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Amateur Radio

COMMUNICATIONS & TECHNOLOGY

APRIL 2006

CQ

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On the cover: Antique radio collector Ron Lawrence, KC4YOY, at his circa-1930 station in Wesley Chapel, North Carolina. Details on page 34.

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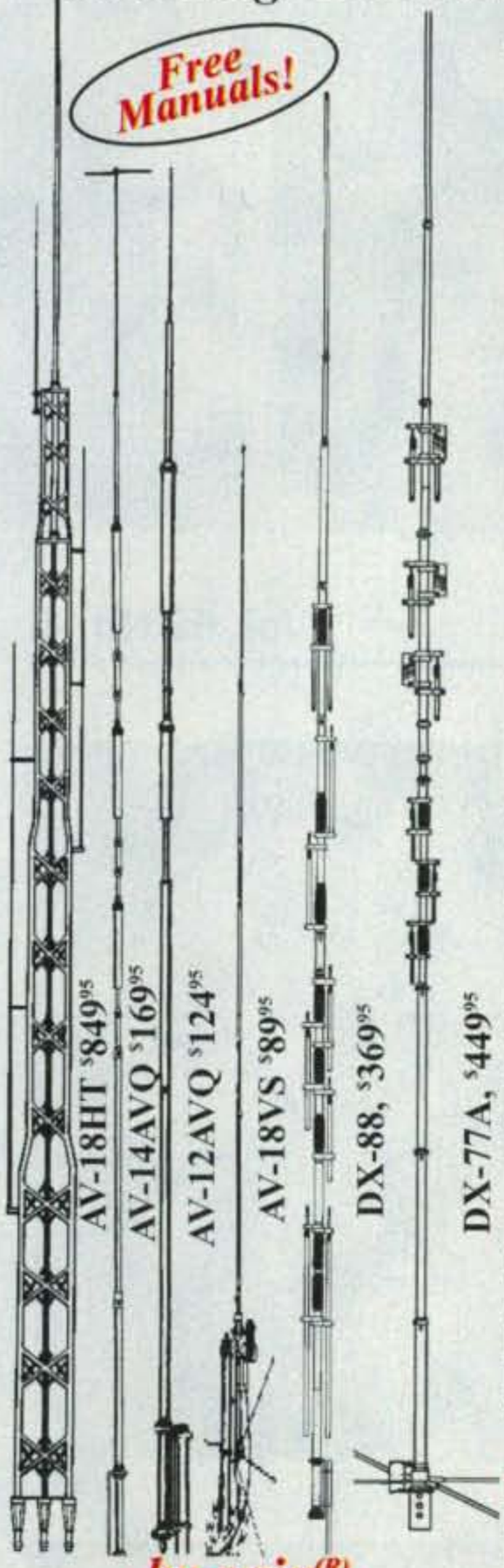


hy-gain® Classics

***All** hy-gain multi-band vertical antennas are entirely self supporting -- no guys required.*

They offer remarkable DX performance with their extremely low angle of radiation and omnidirectional pattern.

All handle 1500 Watts PEP SSB, have low SWR, automatic bandswitching (except AV-18VS) and include a 12-inch heavy duty mast support bracket (except AV-18HT).

Heavy duty, slotted, tapered swaged, aircraft quality aluminum tubing with full circumference compression clamps is used for radiators. Includes all stainless steel hardware. Recessed SO-239 prevents moisture damage. Hy-gain verticals go up easily with just hand tools and their cost is surprisingly low. Two year limited warranty.

AV-18HT, $849.95. (10,12,15,20,40,80 M, 160, 17 Meters optional). 53 ft., 114 lbs.

Standing 53 feet tall, the famous *Hy-Gain HyTower* is the world's best performing vertical! The AV-18HT features automatic band selection achieved through a unique stub-decoupling system which effectively isolates various sections of the antenna so that an electrical 1/4 wavelength (or odd multiple of a 1/4 wavelength) exists on all bands. Approximately 250 kHz bandwidth at 2:1 VSWR on 80 Meters. The addition of a base loading coil (**LC-160Q, $109.95**), provides exceptional 160 Meter performance. **MK-17, $89.95**. Add-on 17 Meter kit. 24 foot tower is all rugged, hot-dip galvanized steel and all hardware is iridited for corrosion resistance. Special tilt-over hinged base for easy raising & lowering.

AV-14AVQ, $169.95. (10,15,20,40 Meters). 18 ft., 9 lbs. **The** Hy-Gain AV-14AVQ uses the same trap design as the famous Hy-Gain Thunderbird beams. Three separate air dielectric Hy-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

AV-12AVQ, $124.95. (10, 15, 20 Meters). 13 ft., 9 lbs. **AV-12AVQ** also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $89.95.

AV-18VS, $89.95. (10,12,15,17,20,30,40,80 Meters). 18 ft., 4 lbs. **High** quality construction and low cost make the AV-18VS an exceptional value. Easily tuned to any band by adjusting feed point at the base loading coil. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

DX-88, $369.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs.

All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $189.95. Ground Radial System, GRK-88, $99.95. Roof Radial System, RRK-88, $99.95.

DX-77A, $449.95. (10, 12, 15, 17, 20, 30, 40 Meters). 29 ft., 25 lbs.

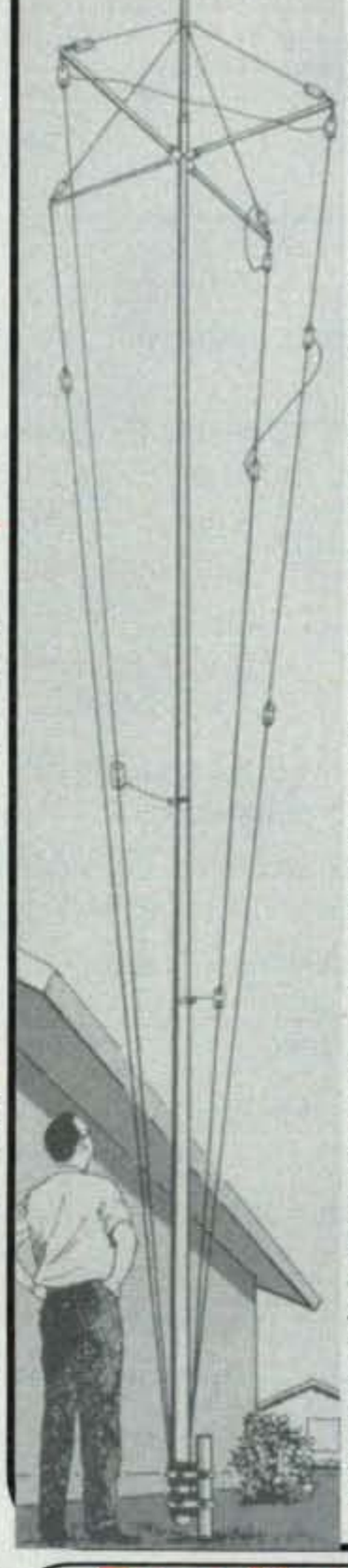
No ground radials required! Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$849.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$169.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$134.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$89.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

Hy-Gain HyTower-Jr™

Stands 39 feet tall . . . Full 1/4 Wave on 40, 20, 15, 10 Meters . . . Cage loading on 80 Meters

New!



AV-18HT-Jr. **$349.95**

Standing a tall 39 feet with *full-size* elements and rated at 5 KW, the AV-18JR *Hy-gain HyTower-Jr.*™ is the world's *second best** performing vertical!

Stub-decoupling is used to give *full-size* quarter wave radiators on 40, 20, 15, 10 Meters with super efficient cage loading on 80 Meters.

The *HyTower-Jr*™ has almost no losses -- your ground system determines your efficiency.

It is automatic bandswitching, fed with 50 Ohm coax and has low SWR over an exceptionally wide bandwidth. SWR is less than 1.2 at resonance on all bands.

The main radiator is aircraft high-strength, heavy walled, 2-inch aluminum tubing swedged at the top. Self-supporting in winds up to 40 MPH (use guy wires for higher winds). Mounts on 1¼ inch plumber's pipe. Heavy duty components will give you years of trouble-free operating pleasure. UPS Shippable.

Requires good ground system for optimum performance.

***The** famous 53 foot *Hy-gain HyTower*™ is legendary. It's the premier, best performing vertical in the world -- bar none! At less than half the price with nearly the *same* performance and based on the *same* principles, the *HyTower-Jr*™ is the poor man's version of its father *HyTower*. Of course, *Junior*™ doesn't have its father's rugged hot-dipped galvanized steel tower and construction!

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Vol. 62 No. 4

AMERITRON . . . 800 Watts . . . $799!

More hams use Ameritron AL-811/H amplifiers than any other amplifier in the world!

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

AL-811H
$799
Suggested Retail
4-Tubes, 800 Watts

AL-811
$649
Suggested Retail
3-Tubes, 600 Watts

You get a quiet desktop linear that's so compact it'll slide right into your operating position -- you'll hardly know it's there . . . until QRM sets in. And you can conveniently plug it into your nearest 120 VAC outlet -- no special wiring needed.

You get all HF band coverage (with license) -- including WARC and most MARS bands at 100% rated output. Ameritron's *Adapt-A-Volt*™ hi-silicon core power transformer has a special buck-boost winding that lets you compensate for high/low power line voltages.

You also get efficient full size heavy duty tank coils, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual illuminated meters, QSK with optional QSK-5, pressurized cooling that you can hardly hear, full height computer grade filter capacitors and more. 13¾Wx8Hx16D inches.

AL-811, $649. Like AL-811H, but has three 811A tubes and 600 Watts output.

AMERITRON *no tune* Solid State Amplifiers

ALS-500M 500 Watt Mobile Amp

AL-500M
$799
Suggested Retail

500 Watts PEP/400W CW output, 1.5-22 MHz, instant bandswitching, no tuning, no warm-up. SWR, load fault, thermal overload protected. On/Off/Bypass switch. Remote on/off control. DC current meter. Extremely quiet, fan off until needed. Uses 13.8 VDC. Compact 9Wx3½Hx15D in., 7 lbs.

ALS-600 Station 600 Watt FET Amp

AL-600
$1299
Suggested Retail

***No tuning**, no fuss, no worries -- just turn on and operate.* 600 Watts PEP/500W CW, 1.5-22 MHz, instant bandswitching, SWR protected, extremely quiet, lighted Cross-Needle SWR/ Wattmeter, front panel ALC control. 120 or 220 VAC. Inrush protected. 9½Wx6Hx12D in.

AL-80B . . . Desktop Kilowatt 3-500G Amp

AL-80B
$1399
Suggested Retail

AL-80B kilowatt output *desktop* linear amplifier doubles your average SSB power output with high level RF processing using our exclusive *Dynamic ALC*™!

You get cooler operation because the AL-80B's exclusive *Instantaneous RF Bias*™ completely turns off the 3-500G tube between words and dots and dashes. Saves hundreds of watts wasted as heat for cooler operation and longer component life.

You get a full kilowatt PEP output from a whisper quiet desktop linear. Compact 15½Wx8½Hx14D inches. Plugs into your nearest 120 VAC outlet. Covers 160 to 15 Meters, including WARC and MARS (user modified for 10/12 Meters w/license).

You get 850 Watts output on CW, 500 Watts output on RTTY, an extra heavy duty power supply, genuine 3-500G tube, nearly 70% efficiency, tuned input, Pi/Pi-L output, inrush current protection, multi-voltage transformer, dual Cross-Needle meters, QSK compatability, two-year warranty, plus much, much more! Made in U.S.A.

Near Legal Limit ™ Amplifier

AL-572
$1445
Suggested Retail

New class of *Near Legal Limit*™ amplifier gives you 1300 Watt PEP SSB power output for *60%* of price of a full legal limit amp! 4 rugged 572B tubes. Instant 3-second warm-up, plugs into 120 VAC. Compact 14½Wx 8½Hx15½D inches fits on desktop. 160-15 Meters. 1000 Watt CW output. Tuned input, instantaneous RF Bias, dynamic ALC, parasitic killer, inrush protection, two lighted cross-needle meters, multi-voltage transformer.

HF Amps with Eimac *3CX800A7*

AL-800
$1825
Suggested Retail
1 tube, 1250 W

AL-800H
$2695
Suggested Retail
2 tubes, 1.5 kW *Plus*

These HF linears with *Eimac*® 3CX800A7 tubes cover 160-15 Meters including WARC bands. Adjustable slug tuned input circuit, grid protection, front panel ALC control, vernier reduction drives, heavy duty 32 lb. grain oriented silicone steel core transformer, high capacitance computer grade filter capacitors. Multi-voltage operation, dual lighted cross-needle meters.

AMERITRON *full legal limit* amplifiers

AMERITRON legal limit amps use a super heavy duty Peter Dahl Hypersil® power transformer capable of 2.5 kW!

Most powerful / *3CX1500/8877*

AL-1500
$3045
Suggested Retail

Ameritron's *most powerful* amplifier uses the herculean *Eimac*® 3CX1500/8877 ceramic tube. It's so powerful that 65 watts drive gives you full legal output -- and it's just loafing because the power supply is capable of 2500 Watts PEP.

Toughest / *3CX1200A7*

AL-1200
$2645
Suggested Retail

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

Classic / *Dual 3-500Gs*

AL-82
$2645
Suggested Retail

This linear gives you full legal output using a *pair* of *dassic* 3-500s. Competing linears using 3-500s *can't* give you 1500 Watts because their lightweight power supplies *can't* use these tubes to their full potential.

Call your dealer for your best price!

Free Catalog: 800-713-3550

Ameritron brings you the finest high power accessories!

ARB-704 amp-to-rig interface. . . $49.95

Protects rig from damage by keying line transients and makes hook-up to your rig easy!

ADL-1500 Dummy Load with oil . . . $69.95

Oil-cooled. 50 Ohms. 1500 Watts/5 minutes. SWR< 1.2 to 30 MHz. Low SWR to 400 MHz.

ADL-2500 fan-cooled Dry Dummy Load, $199.95

Whisper quiet fan, 2.5kW/1 minute on, ten off. 300W continuous. SWR< 1.25 to 30 MHz.<1.4 to 60 MHz.

ATP-100 Tuning Pulser . . . $49.95

Safely tune up for full power, best linearity. Prevents overheating, tube damage, power supply stress, component failure.

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Hams Praised in White House Report

The efforts of ham radio operators were highlighted in the "What Went Right" section of the White House review of the federal response to Hurricane Katrina, released as we were going to press. The paragraph about amateur radio read, in part, "Amateur Radio Operators ... monitored distress calls and rerouted emergency requests for assistance throughout the U.S. until messages were received by emergency response personnel." The report also made 125 recommendations to the President for changes, identified 11 critical actions to be completed before the 2006 hurricane season begins on June 1, and called for creating a "culture of preparedness" among all levels of government, private businesses, and individuals throughout the country.

Peter I Expedition Cut Short by Weather

The 3Y0X DXpedition to Peter I, a tiny island off the coast of Antarctica, was forced to shut down ahead of schedule because of deteriorating weather conditions, but not before making more than 87,000 contacts on HF and VHF, including several via moonbounce (EME) and two with crew members on the International Space Station. According to the group's website, the final contact was made on 17 meters CW with K8LTG at 1813 UTC on February 19. For more on the expedition, see the "DX" and "VHF Plus" columns.

"SuitSat-1" Puts Out Little Signals, Big Headlines

Stuffed with dirty laundry (as well as a radio transmitter) and set adrift from the International Space Station to orbit until re-entering the atmosphere, an obsolete Russian spacesuit made headlines around the world and became what is certainly the most unusual amateur radio satellite ever to circle the Earth. "SuitSat-1," later given the OSCAR designator AMSAT-OSCAR 54, was released during a spacewalk on February 3. Initial reports from NASA indicated that it stopped transmitting within a few hours, but hams around the world continued to pick up weak signals. At press time more than two weeks later, the SuitSat website (www.suitsat.org) indicated that the last reported reception was from F6BYJ on February 20th, along with a statement that in the absence of solid reception reports, "it is certain SuitSat's batteries have died."

Will there be a SuitSat-2? Maybe. The *ARRL Letter* quotes space station Commander Bill McArthur, KC5ACR, as noting in a ham QSO, "We've got more suits that need to be jettisoned."

Robert McDowell Named to FCC

A communications lawyer from Vienna, Virginia is President Bush's nominee to fill the one remaining vacancy on the Federal Communications Commission. Robert McDowell is currently Senior Vice President and Assistant General Counsel for the Competitive Telecommunications Association (CompTel), an industry association representing companies that are developing and providing internet-based telephone, data, and video services. He also worked on President Bush's campaigns in 2000 and 2004. If confirmed by the Senate, his term would run through June 30, 2009.

Western Union Ends Telegram Service

The days of receiving a Western Union telegram are officially over. After more than 150 years of being synonymous with telegrams, Western Union–now a financial services company—quietly posted this message on its "Send a Telegram" webpage: "Effective January 27, 2006, Western Union will discontinue all Telegram and Commercial Messaging services. We regret any inconvenience this may cause you, and we thank you for your loyal patronage." Last year, according to an Associated Press news report, the company sent only 20,000 telegrams, mostly from companies sending formal notifications.

BPL Database Irks ARRL

The ARRL has filed a complaint with the FCC that the database mandated in the Commission's ruling on Broadband over Power Lines (BPL) is "woefully incomplete and improperly managed." The League has been complaining about the database-maintained by the United Telecomm Council—ever since it was set up several months ago. The purpose of the database was to provide a central registry of BPL operations to be used as a reference in cases of interference to licensed services. However, it has been accessible only to individuals in Zip codes served by BPL systems, and the ARRL says its own access was recently cut off. The FCC to date has been totally unresponsive to any amateur complaints regarding BPL interference.

CQ Comments on ARRL Bandwidth Proposal

CQ Communications Inc., publisher of *CQ, CQ VHF,* and *Popular Communications* magazines, filed comments with the FCC in late January on the ARRL's proposal to convert subband regulation from modes (such as CW, voice, and data) to maximum bandwidth (such as 200 Hz, 500 Hz, or 3.5 kHz). CQ's comments supported the concept of bandwidth regulation but took issue with some of the specifics of the ARRL proposal, including a mode-based exemption for AM voice, permitting voice-bandwidth signals on 30 meters and allowing semi-automatic digital "robots" to operate virtually anywhere in the HF bands. CQ's comments may be viewed on the FCC website at <http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6518314310>.

Hams Lauded in Congress

Arkansas Representative Mike Ross, who is also WD5DVR, made special note in the *Congressional Record* in February of the contributions of ham radio operators in the response last year to Hurricane Katrina. "Citizens throughout America dedicated to this hobby—a hobby that some people consider old fashioned or obsolete—were true heroes in the aftermath of Hurricane Katrina, as they were often the only line of communication available into the storm ravaged areas," Ross wrote in comments inserted in the *Record*. The complete text of his comments are in this month's "Public Service" column (page 66) and on the web at <http://www.house.gov/apps/list/press/ar04_ross/morenews/021006d.html>.

Revised Technician Question Pool Released

The Question Pool Committee of the Na-tional Conference of Volunteer Examiner Coordinators has released revisions to new question pool which will be used for Technician Class license exams starting in July. According to QPC Chairman Jim Wiley, KL7CC, most of the changes were to correct typographical errors, but some questions were also reworded for greater clarity and three questions were deleted from the pool entirely. Volunteer examiners designing their own tests are urged to take care to use only the version of Element 2 dated February 6, 2006 in developing Technician Class exams to be given after June 30, 2006.

Young Ham of the Year Nominations Open

Nominations are open for the 2006 Newsline Young Ham of the Year Award, honoring hams under 18 who have made significant contributions to amateur radio and/or their communities. This year, for the first time, the award is open to amateurs in all 50 U.S. states (it had previously been limited to the 48 continental states). The award, sponsored by Amateur Radio Newsline, has been given out annually since 1986. *CQ* and Vertex-Standard are corporate co-sponsors. Additional information and application forms are available online at <http://yhoty.org/award.htm> or by mail from: Newsline Young Ham of the Year Award, 28197 Robin Ave., Santa Clarita CA 91350. Nominations must be received by May 30, 2006.

ARRL Offers Summer Teacher Institutes

The ARRL is offering four week-long Summer Teacher Institutes on Wireless Technology, at locations in California, Connecticut, and New Jersey. Now in their third year, the all expense-paid seminars are available to active teachers on the elementary or secondary level, or to leaders of enrichment or after-school programs. Attendance is limited to 12 teachers per session and will cover basics of wireless technology, robotics, and space technology, along with amateur radio (of course). Applications are due by May 15. Information and applications are available online at <http:// www.arrl.org/FandES/tbp/ti.html> or by mail from Institute Director Mark Spencer, WA8SME, 774 Eastside Road, Coleville, CA 96107.

AD5X Wins 2005 Bill Orr Award

CQ Contributing Editor Phil Salas, AD5X, who is also a frequent contributor to *QST* and other ham radio magazines, has been named the winner of the 2005 Bill Orr Award, issued annually by the ARRL Foundation. The award recognized excellence in technical writing. According to the *ARRL Letter,* Salas was honored for "his excellence at making technical concepts understandable." In addition to frequent feature articles published in both *QST* and *CQ*, Salas recently joined the *CQ* editorial staff as editor of "The Weekender," a monthly column focused on useful and easy-to-build projects for the ham shack. Congratulations, Phil!

UK Hams Get Lifetime Licenses

Great Britain's telecommunications agency has decided to issue lifetime amateur licenses and to shift primarily to online issuance of license documents. In an announcement in mid-February, OFCOM said ham licenses in the UK "will remain valid for as long as the licence details remain correct or until such time as the licence is either revoked by OFCOM or surrendered by the licensee." There will, however, be a requirement that licensees "validate" their license details at least once every five years "in order to maintain their lifetime licence." In addition, OFCOM announced it will provide an online, web-based self-service licensing service, and will issue electronic license documents (probably PDF files) which users may then print out on their own. Traditional paper licenses would still be available, but at a small fee. The announcement did not provide the effective date of the changes.

Public Service to be Hamvention® Theme

The Dayton Amateur Radio Association has chosen "Ham Radio IS Public Service" as the theme for this year's Dayton Hamvention®. According to DARA, the theme reflects "the renewed awareness by the public of the service provided by amateur radio operators after the Gulf Coast hurricanes and other disasters." The Dayton Hamvention® is the world's largest ham radio gathering. It is scheduled this year for May 19–21 at Hara Arena just outside Dayton, Ohio.

Direct Fax to DXCC Desk

The ARRL has installed a dedicated fax number for its DXCC desk to better handle questions and other communications related to the DXCC award program. According to the *ARRL Letter,* there are no policy changes that go along with the new line, and the ARRL still does NOT accept DXCC applications via fax. The new number is 860-594-0346. Faxes for other ARRL departments should continue to be sent to the League's main fax number, 860-594-0259.

Additional and updated news is available on the Ham Radio News page of the CQ website at <http://www.cq-amateur-radio.com>. For breaking news stories, plus info on additional items of interest, sign up for CQ's free online newsletter service. Just click on "CQ Newsletter" on the home page of our website.

RIGtalk USB rig control interface

NEW!

USB to serial converter with TTL level output. Control your CAT or CIV radio directly by USB. No RS232 level converter needed. Plug and Play USB dongle design that makes it easy, simple and neat to controll your radio. Make your station easier and more fun to use with a RIGtalk.

RIGblasters

The original sound card interface for all ham sound card programs, any radio, any computer and all hams.

Any RIGblaster will work with over 2000 radios, over 100 programs and over 23 operating modes!

CBA II Computerized Battery Analyzer

Discover true battery performance! The first easy to use battery lab tester. Test any type of battery, NiCad, LiPoly, Lead Acid etc. *USB* interface with Windows® software. Measure and graph battery capacity with a constant current discharge of up to 40 amps or 150 watts. Graphs may be overlaid saved and printed. Test label printouts also.

RIGrunners

The original Powerpole DC power panels. No equal in quality or performance. Four models to choose from. Detachable power cord, meter you can see and hear from across the room, LEDs to show blown fuses and tested to 50 A. Make your 12 VDC wiring neat, safe, and convenient now.

PWRgates

Emergency backup power systems to safely have both a sealed lead-acid battery and a 13.8 volt power supply always connected to your station. Two models, one with a maintenance charger, and our new model PG40S, Super PWRgate, with a full four-stage selectable 1 to 10 amp fast charger. Gel/AGM batteries available from WMR for great prices.

PWRcrimp

Powerpole crimp tool that perfectly crimps 15, 30 and 45 Amp contacts. Ratcheted with an excellent contact positioner.

www.westmountainradio.com

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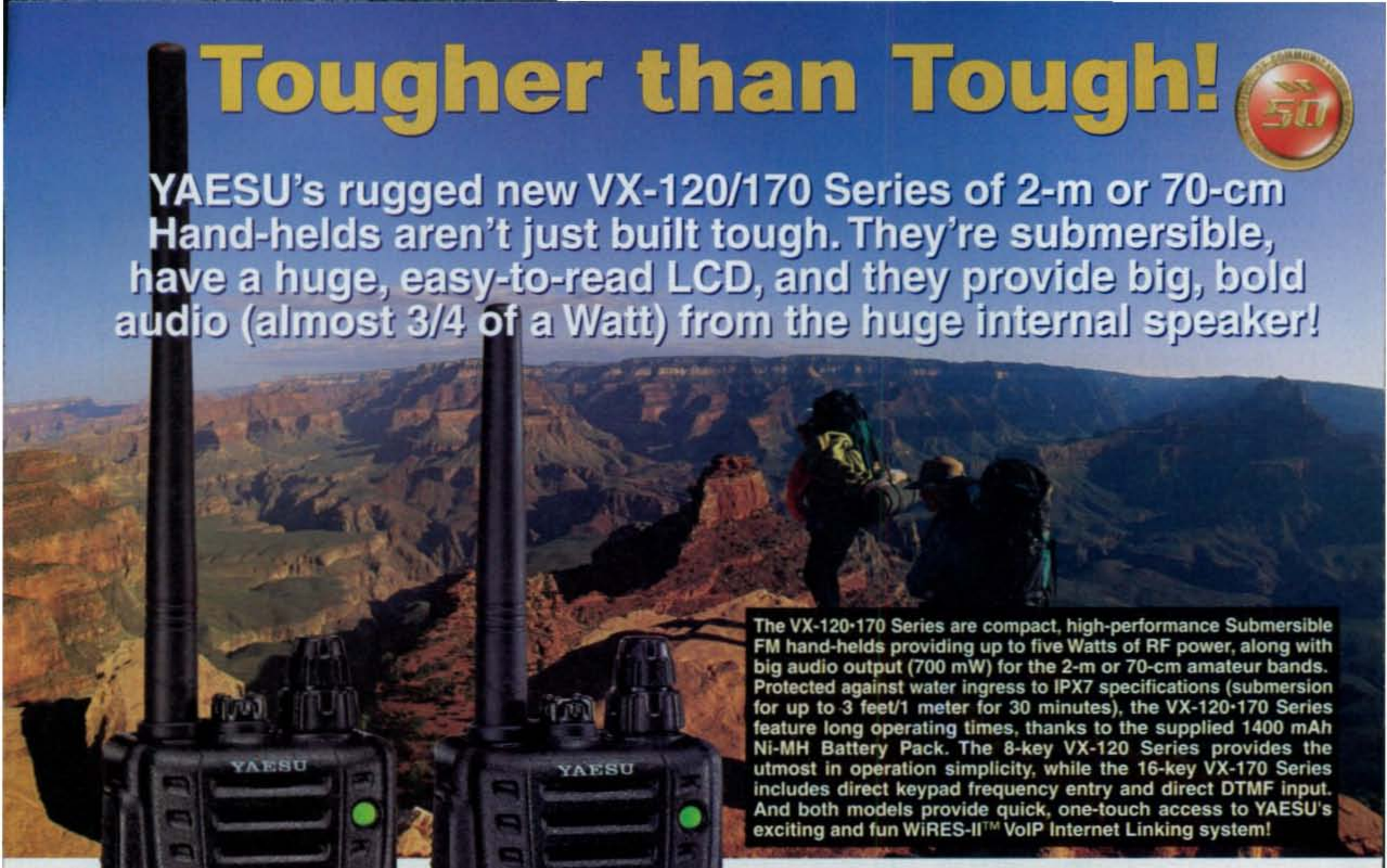
Tougher than Tough!

YAESU's rugged new VX-120/170 Series of 2-m or 70-cm Hand-helds aren't just built tough. They're submersible, have a huge, easy-to-read LCD, and they provide big, bold audio (almost 3/4 of a Watt) from the huge internal speaker!



The VX-120•170 Series are compact, high-performance Submersible FM hand-helds providing up to five Watts of RF power, along with big audio output (700 mW) for the 2-m or 70-cm amateur bands. Protected against water ingress to IPX7 specifications (submersion for up to 3 feet/1 meter for 30 minutes), the VX-120•170 Series feature long operating times, thanks to the supplied 1400 mAh Ni-MH Battery Pack. The 8-key VX-120 Series provides the utmost in operation simplicity, while the 16-key VX-170 Series includes direct keypad frequency entry and direct DTMF input. And both models provide quick, one-touch access to YAESU's exciting and fun WiRES-II™ VoIP Internet Linking system!

- 5W FM Transceiver
- Wide Receiver Coverage
- IPX7 Submersible 3 feet (1m) for 30 minutes
- Loud Audio 700 mW via Internal Speaker
- Long Life Battery FNB-83 (7.2 V/1400 mAh) included
- Huge Display (LCD)
- Enhanced Paging and Code Squelch (EPCS)
- CTCSS/DCS included
- Security Password Feature
- Direct Keypad Frequency Entry (VX-170 Series)
- Transmit Time-Out Timer (TOT)
- Automatic Power-Off (APO)
- Automatic Repeater Shift (ARS)
- YAESU's exclusive ARTS™ (Auto-Range Transponder System)
- RF Squelch Circuit
- 200 Standard Memory Channels with 10 Memory Banks
- Alpha-Numeric Labeling of Memories
- Dual Watch (Priority Channel Scanning)
- Emergency Feature
- Smart Search Memories

IPX7 Submersible 3 feet (1m) for 30 min. | Huge LCD | Big 700 mW Audio! | 1400 mAh Long Life Battery

FM Mono Band Hand Held Transceiver

VX-120/VX-170 Series

(8 key Version / 16 key Version)

VX-120/170 (VHF) VX-127/177 (UHF)

HANDHELD TRANSCEIVERS

IPX7 Submersible 3 feet (1m) for 30 min.

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a CQ editorial

BY RICH MOSESON,* W2VU

zero bias

The Communication Experts

This is one of those months when a bunch of different but related events coalesce around a single concept. In this case, it's accepting the fact—long suspected by many of us—that many of the people with the greatest dependence on efficient and effective communications systems don't understand how they work or how to make them work in a crisis … and that we, as communications experts, have a responsibility to help them.

It started here at home a month or so ago, when I offered to teach a segment of the next CERT (Community Emergency Response Team) class the basics of two-way radio communication, since the team members will be using Family Radio Service handhelds. Response from the emergency management director: "How will this benefit OEM?" After the shock wore off, I wrote up a brief explanation and a syllabus … and a few weeks later was invited to present the material to both prospective and current members.

