809,952	921	472
KB1BOU	593,748	520	332
WD9FEN	18,537	124	111

NORTH AMERICA

WP3/WX9E	4,511,840	2119	652
CK7U	2,920,080	1646	552

AFRICA

CQ3X	13,254,620	4394	790
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ASIA

JH5ZJS	3,854,838	1820	677
JA7YAA	2,942,016	1497	616
RK9AWN	2,937,363	1470	533
RU9D	2,290,301	1651	533
JE6ZIH	2,140,084	1236	551
RZ9QWM	1,855,740	1178	471
HS58A	1,534,858	1538	494
JA2YKA	602,728	554	329
JU1T	381,644	581	292
JA1YKX	314,280	401	270

EUROPE

IH9/			
OK1MM/P	8,099,712	3392	632
HV4NAC	7,732,676	4820	812
LZ9A	7,014,480	3215	880
UU5J	6,778,413	3551	909
RK2FWA	5,623,884	3059	774
OJ8/OH8AA	5,482,752	4007	726
EA3AIR	5,214,330	3007	759
GB6WW	5,152,616	2999	808
II2K	4,659,984	2777	756
DF8KW	4,575,114	2376	774
OH8X	4,501,910	3081	730
4U8ITU	4,491,503	3221	719
RN4W	4,359,942	2806	786
EG1RD	4,343,479	2463	719
9A7A	4,080,114	2412	747
YT1R	4,077,400	2720	725
HG6Y	4,074,594	2657	731
OH7AAC	3,783,546	2483	741
HG5M	3,653,310	2375	705
OH1AD	3,576,783	2330	699

OM3A	3,449,682	2231	662
OM7M	3,440,514	2307	677
OH8LQ	3,411,120	2159	699
OH6WZ	3,410,253	2286	703
R3F	3,338,700	2309	718
OL80J	3,319,739	2226	641
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ED4ML	1,877,174	1873	527
OH8MDG	1,837,550	1571	550
GB5WW	1,809,423	1326	539
RZ1AWO	1,755,494	1611	538
HG750K	1,730,659	1761	541
LY3MR	1,613,360	1667	536
GX8FUN	1,557,171	1662	539
ED3PX	1,403,488	1556	488
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YU7AL	331,608	650	337
DA8SAX	257,472	600	298
EA3FP	251,512	498	298
HG6V	194,580	400	230
LA5M	177,625	456	245
9A1HBC	135,432	327	216
HB9DAI	72,468	250	198
HA4KYV	9,880	77	65

OCEANIA

VK1DX	1,901,144	1271	636
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SOUTH AMERICA

TO9IS	2,390,271	1229	501
LV1V	2,064,172	1095	473
PS2A	1,092,693	862	427

MULTI-OPERATOR MULTI-TRANSMITTER

UNITED STATES

WW2Y	10,192,260	3750	949
KG1D	9,930,228	3700	924
WZ1R	7,121,840	3128	880
WC4E	6,298,565	2946	889
NQ4I	5,186,775	2733	825
WD8LLD	3,469,200	1915	735
KU2Q	410,942	424	298

DX

9A1A	16,098,986	6599	1046
HG73DX	14,354,816	5788	1036
KL7Y	9,666,509	3227	851
OT5A	8,315,727	3961	903
PI4COM	7,361,182	3751	818
LY7A	5,500,044	3670	748
JA1YDU	4,455,933	1940	673
OZ5W	3,211,538	1967	682
OZ5WQ	3,083,184	2456	648
JA1YXP	2,474,730	1308	558
OI1AY	1,327,296	1488	496
YT58TY	734,559	1158	399

Check Logs: The following logs were used for cross-checking. Thank you.