Then, when I went to Florida for the Orlando Hamcation® in February, I encountered several similar situations. Before the hamfest began, I attended the Friday morning sessions of the International Disaster Management Conference, which happened to be going on in Orlando at the same time (see report, page 68). A speaker who was a paramedic at the Superdome in New Orleans during the Katrina disaster complained that "packages get tracked better than patients" and couldn't understand why the TV networks could communicate with the world from outside the stadium while he couldn't communicate with his company's headquarters 60 miles away. A conference attendee suggested that dropping 1000 satellite phones into the Superdome might have been better than dropping in food and water, clearly not understanding that 1000 people trying to make satellite phone calls at the same time from the same location would overwhelm that system as well.

A top official of the London (England) Ambulance Service reinforced that by pointing out that in the aftermath of the subway and bus bombings there last year, the cell phone systems continued to operate but it was impossible to get calls through due to overloading. He also explained that his crews had absolutely no communications inside the subway tunnels. As a result, according to Russell Smith, the ambulance service's Deputy Director of Operations, emergency response officials in London are now so convinced that communications systems cannot be relied upon in a major emergency that they will be basing all future training on an assumption that there will be no communications whatsoever, and that an intact communications network will be a "bonus."

Hamfest setup time beckoned and I was unable to stay for any additional sessions. But from my perspective, I don't think I really needed to. It was clear to me that, regardless of the disaster or emergency situation, the unifying key to effective response is effective communications … and as pointed out at the conference, communications is often the first casualty of any disaster. But that is often the case because of poor communications planning, which itself is often a result of poor understanding of communications systems and the realities of communicating in an emergency or disaster situation.

At the hamfest, one ham business owner who serves on the board of his local natural gas utility told me that the company had removed all the radios from its trucks and now relies entirely on cell phones. The company was in a position to be a "base camp" of sorts for crews from around the country who came to help get gas service restored in the aftermath of Hurricane Katrina. Not only was it impossible for crews from out of town to communicate due to a lack of interoperability, it was also impossible for the company's own crews to communicate back to headquarters because there was no cell phone service in the affected areas. Scouting crews had to drive out to the disaster zone each morning, determine what help could be offered that day, then drive back home to report back and gather crews and equipment to work in the afternoon.

This is unacceptable, as is the fact that a major city like London feels it has no choice but to throw in the towel on disaster communications and train for emergencies on the basis of intact communications being "a bonus." Hams can and should help provide communications, of course, but we need to do more.

Beyond the Radio

Last November, we told you about a radio club in New Jersey that went beyond the traditional role of an amateur radio club, working with the local county government to refurbish a county park with the help of $1 million in grant money. The only direct benefit to the club has been the use of a field house in the park as its headquarters (which it had before getting the grant), but in exchange, the club has been helping with security and other projects. Now, it is becoming apparent that we hams need to go beyond our traditional roles in emergency communications as well. Providing radios and operators is no longer enough.

First of all, the fact is that in a major disaster, we cannot be everywhere at once, and there are serious limitations on our ability to transmit sensitive information, such as names, conditions and destinations of patients transported out of a disaster area. Second, we have more to offer than just our radios and our operating skills. We understand how communications *systems* work (and don't work), and how to set up *ad-hoc* networks on the fly. We need to share that understanding with emergency managers and planners, and help them design systems and backup plans that won't fail at a moment of critical need.

We don't need to worry about "putting ourselves out of a job," because when the you-know-what hits the fan, even intact communications channels will still be overloaded and interoperability between responding agencies will still be a major challenge. There will be plenty of work for us for the foreseeable future.

Police officers, firefighters and paramedics are not communication specialists. We are—at least, those of us with training and experience (if you don't have it, you should get it). We need to build up our relationships with our emergency planners and convince them of our value as planning partners. As an example, in talking informally after his presentation with Russell Smith of the London Ambulance Service, I was explaining how hams can be helpful even when there is not a complete communication breakdown. I used his own example of a system they use in London to prioritize 9-1-1 calls for medical help—red for life-threatening emergencies, yellow for slightly less urgent calls, and green for the more "routine" calls. Dispatchers are trained to tell the difference and, during a major incident, inform callers on the "green" level that because of the incident, an ambulance will not be able to respond, and offer suggestions for alternatives (go to the hospital yourself, call your doctor, call your pharmacist). I explained to Smith that in many cases, hams are able to handle the "green" level radio traffic while freeing up the emergency service frequencies for "yellow" and "red" calls. He was very interested in the concept and said that he'd never thought about prioritizing radio traffic in that manner before. Sometimes, a simple suggestion can be helpful; other times, a more active role in planning and preparation is required. We can offer both.

Amateur radio has had a high and positive profile recently in regard to emergency communications. We need to take advantage of that visibility to help our emergency responders make reliable communications more than "a bonus" in the next disaster. —*W2VU*

*e-mail: <w2vu@cq-amateur-radio.com>

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HAM-IV
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HAM IV and HAM V Rotator Specifications	
WindLoad capacity (inside tower)	15 square feet
Wind Load (w/mast adapter)	**7.5 square feet**
Turning Power (in lbs.)	800
Brake Power (in lbs.)	**5000**
Brake Construction	Electric Wedge
Bearing Assembly	**dual race/96 ball bearings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight (lbs.)	26
Effective Moment (in tower)	**2800 ft/lbs.**

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For large medium antenna arrays up to 20 sq. ft. wind load. Available with *DCU-1 Pathfinder* digital control (T2XD) or standard analog control box (T2X) with *new* 5-second brake delay and *new* Test/ Calibrate function. Low temperature grease, alloy ring gear, indicator potentiometer, ferrite beads on potentiometer wires, *new* weatherproof AMP connectors plus 8-pin plug at control box, triple bearing race with 138 ball bearings for large load bearing strength, electric locking steel wedge brake, North or South center of rotation scale on meter, low voltage control, 2 1/16 inch max. mast.

TAILTWISTER Rotator Specifications	
Wind load capacity (inside tower)	20 square feet
Wind Load (w/ mast adapter)	**10 square feet**
Turning Power (in lbs.)	1000
Brake Power (in lbs.)	**9000**
Brake Construction	Electric Wedge
Bearing Assembly	**Triple race/138 ball brngs**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight (lbs.)	31
Effective Moment (in tower)	**3400 ft/lbs.**

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CD-45II Rotator Specifications	
Wind load capacity (inside tower)	8.5 square feet
Wind Load (w/ mast adapter)	**5.0 square feet**
Turning Power (in lbs.)	600
Brake Power (in lbs.)	**800**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/48 ball brings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight (lbs.)	22
Effective Moment (in tower)	**1200 ft/lbs.**

HAM-V

HAM-V
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with DCU-1

For medium antenna arrays up to 15 square feet wind load area. Similar to the HAM IV, but includes *DCU-1 Pathfinder* digital control unit with gas plasma display. Provides automatic operation of brake and rotor, compatible with many logging/contest programs, 6 presets for beam headings, 1 degree accuracy, auto 8-second brake delay, 360 degree choice for center location, *more!*

ROTATOR OPTIONS

MSHD, $99.95. Heavy duty mast support for T2X, HAM-IV and HAM-V.
MSLD, $39.95. Light duty mast support for CD-45II and AR-40.
TSP-1, $34.95. Lower spacer plate for HAM-IV and HAM-V.

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For compact antenna arrays and large FM/TV up to 3.0 square feet wind load area. Dual 12 ball bearing race. Automatic position sensor never needs resetting. Fully automatic control -- just dial and touch for any desired location. Solid state, low voltage control, safe and silent operation. 2 1/16 inch maximum mast size. MSLD light duty lower mast support included.

AR-40 Rotator Specifications	
Wind load capacity (inside tower)	3.0 square feet
Wind Load (w/ mast adapter)	**1.5 square feet**
Turning Power (in lbs.)	350
Brake Power (in lbs.)	**450**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/12 ball bearings**
Mounting Hardware	Clamp plate/steel bolts
Control Cable Conductors	**5**
Shipping Weight (lbs.)	14
Effective Moment (in tower)	**300 ft/lbs.**

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For ***king-sized*** antenna arrays up to 25 sq.ft. wind load area. Control cable connector, *new* hardened stainless steel output shaft, *new* North or South centered calibration, *new* ferrite beads on potentiometer wires reduce RF susceptibility, *new* longer output shaft keyway adds reliability. Heavy-duty self-centering steel clamp and hardware. Display accurate to 1°. Machined steel output.

HDR-300A Rotator Specifications	
Wind load capacity (inside tower)	25 square feet
Wind Load (w/ mast adapter)	**not applicable**
Turning Power (in lbs.)	5000
Brake Power (in lbs.)	**7500**
Brake Construction	solenoid operated locking
Bearing Assembly	**bronze sleeve w/rollers**
Mounting Hardware	stainless steel bolts
Control Cable Conductors	**7**
Shipping Weight (lbs.)	61
Effective Moment (in tower)	**5000 ft/lbs.**

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Automatically controls T2X, HAM-IV, V rotators. 6 presets for favorite headings, 1 degree accuracy, 8-sec. brake delay, choice for center of rotation, crisp *plasma* display. Computer controlled with many logging/contest programs.

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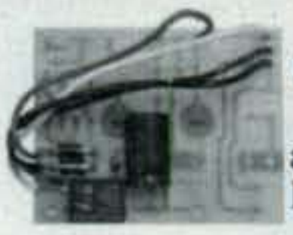

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announcements

Dayton DX Dinner – The annual DX Dinner, sponsored by the SouthWest Ohio DX Assn., will be held in conjunction with the Dayton Hamvention®. The dinner will be Friday evening, May 21, at the Crowne Plaza Hotel. The evening includes a presentation and door-prize drawing. Tickets are $34 each payable in U.S. funds to SWODXA and may be ordered from Jay Slough, K4ZLE, 8183 Woodward Dr., West Chester, OH 45069 (please include an SASE). Space is limited. For more information, contact Jay at <k4zle@ arrl.net>.

•The following Special Event stations are scheduled for April:

K4S, from the annual Sharks Tooth Festival, Venice, Florida; Tamiami ARC; 1300–2100Z April 7–9 on 21.313, 18.153, 14.272, 7.233 MHz. QSL with SASE to Jack Sproat, W4JS, 1419 E. Manasota Beach Rd., Englewood, FL 34223-6341.

N4S, from 25th anniversary of America's first Space Shuttle launch, Kennedy Space Center, Cape Canaveral, Florida; Titusville and North Brevard ARCs; 1700Z April 9 to 2400Z April 15 on 7.250, 14.250, 18.150, 21.350 MHz. For certificate send QSL and SASE with request to Carl Zelich, AA4MI, 1720 Old River Trail, Chuluota, FL 32766-8603.

W8V, from CAP & Aviation Explorer's Aviation and technology fair (youth-oriented event), Civil Air Patrol & Aviation Explorer Post 747, Morgantown Municipal Airport, Morgantown, West Virginia; 1300Z April 22 to 1600Z April 23 on 145.430, 28.350, 14.250, 7.250 MHz, VHF simplex 146.460 MHz. For QSL or certificate send QSL and SASE to Civil Air Patrol W8V, Morgantown Municipal Airport, 225 Hart Field Rd., Morgantown, WV 26505.

W9RI, from 150th anniversary of completion of the first railroad brideg to cross the Mississippi River, Rock Island, IL/Davenport, IA; Green River Valley ARS and Quad City Historica Radio Society; April 22–23 on 28.450, 21.350, 14.250, 7.250, SSB plus CW portions. For certificate send QSL and SASE to W9RI, 2519 29th Ave., Rock Island, IL 61201.

W9Y, from 70th anniversary of the York Radio Club, Elmhurst, Illinois; 0000Z April 16 to 2359Z April 30 on all bands/modes with special attention to 14.250, 7.040, 7.260, 3.925, +442.875 (114.8 tone) and 147.42. QSL via KB9DVC with SASE for certificate (9×12) or QSL. More information: <www.yorkradioclub.com>.

•The following hamfests, etc., are scheduled for late March and April:

March 25–26, **Greater Baltimore Hamboree & Computerfest,** Maryland State Fairgrounds, Timonium, Maryland. Call 410-426-3378 ; <www.gbhc.org>. ***(See us at the CQ booth.)***

March 26, **Lake County ARA Hamfest,** Madison High School, Madison, Ohio. Contact the Lake County ARA at 440-255-0933; e-mail: <rocky@lcara.org>.

April 1, **Longmont ARC Hamfest,** Boulder County Fairgrounds, Longmont, Colorado. Contact 720-652-0115; <www.larclub.net>. (Talk-in 147.270 [100 Hz], 146.52; exams 10 AM)

April 15, **Hambash 2006,** Ararat Shrine, Kansas City, Missouri. Contact Steve Dowdy, WJØI, 816-941-3392; e-mail: <sdowdy@kc. rr.com>. (Talk-in 145.13–; exams)

April 15, **Catawba Valley Hamfest & Computer Fair**, Burke County Fairgrounds, Morganton, North Carolina. Contact Catawba Valley Hamfest, 4895 Karen Court, Morganton, NC 28655. (Talk-in 147.150+; exams)

. April 18–20, **Hamfest (VU4) India Conference,** Port Blair, Andaman and Nicobar islands. E-mail: <niarhamfest@gmail.com> (National Institute of Amateur Radio).

April 22, **Northern Utah Hamfest,** 625 E. 5300 S., South Ogden, Utah. Contact Mike Fulmer, KZ7O, 801-731-7573; e-mail: <kz7o@ arrl.net>; <www.ogdenarc.org>. (Talk-in 146.82 [PL 123])

April 22, **Mobile (AL) ARC Hamfest & Computer Show,** Elk's Lodge, Mobile, Alabama. Contact L. J. Early, WB4YOR, 251-391-0600; e-mail: <wb4yor@comcast.net>. (Talk-in 146.820, 203.5 Hz tone; exams)

April 22, **Red River Radio Amateurs Hamfest,** Red River Valley Fairgrounds, West Fargo, North Dakota. Info: <http://www. rrra.org>. (Talk-in 147.255+; exams)

April 23, **Raleigh ARS Hamfest, NCS ARRL Convention, & Electronic Fleamarket,** Jim Graham Building, NCS Fairgrounds, Raleigh, North Carolina. Contact Jeff Wittich, AC4ZO, 919-362-4787; e-mail: <ac4zo@arrl.net>. (Exams, WA4GIR, 919-387-9152)

April 28–29, **Southeastern VHF Society Conference,** Embassy Suites Convention Center, Greenville, South Carolina. Information: <http://www.svhfs.org/>.

April 29, **Valley of the Moon ARC ARRL Hamfest,** Sonoma Valley Veterans' Memorial Building, Sonoma, California. Contact Darrel, WD6BOR, 707-996-4494; e-mail: <wd6bor@vom.com>. (Talk-in 145.35, –600, PL 88.5; exams 9 AM)

April 30, **Two Rivers ARC Hamfest & Computer Fair,** Spectrum in Boston, Boston, Pennsylvania. Contact the club at 412-664-1683, e-mail: <w3oc@arrl.net>.

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our readers say

When Columnists Correspond...

(The following was sent to "World of Ideas" Editor Dave Ingram, K4TWJ, by Antennas Editor Kent Britain, WA5VJB)

Hi Dave,

Well, your W5LET construction article from a 1967 *Electronics Illustrated* ("World of Ideas," February 2006) certainly had me digging in the garage. I still have that issue filed away somewhere. Here is my Novice rig (see photo), so I guess it's 39 years old now. As a Novice I made four QSOs with it on 80 meters, all within the city limits of Abilene, Texas. Not so notable, since I was a senior at Abilene High when I built it.

And yes, 300 volts across the key does keep one's attention focused. I would also put a 10K 2-watt resistor across the key to spot the transmitter to my command set receiver. 73, Kent, WA5VJB

Remaking Ham Radio (Again)

Editor, *CQ:*

Thank you for your editorial "Remaking Ham Radio (Again)" in the February 2006 *CQ* magazine. It is right in line with some things I've been thinking about.

In the past few months, I've been to several presentations on this new type of amateur radio communication, including a presentation from the ARRL SEC on Winlink 2000 and ARES. We were shown how robust, computer-controlled networks could provide "last mile" communications to served agencies in the event of a communications emergency. The goal appears to be to replace the missing/damaged internet connection so that the served agency can continue to use e-mail in much the same way as they can when the internet connection is working.

While I see the value of keeping communications as "routine" as possible in the event of a communications emergency, I question whether this is really "ham radio." In the past, in addition to providing communication channels, the operators also provided a communications and operating skill. For example, operators would prioritize messages to make sure that the most important messages got through first. The skilled operator kept track of communications and provided information as needed.

At the Winlink presentation, I asked where the communications skill was involved. The answer was that emergency managers aren't really interested in that. As I thought about that, it became obvious that all these emergency managers want from ham radio is a medium through which to communicate. As this medium becomes more network and less radio and the radios become commercial, off-the-shelf, black boxes, there will be less need for radio-savvy ham operators and more need for IT/networking support people, many of whom already have radio skills gained by setting up wireless networks. In the end, the only thing that these emergency managers will be using from ham radio is our frequency spectrum. Once that happens, how long will it be before our spectrum is permanently reallocated to emergency backup networks?

I think ham radio does provide a lot of technical challenges for those so inclined, but we need to find new ways in which ham radio can serve those who wish to develop their operating skills. Thanks and 73 . . . Mark Erbaugh, N8ME

Do You Want to Be Able to **Work Worldwide DX** Using a *Single Wire* Multiband Antenna that's **Free of Traps and Loading Coils?**

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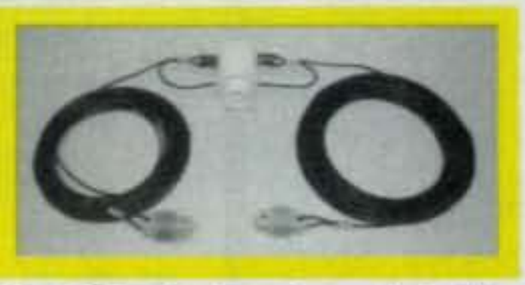

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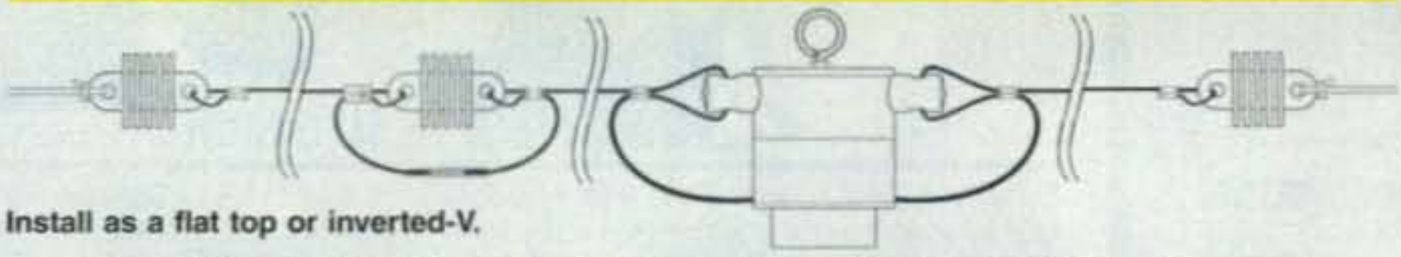

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Unraveling a mystery about backscatter led to a clever technique to measure the distance to any radio scattering region, using ordinary transceivers and a readily available computer program.

Backscatter Over the Atlantic

BY EMIL POCOCK,* W3EP

For at least 50 years, radio amateurs have recognized the characteristic weak, hollow sound of backscatter signals on 20 through 6 meters. Reception of stations via backscatter up to 2000 km (approximately 1250 mi.) away on an otherwise quiet band often precedes general *F*-layer openings. This association has been used by North Americans to anticipate openings to Europe, for example, but its occurrence is widespread around the world. Backscatter often persists after the band is filled with signals arriving via normal *F*-layer paths, but its first appearance is most significant.

This phenomenon is most useful at 50 MHz, where transatlantic openings are rare. During the late fall and winter months of peak solar-cycle years, North American 6-meter operators eagerly await multi-hop *F*-layer propagation toward Europe. Stations all along the east coast direct their Yagis northeast each morning, hoping to hear the first signals from across the Atlantic (see fig. 1). What they often hear first are not Europeans, but other U.S. and Canadian stations with odd hollow-sounding signals. Savvy operators recognize this backscatter as the encouraging sign of an imminent opening to Europe. The band obliges frequently enough to make this a useful warning, but it does not always happen.

Amateurs sometimes have been uncertain about just what causes backscatter and why it serves as an effective predictor of *F*-layer openings. The hollow, or echo-like, characteristic can be attributed to multi-path effects. Signals directed over the Atlantic must be scattered from some distant region back towards the East Coast over slightly different paths. Because of these small differences in distance, the signals arrive at slightly different times, resulting in echo-like characteristics on CW and SSB signals. Beyond that, many amateurs have been uncertain about just where and how this scattering takes place.

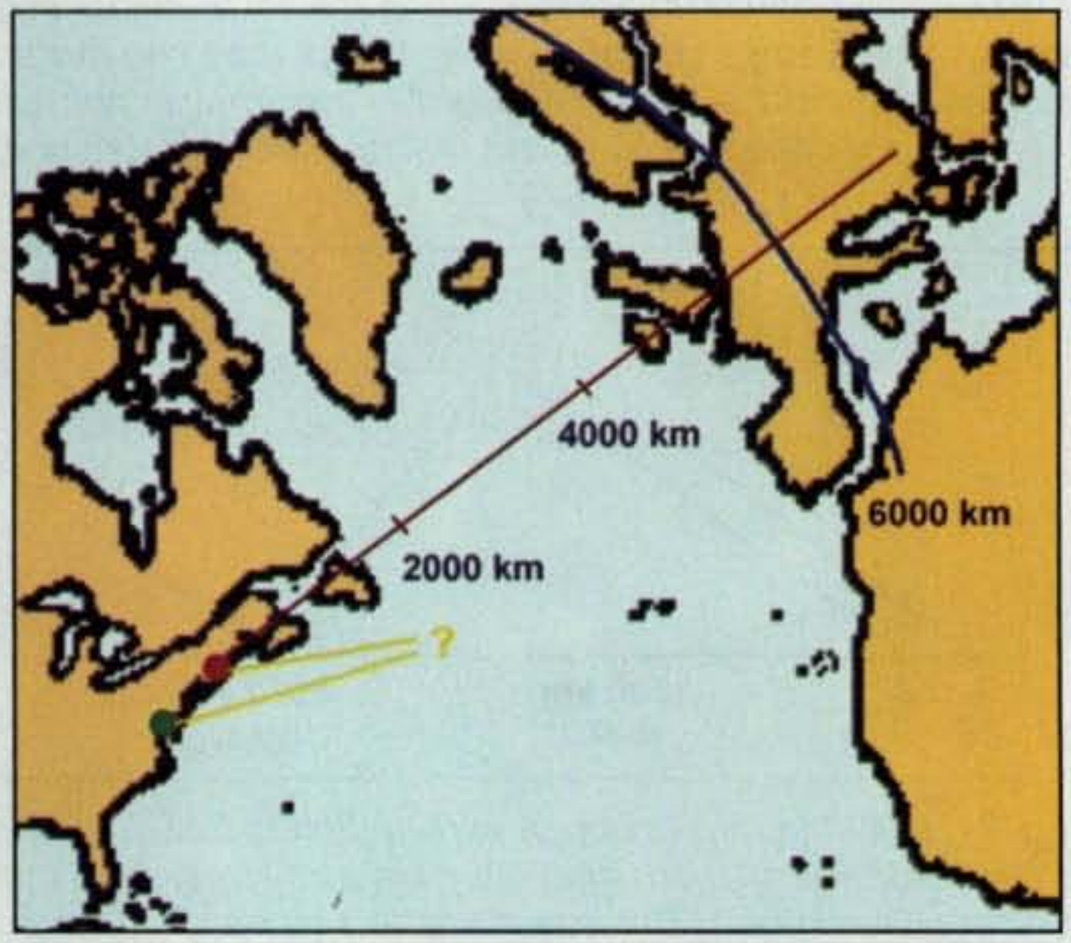

Fig. 1– The experiments investigated backscatter in the North Atlantic. The distance from New England to western Europe is in the 5000- to 7000-km range (approximately 3100–4150 mi.), which requires at least two ordinary F-layer hops for a radio path. The longest possible hop at the maximum usable frequency (MUF) is 4000 km (approximately 2450 mi.), supported by a mid-point refracting area in the F-layer at 2000 km distant. Typical hops are less than 4000 km, because hops shorten as the MUF rises above 50 MHz. Backscatter took place somewhere over the Atlantic, as suggested by antenna headings of observing stations along the east coast of North America (shown in yellow), but the location of the scattering region was unknown.

The Backscatter Problem

There are at least two explanations. A popular conception envisions that scattering takes place in the *F*-layer itself, as shown in fig. 2. In this scenario, backscatter is interpreted as a characteristic of an *F*-layer region whose maximum usable frequency (MUF) had not quite reached 50 MHz. It naturally follows that the band does not open all the way to Europe, because MUF at the midpoint of a potential first hop, about 2000 km distant, was less than the operating frequency. Without a first hop, it was not possible for signals to reach the second-hop region in the eastern North Atlantic and then go on to the European continent.

This seems like a reasonable deduction. As a general rule, the MUF over any particular area of the Earth rises during the morning and peaks shortly after noon, because the *F*-layer is dependent on constant solar radiation. Therefore, the MUF associated with the hop over Europe might ordinarily be expected to reach 50 MHz before the more westerly hop closer to North America. The problem appears to be a matter of waiting for the MUF of the near hop to reach 50 MHz in order to complete the two-hop path to Europe. The presence of backscatter seems to anticipate that critical event.

However, standard textbooks make a quite different case for backscatter,[1] as illustrated in fig. 3. According to this explanation, scattering takes place on the surface of the distant ocean, after signals have made one complete *F*-layer hop. A small portion of the scattered signals then returns toward the transmitting station via a similar path. The echo-like effects are the result of scattering over a turbulent surface, which creates slightly different path lengths and perhaps some modest Doppler shifting. In contrast to the

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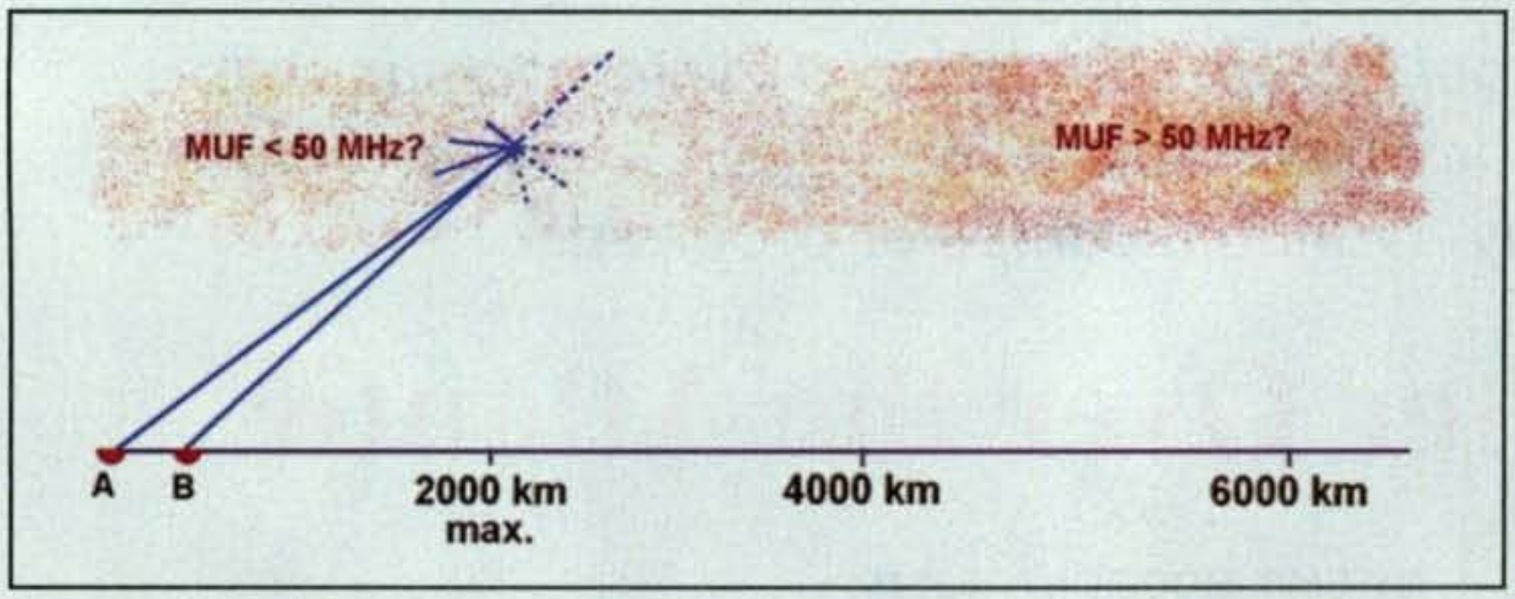

Fig. 2. The common-sense backscatter model supposes that scattering takes place somewhere in the F-layer when the MUF is just below the operating frequency. The Earth's curvature limits that place to no farther than 2000 km away from the transmitter. The F-layer farther east may support an ordinary hop, but in the absence of a complete first hop the signal cannot reach that far.

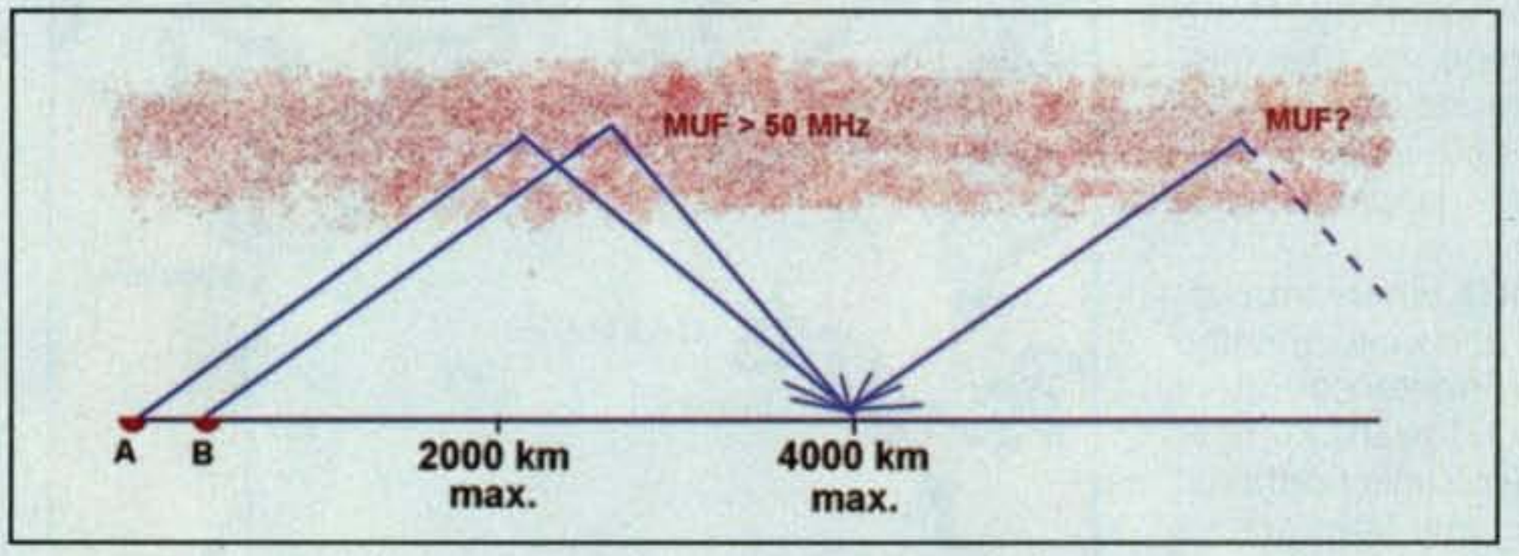

Fig. 3– The standard textbook explanation is that scattering takes place on the ocean's surface no more than 4000 km away by signals that have completed one ordinary F-layer hop. The ocean scatters signals in all directions, so only a small portion returns toward the transmitting station via a similar F-layer path. Most of the signal is refracted by the ocean and continues forward toward the ionosphere and a second hop, if the MUF is high enough.

common-sense explanation, scattering from the ocean requires that the MUF at the first hop be at least as high as the operating frequency.