7J1ALX, 7L3TDU, CE4ETZ, DF30L, DJ0SH, DK5RY, DL0GRH/P, DL3BRA, DL3NEO, DL5DWW, DL5LRA, DL6ZLG, DL7VAF, ES2JJ, F5NLX, HB9LDO, IO8KHP, IT9AUP, JA6FYM, K3WVP, KA9IMX, KO4PY, LA4KF, LA40GA, LZ1HX, LZ1VQ, LZ2AU, LZ2UF/MM, LZ2UZ, LZ3AB, OH3WR, OK1JDJ, OM8TT, OM2XW, OZ1N, OZ5PA, OZ5UR, OZ7QB, PA3CNI, PY1PL, PY200, RA4HRL, RA4LAH, RV3AY, RX3AJB, SMDARR, SM8CSX, SM8NJO, SM3CBR, SM5BEU, SM6BZE, SM6TOL, SP1BNS, SP2CYK, SP2GUC, SP4DZT, SP6AUI, SP6FRQ, SP7BDS, SP7VCA, SP8JMA, SP9DGO/P, SP9LAS, SPL-200189, UA3XBY, UA3YJU, UA4YJE, UR5EIT, UT2XX, UU9JN, UX7TJ, VA3TEE, VE2EM, VK4IV, WB4RUA, XR4B, YO3RK, YO5CUU, YO5DMB.

Put The World At Your Fingertips!

NEW HY-GAIN DX77 ADVANCED VERTICAL WINDOM ANTENNA

...No Ground Radials!
HANDLES 1500 WATTS PEP...
10 THRU 40 METERS
INCLUDING THE WARC BANDS

NEW!

The most advanced vertical antenna—the Hy-Gain DX77 is unsurpassed in mechanical design, high power capabilities and provides 55% greater bandwidth on 20 and 40 meters than competitive verticals.

Never before has such a high performance antenna provided no-compromise capabilities without the need for ground radials. The DX77 is the only vertical without radials that can handle 750 watts keydown of RF output for 30 minutes.

Easy tilt mount is convenient to lower for tuning. Recommended installation is 8 feet above ground. Mount on pole, chimney, rooftop or deck—or great for portable and RV operation!

Exceptional value with advanced features:

- Automatic band switching
- Low angle of radiation
- Double wall tubing, steel masts clamp and stainless steel hardware
- 29 ft. compact, low profile design
- 2-year warranty

HY-GAIN BY TELEX YOUR PERFORMANCE ADVANTAGE

What's important to you when you're planning your new antenna system? Is it durability? Performance? Best antenna for the money? Whatever your criteria, Hy-Gain antenna products have always delivered performance, reliability and value—from 160 meters to satellite communications. Start with our quality designs and high quality materials, add our professional antenna range testing, MIL spec manufacturing and quality assurance, and you can understand why Hy-Gain is the most respected name in amateur antenna products.

TH11DX—This unique design gives you the frequency coverage of a log periodic with the performance of a monobander. Covers 20, 17, 15, 12 and 10 meters with maximum performance and only one feedline.

TH3 MK4—Why make compromises when you can have the best? The TH3 MK4 tribander gives you Hy-Gain performance and reliability with a modest price that is less than the Cushcraft A3. Features impressive 5.9 dBd gain and all stainless steel hardware.

V2R—A rugged antenna for 2 meters, the V2R provides 3 dBd gain with a wide coverage pattern. It features two collinear 5/8 wave antennas fed in phase along with 2 sets of radials that decouple the lower radiator from the mast. Tunable from 138-175 MHz with wind survivability to 120 MPH.

V42R—Expand your capabilities with this dual-band performer. This omnidirectional antenna gives you 3 dBd gain on 2 meters as well as 5 dBd gain on 70 cm. Comes complete with type N connector.

Hy-Gain Ham V with New Digital Control System

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IMRA-International Mission Radio Assn. helps missionaries—equipment loaned; weekday net, 14.280 MHz, 1:00-3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, 2755 Woodhull Ave., Bronx, NY 10469.

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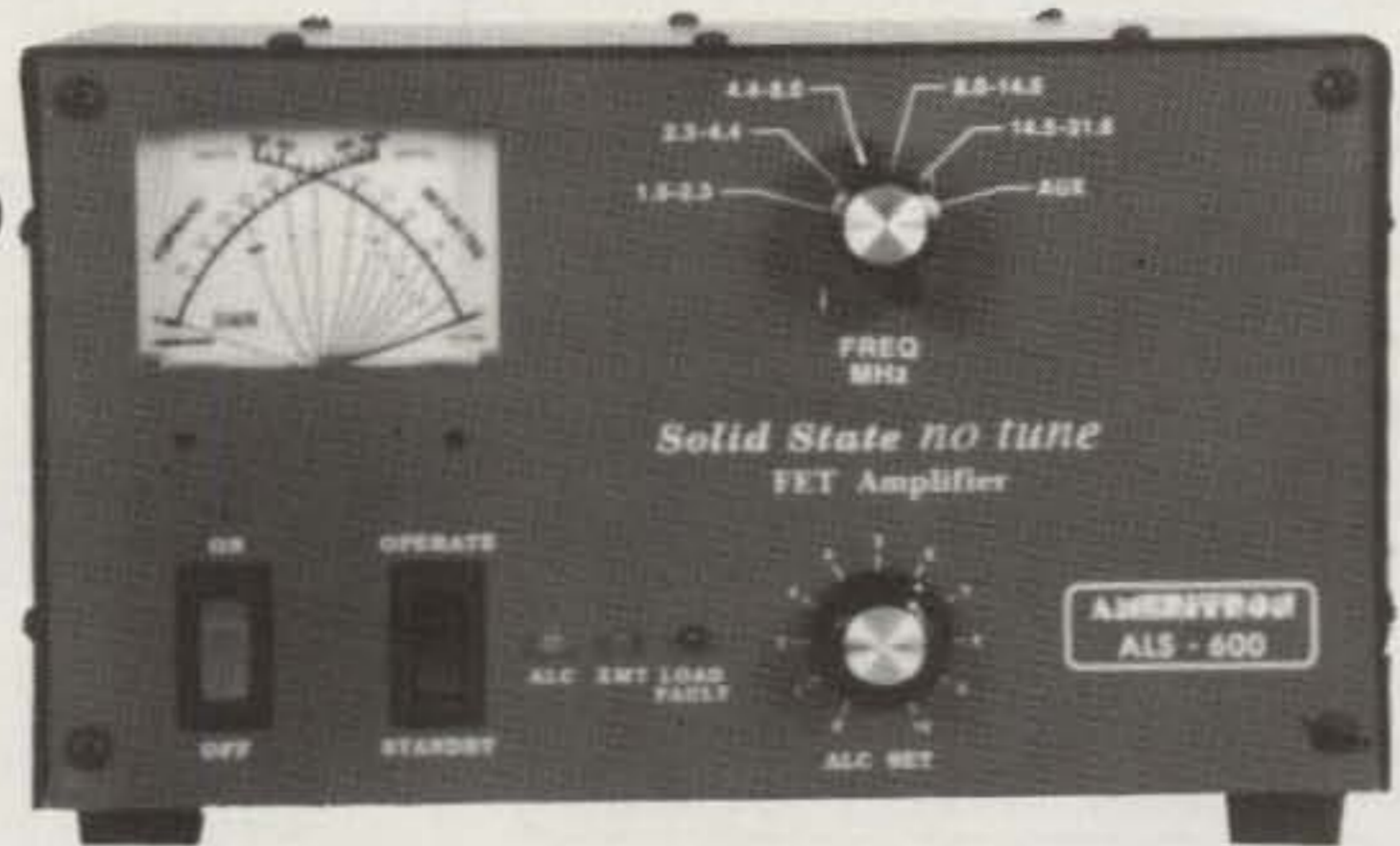
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SURPLUS ELECTRONIC TEST EQUIPMENT for sale at deep discounts. Write, phone, or fax to request the current list. Jim Stevenson, 3401 Sunny Slope Road, Bridgewater, NJ 08807. Phone 908-722-6157; Fax 908-722-6391.