One apparent weakness of the textbook account is that it does not readily explain why Europeans are not heard whenever backscatter is observed. If the presence of backscatter indicates that the MUF of the first hop is at least 50 MHz, and it is assumed that the MUF of the second and more easterly hop must be at least that high, then it follows that a two-hop path from North America to Europe must be open as well. It may be that in some instances Europeans are not heard because none are on the air from optimal locations, but further investigation of some basic issues provides a better general explanation.

Experimental Procedure

The first step in unraveling this conundrum is to determine just where scattering actually occurs. A scattering region closer than 2000 km, the maximum distance to the *F*-layer, would suggest that scattering takes place in the *F*-layer itself. If the distance to the scattering region is in the 3500 to 4000 km range (approximately 2175–2450 mi.), the length of one complete *F*-layer hop near the MUF, then the textbook model of ocean scattering would be supported. Professionals would not find this problem difficult. They simply set up a 50-MHz ionospheric radar and observe how long it takes distinctively scattered radar pulses to return. Calculating distance from the time it takes signals to make the round trip is straightforward.

Amateurs do not have such equipment, but we can configure a system adapted from the radar model. The basic technique involves transmitting short dits and then listening for the return signals in the quiet periods in between. The changeover between transmit and receive must take place very quickly. After allowing for generous margins on either side of the expected results, signals scattered from a region between 600 and 6000 km (approximately 375–3750 mi.) away would take between 4 and 40 milliseconds (ms) for the round trip.[2] This time frame also suggests that effective dits can be no longer than 2 ms in duration. Unfortunately, modern transceivers are not capable of sending coherent dits as short as 2 ms and cannot switch between transmit and receive in anything like the 4 ms necessary to hear scatter signals returning from the shortest distance.

These limitations were overcome by using separate stations for transmitting and receiving, as well as a computer program to generate short dits and to aid in analyzing the received signals. W1LP on Cape Cod transmitted a 10-second sequence of dits using WinMSDSP, a computer program designed for meteor-scatter communication, but ideally suited for this application.[3] The program generates Morse code at very high speed. The output is an adjustable audio tone, which is fed to the transmitter via the microphone input. The high-speed sequence of dits was then transmitted as ordinary SSB. W3EP in Connecticut, 148 km (92 mi) to the west of W1LP, could hear both the direct and scatter signals from W1LP. These signals were recorded in digital form with WinMSDSP, which could display the received signals for more detailed analysis. The distance to the scattering region was calculated from the visual display by noting the time lapse between reception of a direct dit (or mark) and the returned scattered dit. See fig. 4 for more discussion of how this was accomplished.

WinMSDSP was configured to send 1.5-ms bursts of 2000-Hz audio spaced at 37.5-ms intervals, which mimicked a series of radar-like pulses. In program terms, this was the equivalent of sending a dash and 40 spaces at roughly 20,000 characters per minute, the program's upper limit. This worked out to about 27 very short dashes per second. The relatively high audio frequency was necessary in order to obtain visual marks at least 3-Hz long, about the shortest that could be positively identified on the WinMSDSP receive display. This system of using SSB audio did not require the transmitter to shut down between dits and produced a signal no wider than the nominal audio frequency of 2 kHz. The distant receiver was on the entire time.

W1LP and W3EP made several dozen runs during December 2000 and again between November 2001 and January 2002, whenever strong backscatter was observed and we both were available. We began the runs after turning our Yagi

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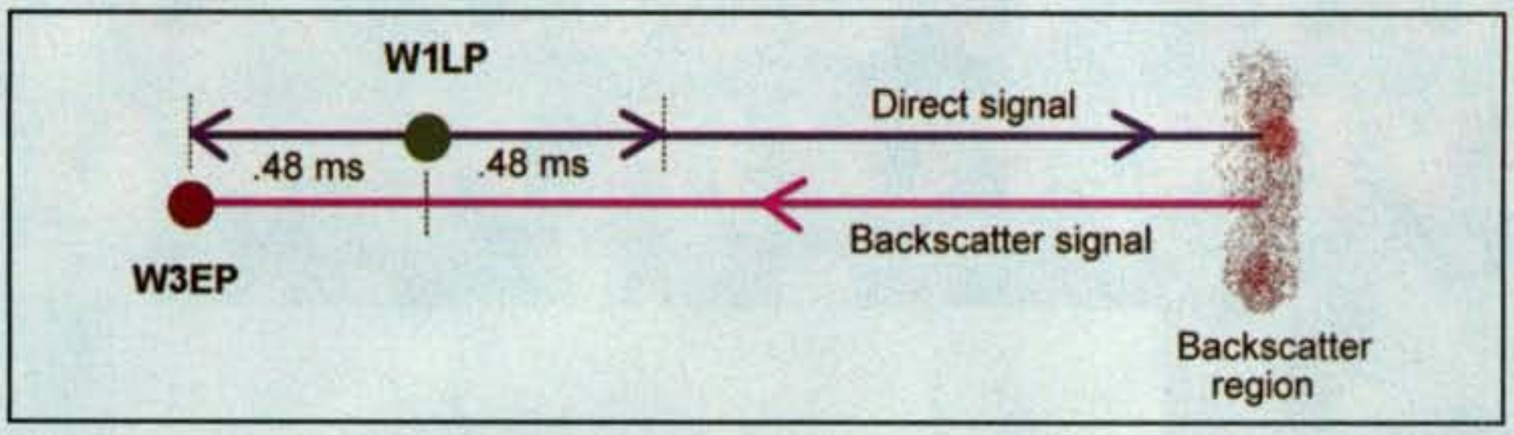

Fig. 4– W3EP was located 148 km west of W1LP, and the typical scattering region was to the east or northeast of both stations. During the experimental runs, the direct signal from W1LP was used as the starting marker, but it was not received at W3EP until .48 ms after it was sent. That must be added to the total time as observed by W3EP. On the return leg of the path, the scatter signal arrived at W3EP about .48 ms after it reached W1LP. That time must be subtracted. The net result is that no adjustment to the raw observation at W3EP is needed to determine the round-trip time relative to W1LP.

arrays in the direction that yielded the strongest signals, which was sometimes as much as 30 degrees south of the direct path to western Europe. W3EP typically received the high-speed dits from W1LP via the direct path with S9 strength and the returning backscatter signals at S1 to S5.[4]

Results

The received signals were astonishing for their clarity and consistency. Once the digital display had been expanded to show just 150 ms of the full sequence, the 3-Hz marks and the weaker 3-Hz traces associated scatter signals were usually easy to identify.[5] The time interval between them was then extracted from the display. The procedure is shown in fig. 5. The calculated one-way distances fell between 3550 and 3950 km (approximately 2200–2450 mi.) for more than two dozen usable test runs, suggesting that the signals completed one-hop, were scattered by the ocean, and a portion returned by similar one-hop paths.

We ran a smaller number of backscatter tests at 28 MHz at about the same time as several of the 50-MHz runs in order to verify the results. The one-hop scatter distances at 28 MHz were expected to be considerably shorter under these conditions. The 1650- to 2000-km (approximately 1025–1250 mi.) results were well within the expected range. On several occasions, it was also possible to pick out 28-MHz backscattering from second hops, a quite unexpected bonus.

North Atlantic *F*-Layer

This experiment seemed to confirm the textbook model, but it still left unexplained why no European stations were heard during our tests. The resolution of this part of the puzzle came from graphic representations of the *F*-layer MUF over the North Atlantic during the fall and early winter. As it turns out, the *F*-layer MUF does not spread uniformly east to west over the Atlantic or anywhere else, for that matter. This is because the geomagnetic field, which plays an important role in the formation of the ionosphere, is not uniform or symmetrical over the Earth.

Over the North Atlantic, *F*-layer ionization spreads generally westward along a northeast-southwest line, as might be expected, save for an anomalous tongue of high-density ionization that forms parallel to the east coast of North America (see fig. 6). The MUF within this anomalous region is initially higher than areas over the North Atlantic closer to Europe. As the MUF rises into the 50-MHz range, a first hop toward Europe can form in the northeastern area of the tongue, but the MUF farther east is still not high enough to create a second hop. If this process continues, the MUF in the remainder of the North Atlantic *F*-layer may reach 50 MHz and support the missing second hop, but often enough the process stalls before that happens. This may be why the band does not always open to Europe when backscatter is heard.

Further Applications

The same technique used to measure the distance to an *F*-layer scattering region can be applied to other situations. A second series of experimental runs on 50 MHz during an aurora also produced surprisingly clear and wonderful results. In this arrangement, no preparations were made with a particular transmitting station. Rather, a station was picked whose direct and aurora signals could be heard simultaneously. A sample of a transmission was recorded

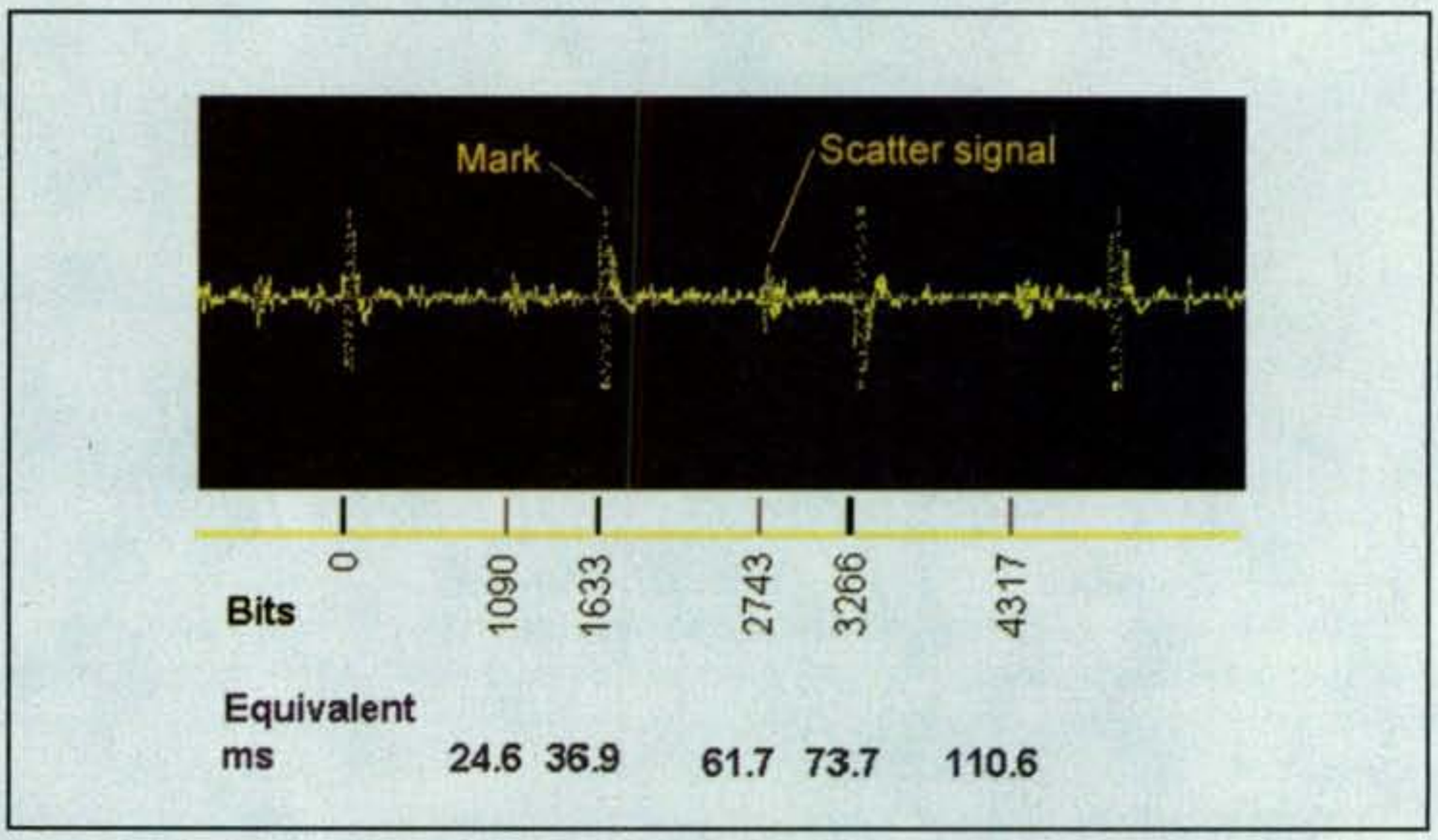

Fig. 5– The WinMSDSP display of the December 27, 2001 test run at 1446 UTC shows the traces of four mark signals and three associated scatter signals. This sequence is 150-ms duration. The numbers on the scale at the bottom are the relative sequential sampling bit numbers of the digital recording. (The bit number is revealed for any position by moving the cursor directly on the display.) Since the program records at 44,300 bits per second, 44.3 bits represent 1 ms in time and 300 km in distance, because radio waves travel through space at 300,000 km/sec. The three scatter signals in this run trailed the marks by 1090, 1110, and 1051 bits, for an average of 1084 bits, or the equivalent of 24.5 ms for the round trip. Thus, the distance from W1LP to the scattering region was 3675 km (one half of 24.5 ms × 300 km/ms), or approximately 2285 mi. The difference between the radio path and the corresponding terrestrial distance is negligible.

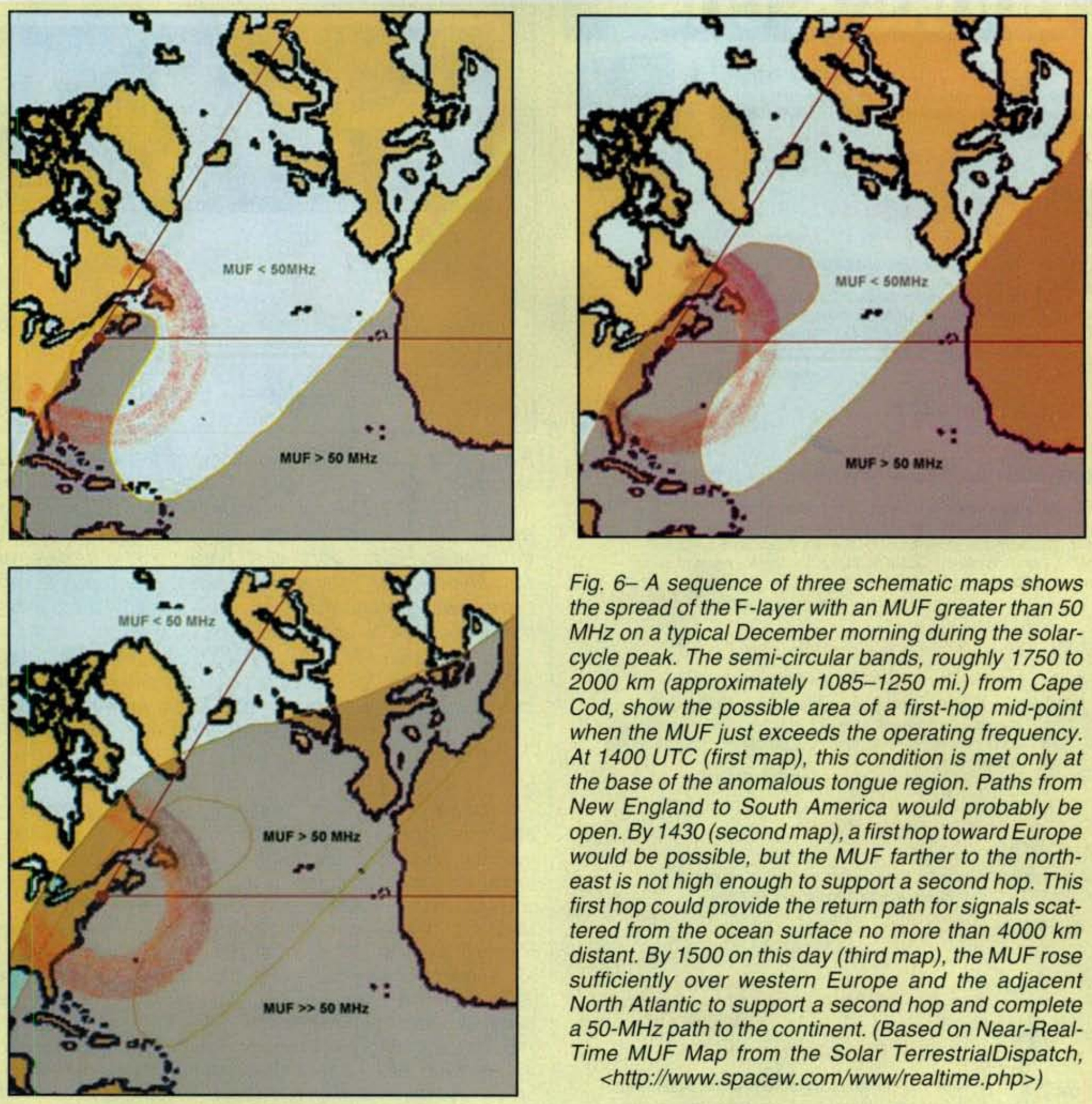

Fig. 6– A sequence of three schematic maps shows the spread of the F-layer with an MUF greater than 50 MHz on a typical December morning during the solar-cycle peak. The semi-circular bands, roughly 1750 to 2000 km (approximately 1085–1250 mi.) from Cape Cod, show the possible area of a first-hop mid-point when the MUF just exceeds the operating frequency. At 1400 UTC (first map), this condition is met only at the base of the anomalous tongue region. Paths from New England to South America would probably be open. By 1430 (second map), a first hop toward Europe would be possible, but the MUF farther to the north-east is not high enough to support a second hop. This first hop could provide the return path for signals scattered from the ocean surface no more than 4000 km distant. By 1500 on this day (third map), the MUF rose sufficiently over western Europe and the adjacent North Atlantic to support a second hop and complete a 50-MHz path to the continent. (Based on Near-Real-Time MUF Map from the Solar TerrestrialDispatch, <http://www.spacew.com/www/realtime.php>)

using the meteor-scatter program, much as had been done in the *F*-layer experiment. A portion was then expanded to reveal a distinctive trace (see fig. 7). The direct signal covered up all but the trailing portions of the weaker aurora-scattered signal, but this was sufficient to determine the number of digital bits between the end of the two traces and calculate the time difference. After accounting for the distance to the transmitting station, a typical range to the aurora scattering region was about 850 km (approximately 528 mi.). Very neat!

Similar techniques might be applied to other HF to microwave scatter situations with good results. Backscatter-like signals are sometimes reported in association with 50- and 144-MHz sporadic-*E*, but little seems to be known about this phenomenon. It might be assumed that it is similar to *F*-layer backscatter, but there is no real evidence. Determining the distance to apparent *E*-layer scattering regions might provide important clues. Microwave rain scatter could be subject to the same analysis, although typical distances to tropospheric scattering regions are usually less than 500 km (approximately 310 mi.), requiring much more stringent time demands. Bistatic observations of time delay coupled with measurements of Doppler shifts in rain-scatter signals could reveal not only distance to the rain, but also the relative velocity of the wind driving the rain. Using similar techniques, it may be possible to identify tornadoes by the large Doppler shift caused by the high winds associated with these storms.[6]

My thanks to Clint Walker, W1LP, who was my partner in the experimental runs, and to those who first heard this article as a presentation at the Central States VHF Society Conference in Toronto, Canada in July 2004.

Notes

1. See, for example, Kenneth Davies, *Ionospheric Radio* (London: Peter Peregrinus, 1989), 188–91.

2. A millisecond (ms) is a thousandth of a second. A Morse code dit (letter E) sent at 25 words per minute takes 50 ms to complete.

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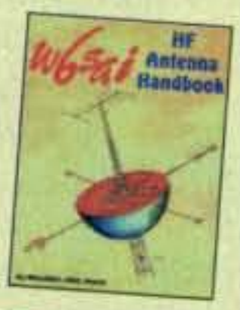

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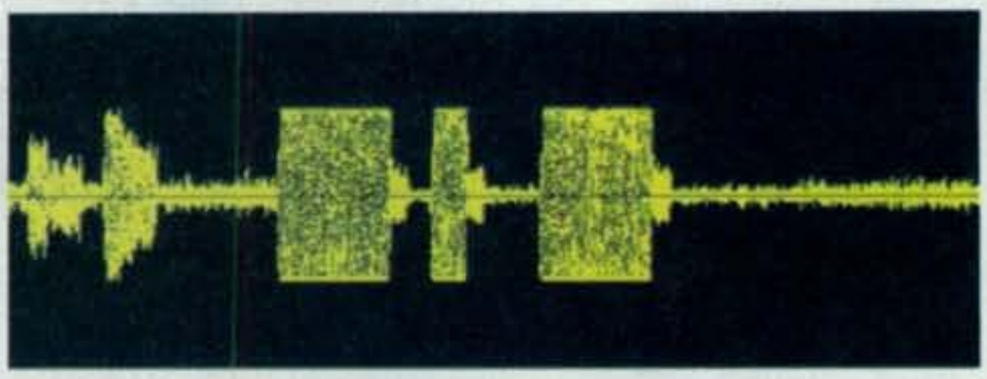

Fig. 7– The WinMSDSP display of the Morse letter "K" received in grid locator FN31 directly and via aurora from a station in FN20. The pair of stations were 262 km (approximately 163 mi.) apart and roughly parallel to the aurora scattering region to the northwest, based on the receiver antenna heading. The interval between the end points of each signal was 210 digital bits, equivalent to 4.74 ms. To this, .87 ms was added to account for the time it took for the direct signal to reach FN31 from FN20. The adjusted round-trip time of 5.61 ms yields a one-way distance from either station to the scattering region of 853 km (one half of 5.61 ms × 300 km/ms), or approximately 530 mi.

3. Tihomir Heidelberg, 9A4GL, wrote WinMSDSP. It can be downloaded from his website at <http://ham2.cc.fer.hr/9a4gl/>, but he is no longer supporting it. Additional information can be found on the web pages of Shelby Enis, W8WN, at <http://www.qsl.net/w8wn/hscw/msdsp.html>.

4. W1LP transmitted with 1000 watts to a 6-element Yagi with a view of the Atlantic Ocean. W3EP received with a state-of-the-art transceiver using 2.1-kHz bandwidth and two 6-element Yagis from an inland location. These stations were probably more elaborate then necessary.

5. This was surprising. Given the multi-path effects evident on the received audio, it was expected that traces of several scatter signals associated with each mark would appear on screen, bunched up, overlaid, or otherwise obscured. In some runs the backscatter dits were difficult to pick out, but in most cases a single clear trace attributable to a returning scatter dit could unmistakably be identified. The time differences from one backscattered dit to the next, as shown in the fig. 5 example, would have been enough to create the echo effect perceived by the ear and further suggests that the scatter-path distance varied somewhat between marks. Identification of the backscatter dits was aided by a distinctive distortion in the sine wave of the 3-Hz marks, probably an artifact of the original computer generation. This distortion appeared at lower amplitude but was nearly unchanged in the backscatter traces.

6. This has been done at least once already. Tom Williams, WA1MBA, writing in the February 1997 issue of *CQ VHF* magazine ("10 GHz: Good Band for a Rainy Day"), described a 1995 rain-scatter contact between W1RIL and WB1FKF with a Doppler shift of 4.1 kHz, which, based on the distances involved, indicated a wind/rain velocity of over 130 miles per hour (approx 210 km/hr). It turned out that the storm toward which they were aiming their signals produced a tornado with peak winds of over 250 mph (approximately 400 km/hr) which caused major damage in western Massachusetts.

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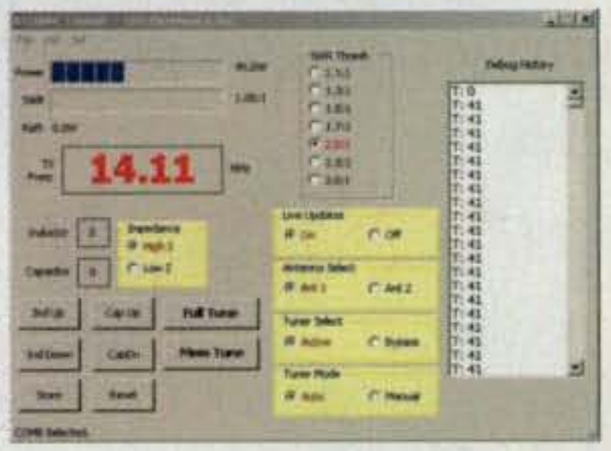

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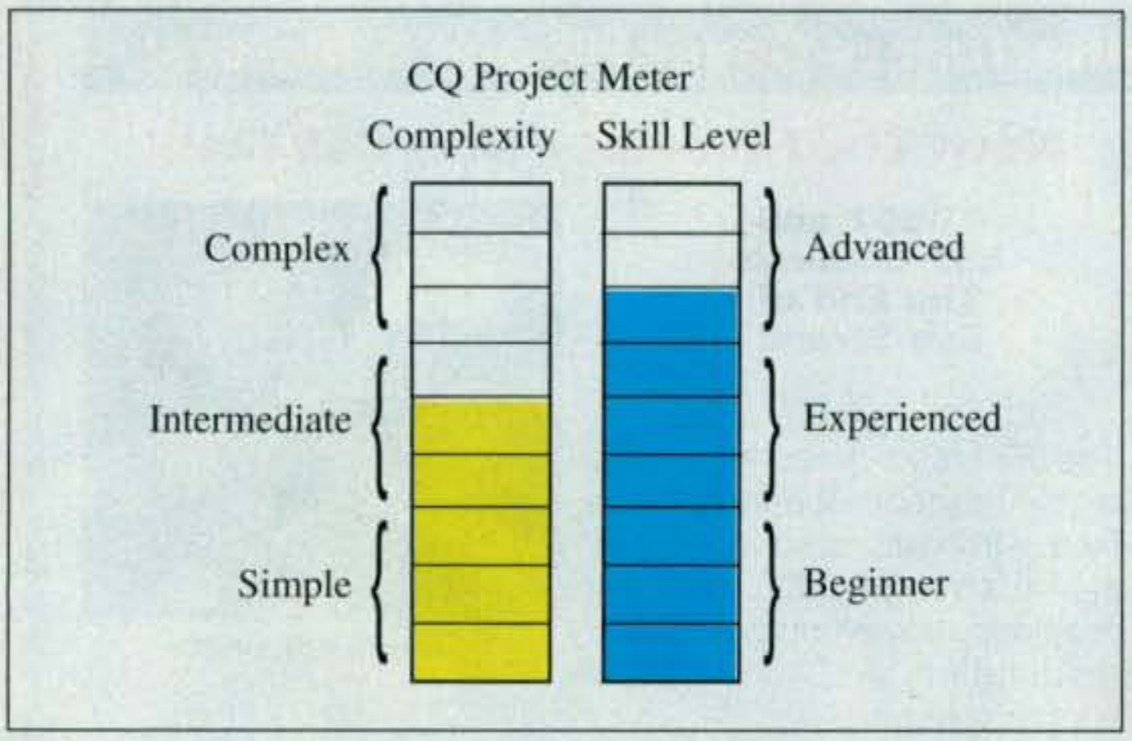
A Simple (as You Want to Make It) Junk-Box Station

BY CLARKE HOMOLY,* WØRPC

This is a project article that requires more than a well-stocked junk-box and a steady hand with a soldering iron. It also requires imagination. The author's goals are to encourage research and experimentation, and to get you thinking about what YOU might be able to build with parts that YOU may already have on hand or may find at a flea market. Because of this, while we're showing you photos of his completed project, we're including the schematic of only the VFO circuit. You're on your own for the rest… — *W2VU*



At a local hamfest I stumbled across a pile of PC boards and scrap aluminum and a pair of impressive-looking instrument knobs. These items looked like a great foundation for some sort of ham radio project. At the time, I really didn't know exactly what sort of station I wanted to build, but my experience has been that waiting until every circuit is selected and perfected often results in the project never getting started. I decided to forge ahead with a large chassis and functioning VFO just to get the project moving along.

The Basic Foundation

A great way to start this project would be to build a chassis large enough to accommodate whatever receiver and transmitter you might end up with. Going for miniaturization would be a blunder, since running out of room would be far worse than having a little extra space. It's a good idea to look at several receivers and transmitters in various publications to get a feel for a chassis size to strive for. I decided that planning and etching a PC board was out, since I did not know exactly what the final circuits would be. This project was to be an experimental, plan-as-you-go creation. I realize that some people would never build in this manner, but that's how I was determined to do it.

The three photos show the front, rear, and underside of the final creation. The chassis was 14" × 8" × 1 1/2". The front panel was a 14" × 6" piece of PC board. Since there was to be no etching of PC.boards, an unetched 9" × 5" PC board was used to hold most of the electronics and serve as a ground plane.

Circuit Construction

The technique used was a simple surface-mount one in which conventional parts were tack-soldered to small squares and strips of PC board was glued to the large board. A hot-glue gun was used to mount those squares and strips, since a simple reheating was all it took to move a pad if a circuit

Front view of the author's homebrew transceiver. Note the nice knobs that served as his inspiration for the whole project.