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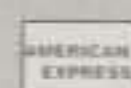
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(from page 6)

sary of FAIRS; May 11-12; operation in the General portion of 40, 20, and 15 meters. For certificate, send QSL and 9 x 12 inch SASE to FAIRS, P.O. Box 341, Floyd, VA 24091.

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

May 4, **Fresno ARC Annual Regional Hamfest**, Riverland RV Park, Fresno, California. For more information, listen to the Club's Sunday night Net at 7 PM on the Club's repeater at 146.940 MHz; or call John Pritchett, WA6JWK, at 209-222-6793.

May 4, **The Keno ARC Annual Hamfest**, Assembly of God Church, Klamath Falls, Oregon. For more information, contact The Keno ARC, P.O. Box 653, Keno, OR 97627; phone 541-883-2736; or 882-1300. (Exams.)

May 4, **Annual Spring Hamfest and Fleamarket**, Westway United Church, Etobicoke, Ontario, Canada. Contact Derrick Poulter, VE3ZXD, at 416-243-2020; or Went Wheatley, VE3WAY, at 416-233-6648.

May 4, **Cochise ARA Hamfest**, club site, Moson Rd., Sierra Vista, Arizona. Contact John or Leatha Braden, 2200 Sonoita Dr., Sierra Vista, AZ 85635, or call 520-459-7960. (Exams.)

May 4, **Western Colorado ARC Hamfest**, Moose Lodge, Grand Junction, Colorado. For more info, send SASE to Richard Carnett, N5PEN, 581 Eastwood St., Grand Junction, CO 81504 (970-244-8713); or Fred Hatten, N5LKO, 2819 US Hwy 50, Grand Junction, CO 81503 (970-241-1051). (Exams.)

May 4, **Wexauke ARC Hamfest**, Cadillac Middle School, Cadillac, Michigan. Contact Dan, KE8KU, Wexauke ARC, P.O. Box 163, Cadillac, MI 49601 (616-775-0998). (Exams.)

May 4-5, **the ARRL West Texas Section Convention and Key City ARC Hamfest**, Abilene, Texas. Contact Peg Richard, KA4UPA, Key City ARC, Inc., P.O. Box 2722, Abilene, TX 79604 (915-672-8889, leave message).

May 5, **Warminster ARC 22nd Annual Hamfest**, Middletown Grange Fairgrounds, Wrightstown, Pennsylvania. Contact George Brechmann, N3HBT, at 215-443-5656 between 9 AM and 9 PM. (Exams.)

May 5, **METRO 70cm. Network Giant Electronic Fleamarket**, Lincoln High School, Yonkers, New York. For info, call Otto Supliski, WB2SLQ, at 914-969-1053. (Exams.)

May 5, **Paul Bunyan ARC Annual Hamfest**, NorthWest Technical College, Bemidji, Minnesota. Contact Roben Beyer, P.O. Box 524, Bemidji, MN 56601 (phone 218-751-4801); or e-mail address emilee@northernnet.com. (Exams by preregistration only. Call Gurnee Bridgeman at 218-243-2002.)

May 5, **Lake Maggiore Hamfest**, Lake Maggiore Park, St. Petersburg, Florida. Call Cecil Wagner, KE4EYI, 813-894-6710.

May 5, **Kishwaukee ARC Hamfest '96**, Sandwich Fairgrounds, Sandwich, Illinois. Send SASE to Howard, WA9TXW, Attn: Hamfest, P.O. Box 264, Sycamore, IL 60178.

May 5, **Decatur Area Hamfest**, Shilling Hall, Richland College, Decatur, Illinois. Contact Roger VanRheeden at 217-864-2673. (Exams.)

May 11, **Lakeshore Hamfest**, Manitowoc County Expo Center, Manitowoc, Wisconsin. Call Glenn at 414-684-7096 (any time); or Red at 414-684-9097 (days). (Exams.)