**317 Quail Trail, Warrensburg, MO 64093*
e-mail: <chomoly@charter.net>

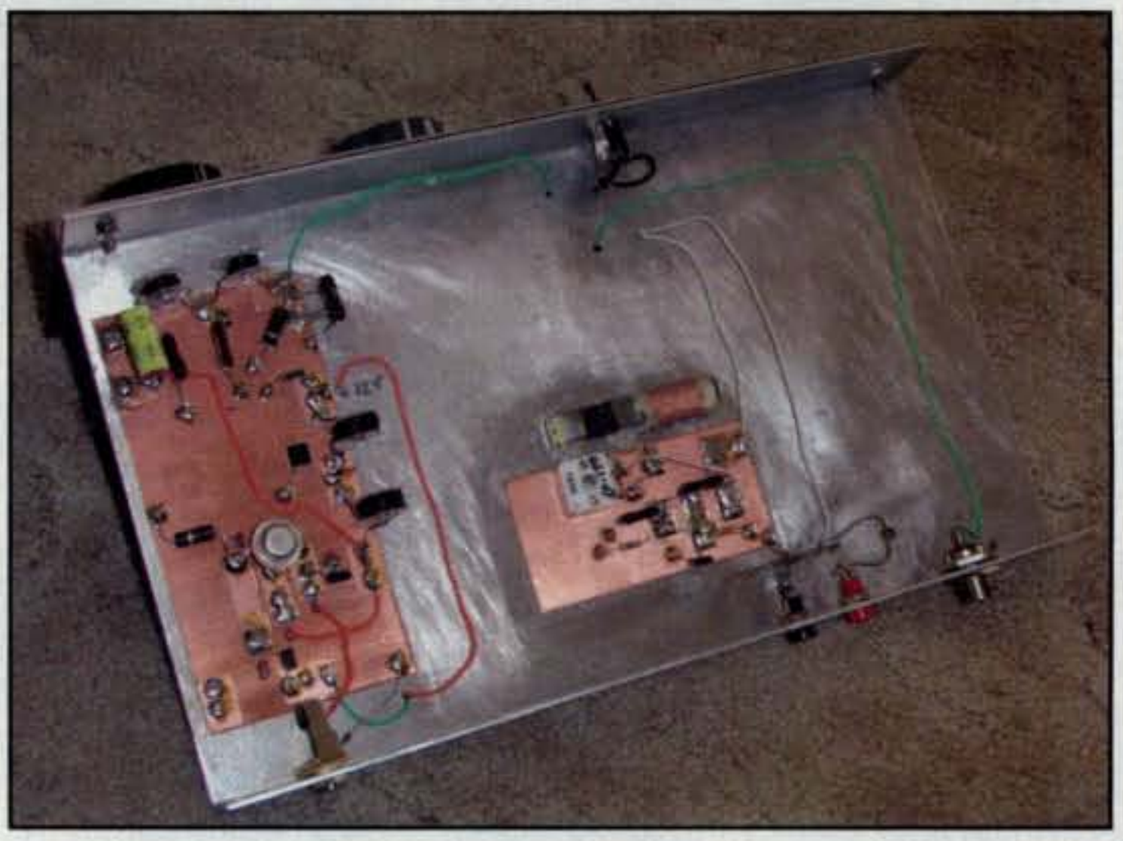
Small pieces of PC-board material hot-glued to the unetched PC-board base provide all the necessary connections for the various components.

Rear/interior view of the transceiver. Most of the parts were salvaged from an old AM broadcast radio. Note the angled piece of aluminum between the variable capacitors, which provides structural stability essential to the stability of the VFO circuit.

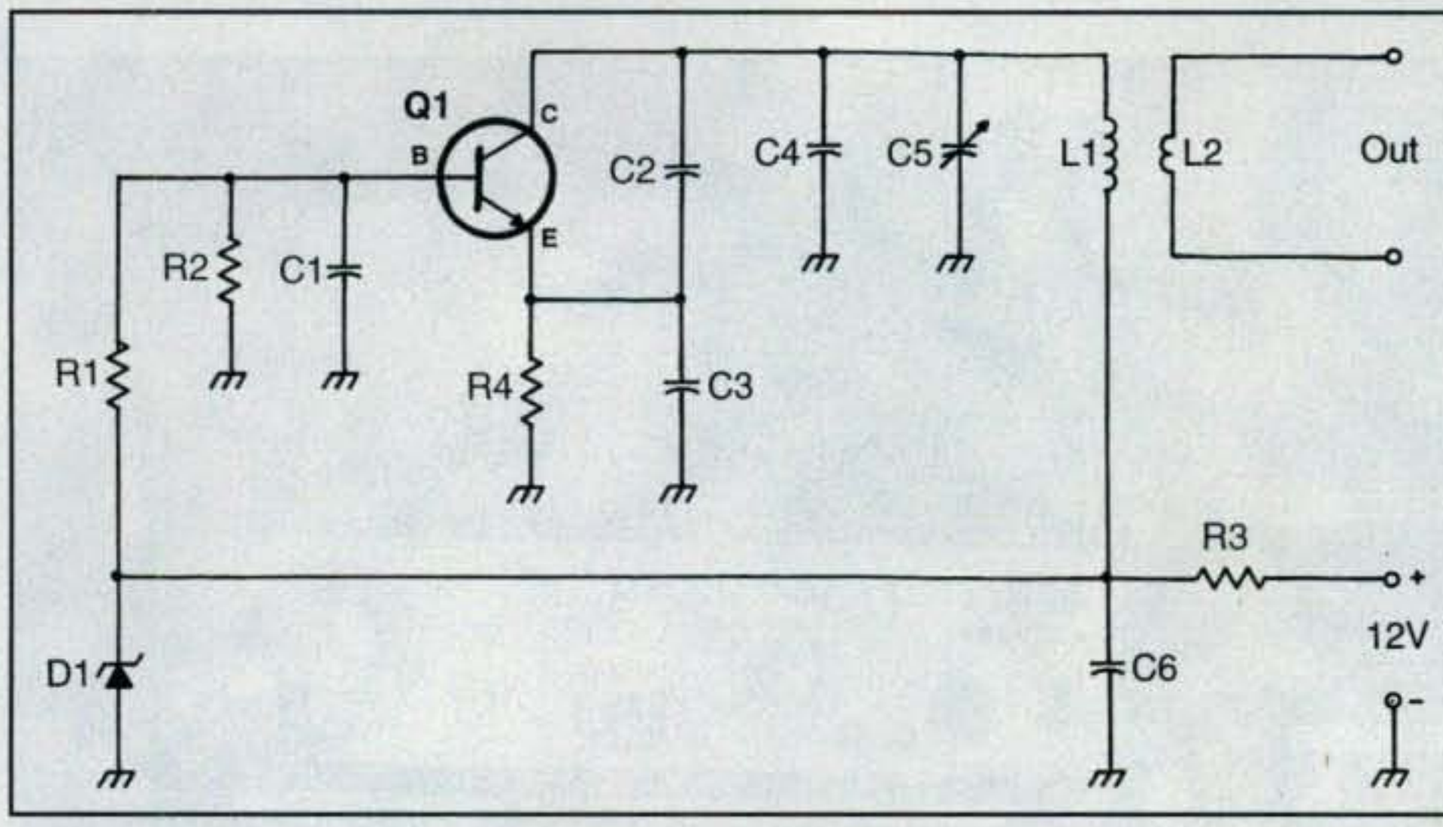
change was necessary. A major portion of the receiver for the station utilized the IF strip, detector, and audio amp from a garage-sale AM radio. The underside of the chassis shows the 5-watt RF amp for the transmitter and the receiver VFO circuit. You will note that the coils are wound on plastic sewing-machine bobbins, which are readily available. I found the most difficult parts to come up with were the two large variable capacitors used to tune the receiver and transmitter. Looking at the rear-view photo, the right side contains most of the transmitter circuitry, the middle of the unit has most of the receiver circuitry, and the left side shows the salvaged AM radio glued to a sheet of plastic.

It is advisable to build the transmitter first. Included in this article is a schematic for a simple 80-meter VFO. Mechanical rigidity is a must for a VFO circuit, and it was discovered that two more triangular front-panel braces would have improved the VFO.

Once the oscillator is heard on a communications receiver, I think you will be motivated to seek out those circuits needed to complete the project. This project really does get a person into the spirit of researching circuits and experimenting with them, all in the best tradition of amateur radio!



Bottom view of the WØRPC transceiver. Circuits underneath the main chassis include the receive VFO and the transmitter power amplifier.



Parts List
C1 & C6 – .05 µF
C2 & C3 – 1500 pF silver mica
C4 – 130 pF silver mica
C5 – 10–150 pF variable
D1 – 9.1v zener 1/2w
L1 – 19 turns #22 magnet wire on plastic bobbin (2.6 µF)
L2 – 8 turns #22 wire over L1
Q1 – 2N2222
R1 – 22k 1/2w
R2 – 4.7k 1/2w
R3 – 51 Ω 1/2w
R4 – 470 Ω 1/2w

Fig. 1– Schematic for a simple VFO tuning from 3.5 to 4.0 MHz. See parts list for specifics. Circuitry for the rest of the radio is up to your imagination, budget, and junk-box contents.

The "little brother" of AOR's ARD-9800 has drawn a whole new group of hams into the world of HF digital voice.

CQ Reviews:

The AOR ARD-9000 Digital Voice Modem

BY RICH MOSESON,* W2VU

It's been nearly two years since we reviewed AOR's ARD-9800 digital modem (June 2004 *CQ*), which is capable of producing very high-quality digital audio in an HF bandwidth, as well as transmitting digital image files (with an optional additional chip installed). One of the very few negatives about that unit was that it was kind of pricey ($549 list) for a ham who is not yet totally committed to doing digital voice (DV) on HF. The folks at AOR listened to their customers (and potential customers) and developed a smaller, self-contained, DV-only modem at a much more reasonable price ($339 list), the ARD-9000. In doing so, they made a few other improvements and perhaps without realizing it, opened up the DV "window" to a whole new group of hams "HFPackers," who enjoy using small HF transceivers to keep in touch while hiking or mountain-climbing. But let's take a look at the unit itself before we "hit the trail."

**Editor, CQ*
e-mail: <w2vu@cq-amateur-radio.com>

Bringing DV to HF

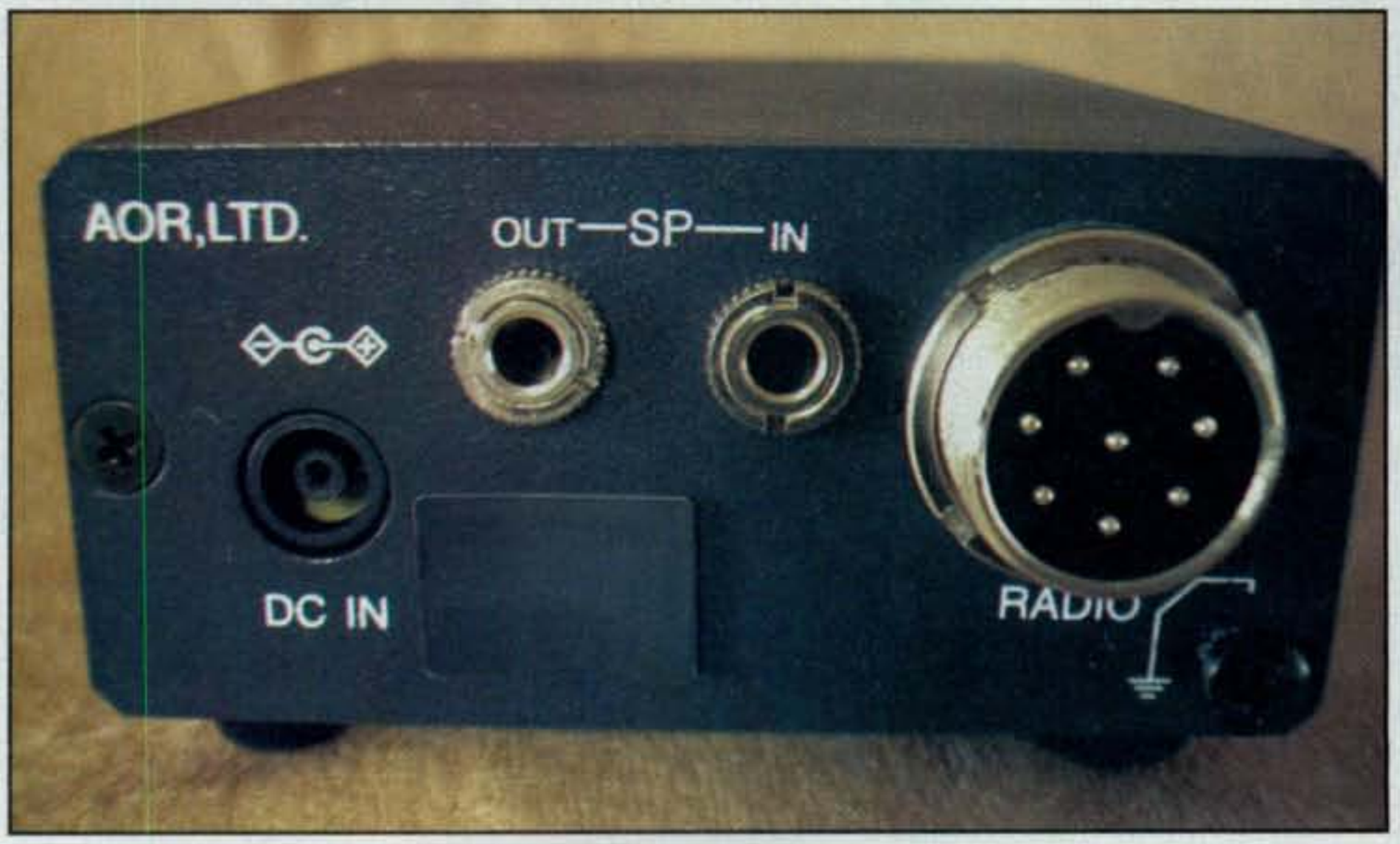
Until AOR introduced the ARD-9800 at Dayton in 2003, the few options for using digital voice on the ham bands were available only on VHF and UHF, where there was more bandwidth available to support a robust DV signal. But AOR combined

The ARD-9000 (left) is considerably smaller and more portable than the earlier ARD-9800.

← Close-up of the ARD-9000 front panel. There are only two controls—power/volume and a "sync" button to try to force synchronization with another signal if there have been dropouts. The LEDs are explained in the sidebar "If it's Orange, it Must Be Digital."

ARD-9000 Specs

Modulation method	OFDM (Orthogonal Frequency Division Modulation)
Bandwidth	300 Hz – 2500 Hz, 36 carriers
Symbol rate	20 mS (50 baud)
Guard interval	4 mS
Tone steps	62.5 Hz
Modulation method	36 carriers: DQPSK (Differential Quadrature Phase Shift Keying) (3.6k)
AFC	±125 Hz
Error correction	Voice: Golay + Hamming
Header	1 sec., 3 tones + BPSK training pattern for synchronization
Digital voice	AMBE coder/decoder
Signal detection	Automatic digital detect, automatic switching between analog and digital modes
Power requirements	10–16 VDC, approximately 100 mA (@ 12 VDC); 6 VDC by setting internal jumper
Dimensions (excluding projections)	2.8" (w) × 1.3" (h) × 3.9" (d)
Connectors	Radio: Microphone output (level adjustable) Speaker input (200 mV – 5 V p-p), external speaker output DC input connectors Speaker Microphone (with PTT)
Others	Force synchronization switch



← Close-up of the ARD-9000 rear panel. Connectors are (from left) for DC power, speaker out and in (from rig), and the connecting cable to the radio's mic input. The tape next to the DC input jack covers a jack for a battery charger, a feature that is not yet available.

the G4GUO digital protocol with the compression of a high-grade AMBE vocoder (voice encoder) to produce a DV signal within the same approximately 3-kHz-wide bandwidth used by a standard single-sideband signal. Keeping the signal to an SSB bandwidth made it feasible to bring DV to HF. (By the way, this unit is not limited to HF; it is an outboard unit that plugs into the mic and speaker jacks on virtually any ham rig, so it is just as usable on VHF and higher as it is on HF.)

As with any digital signal, a listener to an analog-only receiver will hear only noise. But when you plug in one of the AOR modems (or another brand should anyone else choose to use this open protocol), that "noise" is translated into crystal-clear FM-quality audio with absolutely no background noise. Of course, you need a good, strong signal to accomplish that, and when we reviewed the ARD-9800, we determined that the signal needed to be two S-units above the noise in order to provide a very solid link. AOR says the upgraded software in the 9000 permits clear reception on weaker signals, but as we'll explain later, we were unable to test that particular aspect.

The ARD-9000

There are several other, and more obvious, differences between the 9800 and the 9000. First of all, the 9000 is for digital voice only, no photos or other file transfers (but most people weren't using that feature anyway). It is physically smaller and operates on a range of voltages from 10 to 16 volts. According to the spec sheet on the AOR website, internal jumpers can be configured to drop the operating voltage to 6 VDC, and HFPack users have found that you can operate on 9 volts without making any adjustments. Plus, the 9000 comes

DV on the Trail

By Ken Chong, DDS, WB6MLC

At the 2005 TAPR Digital Communications Conference in Santa Ana, CA, I saw the ARD-9000 on display along with the 9800. I had always admired the 9800 after seeing it demonstrated over the last two years at conventions, but never thought it would work for HFpack. When I saw the small battery-powered ARD-9000, though, a light bulb went on above my head. This was small enough to pack along when pedestrian portable (/PP) or pedestrian mobile (/PM).

Always willing to try something new to push the envelope for the HFpack group, I bought an ARD-9000 at HRO after sneaking out of the DCC. Two other HFpackers, Oliver, KB6BA, and Glenn, WB6W, were also sufficiently impressed to buy their own 9000s at the same store. We headed back to the hotel, and snuck back into the TAPR DCC with very suspicious-looking AOR bags at our sides. (Folks figured out that we had just been to the candy store!)

The ARD-9000 is very easy to hook up when portable. Most of us HFpack DV users have done DV when pedestrian portable. It was recently determined that the ARD-9000 can operate on as low as 7.0 volts before it begins to motorboat. There is a mystery internal battery charging connector on the back of the 9000. The AOR Users' Group found out that this was for an internal battery accessory that is not yet available in either the USA or Japan. Presently, I am using a Lithium Ion 9-volt battery for my own 9000 for light weight. We all use the AOR accessory cables for the particular brand of radio to simplify the hookups. The build quality of the AOR provided cables is very high, and they are properly shielded.

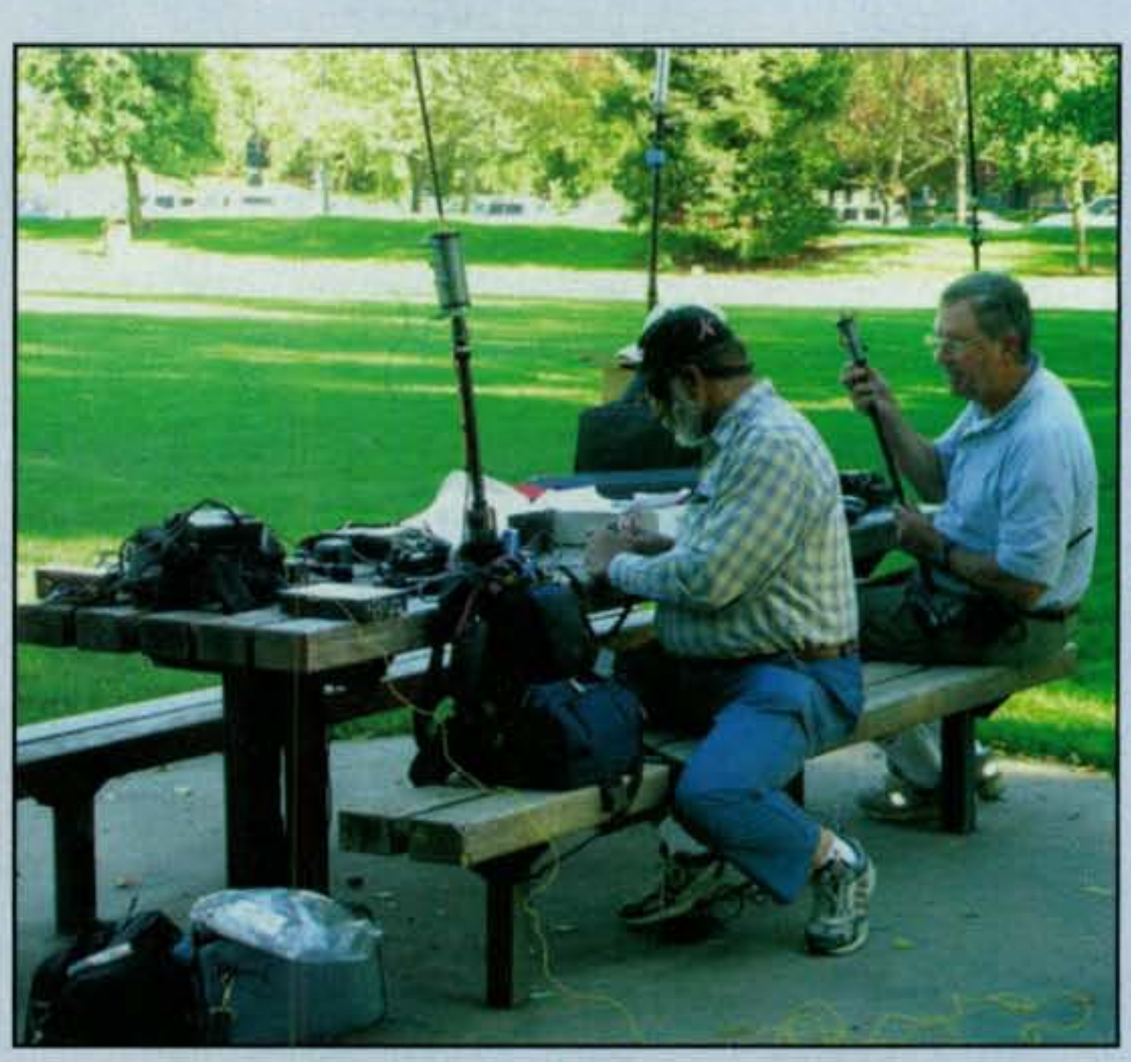
Pedestrian-mobile operation is still a work in progress. RFI and feedback have to be eliminated by making sure that the radio and AOR box's power packs are kept separate. Ferrites must be snapped onto both the mic cable and all interconnects. Also, one must be very careful not to overdrive the rig when running AOR DV. Due to the high crest factor of OFDM modulation, only a couple of watts are necessary to put out a full 25 watts, for example. I have used both my FT-817 and FT-857D successfully on AOR DV.

This must have been an interesting sight for non-ham park visitors, as HFPackers at Pacificon 2005 in San Ramon, California set up a "Day in the Park" of pedestrian portable operating, including digital voice with the ARD-9000. (Pacificon photos courtesy of Ken Chong, WB6MLC)

What's It Like To Use an ARD-9000 on the Trail?

The supplied speaker microphone can be set up to toggle back and forth between DV and analog, as explained in the user manual. For example, to go digital, one squeeze of the PTT button and you are in DV mode. You can proceed to speak immediately. To go to analog mode, you do two quick squeezes before speaking (keeping the button held down on the second squeeze). In the field, it was easy to forget at first, but eventually we all got the hang of it. The ARD-9000 has a built-in memory, so it is not necessary to wait for the sync tone to complete. You just begin speaking naturally and the unit will buffer your speech until it is ready to transmit its data.

WB6MLC's HFPack digital station is centered around his Camelbak pack, containing the body of his FT-857D and his W3FF Jumbo Buddistick /PM antenna. On the table, from the left, are his LDG Z11PRO auto tuner, FT-857 control head, ARD-9000 DV, and a Kenwood F6A HT used for monitoring the digital signal for any RF feedback. The antenna mount is homebrewed with a Delrin rod and pipe insulation foam to stabilize it inside the pack.



The HFpackers in attendance had a good time working stations with their own setups and antennas, but they also enjoyed trying out Ken's DV setup, as in this photo. Not realizing at the time that these photos would be published, Ken didn't get the names or calls of the hams pictured.

Receiving AOR DV does require careful tuning, but there is a resync button if you are initially far enough off to hear only the raw OFDM modulation (which sounds a lot like noise to others). When out on the trail, the band noise is very low, so decoding an AOR DV signal is very easy. This is not a QRP mode, however, and at least an S5 signal is necessary to sync up properly.

Since these stations are out in the clear away from high man-made noise, AOR DV does sync up reasonably well for clear communications. When the DV syncs up, the result is sometimes startling. All band noise and static are gone and replaced with an FM quality voice. It was much fun and can become addictive at times. A good application for DV is especially between HFpackers who are /PM or /PP on different mountaintops or other locations. The ARD-9000 was designed to allow one-hand operation with the speaker microphone, and it does work well while on the trail.

My Setup

To go /PM, I bought a small leather pouch with a belt loop that is just the right size to hold the ARD-9000 on my fanny pack. The rest of my gear is contained in a CamelBak with a Buddistick for an antenna. The FT-857D has a homebrewed remote head platform connected to the body of the rig (inside a pouch attached to the pack) with a 3-foot data cable. The AOR unit connects to the front of the rig's body at the mic input.

The 9-volt Lithium Ion battery is attached to the top of the ARD-9000 with hook-and-loop fasteners. At about 100 ma current draw, one has just enough juice for a few good contacts when in a good location. To preserve battery power, I keep the AOR turned off until the top of the trail is reached. If I were to need more DV power, I also have a 12-volt AA pack that can be attached to the AOR pouch.

The AOR DV HFpackers conduct a net around 3:00 PM PST (2300 UTC) on 7.296 MHz USB every Sunday. 7.296 MHz USB is a standard HFpack frequency used for the sunset HFpack net, which begins after we are finished. Many members of the AOR user's group show up to say hello and to exchange information.

What About the Future?

I hope to keep using my AOR ARD-9000 when /PM and /PP. At the next HFpack Forum at Pacificon 2006 (October 13–15, see <www.pacificon.org>), the HFpack group will be conducting a live demonstration of AOR DV in action. The highlight of the evening will be the famous HFpack pedestrian mobile "Zombie Walk," which takes place near midnight. I will be AOR DV equipped this next Zombie Walk. (What is a Zombie Walk? It is when HFpackers get on the air /PM in the dead of night to talk to other HFpackers on the low bands. Many are /PM in other states listening for other HFpack Zombies.)

with a magnet that you can attach to the bottom for physical stability on top of your transceiver or other piece of metal equipment in your shack.

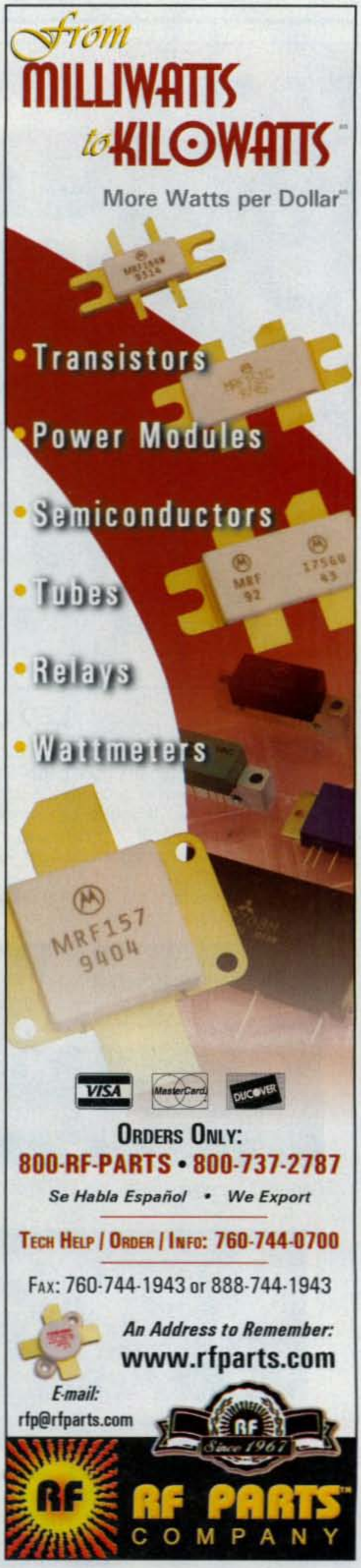
Switching between analog and digital is simple. In fact, on receive, it's automatic. Your receiver will operate in its normal analog mode until a digital signal is detected. At that point, the ARD-9000 automatically switches into digital mode to read the "header" information and attempt to decode the incoming signal. On transmit, from the analog mode, you simply give a quick click to the mic button and it switches you into digital. Another quick click brings you back to analog. You may also choose to switch over by pressing the mic button halfway, pausing, then pressing it the rest of the way and continuing to talk. An LED on the front panel tells you which mode you're in (see sidebar "If It's Orange, It Must Be Digital"). Plus, the supplied microphone is actually a speaker-mic, making an external speaker unnecessary for portable use.

On the receive side, the unit includes a button to "force" re-synchronization when the signal has briefly been lost during a transmission and no new header has been sent. Plus, it has built-in AFC (automatic frequency control) to lock in a signal within 125 Hz of your VFO setting (above or below), making the tuning a little less critical.

The audio input to the 9000 comes via a cable from the external speaker jack on your radio. There is a speaker jack on the 9000 into which you can then plug a speaker. *One note:* The power source to the ARD-9000 must be turned on for a speaker connected in this manner to work, even if the unit itself is not turned on. More than once, I've flipped on my rig, planning to use another mode, and gotten silence from the speaker until I turn on the power supply for the ARD-9000. Obviously, this is not a problem if your power for the 9000 comes from the same supply that powers your rig, and it's not a "problem-problem" in any event, just a minor annoyance.

DV and HFPack

The ability to use the ARD-9000 without external power and without an external speaker has brought DV to a growing group of hams who enjoy operating HF while walking, hiking, or biking (generally known as pedestrian mobile or /PM), or while at a location to which they've walked, hiked, or biked (pedestrian portable or /PP). The group is known as HFPack, and more informa-



Removing two screws on the back of the 9000 allows you to slide out the circuit board. An optional magnet attaches to the bottom of the cabinet to hold the small unit in place on any metal surface. ←

tion can be found at <http://www.hfpack.com/>. One of the pioneers of DV for HFPackers, Ken Chong, WB6MLC, explained the appeal:

"Out on the trail, the lower noise floor makes AOR DV a pleasure to use. Those of us pedestrian mobile and portable are using the 9000 running on a separate 12-volt battery pack. I am not sure who actually started AOR DV on HFpack, but I think I am the first one to announce it on the HFpack Group."

Ken added that the unique nature of operating from a backpack created some problems you probably wouldn't find at a home station, such as issues with RFI and feedback prevention. (See the sidebar "DV on the Trail" for more

LED Colors: If It's Orange, It Must Be Digital

You can tell at a glance which mode you're in on the ARD-9000. There are two LEDs on the front panel. The red one on the left, labeled "Over," is used for properly adjusting the audio levels. On transmit, it lights up if you're overmodulating; on receive, it flashes if the audio level of a digital signal is too low, goes on steady if it's too high, and goes off if it's "just right," as Goldilocks might say.

The LED on the right can be three different colors and deliver five different messages. If it's off, you're in analog mode on receive. When you transmit in analog, it glows red. If you switch to digital mode, it turns green, and it flashes when it's receiving a signal. Finally, it glows orange when you're transmitting in digital mode. The other giveaway that you're transmitting in digital is that when you release the PTT button on the mic, the transmitter stays on for another second or two, while it finishes transmitting whatever you've been saying.

In analog receive mode, the LED marked "STA" is not lit.

In analog transmit, the LED glows red.

In digital mode—the default startup mode—the LED glows green in receive and flashes when a digital signal is being received.

In digital transmit mode, the "STA" LED glows orange.

details). Ken notes that the rigs most commonly used right now for /PM and /PP operating are the Yaesu FT-817 and FT-857D.

Sunspot Blues

The bottom of the sunspot cycle is a rotten time to try to field-test anything on the HF ham bands. Propagation during the time I was testing the ARD-9000 was just plain awful . . . on days when there was any propagation at all! As a result, I was able to make only a handful of contacts. Those that I did make were strong enough that I couldn't test for any improvement in the unit's ability to copy weak or marginal signals. In a last-ditch effort to make some more contacts before writing this review, I put out a notice on the AOR-DV message board (http://groups.yahoo.com/group/ARD9800/) looking for skeds. I got replies from hams in England, Norway, and Italy, but when the time came to try to hook up, there just wasn't any propagation. Such is life at the bottom of the sunspot cycle.

Lots of Support

One thing that has not changed from the 9800 to the 9000 is the great group of people and websites out there to help newcomers to the mode. If anything, the number of resources on the internet has grown along with the number of hams using DV on HF. Two of the most knowledgeable and most helpful people are Mel, KØPFX, in St. Louis, and Paul, KQ6EH, in California.

The main gathering point for ARD-9800/9000 users is the Yahoo! Groups site, <http://groups.yahoo.com/group/ARD9800/>. You have to join or register to access most of the resources, but it's free. Other web resources include <http://www.rfelectronics.com> and <http://www.hamradio-dv.org> (mirror sites with the same info); the AOR ARD DV Modem Chat Room at <http://client0.sigmachat.com/sc.pl?id=118636>; and the "AOR Online Finder" at <http://n1su.com/aor_online.html> (N1SU's site also has information on other ham radio digital modes, including WinDRM, HamDReaM, DIGTRX, and Olivia MFSK). In addition, you can hear a recording of a DV QSO between KØPFX in Missouri and LA4LN in Finland at <http://folk.uio.no/tomvs/la4ln/k0pfx4ln.mp3>. The QSO is in English. Plus, of course, there is the AOR website at <http://www.aorusa.com>.

Again, the ARD-9000 lists for $339 and may have a slightly lower "street price." Contact your favorite dealer or AOR for more details. ■

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Results of the 2005 CQ WW VHF Contest

BY JOHN LINDHOLM,* W1XX

BlackBerry: A portable handheld computer with a mini-keyboard for sending and receiving e-mail.

LingonBerry: A portable interactive 3830 device for instant amateur radio contest reporting. Utilizes authorized Part 97 RF spectrum for both visual and audio interactive response.

Handbook of Fruitful Communications Devices [2005 Edition]

As has become traditional, the spring meeting of the Contest Quahogs of Rhode Island (CQRI) was devoted to a review of the popular CQ WW VHF Contest, held July 16–17, 2005. Thanks to the recent invention of the LingonBerry by OH-amateur Prof. Olaf Pikisilmä, two-way pictorial and audio exchanges were instantaneously available to all participants. The projection mode enabled all to view input on the screen right next to the mounted Quahogasaurus head unearthed by Fossilman from the Charlestown moraine.

Favorite Topic: Propagation

K4XR was first to offer: "Some fair openings for a few hours on 6 meters, but conditions were really flat on 2." K9GY "had an nice opening to Florida from 17–19Z on day two," while K9HUY in Florida experienced a "great opening on Sunday to make it all worthwhile." Multi-op station N4DXY noted "the band opened up nicely to the northeast on Sunday," while N2GKM found "6 meters fun on Sunday." Mountaintop multi W3SO "shut down at 10:45 PM local Saturday due to heavy electrical storms. The first operator back at the site Sunday morning phoned the others and excitedly reported the bands were wide open. Six-meter *E*-skip to the south and Caribbean continued throughout the day. Two meters never really opened up like that, but we worked south to EM85 and EM95. It seems the single operators opted for 6 meters over 2. Rover activity was good, as we were able to clean sweep many in each grid square they passed through. Activity was definitely up for this year's CQ WW VHF Contest."

On the DX side, EU powerhouse station OK1KIM "tried Multi-Single, making about 10 Qs on each band for some nice multipliers. On 2 meters, tropo openings to the west on late Saturday and even better Sunday morning produced some rare locators in England and France. Sunday afternoon 6 meters finally opened up to Italy, southern France, and Spain." VA3TSG "was bored until 6 meters opened up Sunday and then enjoyed the best results ever." Jody, VP5JM, who made it into lots of North American 6-meter logs, really "enjoys the contest when the band is open, since there are so many nice people on that band."

Newbies

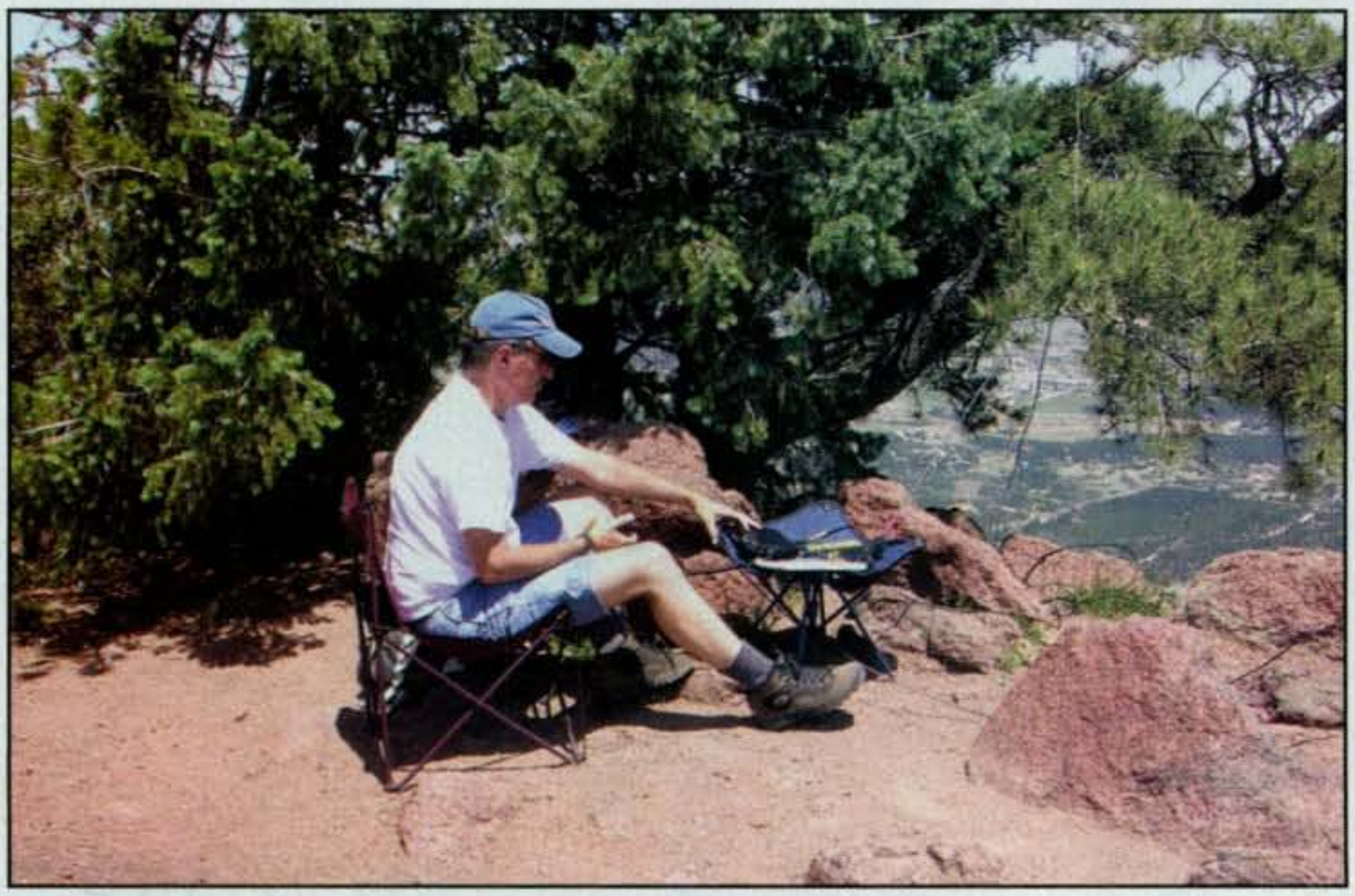
One of the major attractions of the CQ WW VHF Contest is its appeal to newcomers. You don't need a whole shack full of gear to compete, as noted by HS7ZSX: "My first contest was very exciting, making contacts in central Thailand up to 400 km by VHF-FM with 10 watts limited power." And from Karn, E20ZFD: "This was my first time in the CQ WW VHF Contest. I was very happy to make so many QSOs . . . lots of fun."

Can it get any better than these father-and-son combos? Via KB3KJS: "First contest for my son Josh, KB3LTE. We had a blast. Josh got to experience a real nice *Es* opening on 6 meters that lasted almost all day on Sunday." Meanwhile, new ham KE5ELU deputized "son KE5DUK to rover to a nearby grid intersection to activate four grid squares on FM simplex." Taking a cue from mass media advertising, Bill, W4GRW, found this contest to be "very special for me, operating with my 17-year-old son, Josh, W4WJF. I operated Single Op 6 meters, and Josh SO 2 meters. Result? Sandwiches for two, $10; snacks for two, $12; drinks for two, $15; spending a weekend of quality time operating beside a great kid and contester, *priceless!*"

The Old Timer

Not to be denied his usual due, the "Old Timer" grabbed the D104 to compare VHF contesting to, of all things, basketball. An avid round-ball fan of Atlantic Coastal University, he explained how media game announcers continually fall into the use of meaningless clichés, which got him to thinking of comparable contesting usage. After the following comparison was presented (which impressed no one), the OT mercifully sat down.

*48 Shannock Road, South Kingstown, RI 02879
e-mail: <w1xx@cox.net>



Bob, KØNR, is the ultimate QRP portable "Hilltoppper" proponent. Here he's enjoying the fresh air operating in the 2005 CQ WW VHF Contest from Mt. Herman [CO] in DM79. This was a backpack hiking effort providing "a fun afternoon running radios in the mountains." (Photo by KAØDEH)

TOP SCORES
WORLD

All Band

SQ6ELV	7,844
XE2ED	2,226

6 Meters

EH2ARD	31,784
EH6VQ	22,890
CT1DHM	21,111
S51CK	15,879
TA2RC/P	13,398
VP5JM	13,157

2 Meters

DK5DQ	39,960
DG3XA	13,692
E20YGG	12,782

QRP

HS9MBK/P*	2,250
JH3DMQ	1,003

Rover

HS6RMY	16,740
E20MFV	13,860

Multi-Op

OK1KIM	293,940
CQ3A	71,278
IQ2GM	36.480
HSØAE	21,298
F6IFR	18,837

USA

K2DRH	74,880
W4WA	45,650
WA1HHN	45,486
W1XX	42,315
K3TUF	28,122
W3DOG	27,645
K4XR	25,840
W2DAN	23,868
K9HUY	17,216
W3ARS	15,540

6 Meters

K1TOL	70,144
W2MMD	35,394
WN1GIV	21,842

2 Meters

W4WJF	10,540
W3MTC	6,104

QRP

KA1LMR	30,969

K9GY	8,325
K9AKS	6,816
WB2SIH	5,244
NØURW	5,088
K1ZE*	2,610

Rover

W4VHF	80,073
K9JK	23,754
WB8BZK	20,705
W4TXS	16,530
W4SHG	10,366

Multi-Op

W3SO	99,883
K5QE	39,984
KB1DFB	16,284
N4DXY	14,916
K4ATM	14,120

*Hilltopper

QSO LEADERS BY BAND
WORLD

Single-Op 50 MHz

EH2ARD	274
CT1DHM	227
VP5JM	223
EH6VQ	210
S51CK	201

144 MHz

E20YGG	581
HS8GLR/9	474
DK5DQ	333
HS4DDQ/1	234
HS9MBK/P	225

Multi-Op 50 MHz

CQ3A	432
OK1KIM	224
F6IFR	207

144 MHz

OK1KIM	598
HS1QKQ	512
HS0AE	463
HS1CLE	422
E20HWD	418

USA

Single-Op 50 MHz

K1TOL	512
W2MMD	347
WN1GIV	326
W1XX	309
K2DRH	294
W2DAN	264
K9HUY	261
W4WA	257
WA1HHN	243
KA1LMR	231

144 MHz

W4WJF	170
K2DRH	141
W3MTC	109
KG6IYN	106

Multi-Op 50 MHz

W3SO	307
N4DXY	168
K5QE	151
KB1DFB	140
W1QI	138
K4ATM	135

144 MHz

W3SO	222
K4ATM	109
K5QE	103

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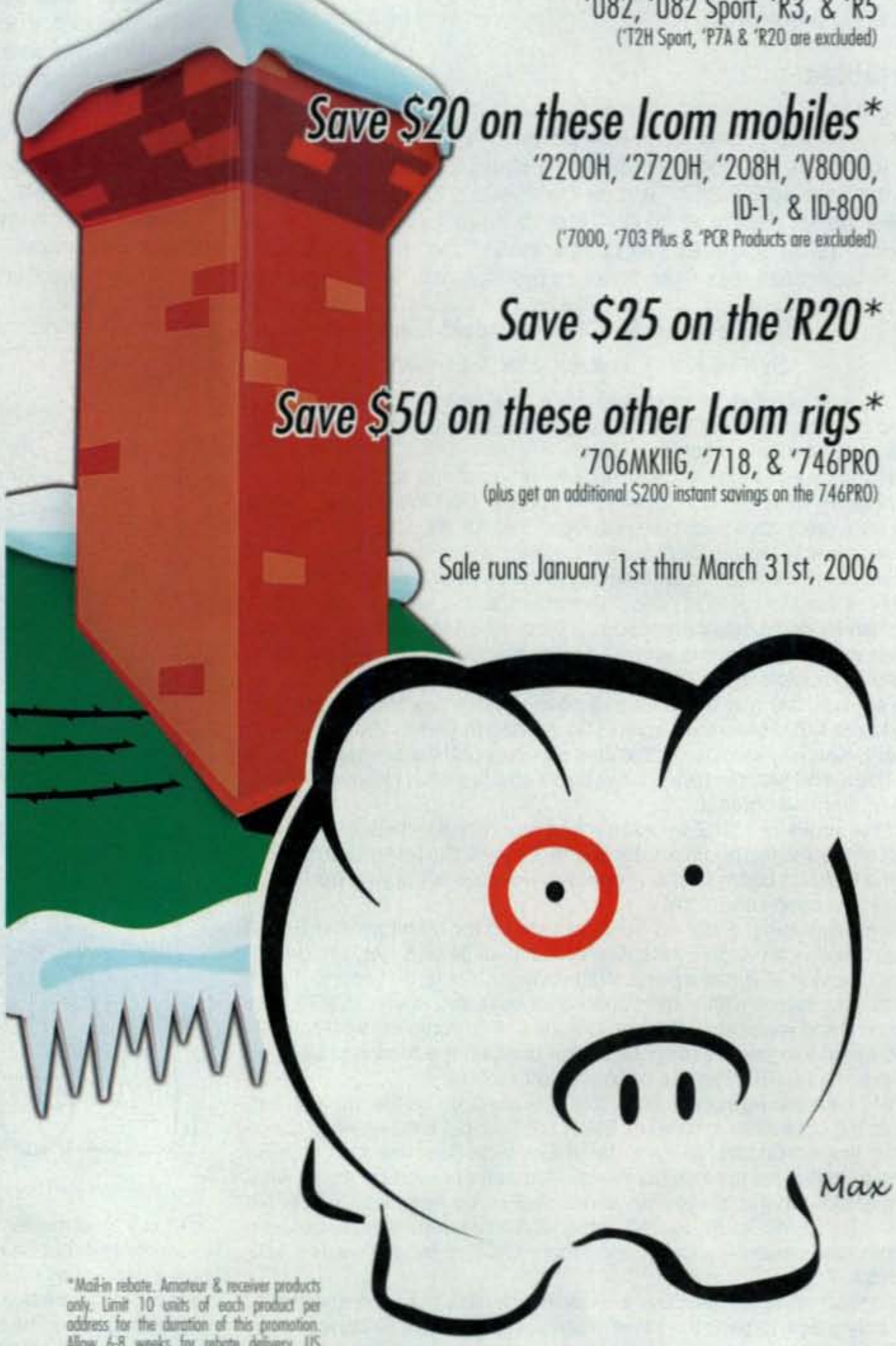

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Basketball Sports Clichés Applied to VHF Contesting
By "The Old Timer"

Basketball	VHF contesting
Let the game come to you.	Call CQ a lot.
Knows how to play the game.	Has read the contest rules.
Take what the defense gives you.	Two kHz from the calling frequency is clear.
Take care of the ball.	Check the SWR often.
Starts with the point guard.	Use a good logging program.
Knows how to put the ball in the hoop.	Rogers the completed QSO and hits the "enter" key.
There is no "I" in team.	Operate multi-op.
Has tremendous up-side.	KW amplifier.
There's a lid on the basket.	You've worked everybody!
Play within yourself.	Take some off time.

Portables

The LingonBerry heard next from a very vocal group of stations, such as K7MDL, who "operated portable for five hours at 5300 feet at the Mt. Pilchuck [Washington state] fire lookout with just 5 watts with an FT-817." It took California's KQ6EE "six hours to hike up Mt. Baldy at 10,064 feet to have fun in the contest, working as far south as DM12 in Mexico." On the East Coast, NE1B "operated less than three hours from Mt. Washington in FN44 using a 6-meter mobile whip and 4-element 2-meter beam." Meanwhile, NE1RD extolled the virtues of the QRP Hilltopper category, "working from atop Mt. Wachusett in FN42 with a cool breeze, cool drinks, and a great view."

K7XC "operated portable from a rented forest service lookout at Drake Peak in Oregon's CN92. It is an awesome location at 8220 feet with tropo contacts ranging from CM97 to CN97 all with 100 watts to a homebrew 4-element 6-meter Yagi and M^2 2M9SSB atop a 30-foot trailer tower. Patience and persistence prevailed over wind, bugs, and Murphy, and nothing beats the smell of bacon and eggs cooking outdoors Sunday morning, thanks to the support of my lady, Rosie."

Portables were in evidence on the DX side as well, with TA2RC, who "planned a good operation from KM59. But two days of rain wiped out all access roads." Thus, Ozer "returned to KN50bv two hours before the contest start. After a pileup on

Expanded CQ WW VHF Results

For a listing of the ops and grids activated by the rover stations in the 2005 contest, plus the operators of the multi stations, go to <www.cq-amateur-radio.com>, to the Contests section, to "Expanded Results of the 2005 CQ WW VHF Contest."

K9ILT/Rover in Cheesehead-Land

By Tim, KØPG, and Pat, K9ILT, Sullivan

This year in order to do something a little different, we thought we would go north through the Cheese Curtain and run some Wisconsin grids along the Lake Michigan shore.

We took a scouting trip over the July 4th weekend and found a couple of good rover spots. Upper Lake Park in Port Washington would give us a great shot over Lake Michigan into MI, IN, OH, and ON with a great view from the lighthouse. However, there was a minor detail that we didn't know about until the day of the contest. The third Saturday in July is the annual "Fish Day," described as the world's largest outdoor fish fry and a major attraction . . . blocked-off streets, a big parade, an arts and crafts fair held where? You guessed it. At Upper Lake Park!

With no vehicle access to the park and throngs of people, we lost our high spot. All the way there we had been rehearsing: "Who's the VE3? Would the W8 please try it again." So we had to find a different spot in a hurry. Keeping as close to the lake as we could, we eventually came to a dead-end with big trees between us and the lake. However, it was time to start the contest.

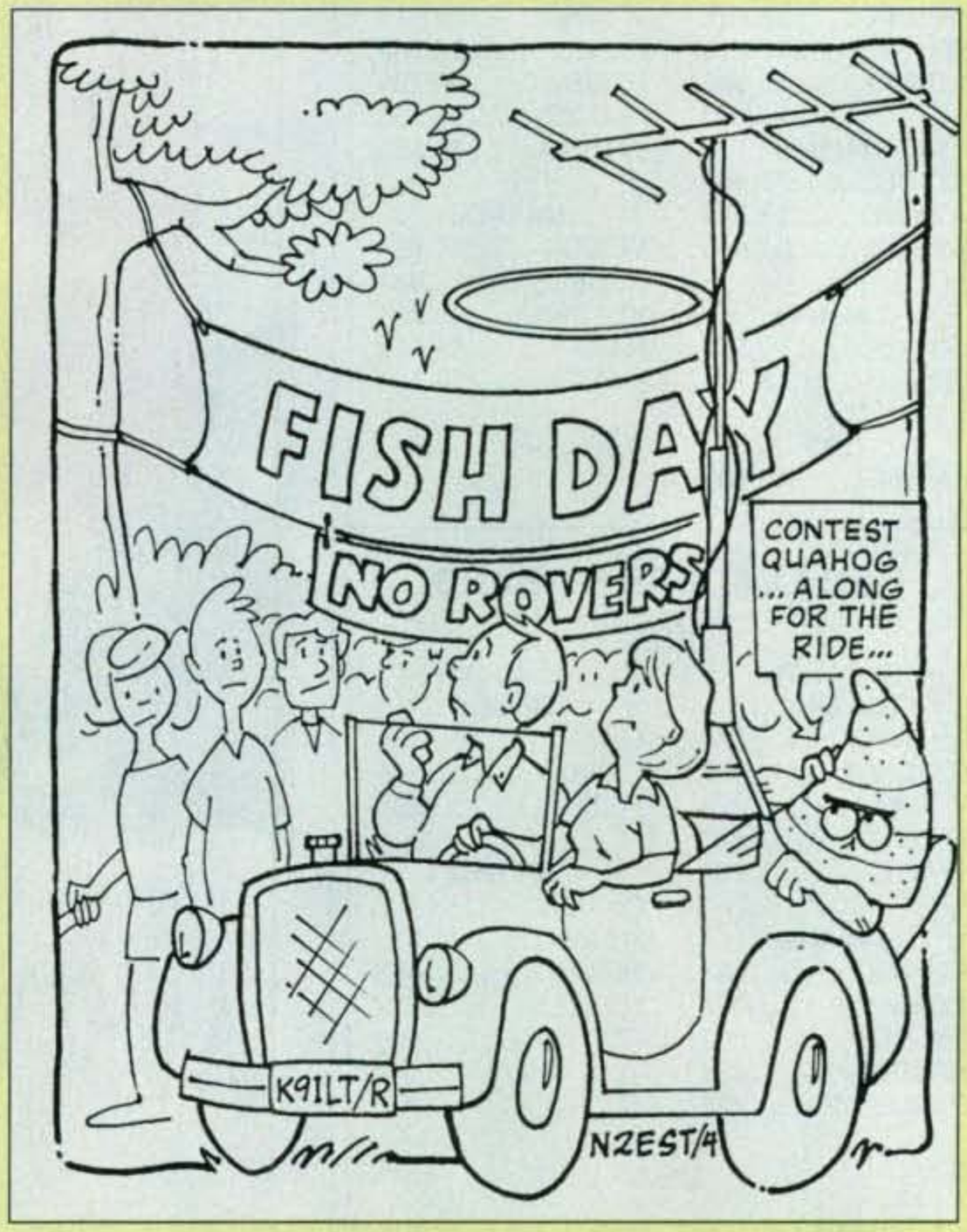
At the stroke of 1800Z we exchanged reports with N9UX/R, who was weak on 2 but with a booming signal on 6. Oh well. Since we had checked out the 2-meter beam on the analyzer before we left (it was perfect), it must have been conditions.

Hearing nothing on 2, we decided to head for Manitowoc in EN64. While traveling through EN63, KB9VQC called us on 6 with a huge signal . . . moving to 2, not a peep. With no luck CQing, we went to a park on the lake shore with a nice open shot east and south. W9GA was loud on 6 and weak on 2. We had to go to CW to complete with K2DRH on 2. Something was wrong! I took the coax off the amp and plugged in the analyzer. The needle pegged! No antenna!

Pat (the more agile one) knew the drill: climb up on the vehicle roof, wiggle the connector and balun; SWR 1.2:1 . . . back in business. Upon further inspection later at our hotel in Sturgeon Bay, the coax adapter to the amplifier fell apart in my hands. After an appropriate fix we were off to EN65. On the "DeLorme" we located some nice spots where we worked lots of WI, IL, IN, and MI stations. A little later we drove out onto a lighthouse causeway for a bunch more Qs. Our best DX was K9ZO in EN50.

In search of food, the Coyote Roadhouse was our next adventure. The only place to park the rover-mobile was right out in front in plain sight. Anyone who has rovered knows what came next. It was straight from the scene in *Close Encounters of the Third Kind* when all the scientists did the glazed-over "Spielberg stare" at the spaceship and aliens.

Pretty soon a fellow who had been selected by the group at the bar approached us. Pointing to our 5-element 2-meter beam and KB6KQ 6-meter loop mounted on the roof tripod, he asked, "What's that for?" I replied, "There's a bear with a radio collar causing trouble. We're tracking him down." Then the waitress wanted her picture taken next to our vehicle.



I tried to seriously explain that we were making contacts in a ham radio contest, but he'd have none of it: "My dad's a ham and his antenna's a whip-thing on a magnet. What you got there isn't ham radio." So I repeated the bear story, which he liked better.

We bagged it for the night and were on the road again by 1400Z heading south for EN54, 53, and 52. Six meters finally opened up when we were in Oconomoc. Signals were very loud and then they were gone, prompting Pat to observe, "I guess that's why they call it sporadic." As 2100Z approached, we spent the final 20 minutes making contacts in a Wal-Mart parking lot.

We had a lot more fun than our 7K score would indicate, but if it hadn't been for "Fish Day" and the bad adapter, we would have had a much better score. Wait 'til next year. Thanks to everyone who rode along with us and helped us enjoy the scenery in our favorite way. 73!

W4VHF (right) stopped by the CQ Dayton booth last year to pick up his plaque from contest director W1XX (left). Ted was first-place finisher with wife K4LVV in the Rover category for the fifth consecutive time in 2004, only to repeat again in '05. (W2VU photo)

6 in the first hour, the band closed until Sunday evening, but not enough for a good score."

Who Won?

Judging from the exuberant quotes, the answer is "everyone!" Scores do not tell it all, but then again making the biggest score possible is certainly an objective. Repeating as top U. S. scorer was K2DRH, who noted "in discussion with K9AKS in our post contest round table, it was a good thing this is a 27-hour contest instead of 24. Six meters finally opened up to the East Coast in a far-ranging and wildly cyclic feeding frenzy. It kept moving between New England FN grids and the Mid-Atlantic FM grids, with a few southeastern EM grids thrown in for good measure." Bob scored just under 75K points, followed closely by Lefty, K1TOL, operating only 6 meters, with 70K. On the DX side, 2-meter single-band repeat winner DK5DQ led all single-ops with nearly 40K points, while Spain's EH2ARD, operating just the "magic band," followed with 31K.

NC State student W4WJF out focused all U.S. 2-meter single ops with 170 Qs in 31 grids. The CQRI contingent did not fail to notice that all other 2-meter scores trailed significantly, underscoring the continued decline in 2-meter North American contest activity. Short of grounding all 6-meter Yagis, how do we reverse this alarming trend on 144 MHz?

KA1LMR led the QRP crowd with a nice 30K score, while K1ZE and HS9MBK outpaced other Hilltoppers, who venture to far-flung locations often with their rigs on their backs to dispense rare multipliers.

Big-time multi-op stations fuel increased contest activity, and the ever-

2005 PLAQUE WINNERS

Single Operator

USA All Band: Bob Striegl, K2DRH. Donor: Ted & Itice Goldthorpe, W4VHF & K4LVV
USA 6 Meters: Lefty Clement, K1TOL. Donor: Todd Dravland, WDØT
USA 2 Meters: Josh Fisher, W4WJF. Donor: *CQ* Magazine
USA QRP: Christopher M. Merchant, KA1LMR. Donor: Bob Witte, KØNR
World 6 Meters: Jon Sistiaga, EH2ARD. Donor: Dennis Motschenbacher, K7BV/1
World 2 Meters: Nicolas Exner, DK5DQ. Donor: Contest Quahogs of RI
Asia 2 Meters: Natthida Suphon, E20YGG. Donor: Golden Kilowatt Council In Memory of Hans D. Hollstein, HSØ/KA3TDZ

Multi-Operator

USA: Wopsononock Mountaintop Operators, W3SO. Donor: Bob Striegl, K2DRH
World: Radioklub OK1KIM. Donor: Grid Pirates, K8GP
Asia: HS0AE. Donor: Siam DX Group

Rover

USA: Ted & Itice Goldthorpe, W4VHF [+K4LVV]. Donor: W3SO, Wopsononock Mountaintop Operators

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GRID MULTIPLIER LEADERS BY BAND

WORLD

Single-Op

50 MHz

EH2ARD.....116
EH6VQ.....109
CT1DHM.....93
S51CK.....79
TA2RC/P.....77
Z36W.....72

144 MHz

DK5DQ.....60
DG3XA.....42

Multi-Op

CQ3A.....152
OK1KIM.....100
F6IFR.....91
IQ2GM.....75

144 MHz

OK1KIM.....107
IQ2GM.....39

USA

Single-Op

50 MHz

K1TOL.....137
W2MMD.....102
W1XX.....88
K2DRH.....85
W4WA.....76
WA1HHN.....75
W3DOG.....74
KA1LMR.....74
W2DAN.....71
WN1GIV.....67

144 MHz

K2DRH.....45
WA1HHN.....39
W4WA.....34
W4WJF.....31

Multi-Op

50 MHz

W3SO.....89
K5QE.....71
W1QI.....58
N4DXY.....51
KB1DFB.....50

144 MHz

W3SO.....44
K5QE.....41

enthusiastic W3SO team again posted the best North American score with just a shade under 100K points. Team OK1KIM did the same on the DX side with a whopping 293K score, and Madeira's CQ3A was second with a nifty 71K.

For the sixth consecutive year, W4VHF/R [+K4LVV] won the Eukanuba® award, activating four grid locators for a score of 80K. Meanwhile, Thailand discovered the joys of rover operation, with HS6RMY, H20MFV, and others posting nice scores.

For "the rest of the story" (scorewise) see the top scores, QSOs, and grid boxes, the plaque winners, and the *complete* scores listing for *all* logs submitted.

Math 101

The CQRI members gave a rousing round of applause for NC1C, without whose log-processing software these results would not appear. Dave reported a banner year for entries. A record 303 valid logs were submitted, with 30,790 claimed QSOs—100% cross-checked for accuracy. Error rates were pretty much unchanged from previous years: Invalid or "not in log" 1.1%; Dupes 0.2%; "Busted" calls 1.3%; Overall error rate 3.1%. 9971 different callsigns were logged, with 4310 making at least two QSOs. 664 different grid locators were reported active. All the numbers indicate a healthy 25% increase in activity, not bad considering the smattering of enhanced propagation. CQ VHF is on the move! Also acknowledged for his able assistance is Bruce, WA7BNM, who continues to make CabForms available to those folks who enter their paper logs online—much to the relief of the volunteer data-entry team.

2006 CQ VHF Contest

Before breaking up for coffee and donuts, the contest director took the podium to remind everyone of the upcoming 2006 CQ WW VHF Contest, July 15–16. The full announcement will appear in the June issue of *CQ*, on the CQ website, and on the new contest dedicated website: <www.cqww-vhf.com>. This website has all updated information relative to the contest thanks to its multi-tasking webmaster, NC1C.