May 11, **The Kankakee ARS Hamfest**, Will County Fairgrounds, Peotone, Illinois. Contact Will Bowser, 1210 N. Riverside Drive, Mokenca, IL 60954 (815-472-2079). (Handicapped accessible.)

May 11, **RACK Amateur Radio and Computer Fair**, Tennessee Valley Fairgrounds, Knoxville, Tennessee. Contact Carol Whetstone at 423-673-0475.

May 17-19, **Dayton Hamvention '96**, Hara Arena, Dayton, Ohio. Call 513-276-6930; FAXMail: set fax to manual send/receive, then call 513-276-6934; BBS via America Online; e-mail address: Hamvention@aol.com or nemo@ix.netcom.com; or send SASE to Hamvention, Box 964, Dayton, OH 45401-0964. (Handicapped accessible; exams.)

May 18, **Annual Spring Auction and Fleamarket**, VFW Post 6342, Forestdale, North Smithfield, Rhode Island. Contact Rick Fairweather, K1KYI, 144 Parkview Drive, Pawtucket, RI 02861, or call 401-725-7595 (between 7 and 8 PM).

May 18, **11th Annual Ephrata Area Repeater Society Hamfest**, Ephrata Sr. High School, Ephrata, Pennsylvania. Write to E.A.R.S., Inc., 906 Clearview Ave., Ephrata, PA 17522; or call Bill, N2PZA, after 6 PM at 717-484-2102. (Exams.)

May 18-19, **ARRL Washington State Hamfest**, Selah Middle School, Yakima, Washington. Contact Larry Selger, K17JL, 13112 Douglas Rd., Yakima, WA 98908 (509-966-5117 eves.). (Exams.)

May 19, **North Iowa ARC Tailgater**, Southbridge Mall parking lot, Mason City, Iowa. Contact John Helgeson, KB8PAG, P.O. Box 735, Clear Lake, IA 50428 (515-357-5810).

May 20, **Carteret County ARS Amateur Radio Exams**, fellowship hall at First Presbyterian Church, Morehead City, North Carolina. Contact Art Sylvester, KC4QD, at 726-1205; or Cecil "Penny" Pennington, K4QJV, at 247-6240. (Exams.)

May 25, **Durham FM Assn. Hamfest & Computer Show**, South Square Shopping Mall, Durham, North Carolina. Contact Rodney Draughon, AE4JW, 910-364-7420. (Exams at 10 AM; preregistration requested; contact Dave Snyder, N2MLU, 919-644-8681).

May 24-26, **Northern Alberta Radio Club Diamond Jubilee Hamfest**, Shakers Acres Camp and RV Park, Edmonton, Alberta, Canada. Contact Elmer Lodmell, VE6BLO, Glenora Postal Outlet, P.O. Box 53124, Edmonton, AB, Canada T5N 4A8; or e-mail ve6blo@tic.ab.ca. (Exams.)

May 26, **Maryland FM Assn. Hamfest**, Howard County Fairgrounds, West Friendship, Maryland. Contact Melvin Seyle, WA3KZR, 15809 Pointer Ridge Dr., Bowie, MD 20716 (301-249-6147).

May 31-June 2, **Midwest-Dakota Hamboree Convention**, Narina Inn, S. Sioux City, Nebraska. Contact Dick Pitner, W6FZO, 2931 Pierce Street, Sioux City, IA 51104. (Exams.)