With the appointment of regional coordinators worldwide, using E21EIC's program in Thailand as a template, CQ VHF is gaining increased recognition as a viable member of the CQ World-Wide family of contests. With thousands of entrants in CQ-sponsored DX, 160, RTTY,

VHF Contesting in Thailand

By Fred Laun, K3ZO/HSØZAR

Look at all those happy faces! I recently had the pleasure of a month-long trip to Thailand which included the December meeting of the Radio Amateur Society of Thailand. Usually the monthly RAST meeting is attended only by a few old-timers. This time the meeting was mainly given over to the presentation of certificates and awards to participants in the 2004 CQ WW VHF Contest.

What a blast! Thanks to the contest, the meeting was infused with the youthful spirit of contest participants. Contest coordinator Champ, E21EIC (far right in the photo), emceed the awards ceremony. The Hans Hollstein Memorial Plaque, held by HF/VHF contester Yod, HSØXNO (center), was won by YL operator E21DKD, who could not attend. The woman next to him in the photo is long-time RAST President Mayuree, HS1YL.

Standing to my right (I'm the tall guy in the center) is John, HS1CHB, who started the idea of mass Thai participation in the CQ VHF Contest in 1996. This was a result of brainstorming between him and me on how we could bring contesting to the vast majority of Thai hams "frequency-locked" on 2-meter FM. Champ, E21EIC, has done a magnificent job in promoting competition in recent years, especially among young people at universities.

It might even be said that CQ, through its VHF contest, has done more to encourage youthful enthusiasm for amateur radio in Thailand than any other institution.

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Burial: **Yes**, UV Resistant: **Yes**.
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Usage 450 MHz and Higher.

CNT240 (LMR type)
Connector: **N, PL259, TNC, SMA, BNC & QMA** RG8X SIZE SHOWN
Burial: **Yes**, UV Resistant: **Yes**.
Shields: **2** (100% bonded foil +90% TC Braid) **VP 84%.**
Attenuation 3.0dB @ 150 MHz at 100ft.
Usage 1 MHz and Higher.

CNT195 (LMR type)
Connector: **N, PL259, TNC, SMA, & BNC** RG58U SIZE NOT SHOWN
Burial: **Yes**, UV Resistant: **Yes**.
Shields: **2** (100% bonded foil +90% TC Braid) **VP 80%.**
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and WPX contests, we should expect the same for our VHF contest. Talking up the contest at your club meetings, Elmering a contest "newbie," or sponsoring a plaque, contribute to more fun and Qs for everyone. Are you doing your part?

With that, all the LingonBerrys were turned off 'til post-contest reporting time.

73, John, W1XX

QRM

Caught bits of the contest during a family trip to the lake with an IC-706MKIIG to a 3-element at 10 feet on 6 and an omni on 2. As a result, son, age 7, now wants to study for his license! . . . **AA4ZZ.** Nice 2-meter enhancement just before midnight to the west. Those who thought the bands closed Saturday night after 2130 local missed a lot. Six opened up twice on Sunday...**AK4FL.** I think I was the best station from northern Europe in the contest. Not much activity from Scandinavia, so I missed many multipliers. This was my first CQ WW VHF Contest. My station is near the Hamburg-Bremen Motor Speedway, so I heard many Harley-Davidson motorbikes for their biker meeting of nearly 10,000 participants, creating a high noise level! Best DX was G4PSU/P at 795 km...**DG3XA.** Ran an FT-817 with 5 watts out, plus a homebrew 4-element Yagi after the DK7ZB design. Overall activity low, as the contest is not known well enough yet in EU . . . **DH8BQA.** Unfortunately a lightning strike before the contest disabled much of my station. But managed to recover for 6 hours of contest operating. Lots of fun . . . **E20YLM/4.** Best DX UX8ER, KN70do at 2667 km . . . **EA3FM.**

I am very happy to be QRV in CQ WW VHF every year. This year we had many new Thai hams QRV in the contest...**HSØXNO.** I was very excited to be in the CQ WW VHF Contest for the first time. I've been licensed 18 years but this was the first time in the contest . . . **HS1VSB.** I met many old and new friends in the contest. A lot of fun . . . **HS6MCB.** First time in the contest and a very good experience . . . **HS7QLZ.** Fun time and good 6-meter openings operating from my SUV on a nearby hilltop for the weekend . . . **KA1LMR.** This was my first contest and I had a good time. The goal I set for myself was 1000 points. Will do better next time . . . **KA3DQD.** Good conditions except for a bit of QRN from thunderstorms in the area . . . **KB8U.** I was QRV on a mountaintop on Phuket Island, IOTA AS-053. What a view . . . **HS8KAY.** Very, very nice contest. Conditions got better Sunday afternoon increasing the 50 MHz score . . . **I2AZ at IQ2GM.** A very limited part-time operation while on vacation with the family on Cape Cod . . . **K3IXD.** Six-meter band was very quiet on the West Coast, so there were not many QSOs . . . **K6JRA.** Only worked the contest for a short time, but had lots of fun . . . **KG4NEP.** Zero propagation but at least a fair turnout of locals to keep activity up over the entire duration of the contest. The nice pace allowed time to encourage others to join in the good time. Contest probably needs a little more publicity . . . **KG6IYN.**

First 6-meter contest. Tough conditions but had a great time . . . **KI4AOC.** My first contest. Great learning experience. Look forward to next year . . . **KI4HRF.** QRP = no TVI = lotsa fun! . . . **KR1ST.** Only operated 4 hours but it was fun. Hope to operate more next time . . . **N1CJG.** Fun to work VP5 in one call and a few FL, MS, GA, and AL grids . . . **N3UM.** Naturally the aurora waited until after the contest . . . **N6KW.** Was in the contest the first hour to give out points, then away 'til 1740Z when I arrived home to find 6 meters open. So I had fun 'til the end of the contest . . . **VE3CRU.** Worked a few new grids . . . **VO1AU.** The start of the contest was quite slow, just picking up as many locals as possible. On Sunday morning at about 1305Z the fun really started. Worked most of FL, GA, AL, TN, and the Carolinas with a few in EN41 off the side of the beam. Then snagged VP5JM. After a break for lunch, there was another opening to the northern part of 4-land. Got KØHA in EN10 just before the band closed at 2019Z. Spent the last 35 minutes on 2 meters looking for a few more Qs; W3DOG was a nice surprise from FM28. Overall, it was a really fun and exciting contest for me . . . **W2AJM.** Had other commitments but managed to get on early Saturday and Sunday afternoon. There were good 6-meter openings to the south. I even had several CW QSOs. Two meters was very sparse even though most signals were very good. Guess everyone opted for 6 meters. Keep the two-band concept! . . . **W2UDT.**

Unfortunately bad conditions, but good enough I hope for one more first-place single-op score from Mexico . . . **XE2ED.** My first time in this contest. No propagation but it was fun with some interesting QSOs . . . **XE2K.** My second time in the the CQ WW VHF Contest. It was difficult since the temperature in the shack was more than 40° C. Anyway, I had fun and it was nice to hear some old friends on the magic band. See you next year . . . **Z36W.** Thanks to all concerned in running the contest . . . **ZC4LI.**

Number/letter groups after call letters denote the following: Class (A = all band, 6 = 6 meters, 2 = 2 meters, Q = QRP, Q* = QRP portable hilltopper, R = rover. M = multi-operator), Final Score, Number of QSOs, Number of grid locators, State/Province (USA/Canada only), Grid Locator or Number of grids activated (rover only). Rover scores for USA are listed separately. Certificate winners are listed in boldface. * Is a Hilltopper.

2005 VHF RESULTS

NORTH AMERICA

UNITED STATES

W1XX	**A**	**42,315**	**356**	**105**	**RI**	**FN41**
W2OAN	**A**	**23,868**	**285**	**78**	**RI**	**FN41**
W1RZF	**A**	**13,333**	**162**	**67**	**MA**	**FN42**
N1ZN	**A**	**6,837**	**117**	**53**	**CT**	**FN31**
K1TR	**A**	**3,306**	**72**	**38**	**NH**	**FN42**
N4CW/1	**A**	**2,640**	**67**	**33**	**ME**	**FN53**
NE1B	A	1,155	43	21	NH	FN44
KC1MA	A	1,116	46	18	MA	FN51
N1ZMB	A	609	26	21	MA	FN42
N1CJG	A	570	24	19	CT	FN31
WA2BTR	A	351	20	13	ME	FN54
KV1J	A	252	16	14	MA	FN44
W1CRK	A	180	14	10	MA	FN41
K1TOL	**6**	**78,144**	**512**	**137**	**ME**	**FN44**
KB1JDY	6	840	40	21	CT	FN41
K5ZD	6	1	1	1	MA	FN42
K1ZE	**Q***	**2,610**	**60**	**29**	**CT**	**FN31**
NE1RD	**Q***	**630**	**35**	**14**	**MA**	**FN42**
KA1LMR	**Q**	**30,969**	**282**	**93**	**NH**	**FN43**
KB1DFB	**M**	**16,284**	**188**	**69**	**CT**	**FN41**
W1QI	M	12,104	158	68	CT	FN31
K1JT	**A**	**9,536**	**132**	**64**	**NJ**	**FN20**
KA2CYN	**A**	**8,662**	**128**	**61**	**NY**	**FN31**
W2UDT	A	8,468	123	58	NJ	FN20
W2AJM	A	6,273	107	51	NY	FN21
N2GKM	A	1,953	48	31	NY	FN31
KC2MHU	A	1,484	42	28	NY	FN12
W2CXM	A	814	34	22	NY	FN12
W5KI	A	494	25	19	NJ	FM29
W2MMD	**6**	**35,394**	**347**	**102**	**NJ**	**FM29**
NA2R	6	3,740	85	44	NJ	FN20
K2CS/P	**6**	**1,968**	**56**	**35**	**NY**	**FN23**
N2GDY	6	736	32	23	NY	FN31
KC2HZW	6	170	17	10	NY	FN30
KA2BXH	6	160	16	10	NJ	FN20
N2SLN/M	6	4	2	2	NY	FN22
WB2SIH	**Q**	**5,244**	**85**	**46**	**NY**	**FN31**
WV2ZOW	**M**	**4,730**	**78**	**43**	**NJ**	**FN20**
WA1HHN	**A**	**45,486**	**321**	**114**	**PA**	**FM19**
K3TUF	**A**	**28,122**	**249**	**86**	**PA**	**FN10**
W3DOG	**A**	**27,645**	**239**	**95**	**DE**	**FM28**
W3ARS	**A**	**15,540**	**171**	**70**	**MD**	**FM19**
W3ZZ	A	12,032	155	64	MD	FM19
W3MEL	A	7,644	115	52	PA	FN10
K3ISH	A	7,502	113	62	PA	FN21
W3LL	A	4,992	104	39	MD	FM19
KB3JGS	A	4,712	92	38	PA	FN20
KB3HQX	A	1,271	37	31	PA	FN22
KA3DQD	A	925	35	25	DE	FM29
N3UM	A	820	31	20	MD	FM18
KB3EXB	A	392	23	14	PA	FN10
W3DSX	A	240	17	10	PA	FN10
W3PT	**6**	**4,305**	**105**	**41**	**PA**	**FN10**
W3GNQ	6	340	20	17	DE	FM28
4U1WB	6	128	16	8	DC	FM18
K3TW	6	104	13	8	MD	FM18
K3ZO	6	48	8	6	MD	FM18
W3MTC	**2**	**6,104**	**109**	**28**	**MD**	**FM19**
W6AXX	2	1,564	46	17	MD	FM19
K3CHB	2	24	6	2	PA	FN20
K3OQ	**Q**	**378**	**20**	**14**	**MD**	**FM19**
W3SO	**M**	**99,883**	**529**	**133**	**PA**	**FN00**
NN3Q	M	5,029	95	47	PA	FN11
KB3KJS	**M**	**2,656**	**66**	**32**	**MD**	**FM19**
N3YRR	M	1,452	46	22	MD	FM19
W4WA	**A**	**45,650**	**336**	**110**	**GA**	**EM84**
K4XR	**A**	**25,840**	**258**	**85**	**AL**	**EM64**
K9HUY	**A**	**17,216**	**265**	**64**	**FL**	**EL86**
KN4SM	**A**	**13,904**	**138**	**79**	**VA**	**FM16**
WB4WXE	A	11,078	166	58	AL	EM74
K4QI	**A**	**10,230**	**167**	**55**	**NC**	**EM85**
NJ2F	A	8,918	159	49	FL	EL96
N4HN	A	6,811	115	49	NC	EM95
KD4MA	A	5,160	112	43	FL	EL88
KI4FIA	A	5,148	89	44	FL	EL99
KI4GZD	A	4,185	99	31	NC	EM95
K4FJW	A	2,886	80	26	VA	EM86
N4DWK	A	2,250	58	30	VA	FM17
KI4AOC	**A**	**1,395**	**40**	**31**	**SC**	**EM92**
K4ZDO	A	1,248	41	24	VA	FM08
K4FTO	A	1,197	40	21	VA	FM18
AA4ZZ	A	1,188	42	22	NC	EM95
KE4YYD	A	768	25	16	FL	EL79
KU4VQ	A	741	27	19	FL	EL99
N4AVM	A	713	28	23	NC	FM05
K9TWP	A	364	19	14	VA	FM18
KG4NEP	A	345	22	15	NC	EM96
WB4YDL	A	336	22	14	TN	EM56
W4NE	A	160	12	10	SC	EM84
KI4HRF	A	42	6	6	AL	EM64
WN1GIV	**6**	**21,842**	**326**	**67**	**FL**	**EL96**
W4IHI	6	7,774	169	46	FL	EL87
W4GRW	**6**	**6,786**	**174**	**39**	**NC**	**EM96**
K4UTE	6	4,000	100	40	FL	EM90
WK4Y	**6**	**2,850**	**75**	**38**	**VA**	**FM17**
N4MM	6	2,759	89	31	VA	FM09
KD4QIT	6	1,792	64	28	VA	FM17
KU8E	**6**	**1,188**	**54**	**22**	**GA**	**EM72**
N4BAA	6	1,064	38	28	VA	FM16
W4FRA	6	675	27	25	NC	FM15
K4NAU	6	500	25	20	SC	FM02
K4BAI	6	378	21	18	GA	EM72
K3IXD/R	6	12	4	3	SC	FN41
WG4RAY	6	1	1	1	GA	EM73
WB3DPR	6	0	0	0	FL	EL98
W4WJF	**2**	**10,540**	**178**	**31**	**NC**	**EM96**
KU4BP/4	**Q***	**484**	**22**	**11**	**NC**	**EM96**
AK4FL	**Q**	**2,480**	**53**	**31**	**AL**	**EM64**
KR1ST	Q	800	37	20	SC	EM92
N4DXY	**M**	**14,916**	**197**	**66**	**AL**	**EM62**
K4ATM	**M**	**14,120**	**244**	**40**	**NC**	**EM95**
NE0P	A	171	11	9	OK	EM04
NM5M	A	110	15	5	TX	EM13
W5PR	**6**	**1,026**	**54**	**19**	**TX**	**EL29**
KJ5RC	**6**	**1,012**	**44**	**23**	**MS**	**EM42**
KE5ELU	2	40	5	4	AR	EM34
K5QE	**M**	**39,984**	**254**	**112**	**TX**	**EM31**
KG6IYN	**A**	**6,137**	**217**	**19**	**CA**	**DM12**
KC6ZWT	A	1,302	39	21	CA	CM98
KF6YYV	A	1,010	70	10	CA	DM03
KC6SEH	A	152	13	8	CA	CM98
WA6MBL	6	230	46	5	CA	DM03
K6JRA	6	1	1	1	CA	CM87
KQ6EE	**Q***	**590**	**40**	**10**	**CA**	**DM14**
KG6TGI	**Q***	**20**	**5**	**4**	**CA**	**DM13**
K7XC	**A**	**4,329**	**76**	**39**	**NV**	**CN92**
WA7TZY	**A**	**3,186**	**76**	**27**	**WA**	**CN87**
N6KW	A	3,036	87	23	WA	CN87
N7DB	**A**	**1,700**	**60**	**17**	**OR**	**CN85**
KI7JA	A	1,488	54	16	OR	CN85
W7MGC	A	1,360	53	16	WA	CN85
WB7BST	A	1,105	36	17	WA	CN87
KG7P	A	369	27	9	WA	CN87
W7OJT	A	147	11	7	AZ	DM24
K7ZD	A	115	18	5	AZ	DM33
K7MDL	**Q***	**1,064**	**50**	**14**	**WA**	**CN87**
KD7WPJ	Q	6	2	2	UT	DM37
KB8U	**A**	**12,716**	**138**	**68**	**MI**	**EN71**
K8MR	**A**	**1,664**	**45**	**26**	**OH**	**EN91**
KF8QL	A	1,600	42	25	MI	EN72
N8BJQ	A	558	23	18	OH	EN80
W8IDM	A	364	21	14	OH	EN91
K8AB	A	340	21	10	OH	EN91
W8KNO	A	60	6	6	OH	EN91
KG6URI	A	6	2	2	MI	EN82
AJ1M	6	108	12	9	WV	FM08
NF8M	6	54	9	6	MI	EN82
K8GT	6	6	3	2	MI	EN82
KB8UUZ	6	6	3	2	OH	EN91
K8MM	2	182	13	7	MI	EN83
N8XA	Q	96	10	6	OH	EM79
K2DRH	**A**	**74,880**	**435**	**130**	**IL**	**EN41**
K9ZO	A	11,264	127	64	IL	EN50
N9TZL	A	1,122	33	22	IL	EN52
KC9SCH	2	160	10	8	IL	EM59
W9SZ	**Q***	**209**	**13**	**11**	**IL**	**EN51**
K9GY	**Q**	**8,325**	**161**	**37**	**IL**	**FM08**
K9AKS	Q	6,816	99	48	IL	EN41
N9DG	Q	680	24	17	WI	EN53
KØAWU	**A**	**2,542**	**65**	**31**	**MN**	**EN37**
WØOAL	A	497	49	7	CO	DM79
NØPOH	A	315	30	7	CO	DM79
KØNR	A	176	29	4	CO	DM79
KØCF	6	228	19	12	IA	EN41
NØURW	**Q**	**5,088**	**79**	**48**	**IA**	**EN41**
NØUNL	**M**	**2,664**	**53**	**37**	**NE**	**EN10**
WVØH	**M**	**1,130**	**80**	**10**	**CO**	**DM79**

Rover

W4VHF	**80,073**	**445**	**123**	**4**
K9JK	**23,754**	**144**	**107**	**12**
WB8BZK	**20,705**	**136**	**101**	**12**
W4TXS	**16,530**	**146**	**87**	**6**
W4SHG	**10,366**	**101**	**71**	**4**
K9ILT	**6,784**	**79**	**53**	**6**
N6TEB	**2,852**	**60**	**31**	**4**
AA4S	1,980	42	33	4
NE9O	**1,922**	**62**	**31**	**3**
W6KA	1,820	45	26	3
K8DOG	**1,421**	**33**	**29**	**3**
N7EIE	**1,365**	**39**	**21**	**6**
K1DS	880	34	20	
W4YOE	336	23	12	

CANADA

VE3KZ	**A**	**7,008**	**120**	**48**	**ON**	**FN03**
VE3SPW	A	966	34	21	ON	FN04
VE3CRU	**6**	**1,344**	**56**	**24**	**ON**	**FN03**
VA3TSG	6	1,175	47	25	ON	FN03
W1AJT/VE3	6	874	38	23	ON	FN04
VO1AU	6	180	15	12	NL	GN37
VE2DC	2	84	7	6	QC	FN35

MEXICO

XE2ED	**A**	**2,226**	**109**	**14**	**DM12**
XE2K	**A**	**216**	**16**	**9**	**DM22**
XE2AT	**R**	**364**	**26**	**7**	**4**

PUERTO RICO

NP3CW	**A**	**90**	**12**	**5**	**FK68**

TURKS & CAICOS ISLANDS

VP5JM	**6**	**13,157**	**223**	**59**	**FL31**

AFRICA
MADEIRA IS.

CQ3A	**M**	**71,278**	**443**	**157**	**IM12**

EUROPE
BALEARIC IS.

EH6VQ	**6**	**22,890**	**210**	**109**	**JM19**

BULGARIA

LZ2UZ	**6**	**9**	**3**	**3**	**KN33**

CROATIA

9A1DL	**6**	**924**	**33**	**28**	**JN95**

UK BASES/CYPRUS

ZC4LI	**6**	**4,290**	**78**	**55**	**KM64**

CZECH REPUBLIC

OK1KZ	**A**	**756**	**32**	**14**	**JO70**
OK1KIM	**M**	**293,940**	**822**	**287**	**JO60**
OK1KDO	**M**	**3,726**	**81**	**23**	**JN69**

ENGLAND

G0MTN	**Q***	**168**	**12**	**7**	**IO92**

FRANCE

F6IFR	**M**	**18,837**	**207**	**91**	**JN09**

GERMANY

DL2OM	**6**	**8,509**	**127**	**67**	**JO30**
DK5DQ	**2**	**39,960**	**333**	**60**	**JO31**
DG3XA	**2**	**13,692**	**163**	**42**	**JO43**
DH8BQA/P	**Q***	**270**	**15**	**9**	**JO30**

IRELAND

EI2JD	**6**	**2,590**	**74**	**35**	**IO53**

ITALY

IQ2GM	**M**	**36,480**	**223**	**114**	**JN44**
IV3ZLT	**M**	**1,302**	**36**	**31**	**JN65**

MACEDONIA

Z36W	**6**	**9,720**	**135**	**72**	**KN11**

NETHERLANDS

PE2TET	**6**	**143**	**13**	**11**	**JO32**

POLAND

SQ6ELV	**A**	**7,844**	**110**	**53**	**JO80**
SP6MLK	**6**	**1,428**	**42**	**34**	**JO80**

PORTUGAL

CT1DHM	**6**	**21,111**	**227**	**93**	**IN61**

ROMANIA

YO3CZW	**6**	**238**	**17**	**14**	**KN34**

SLOVAKIA

OM5MX	**2**	**1,952**	**51**	**16**	**JN98**

SLOVENIA

S51CK	**6**	**15,879**	**201**	**79**	**JN76**
S57S	**Q**	**100**	**10**	**10**	**JN76**
S56PBZ	Q	1	1	1	JN76

SWEDEN

SA1A	**6**	**168**	**14**	**12**	**JO97**
SM1TDE	6	1	1	1	JO97

SPAIN

EH2ARD	**6**	**31,784**	**274**	**116**	**IN93**
EH3ATO	**6**	**4,536**	**84**	**54**	**JN02**
EH5HT	**6**	**3,822**	**78**	**49**	**IM98**
EH5GLN	**6**	**3,332**	**68**	**49**	**IM98**
EA3FM	**6**	**2,145**	**55**	**39**	**JN11**
EH1ATQ	**6**	**238**	**17**	**14**	**IN73**
EA1TI	**2**	**416**	**16**	**13**	**IN73**

TURKEY

TA2RC/P	**6**	**13,398**	**174**	**77**	**KN50**
TA2MW/P	**2**	**518**	**37**	**7**	**KN50**
TB1CAK	2	84	14	3	KN41
TA1BM	2	70	7	5	KN40
TA2RX	**Q***	**108**	**18**	**3**	**KN40**
TA7KA	**M**	**3,154**	**83**	**38**	**KN91**

UKRAINE

UR5QU	**6**	**6,667**	**113**	**59**	**KN77**
UX8FF	**6**	**5,280**	**88**	**60**	**KN45**
UT7U	**6**	**2,911**	**71**	**41**	**KO40**
UX8IR	**6**	**918**	**34**	**27**	**KN87**
UT2UB	**6**	**616**	**28**	**22**	**KO50**
US9QA	6	589	31	19	KN77
UR5FAV	6	374	22	17	KN45
UY5ZZ	6	247	19	13	KN77
UT5UKY	6	48	8	6	KO50
UT7E	**2**	**96**	**16**	**3**	**KN78**

ASIA
JAPAN

JR5XPG	**A**	**1,300**	**46**	**20**	**PM74**
JI7GBI	**A**	**6**	**2**	**2**	**QM08**
JE6GZH	**2**	**2**	**1**	**1**	**PM53**
JH3DMQ	**Q**	**1,003**	**46**	**17**	**PM74**
JH7IMX	**Q**	**6**	**2**	**2**	**QM08**
JA7YCQ	**M**	**12**	**4**	**2**	**QM08**

THAILAND

E20YGG	**2**	**12,782**	**581**	**11**	**OK03**
HS8GLR/9	**2**	**5,688**	**474**	**6**	**OJ07**
HS4DDQ/1	**2**	**5,616**	**234**	**12**	**OK03**
E21YDP	**2**	**4,224**	**132**	**16**	**OK03**
HS4FHT	**2**	**2,808**	**117**	**12**	**OK16**
HS6MCB	**2**	**2,790**	**93**	**15**	**OK05**
HS6TUX	**2**	**2,136**	**89**	**12**	**NK96**
HS1VSB	**2**	**1,656**	**69**	**12**	**OK16**
HS2WPJ	**2**	**1,250**	**125**	**5**	**OK03**
HS4BPQ/9	**2**	**1,056**	**132**	**4**	**OJ06**
HS5AYQ	**2**	**918**	**51**	**9**	**NK98**
E21EIC	**2**	**870**	**87**	**5**	**OK03**
E20WGQ	2	840	60	7	OK03
E20FWF	2	810	135	3	OK03
HS5IGY	2	760	95	4	NK98
HS3NWD	2	738	123	3	OK03
HS7ZSX	**2**	**700**	**70**	**5**	**NK92**
E20YLM/4	2	656	41	8	OK16
E22KY	**2**	**500**	**125**	**2**	**OK04**
E20XMG/4	**2**	**480**	**40**	**6**	**OK17**
HS8LWQ	**2**	**480**	**60**	**4**	**NJ99**
E20ZFD	2	380	95	2	OK03
HS8KPM	2	320	80	2	NJ99
HS7QLZ	2	316	79	2	OK03
HS8NVE	2	120	30	2	NJ98
HS0XNO	2	92	23	2	OK03
HS1OVH	2	68	17	2	OK03
HS8KGG	2	28	14	1	OK03
HS1SPX	2	8	4	1	OK03
HS9MBK/P	**Q***	**2,250**	**225**	**5**	**OJ07**
HS8KAY/P	**Q***	**666**	**111**	**3**	**NJ97**
HS0AE	**M**	**21,298**	**463**	**23**	**OK03**
HS1OKQ	**M**	**15,360**	**512**	**15**	**OK03**
E20HWD	**M**	**13,376**	**418**	**16**	**OK03**
E21WRI	**M**	**11,730**	**345**	**17**	**OK03**
HS1CLE	**M**	**10,972**	**422**	**13**	**OK03**
HS1IB	M	8,708	311	14	OK03
HS0QLS	M	8,088	337	12	OK03
E22TH	M	6,528	272	12	OK03
HS6GPX	**M**	**4,862**	**143**	**17**	**OK06**
HS4MAF	**M**	**4,472**	**172**	**13**	**OK17**
HS2OKK	M	3,276	182	9	OK03
HS9EOW	**M**	**3,136**	**196**	**8**	**NJ97**
HS9PSU	**M**	**2,630**	**263**	**5**	**OJ07**
HS4PRV	**M**	**2,448**	**136**	**9**	**OK16**
HS6GGP	**M**	**1,212**	**101**	**6**	**OK12**
HS5AC	**M**	**656**	**164**	**2**	**NK98**
HS6RMY	**R**	**16,740**	**310**	**27**	**2**
E20MFV	**R**	**13,860**	**385**	**18**	**3**
HS9LPV	**R**	**2,628**	**146**	**9**	**2**
HS3PMT	**R**	**2,496**	**78**	**16**	**5**
HS1JNB	R	128	16	4	2
HS1SPX	R	8	4	1	OK03

On the Cover

Walking into Ron Lawrence's converted two-car garage is like walking into a radio museum. Well, maybe not. Ron, KC4YOY, of Wesley Chapel, North Carolina, probably has a bigger and better collection than most radio museums! To get a full sense of the size of Ron's collection, you'll have to go to his website, <www.radioheaven.homestead.com>, and see the two photos that *CQ* cover photographer Larry Mulvehill, WB2ZPI, shot with his "fisheye" lens. It is truly amazing!

KC4YOY's very rare Clough-Brengle transmitter.

In the photo on our cover, Ron is spinning the tuning dial of his 1934-vintage first-generation National HRO receiver, part of a 1930s-era ham station built around the very rare transmitter on the shelf above. It's a Clough-Brengle model 4581, also built in 1934 and, according to Ron, one of only two known to exist. Ron says Clough-Brengle was a well-known test equipment manufacturer in the '30s, but also built some of these transmitters under contract to the Civilian Conservation Corps (CCC).

"There's a switch on the upper left of the transmitter labeled "Amateur/Official," says Ron, who explains that most of the radio operators recruited into the CCC were hams, coaxed along by permission to operate on the ham bands when off duty, as well as by radios designed to let them do that! While Ron says the HRO receiver is hooked up and working, he has not even tried to put the Clough-Brengle on the air. "I have not transmitted on it," says Ron. "It's a museum piece. To butcher it up to transmit on it would be sacrilege to me." Ron is working on histories of both Clough-Brengle and the use of radio by the CCC. *(Cover photo by Larry Mulvehill, WB2ZPI)*

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Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

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MFJ-1118, $74.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

Two pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

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MFJ-1116, $49.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $34.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

MFJ-1117, $54.95. For powering four HF /VHF radios (two at 35 Amps each and two at 35 Amps combined) simultaneously. Tiny 8x2x3 inches.

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Scientists at the Massachusetts Institute of Technology have been experimenting with viruses that can form critical parts of field-effect transistors. The Lauton Institute has succeeded in using viruses to construct an entire radio transmitter that soon will be sold as a kit.

A CQ Exclusive:

The Next-Generation "Heathkit®"

Biologically-Based Self-Assembly Kits for the Radio Amateur

BY PROFESSOR EMIL HEISSELUFT*
LAUTON INSTITUTE, GROSSMAUL-AN DER DONAU, AUSTRIA

Will wonders never cease? When Heathkit® began selling kits for oscilloscopes, transmitters, and other equipment for the ham shack, the equipment was tube-based and bulky. Today a number of kit manufacturers provide a broad array of miniaturized solid-state products for the radio amateur that are among the most sophisticated available anywhere.

Now the kit-building landscape is about to change again, and this time in a revolutionary way. As described by Professor Emil Heisseluft in this CQ exclusive, the Lauton Institute is launching a line of biologically based transmitter kits that literally assemble themselves. Radio amateurs will be able to say that they are using a kit-based transmitter, for example, without ever having lifted a finger to position a component or solder it to a printed circuit board. Here are the details about this astonishing development.

—W2VU

Late in 2003, a scientist with the Massachusetts Institute of Technology (MIT, Cambridge) predicted that her laboratory "…would have genetically engineered a virus to coat itself in a crystalline semiconductor sheath and locate and bridge two electrodes—thus forming the critical part of a field-effect transistor."[1] This was heralded as but one more example of how nanotechnology is facilitating the development of devices, and even circuits, having dimensions on the order of billionths of a meter. While a large number of institutions—including MIT, DuPont, Dow Corning, and others—have just entered the race to produce electronics, sensors, displays, and other devices using microbes and biomolecules, the Lauton Institute has long been experimenting with viruses and other biomolecules (e.g., peptides and DNA).

**e-mail: <heisseluft.emil@mashuga.orf.ar>*

Professor Heisseluft is back in Austria, where he is working with the U.S. Military's Institute for Collaborative Biotechnologies on testing miniaturized versions of directed evolution laboratories. Mail may be conveniently sent to the professor c/o CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801.

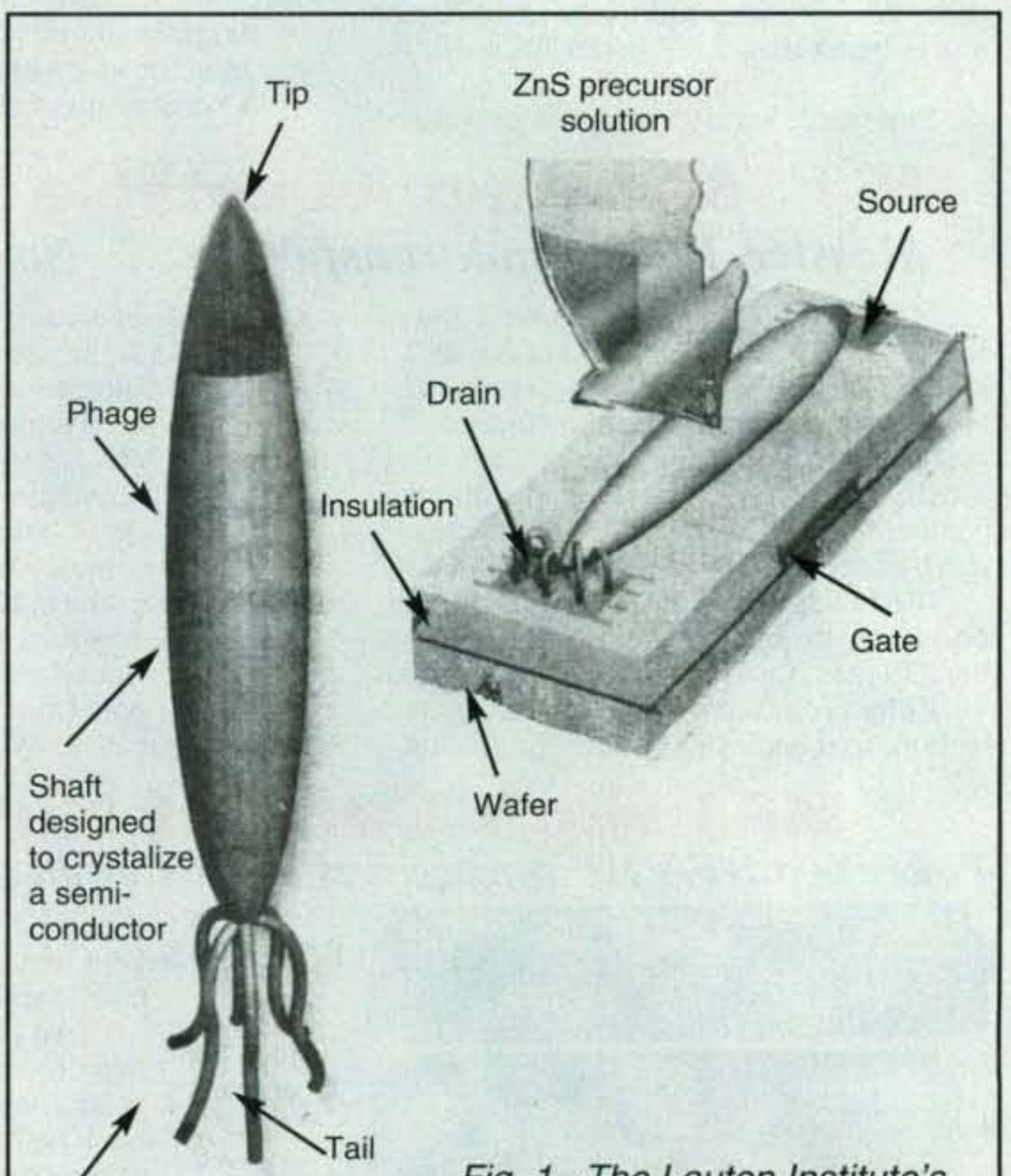

Fig. 1– The Lauton Institute's GERC uses a transistor fabrication process similar to the one used by MIT, but faster than the latter's version. (Modified after P. Fairley, IEEE Spectrum, *November 2003, p. 39)*

Our work now has progressed to the point where we are about to launch our first, complete biologically based kit for a radio transmitter . . . a kit that will assemble itself! However, before I reveal how we accomplished this stunning achievement, it would be good to stop and review how the Lauton Institute became one of the leading research organizations in the field of genetic engineering.

Previous Work in Genetic Engineering

Ironically, the first paper on molecular engineering by the Lauton Institute published in the popular literature was an article that appeared in the April 1982 issue of *CQ* on the *threat* to molecular electronics from microbes produced by genetic engineering.[2] The seminal research on this topic was performed by the institute's prestigious Genetic Engineering and Research Center (GERC), which dates to 1971 and which, by the early 1980s, was recognized as a world leader in the development of new microbes using gene-splicing techniques.[3]

In the years that followed, GERC discovered revolutionary new ways to slow the aging process.[4] The research was paid for by three well-known, high-scoring DXers who had approached me in Dayton in the early 1990s. They offered to fund a research program that would lead to the development of drugs that would extend their lives to the point where they could ascend to and remain at the top of the ARRL DXCC Honor Roll for decades while their competitors died off. These studies continue to this day, and we are making encouraging progress.

So you see, my dear readers, the Lauton Institute has been at the forefront of genetic engineering since the early 1970s. This legacy bodes well for the success of our most recent, and perhaps most daring, experiment—the use of viruses to fabricate the electronic components needed to self-construct an entire radio amateur transmitter from a kit.

Directed Evolution

The process we employ is very similar to the one being used by MIT, although scientists at GERC have been able to accelerate it by a factor of more than a thousand. Called *directed evolution*, the process engineers viruses (called *phages*) such that each part is coated with a different protein. Importantly, the coats on the tip, body, and the end of a virus can be genetically engineered to

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The complete microbe breeding and directed evolution laboratory that comes with the MBDE-241 241-GHz self-constructing transmitter kit (Model 300L Bioreactor photo by Ari)

be different. It is the difference in the coatings that gives the viruses the ability to produce electronic components.

For example, at GERC we have made phages for which the tip and tail had the ability to bind to gold while the shaft was designed to crystallize a semiconductor. The process we used to fabricate a transistor, for example, is described in reference 1 and shown in the fig. 1. As can be seen, we place the virus on a wafer that has gold source and drain electrodes as well as a gate and an insulator. The virus will bind to the gold, forming an elementary transistor channel. (Note that the platform for the device is the wafer.) Then, the chip is submerged in a zinc-sulfide (ZnS) solution, which results in uniform crystals of ZnS forming all along the body of the virus. This crystalized coating is, basically, a nanowire. All that remains to be done is vaporize the virus, leaving the nanowire linked to the gold electrodes and forming a nanotransistor.

The MBDE-241, a 241-GHz Self-Constructing Transmitter Kit

Using this (and other) genetic engineering technologies, GERC has succeeded in developing not only electronic components, but entire electronic systems. In fact, so successful has our work been, that we now are ready to launch our first kit for radio amateurs—a completely bioengineered, self-constructing, 241-GHz transmitter suitable for wideband applications. The kit, designated the MBDE-241, will be a bit expensive at first, costing in the neighborhood of tens of millions of dollars. The reason for this is that the kit purchaser will be required to erect a complete microbe breeding and directed evolution laboratory of the type shown in the accompanying photo before kit assembly can begin. However, as more and more amateurs purchase these products, we expect prices to fall rapidly, and soon the technology will be within everyone's reach.

Summary

Using directed evolution processes, the Lauton Institute not only has been able to coax viruses to self-construct transistors and other electronic components, but also to force them to biologically self-assemble an entire 241-GHz transmitter without the radio amateur having to lift a finger. While the cost of the equipment required to facilitate this process is somewhat out of reach for all but the most affluent operators at this time, the institute is working fast to develop fabrication laboratories that are within the financial reach of all amateur radio operators. ■

Notes

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SS-18	15	18	1⅜ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅜	4.2
SS-30	25	30	3¼ x 7 x 9⅜	5.0

MODEL SS-25M

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SS-25M*	20	25	2⅞ x 7 x 9⅜	4.2
SS-30M*	25	30	3¼ x 7 x 9⅜	5.0

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅜	6.5
SRM-30	25	30	3½ x 19 x 9⅜	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅜	6.5
SRM-30M	25	30	3½ x 19 x 9⅜	7.0

MODEL SRM-30M-2

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30-2	25	30	3½ x 19 x 9⅜	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅜	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

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GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
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SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
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SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

What You've Told Us...

Our January survey asked your views on the FCC's proposal to eliminate all code testing for amateur licenses, but to make no other changes in license requirements or operating privileges. Responses, as expected, were overwhelming, but there is very little consensus in your views. Our questions looked at each of the major components of the FCC's proposal.

Regarding the FCC plan to eliminate code testing for the General Class license, 21% of you strongly agree, 16% agree, 9% neither agree nor disagree, 21% disagree and 36% strongly disagree. Overall, that's 37% in favor, 57% opposed.

The only real consensus was in opposition to the proposal to eliminate code testing for the Extra Class license, with 76% opposing it and only 21% supporting it. The breakdown was: 15% strongly agree, 6% agree, 5% neither agree nor disagree, 16% agree and 60% strongly disagree.

The FCC's decision *not* to propose a new entry-level license with HF privileges met with mixed reactions, with 21% strongly agreeing, 16% agreeing, 15% with no opinion, 21% opposing and 28% strongly opposing. Responses were even more evenly split to the FCC's decision to keep operating privileges as they are even if code test requirements are approved, with 20% in strong agreement, 22% agreeing, 14% having no opinion, 22% disagreeing and another 22% strongly disagreeing.

Most of you disagree with making the General Class the default entry level license for HF operating, with 14% strongly agreeing, 15% agreeing, 12% unsure, 25% disagreeing and 36% strongly disagreeing.

Finally, we asked how you feel about giving all Technicians the limited HF privileges now given to Techs who pass their code tests, if the code test is eliminated. A bare majority approve, with 25% strongly agreeing, 29% agreeing (54% total), 15% undecided, 12% opposing and 25% strongly opposing (37% total).

This month's free subscription winner is Jack Phifer, W4RTW, of Mooresville, North Carolina.

Reader Survey
April 2006

We'd like to know more about you—about who you are, where you live, what kind(s) of work you do, and of course, what kinds of amateur radio activities you enjoy. Why? To help us serve you better.

Each time we run one of these surveys, we'll ask a few different questions and ask you to indicate your answers by circling numbers on the Survey Card and returning it to us. As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

This month we'd like to know the extent, if any, of your participation in emergency planning for your company or community.

Please answer by circling the appropriate numbers on the reply card.

1. Are you currently involved in emergency or disaster planning for your company or community?
Yes 31
No 32

2. If you answered "no" to question 1, have you been involved in such a role in the past?
Yes 33
No 34

3. If you answered yes to either question 1 or question 2, what is the nature of your involvement? (Circle all that apply)
Company - Senior management 35
Company - Emergency management committee 36
Company - Fire warden/floor marshal 37
Company - Other 38
Community - Elected official 39
Community - Local Emergency Planning Council 40
Community - Emergency service professional 41
Community - Volunteer firefighter/ambulance 42
Community - CERT volunteer 43
Community - Other 44
No involvement 45

4. Are you involved in the planning, design or implementation of emergency or disaster-related communications systems for your company or community *beyond ham radio*?
Yes - Company - Planning 46
Yes - Company - Design 47
Yes - Company - Implementation 48
Yes - Community - Planning 49
Yes - Community - Design 50
Yes - Community - Implementation 51
No 52

5. Do you feel that your amateur radio training and/or experience has helped you in communications system planning &/or emergency response planning beyond amateur radio?
Yes - Communications system planning 53
Yes - Emergency response planning 54
No 55
Not involved 56

6. Do you have a family emergency plan?
Yes, regularly reviewed and updated as needed 57
Yes, but not recently reviewed or updated 58
No 59
Don't know what that is 60

Thank you very much for your replies. We'll be back next month with more questions.

The ARD9000 makes Digital Voice FUN and AFFORDABLE!

Hearing is Believing!

Digital voice could be the biggest revolution in HF radio since SSB! All over the world, hams have been discovering how much fun it is to work HF without background noise.

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AOR's digital voice technology delivers audio quality you have to hear to believe. Whether you are working digital voice across state lines or across an ocean, amazing doesn't seem strong enough to describe it.

With an ARD9000, it's easy to convert existing HF analog transceivers to work digital voice with NO transceiver modifications. The ARD9000 automatically detects a digital signal and decodes it, so you also maintain full analog capabilities. Whether a contact comes in as digital or analog, the ARD9000 can handle it.

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You'll be amazed at how much fun it is to work ham radio in digital voice mode.

- NO transceiver modifications necessary
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In the woods or on the streets, fun and adventure with radio direction finding (RDF) await you . . . medals, too! Get started during CQ's National Foxhunting Weekend.

It's Radio Foxhunting Season

BY JOE MOELL,* KØOV

Mention "foxhunting" to most people, and their thoughts will turn to hounds, horses, furry creatures, and a sport that's banned in Britain. Mention it to ham operators, and most will think of tracking radio transmitters. Far from being banned, it's greatly encouraged by amateur radio and government leaders here and abroad, because it provides training for volunteer enforcement and public service. It enhances international goodwill, as well.

As spring weather warms the country, foxhunting activities are picking up again. CQ is encouraging it for the ninth year by sponsoring the National Foxhunting Weekend (NFW). On or around May 13–14, hams around the country will hold RDF contests of all kinds.

A Champion in Your Club?

Some clubs prefer foxhunting in vehicles (T-hunting), others like it on foot, and still others try some sort of combination. For fans of all-on-foot hunting, there are internationally recognized rules and guidelines that make national and multinational competitions possible. It started in Europe over three decades ago and in summer 2001, hams from ten states and three foreign countries gathered in Albuquerque, New Mexico for the USA's first national championships. It's been an annual and growing tradition ever since.

International-rules foxhunting—also called foxtailing, radio-orienteering, and ARDF (amateur radio direction finding)—is coordinated by the IARU (International Amateur Radio Union). Over two dozen countries hold national championships of their own, leading up to the ARDF World Championships in even-numbered years.

The Sixth USA ARDF Championships will be April 7–9, 2006 at William B. Umstead State Park near Raleigh, North Carolina. The fun gets under way on Friday afternoon with practice and equipment checkout sessions, followed on Saturday by the main 2-meter competition and on Sunday by the 80-meter event. The big forest site is right next to Raleigh/Durham airport.

Whether you are an expert or you have never finished a formal radio-orienteering course before, USA's ARDF Championships are open to you. Senior citizens need not worry about trying to compete against teenagers. Equal medals for first, second, and third place are awarded in five separate age categories for OMs from under 18 to over 60. There are four similar age categories for YLs.

Surplus ammunition boxes make great waterproof enclosures for unattended fox transmitters (and decoys, too). With room inside for a handie-talkie, controller/timer, and a big battery, they are suitable for both mobile and on-foot transmitter hunts. (Photo by Joe Moell, KØOV)

**ARRL ARDF Coordinator, P.O. Box 2508, Fullerton, CA 92837*
e-mail: <homingin@aol.com>
web: <www.homingin.com>

An ordinary baseball bat and glove? Actually, there's a hidden transmitter inside this bat! Tony Boegeman, WA6ZMZ, and Joe Loughlin, KE6PHB, put transmitters in a bat, a flower pot, and a sprinkler vault for a foxhunt in San Diego. (Photo by Tom Sneden, KE6VCR)

This year's organizers are Charles (NZ0I) and Nadia Scharlau of Chapel Hill, North Carolina. Both have been consistent medal winners at previous USA Championships. They attended the World Championships in 2002 and 2004, where Nadia was among the top six finishers in her category on one band each time.

At the official 2006 USA ARDF Championships website (http://www.ardf.us) you will find more on the schedule, lodging, food, transportation, and hunt site, which is off limits to participants until the day of the hunt. Advance registration is a must, so don't delay.

Foxboxes for international-rules ARDF competitions must be in plain sight along with a flag and scoring punch, either electronic or manual. The goal is to find the optimum route to all foxes and the finish line (sometimes several miles), so concealment is unnecessary. Here Sam Vigil, WA6NGH, is "punching in" at a southern California radio-orienteering event. (Photo by Eve Vigil, KF6NEV)

World Championships in LZ1

Besides taking home medals, the USA's best radio-orienteers in each age/gender category will receive an opportunity to represent the USA at the next ARDF World Championships (WCs), which begin September 12 in Bulgaria. This will be the fifth year that stateside foxhunters have competed in the WCs.

The Bulgarian Federation of Radio Amateurs (BFRA) is hosting this year's WCs. The gathering place will be Primorsko, a resort village on the Black Sea coast, about 32 miles southeast of the port city of Burgas and 255 miles east of Sofia, the capital. Team USA members will touch down in Europe; travel to Sofia, Varna, or Burgas by air or rail; and then be transported by the organizers to the host town.

A three-star hotel located only 50 yards from the beach will house the WC competitors. On Wednesday, September 13, the Bulgarians will have ARDF training events on both bands, followed by a gala opening ceremony. These ceremonies traditionally include a parade of the competitors, entertainment, and a welcome by local and national dignitaries.

Thursday starts early as everyone boards buses to be taken to an undisclosed location for the first big competition. The terrain will be wooded and hilly, with deep gullies. Some categories will compete on 2 meters and the rest on 80 meters. Friday will be a day of rest with an optional excursion. The second competition in a different venue and on a different band for each category will be Saturday, followed by the closing ceremony and banquet.

If the 2006 WCs are typical, Team USA will face over 300 competitors from over 25 European and Asian nations. WC entrants are divided into the same age/gender categories as in North Carolina. Each country may have a maximum of three persons per category on its team. The USA's team roster will be finalized in May and June. Team USA members and visitors are responsible for their own WC entry fees, as well as transportation expenses to and from Bulgaria.

It's not too late to put in your name for

These radio-orienteers represented the USA at the 2004 ARDF World Championships in the Czech Republic. Back row, left to right: Nadia Scharlau; Charles Scharlau, NZ0I; Bob Cooley, KF6VSE; Jerry Boyd, WB8WFK; Vadim Afonkin; Richard Thompson, WA6NOL; George Neal, KF6YKN; Bob Frey, WA6EZV; Csaba Tiszttarto; Dick Arnett, WB4SUV; and Matt Robbins, AA9YH. Front row (l. to r.): Jay Thompson, W6JAY; Karla Leach, KC7BLA; Harley Leach, KI7XF; and Jay Hennigan, WB6RDV. Who will be on the 2006 team? (Photo by Charles Scharlau, NZ0I)

Team USA 2006 consideration. The three categories for males age 40 and over already have at least three candidates, but more are welcome. Team USA selection in "overbooked" categories will be based on performances and standings in last year's national championships in Albuquerque and this year's championships in Raleigh.

The categories for males under 40 and for all females still have fewer than three as of this writing, so it may be possible for inexperienced radio-orienteers in these categories to join the team. One may also attend as a non-competing visitor, but the USA's visitors must be included on the national team roster.

If you are interested in traveling to the WCs as a member of Team USA or as a USA visitor, please contact me now via e-mail (homingin@aol.com). My "Homing In" website (www.homingin. com) has details on Team USA formation as well as information on how hams in other countries can join their national teams. This site also has lots of basic information about mobile and on-foot foxhunting, including ideas for local hunts and equipment.

Make Your Own Rules

For many clubs, the National Foxhunting Weekend kicks off a season of regular transmitter hunts. For others, it's a once-a-year event, like Field Day. It's often accompanied by a picnic or barbecue. *CQ* doesn't impose any rules or offer any prizes for the NFW. That's up to you and your fellow hometown hams. You don't even have to schedule it on May 13–14. Any weekend in the spring will be fine!

Some hams like formal transmitter hunts with carefully crafted boundaries, specifications for signal parameters, time limits, and so forth. Others are completely content just by having one or more signals to hunt—no need for any regulations, they say.

All you need to put on a starter mobile T-hunt is a willing volunteer with a 2-meter radio. That's you? Good! Find an unusual location and start transmitting at the appointed hour. A good time for your club's first hunt is on a weekday evening right after a net, when listenership is high.

From your hiding place, make frequent transmissions on the repeater input, urging every listener to get in the car and participate. Declare small boundaries, such as a county or part of it. After a while, you might help hunters by announcing smaller boundaries or giving other clues.

The first mobile T-hunts should be easy enough such that everyone is successful and encouraged. The signal should be strong and the transmitter should be in plain sight, perhaps in the parking lot of a restaurant or on a table in a city park. Give them a challenge, but not an impossible task. With a few short hunt successes, they will be eager to try longer range hunts.

If an all-on-foot hunt is your club's choice, be sure that the kids, grandkids, nieces, and nephews of all members are invited. They don't need driver's licenses or ham licenses to receive and hunt. It's a great way to show them that ham radio is more than HTs, computers, and QSL cards.

Whatever your club's RDF contest style, just be sure to make it safe, make it fun, and make it happen on or around the second weekend of May. Afterwards, write up the results and send them to me for a future *CQ* article. The list of items in a complete report is posted at my website. Besides the details of date, location, hiders, and winners, readers also want to know what was unique about your hunt and what lessons (positive and negative) you learned from it.

In next month's *CQ*, I'll be back with stories and photos from last year's NFW, which should give you plenty of ideas for challenging and inventive hunts in your town. Start talking up the NFW and making plans for your own club's participation. Happy Hunting! ■

MFJ *Speech Intelligibility* Enhancer

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On the other hand, the low frequencies, 125 to 500 Hz have most of the speech energy (55%) but contribute very little to intelligibility -- only 4%.

To dramatically improve your ability to understand speech, you must:

First, drastically increase the speech energy above 500 Hz, where 83% of the speech intelligibility is concentrated.

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A balance control and separate 2½ Watt amplifiers let you equalize perceived loudness to each ear so both ears help.

By boosting high and cutting low frequencies and adjusting the balanced control, speech that you can barely understand become highly understandable!

Even if you *don't* have high frequency hearing loss, you'll dramatically improve your ability to understand speech. You'll get an edge in contesting and DXing and enjoy ragchewing more.

Here's what *QST* for April, 2001 said . . . *"I expected a subtle effect at best, but I was astonished . . . The result was remarkably clean, understandable speech without hissing, ringing or other strange effects . . . made a dramatic improvement . . ."*

Immuned to RFI. Has phone jack, on/off speaker switch, 2 inputs, bypass switch. 10Wx2½Hx6D". Needs 12 VDC.

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Transformer-coupled -- No RFI, hum or feedback . . . 75 seconds total, 5-messages . . . Records received audio . . .

MFJ-434
$179.95

Let this *new* microprocessor controlled MFJ *Contest Voice Keyer*™ call CQ, send your call and do contest exchanges for you in your own natural voice!

Store frequently used phrases like "CQ Contest this is AA5MT", "You're 59" . . . "Qth is Mississippi" . . . Contest by pressing a few buttons and save your voice.

Record and play back five natural sounding messages in a total of 75 seconds. Uses *eeprom* -- no battery backup needed.

You can repeat messages continuously and vary the repeat delay from 3 to 500 seconds. Makes a great voice beacon and calling CQ is *so* easy.

You can also record and play back off-the-air signals -- great help if you didn't get it right the first time! No more "*Please repeat*".

A playing message can be halted by the *Stop Button*, your microphone's PTT/VOX, remote control or computer.

Has jack for remote or computer control (using CT, NA or other program). Lets you select, play and cancel messages.

Your mic's audio characteristics do not change when your MFJ-434 is installed.

All audio lines are RF filtered to eliminate RFI, audio feedback and distortion. An audio isolation transformer totally eliminates hum and distortion caused by ground loops.

It's easy to use -- just plug in your 8 pin mic and plug the MFJ-434 cable into your transceiver. Internal jumpers let you set it to your rig. Use your mic or its built-in mic for recording.

Built-in speaker-amplifier. Speaker/phone jack. Use 9 Volt battery, 9-15 VDC or 110 VAC with optional MFJ-1312D, $14.95. 6½Wx2½Hx6½D in.

MFJ-73, $29.95. MFJ-434 Remote Control with cable.

60 dB Null *wipes out* noise and interference

MFJ-1026
$179.95

Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

Eliminate all types of noise -- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies, lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

It's *more effective* than a noise blanker! Interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and frequences from BCB to lower VHF.

You can null out strong QRM on top of weak rare DX and then work him! You can null out a strong local ham or AM broadcast station to prevent your receiver from overloading.

Use the MFJ-1026 as an *adjustable phasing network*. You can combine two antennas to give you various directional patterns. Null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

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MFJ-1026 less built-in active antenna, use external noise antenna.

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You can continuously *tune* low pass, high pass, notch and bandpass filters and continuously *vary* bandwidth to pinpoint and eliminate interference.

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math's notes

A Technique for Recovering Very Weak Signals

BY IRWIN MATH,* WA2NDM

This time (in keeping with the month) we would like to present a "new" technique that could easily revolutionize communications where weak signals are concerned. As everyone knows, noise limiters, DSP processing, and the like all are valuable tools in helping us deal with signals that are in the signal-strength area of less than S1, but what about signals that are so weak that they are not normally detectable at all? Is there hope? We believe that we have an answer.

Fig. 1 is a drawing of what a spectrum analyzer might display when a normal signal along with a small amount of noise is applied. In this case we have used a single carrier (to avoid confusion). However, modulated carriers would look similar, but with various sidebands as well. The signal shown here is probably in the area of S8 or S9. The noise amplitude is so low in comparison to the level of the signal that the signal sounds perfect.

Now as the signal gets weaker and weaker, we progress to fig. 2. Here we have an S1 signal that, as you can see, is just about at the noise level. Since there is still some signal, we still have a chance, although deciphering it can be an ordeal.

Consider fig. 3, however. Now the signal (shown by dotted lines) has dropped below the noise level, and if we listen, we hear nothing but a hiss, which is what random noise usually sounds like. If we could somehow eliminate (or at least reduce) the noise level, we would be in business. This is exactly what our technique does.

Fig. 4 is a block diagram of the system, which is comprised of three transistors (Q1, Q2, and Q3) and three op-amps (A1, A2, and A3). Q1 controls the input to the receiver; Q2 the state of A1, the channel 1 amplifier; and Q3, the state of A2, the

*c/o CQ magazine

Fig. 1– Normal S8 or S9 received signal.

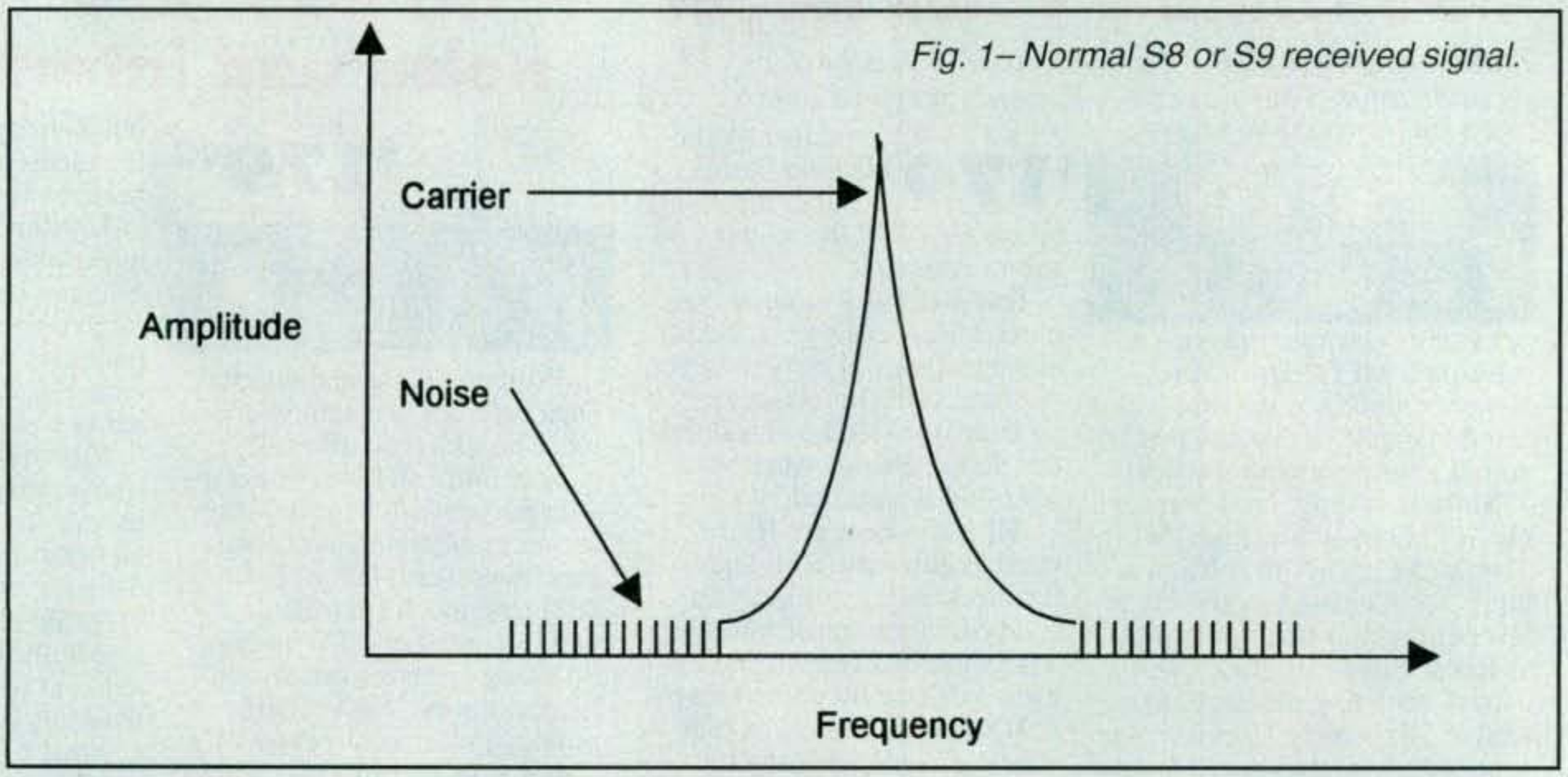

Fig. 2– Normal S1 received signal.