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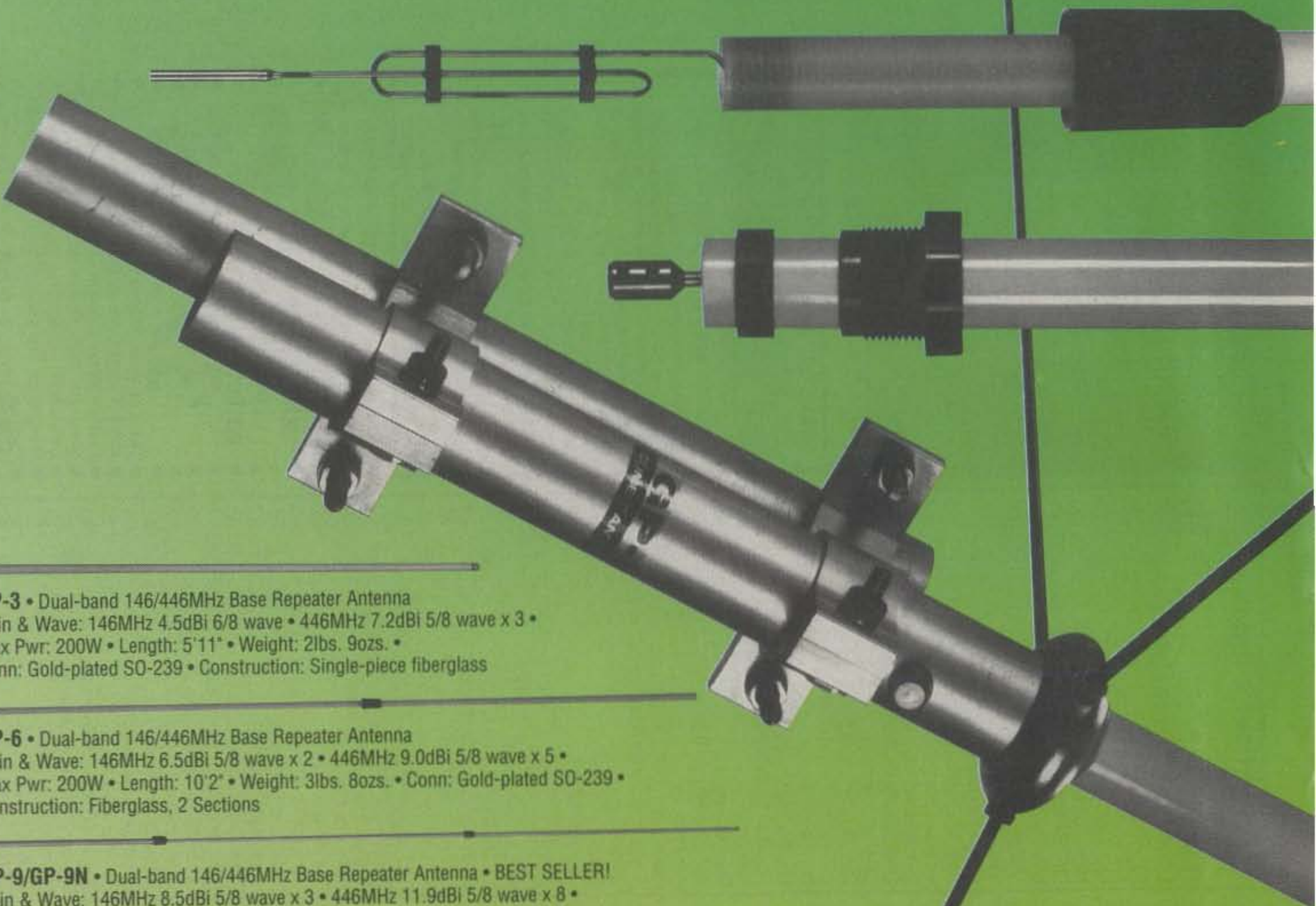
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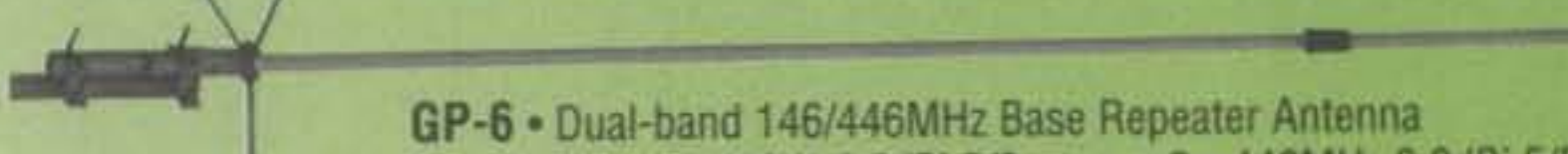
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Exclusive SLC System:

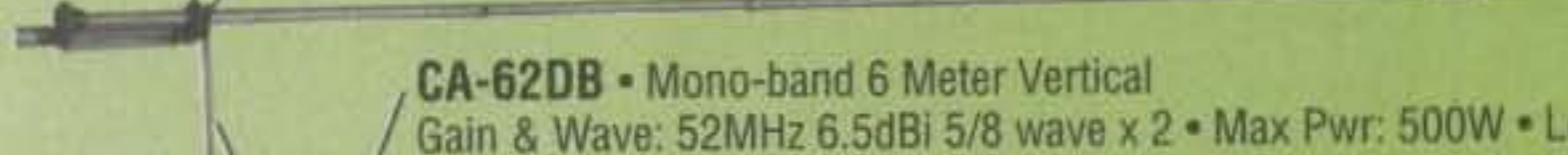
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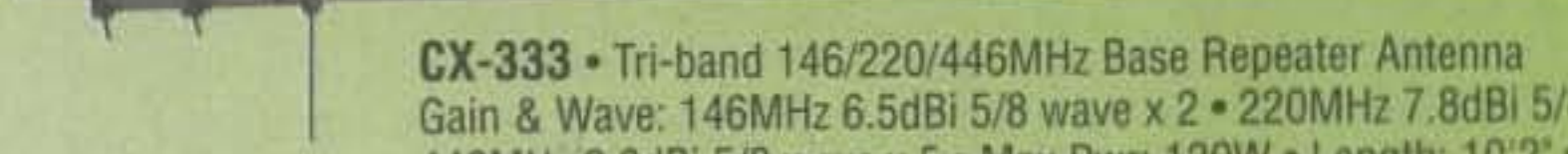


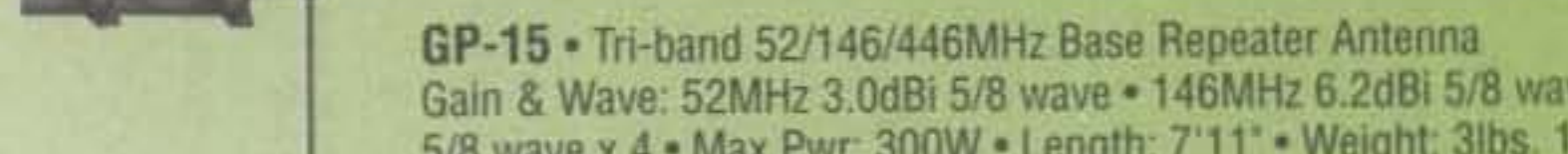
- 

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

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Don't let your contest results depend on "previous generation" technology. Get the Dxer's advantage with the "Next Generation" IC-738.

FEATURES

- New DDS Technology
- 100W (SSB, CW, FM)
40W AM Standard
- AT-170 High Speed Automatic Antenna Tuner (160-10 Meters)
- Two Antenna Connectors (Front Panel Switchable)
- 4 Function Meter (SWR/ALC/PO/S)
- VOX
- RF Gain
- Pass Band Tuning
- Notch Filter
- 10 Electronic Scratch Pad Memories
- 101 Memory Channels (10 split, 2 scan edge)
- RIT/ Δ Tx Functions
- Quick Split w/Simultaneous Display
- Speech Compressor
- Attenuator (20 db)
- Pre Amplifier (20 db)
- Double Band Stacking Registers
- Set Mode Menu to Customize Operation
- Menu Selectable CW Filters
- Noise Blanker
- Fast/Slow AGC
- High Dynamic Range/Low Distortion
- Built-in Electronic Keyer
- Direct Keyboard Entry
- Hand Microphone Included (HM-36)
- Computer Control Port (CI-V)

NEXT GENERATION TECHNOLOGY

Next Generation Circuitry

DDS (Direct Digital Synthesis) ICOM's unique DDS IC is used for the LPL Circuit. High tech and compact, the PLL unit improves frequency resolution to 1 Hz step. You'll experience an analog feeling of the tuning, faster PLL lockup times, improved phase noise blocking and high dynamic range.

Next Generation Tuner

AT-170 Advanced Tuner Preset memories, in 100kHz steps, provide very high speed tuning. "Automatic re-tune" turns the AT-170 on, and tunes, when SWR exceeds 1.5:1. "Through inhibit" permits tuning at SWR conditions up to 3:1 (when your antenna can't be tuned to 1.5:1). "Sensitive/Normal" gives you the choice of minimum possible SWR or 1.5:1. This eliminates tuning each time you transmit, unless desired.

Next Generation Duty Cycle

100% Full Duty The final power amplifier outputs a stable 100 W in SSB, CW and FM modes. The aluminum die cast frame, large heatsink and innovative twin cooling fan system stabilize the PA circuit to ensure 100% duty cycle operation.

Next Generation Frequency Management

Quick Split Operation Pre-programmable offsets, simultaneous display of Tx and Rx frequencies and XFC (Transmit Frequency Change) give you a competitive edge when calling Dx stations operating split frequencies. "Split Lock" permits changes in your transmit frequency while protecting your receive frequency against accidental changes.

Next Generation CW Operation

CW Contest Package Our built-in electronic keyer with separate key jack, full break-in (QSK) and separate jacks for an extended CW key or memory keyer, make a competitive package for CW contesting. For example, use a memory keyer (or TNC with CW capability) to make contacts easily, then use your paddle for normal operation.

*See your dealer for details

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Wide Band Receive
RX: 76-200 MHz, 300-540 MHz, 590-999 MHz*
TX: 144-148 MHz, 430-450 MHz
- AM Aircraft Receive
- MIL-STD 810 Rating
- Digital Coded Squelch (DCS)
- 112 Memory Channels
- 12V DC Direct Input
- High Speed Scanning
- Alphanumeric Display
- CTCSS Encode (Decode w/FTT-12)
- Auto Range Transpond System™ (ARTS™)
- Dual Watch
- Direct FM
- High Audio Output
- ADMS-1C Windows™ Programmable
- Four Battery Savers:
Automatic Power-Off (APO)
Receive Battery Saver (RBS)
Selectable Power Output (SPO)
Transmit Battery Saver (TBS)
- Time Out Timer (TOT)
- 2.5 and 5 Watt Versions Available
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"You notice how loud this HT's audio is?"

"Yeah, it's Mil Spec tough like a commercial HT."



"Easy to operate, small, great price!"

"Yaesu did it again!"

For the foremost in top-performing, durable, dual band handhelds there is one choice. The FT-50R. Manufactured to rigid commercial grade standards, the FT-50R is the only amateur dual band HT to achieve a MIL-STD 810 rating. Water-resistant construction uses weather-proof gaskets to seal major internal components against the corrosive action of dust and moisture. And, the rugged FT-50R withstands shock and vibration, so throw it in with your gear!

Dynamic and exclusive features set the FT-50R apart, too. Wide Band Receive includes 76-200 MHz (VHF), 300-540 (UHF), and 590-999 MHz*. Dual Watch checks sub-band activity while receiving on another frequency, then when a signal is detected, shifts operation to that frequency. Digital

Battery Voltage displays current operating battery voltage. Digital Coded Squelch (DCS) silently monitors busy channels. Auto Range Transpond System™ (ARTS™) uses DCS to allow two radios to track one another. And, the FT-50R is ADMS-1C Windows™ PC programming compatible, too. To round out the FT-50R, it has four battery savers, and super loud audio—remarkable in an HT this size.

A reliable companion where ever you go, the FT-50R is one tough little dual bander with all the features you want!

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FT-10/40R
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