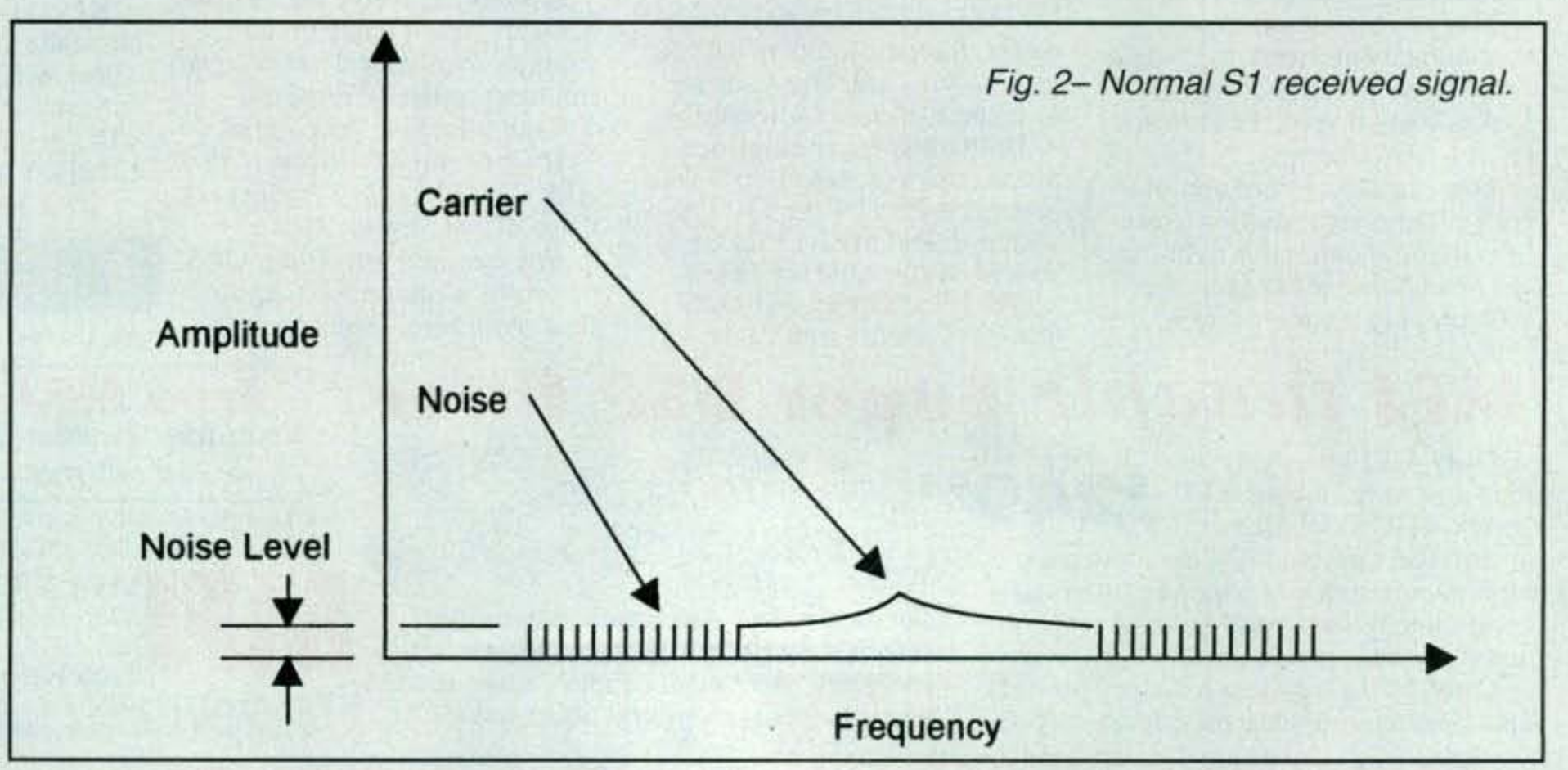

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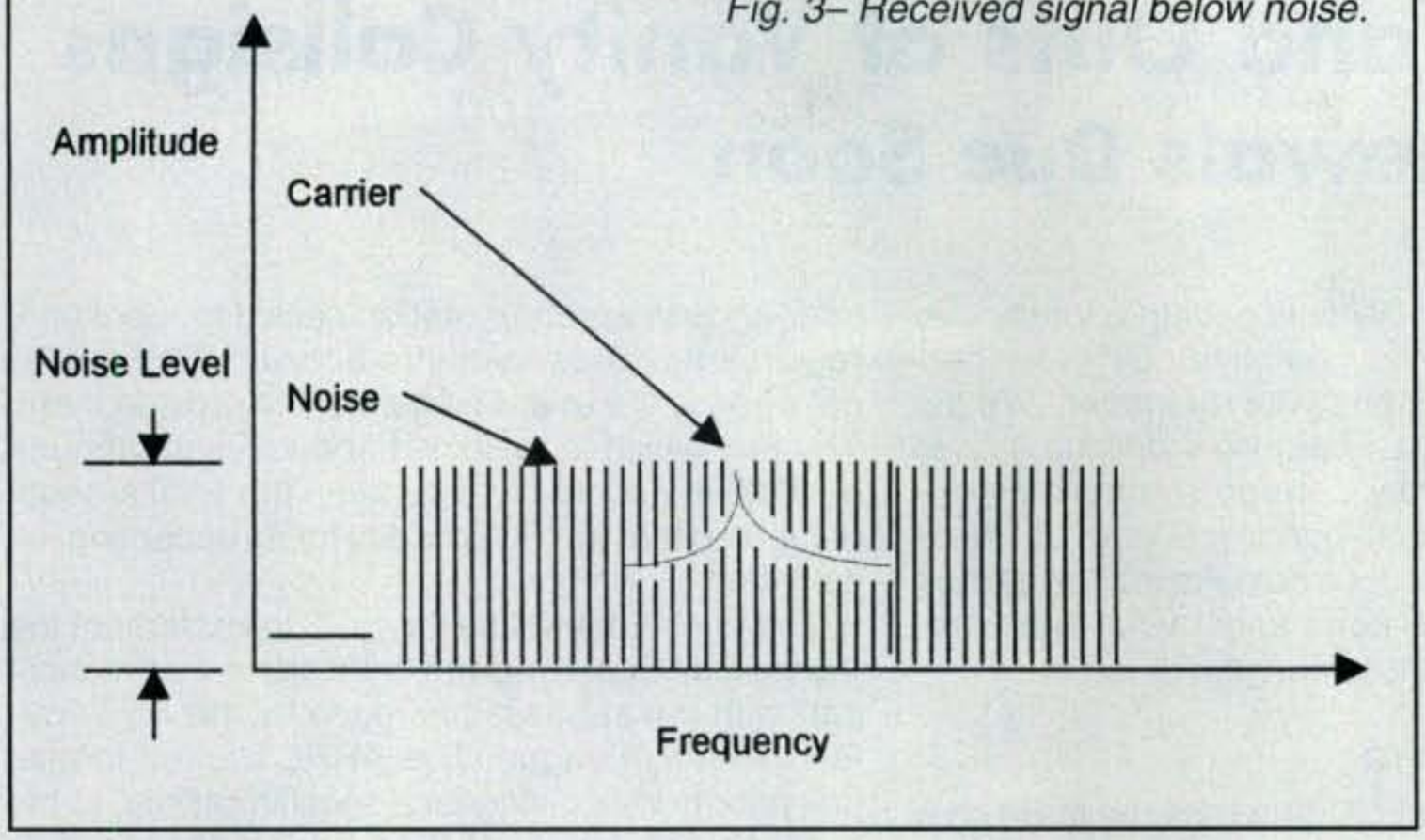
Fig. 3– Received signal below noise.



channel 2 amplifier. All three transistors are in turn driven by the output of an oscillator, OSC 1. When Q1 and Q2 conduct, Q3 is cut off, and when Q1 and Q2 are cut off, Q3 conducts. When both Q1 and Q2 are cut off, RF from the antenna (at the input to the receiver) is passed through a 50-ohm load and then through the normal receiver RF/ IF/Detector chain. Audio output is then passed through channel 1 in the normal manner and appears at the output of the channel (A1). This output we will call {signal + noise}. At the same time, Q2 is conducting, so the output from channel 2 (A2) is zero, since its input is shorted.

Now consider what happens when Q1 and Q2 conduct and Q3 is cut off. The output from the receiver is now only noise (since Q1 is shorting the input), and the output of channel 1 is zero (since Q2 is shorting its input). However, at this time Q3 is cut off, so the output from channel 2, which can now amplify, is simply {noise}. Next, both the {signal + noise} output from channel 1 and the {noise} output from channel 2 are connected to a differential amplifier, A3, which neatly subtracts one from the other according to the following relationship:

{signal + noise} – {noise} = signal

The result is the recovered signal.

If the speed and duty cycle of the oscillator are varied, the ratio of signal to noise reduction will also vary, and optimum results can be obtained with all types of signals from AM to FM to SSB by the proper adjustment. The frequency of the oscillator, however, should be at least 2 to 10 times faster than the expected maximum modulation frequency of the detected signal. If the oscillator is too slow, portions of the signal that occur during the "noise"-channel interval will be lost, resulting in distortion.

The accuracy of this system is not ideal. Since there is a finite time interval between the {signal + noise} portion and the {noise} alone portion, and since noise itself is random in nature, cancellation (of noise) will never be truly perfect. With careful adjustment of the oscillator's frequency and duty cycle, though, it should be easy to "pull" signals that are least 10 to 20 times below the noise up to levels that can be cleaned up by more conventional methods. Obviously, such an approach needs a lot of additional experimentation, but the description given here it is a very good place to start.

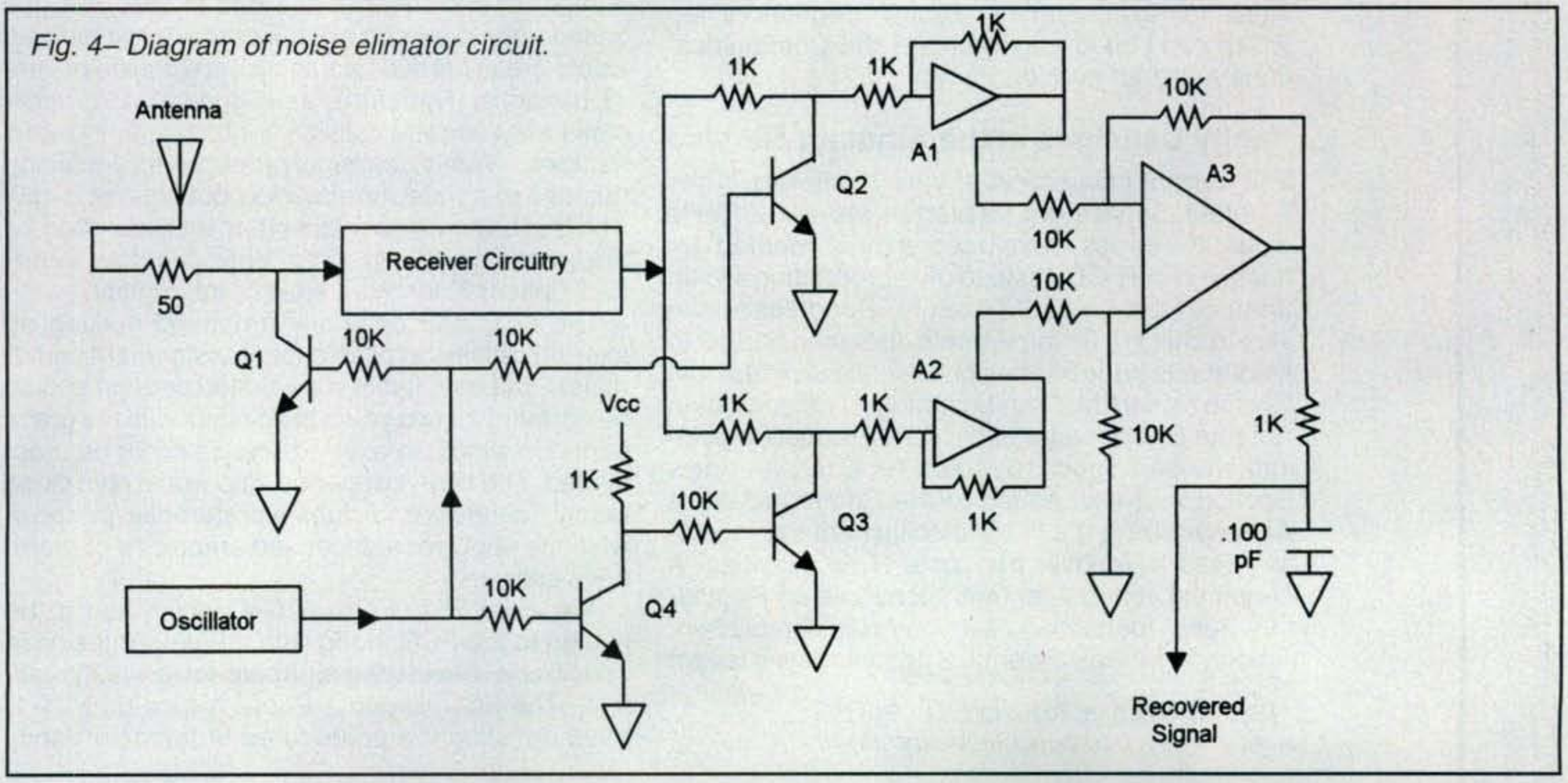
Since the beginning of April is usually filled with all sorts of non-conventional noise, we could not think of a better project than noise reduction at this time. Please let us know of your results.

73, Irwin, WA2NDM

February Column Correction

Please note that the indicator LEDs in the automotive circuits were inadvertently drawn backwards. Reverse the polarity and all will be okay. Also, the output of fig. 1 will be 0.7 volts less than the base voltage, so you might wish to add a silicon diode such as a 1N4148 in series with the zener. This will not only give the correct output voltage, but will add some temperature stability as well.

Fig. 4– Diagram of noise elimator circuit.



BY FREDERICK O. MAIA,* W5YI

The Ins and Outs of Vanity Callsigns
First Renewals Due Soon

A reader writes, "Why is getting a vanity station callsign so complicated?" We thoroughly understand your frustration! We get dozens of comments about how difficult it is to understand the vanity callsign program procedures. It appears that hundreds (maybe thousands) of radio amateurs would like to change their station callsigns but don't know where to start. Let's try to sort out the problem.

Some Background

There are really two FCC proceedings that come into play here. Both took place in the mid-1990s. First, many of the complicated underlying rules are a result of comments and suggestions received from the amateur community when the FCC was adopting the vanity callsign ground rules.

Second, the Commission completely overhauled the way it handles applications and licensees in all radio services. The procedures are lengthy and can be very confusing, especially to long-term amateurs who were familiar with the old FCC forms, procedures, and application-handling system.

The first vanity callsign was issued exactly ten years ago, and the first renewals will be coming due next month, in May of 2006. The renewal of a vanity callsign must necessarily include payment of another regulatory fee—currently $2.19 a year, or $21.90 for another ten years. The ARRL believes that a one-time fee, rather than a recurring charge, is more appropriate, because the Commission's additional workload occurs at the time of the initial processing of the vanity callsign. The FCC points out that the enabling legislation provides for a continuing "annual" regulatory fee which can't be changed unless the Communications Act is amended.

Vanity Callsigns in the Amateur Service

The current incarnation of vanity callsigns in the Amateur Service got its start in the early 1990s when Congress developed a new method for financing the FCC. Instead of appropriating a fixed amount from the US Treasury, Congress's plan was to shift the Commission's operating budget to the various beneficiaries of its services. President Clinton signed the Omnibus Budget Reconciliation Act (the official name of his deficit reduction plan) into law on August 10, 1993. As a result, a new Section 9(a) was added to the Communications Act authorizing the FCC to collect annual regulatory fees to recover the costs of its activities. A beginning reimbursement "Schedule of Regulatory Fees" for its many services was established. Among them was the annual administrative fee for user-chosen amateur station callsigns. Section 9 requires that fees take into account the benefits provided to the user and the cost to provide them. The fee, which is reviewed and adjusted annually, also takes into consideration the total amount of funding that the FCC needs for its upcoming fiscal year.

The rules adopted by the FCC to implement the Vanity Call Sign Program went along for the most part with the suggestions made by the American Radio Relay League. The ARRL wanted to give first priority in applying for a specific callsign to the former holder, or where the holder is deceased, to a close relative. Many amateurs favored giving higher priority to those who held the higher classes of operator license; some thought priority in selecting a callsign should be given to those who have held their licenses the longest.

The ARRL's suggested method was to open the system gradually through four "starting gates." Gate One would allow a previous holder to apply for that callsign, or where the holder is deceased, a close relative (or the deceased member's club) could apply. Gate Two would allow Amateur Extra Class operators to apply for any available callsign, subject to certain restrictions. Gate Three would allow Advanced Class operators to apply for certain available 2×2, 1×3, and 2×3 callsigns. Gate Four would open the system to any licensee. The FCC adopted the League's proposal.

The League also suggested that an applicant be permitted to submit a preferential list of up to 25 callsigns selected from the callsign region where the licensee resides. The FCC went along with the number of choices, but declined to limit callsigns based upon a person's place of residence, since it would greatly reduce an applicant's choice of vanity callsigns. Therefore, as a general rule, applicants may select a callsign containing any district number. Vanity callsign applicants, including trustees of amateur clubs, may not choose a callsign that has a format higher than that permitted for the license class held. (See "What Are Your Vanity Call Options?" for more specific information.)

The FCC had originally proposed making an expired callsign available for reassignment immediately, but decided that a vacated callsign should be dormant for two years to coincide with the grace period in which an expired license could be reactivated. The two-year period also would give close family members and clubs a preferential period in which to apply for a deceased amateur's or member's callsign.

A special FCC Form 610-V, which had to be mailed to the FCC along with the proper fee, was specifically developed to apply for a vanity callsign. The FCC issued a Public Notice on May 1, 1996 detailing the procedures of the new Vanity

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Call Sign System, and the program was off and running. The beginning annual regulatory fee was $3 a year, or $30 for a ten-year license term. A special address was established at a bank in Pittsburgh, Pennsylvania to receive vanity application packages.

The first vanity callsign "starting gate" opened to previous callsign holders and close relatives of deceased amateurs on May 31, 1996. Two months later Gate "1-A" opened to club stations wishing to obtain the callsign of a deceased member. The last starting gate, Gate 4, opened in December 1998.

Universal Licensing System

It was not only the suggestions of the amateur community and the resulting FCC guidelines that made the vanity callsign application process confusing. Just as the final vanity callsign gate was opening, the FCC completely overhauled its handling of all wireless applications and licensee databases. The order implementing a new Universal Licensing System (ULS) came out in late 1998. The separate amateur radio station database was dumped into a master integrated database that included all FCC licensees in all wireless radio services.

The objective of the new automated licensing system was to facilitate the electronic filing of all applications—including vanity callsigns—and to provide access by the public to all licensing information for all wireless radio services. In a nutshell, ULS completely changed the way the Commission received and processed all applications. It was a major undertaking. For the first time, all wireless applicants and licensees would be able to file their own licensing-related applications and other filings using their personal computer, thus increasing the speed and efficiency of the application process.

The new Universal Licensing System began operation in 1999 and with it came new application forms which could be used for multiple radio services. Forty existing forms used by the various radio services were replaced by only four. FCC Form 605 was not only to be used by the Amateur Service, but by the Ship, Aircraft, General Mobile Radio Services, and Commercial Radio Operators as well. Amateurs were instructed to use a new Schedule "D" in conjunction with the main Form 605. Other services had different schedules.

The new FCC Form 610-V that was briefly used for vanity filings was discontinued. To add to the disarray, much of the information on the new Form 605 did not apply to ham radio. Also, the new FCC Form 605 and Schedule "D" could not be used by amateurs involved in examining applicants for new and upgraded ham licenses. The old Form 610 provided a mechanism for applicants to apply to be tested and graded by volunteer examiners and to be granted licenses authorized by VECs. The new FCC Form 605 completely overlooked amateur testing and the VEC System.

I happened to be at the FCC's Private Radio Bureau in Washington, D.C. on VEC business when the order came out. I inquired as to which form should be used by amateur radio applicants applying to be tested—by the three VEs who would certify that the necessary license examinations had been passed, and by Volunteer Examiner Coordinators (VECs) as authority to grant a new or upgraded amateur license.

I was told that the new ULS was intended to be a streamlined application processing and licensing system and not meant to include peripheral activities such as the testing of amateur radio operators as the old FCC Form 610 did. Furthermore, I was told that the VECs could create and use their own internal "worksheets" as long as the FCC would not be seeing or using them.

When I got back to Dallas, I quickly adapted the existing FCC Form 610 into a new NCVEC Form 605 and distributed it to all VECs so that it could be used as an internal form by the amateur community. A shorter card-type version was adapted for use in monthly renewal mailings. The VEC's "worksheets" continue to be used to this day, not only for amateur examinations, but for renewals and address changes as well. Both must be returned to a VEC for electronic filing. The FCC will not accept them, since they are not an authorized form which must be approved by the federal Office of Management and Budget.

The filing of paper applications by individual applicants, although still legal, was downplayed by the FCC, and a trend toward electronic filing of all applications became the rule. VECs were not permitted to use the paper forms, however, and were required to only file electronically. Each VEC had to write its own software to interface its PCs with the FCC's mainframe.

They've Given You a Number...

As part of the transition to ULS, all existing licensees were issued FCC Registration Numbers (FRNs) and passwords with which to access their ULS accounts. FRNs are assigned to each person "doing business" (filing applications) in the licensing system. Each FRN is associated with exactly one Social Security Number. This allows amateurs to keep their own account up to date. Those who did not automatically get an FRN could apply online or could submit a paper Form 160 to the FCC. At the same time, the FCC required all applicants to provide their Social Security Numbers (also known as Taxpayer Identification Numbers) in accordance with a new law mandating that all federal agencies collect this information to help track down people who owe money to the government. All applications must pass a "red light" screening before a license can be issued. This certifies that an applicant is debt-free to the government. Applications from amateurs who flat-out refuse to supply their SSNs are dismissed—that is, thrown out . . . trash-canned.

Applicants for vanity callsigns could apply online (as long as they knew their FRN and ULS password) or could use the new paper FCC Form 605-D. If the paper form was used, another FCC Form 159 (Remittance Advice) had to be submitted along with the vanity callsign fee. It was great if you understood the sys-

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tem. Unfortunately, most radio amateurs, especially newcomers, are not aware of all the paper forms, online filing procedures, and underlying vanity callsign qualifying rules. Many have lost the password that allows them to use the Universal Licensing System. (See "Renewing Your Vanity Call Online" for instructions on what to do if you've lost, or never knew, your password.)

The VECs, on the other hand, were well versed on how ULS worked, since the FCC made many presentations to them beginning in the late 1990s at their annual meeting held near the FCC's Licensing Facility in Gettysburg, PA.

Filing a Vanity Callsign Application

Amateur licenses may be renewed only during the final 90 days before expiration, or up to two years after your license has expired (but you will have *no operating authority* until your license is renewed). After the two-year "grace period," your license will be cancelled by the FCC and removed from its database, after which you will have to retake all of the needed examinations in order to regain your previous operating privileges. You will be assigned a new sequential callsign, but you may be able to get your old callsign back by filing through the Vanity System. See the <http://www.w5yi.org/> webpage for more information on renewals and vanity callsigns, and be sure to read the Vanity Frequently Asked Questions (FAQ) located at: <http://www.w5yi.org/page.php?id=254>.

Radio amateurs may file an initial application for a vanity callsign or renew their vanity license directly with the FCC online using the Universal Licensing System (ULS). It currently takes 18

What Are Your Vanity Call Options?

The vanity callsigns for which you may apply are limited by your license class and to some extent your geographical location. The main restriction is that you may not apply for a callsign format reserved for higher class licensees, unless you are applying to regain a call that you previously held. These callsign formats for the various license classes have been in use since 1978 when a system of four callsign "groups" was established.

Group "A" callsigns with one-by-two formats (plus AA through AL-by-two letters) were sequentially assigned to Extra Class amateurs. Two-by-two (Group "B") formats went to the Advanced Class, and one-by-three (Group "C") to General and Technician Class hams. Novices got two-by-three (Group "D") format calls beginning with KA–KZ and WA–WZ prefixes. The FCC did not assign two-by-three formats beginning with AA–AL or NA–NZ to anyone.

Licensees outside of the continental U.S. were allocated special prefixes. AH, KH, NH, and WH went to licensees in the Pacific area (such as Hawaii). AL, KL, NL, and WL were assigned to Alaska, and KP, NP, and WP to the Caribbean (such as Puerto Rico). Certain numerical districts within these prefixes were reserved for smaller U.S. territories. For example, amateurs in American Samoa are eligible for AH8, KH8, NH8, and WH8 callsigns. Radio amateurs residing in the original 48 states may not apply for callsigns containing these restricted prefixes. However, they may otherwise apply for a callsign from outside of the call district in which they live.

To make matters even more confusing, certain callsigns were ruled "off limits" to everyone, such as callsigns containing Q-code (QRA to QUZ) suffixes, the letters "SOS," certain military and FEMA callsigns, and two-by-three format callsigns having the letter X as the first letter of the suffix (these are only assigned to non-amateur experimental stations).

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Renewing Your Vanity Call Online

Vanity callsign renewals may be made no earlier than 90 days before the expiration of the call. A renewal "grace period" of two years also applies, during which time you have no operating privileges. The FCC's online Universal Licensing System (ULS) is located on the web at: <http://wireless.fcc.gov/uls/>. You will need your FCC Registration Number (FRN) and ULS password to work on your FCC record.

Your FRN is public information and can be found on any of the online licensee databases, such as QRZ.com. You can also obtain it by querying ULS "License Search" at the above webpage. Enter a specific callsign and select "Search." Your FRN will appear on your license record.

To renew a vanity callsign, click on the Online Filing "Log In" link in the center of the ULS main page. On the next screen, enter your FRN and password (see below if you don't know your password). Your ULS record will appear. Select "Renew Licenses" from the left side of the next screen.

Your vanity callsign will appear in a box on the left side if is within the 90-day window. Click "Add" your callsign to the "Licenses to Renew" box and click on "Select." You will next be taken to the FCC's online FCC Form 159 "Remittance Advice." You will be able to print out the form for mailing with your fee, or you can pay online using a credit card.

If you do not know or have forgotten the password associated with your FCC Registration Number (FRN), you will have to reset the existing one. Your password ensures that only you and your authorized representatives are able to update your FCC record, complete certain applications, and renew your license. Your password must be 6 to 15 characters long and is case-sensitive.

An unknown password can be reset by establishing and then using a Personal Security Question (PSQ). Answering the PSQ allows users to reset their password without contacting FCC Support staff. Individuals can choose from question types commonly used, such as "Your mother's maiden name," "Your favorite pet's name," and "City of your birth."

Resetting a Password

You can reset your password online, if you have established a Personal Security Question (PSQ) and answer it properly. If you have already established your PSQ, proceed to step number 6 below.

If you do not have a PSQ (and most amateurs do not), you may establish one by going to the following website: <https://esupport.fcc.gov/password.htm>. The top of the page says "Forgot Your Password?"

1. Farther down the screen, click on "Set Personal Security Question."
2. Complete the next screen with all of the required information, including your FRN and Social Security Number (SSN). Again, the FCC is required by law to ask for your SSN.
3. At the bottom of the page, select a question or enter a custom question in the appropriate field. (If you are going to do a custom question, be sure to select the "custom question" option from the drop-down menu on the first question field.) Next, enter the answer in the appropriate box and click the "Submit" button.
4. After you submit your request, you will receive a tracking number consisting of the letters "HD" and 13 digits. As of now, the first seven digits are all zeroes. It is important that you make note of this number.
5. You will receive an e-mail from the FCC when your FRN registration information has been updated with your PSQ.
6. After your information has been updated, go back to the password website: <https://esupport.fcc.gov/password.htm>.
7. Click on "Forgot your Password."
8. Click on "Reset Password."
9. Enter your FCC Registration Number (FRN) and click continue.
10. Answer your PSQ and click continue.
11. Enter a new password, retype it in the next box to confirm, and click continue.
12. You will receive a confirmation screen that your FRN has been updated successfully.
13. At this point, you will have successfully reset your password and can continue with an online filing.

Should you have any further questions, or need additional information, submit a request through <http://esupport.fcc.gov/index.htm> or call the ULS Customer Support Hotline at (877) 480-3201, selecting "Option 2" after the main-menu recording. The hotline is operational Monday–Friday, 8:00 AM to 7:00 PM Eastern Time, except Federal holidays.

days from date of receipt for the FCC to grant a new vanity callsign. The delay is caused by the need to allow time for paper-filed applications to arrive at the Commission so as not to give electronically-filed applications an unfair advantage in obtaining a specific callsign.

Last year due to Hurricanes Katrina, Rita, and Wilma, it became necessary to extend the expiration dates of all radio licenses—including amateur radio. Because the expiration date extensions impacted the two-year grace period, and the two-year period during which a vacated callsign may not be reassigned, no vanity callsigns were issued between September 24, 2005 and early January 2006. However, the 18-day turn-around time is now back in force.

Vanity callsign renewals also may be made no earlier than 90 days before expiration. The two-year renewal "grace period" also applies for vanity call renewals, but remember that you have no operating privileges until your license is actually renewed. The FCC's online filing center is located on the web at: <http://wireless.fcc.gov/uls/>. The process can be somewhat intimidating, especially if you're not used to dealing with federal bureaucracy. See "Renewing Your Vanity Call Online" for specific instructions.

If the process is too confusing for you, the W5YI-VEC can do it for you.[1, 2] The fee is $39.95 for an initial vanity callsign application or $29.95 to renew an existing vanity callsign. Both of these fees include the required $21.90 FCC regulatory fee. Address changes, routine (non-vanity) license renewals, and requests for duplicate licenses are handled for an $8.00 service fee. If you choose to use this service, you may file your electronic application online by going to <http://www.w5yi.org> and clicking on the graphic link "Renew Your License Today On-line," or you may print out the NCVEC 605 Form and mail it along with your remittance to: W5YI-VEC, POB 565101, Dallas, TX 75356.

No matter which way you choose to do your renewal—online or on paper, on your own or with help—the most important thing to remember is to get that renewal in on time, and that if your license does expire, you may not operate until you have filed your renewal paperwork (and fee if a vanity call) and your license is again listed as active on the FCC's database.

73, Fred, W5YI

Notes

1. Even though the W5YI-VEC still carries my callsign, I have retired from active participation in the organization and no longer have any financial interest in it.
2. At this time, the W5YI-VEC is the only organization that will process vanity renewals. The ARRL will file non-vanity renewal applications for its members at no charge. However, it will not process vanity callsign renewal applications due to the fees involved.

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Power Curve -- typical output power in Watts										
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B-2518-G	5	7	40	60	80	100	125	160	160	160
B-5018-G	--	2	15	25	40	50	70	100	130	160
Watts In	.25	.5	3	5	8	10	15	25	35	50

35 Watts for 2 Meter HT

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Keys 2006: Oh, the Glamour! Part I

BY DAVE INGRAM,* K4TWJ

Oh, those marvelous little telegraph keys! They are unquestionably the most popular aftermarket accessory ever made, and with good reason. No amateur radio setup is complete without one (or its close cousin, the bug or the paddle). Even amateurs who do not operate CW need a key for transmitting a brief full-power signal to check station output and SWR and/or adjust an antenna tuner. Indeed, how can you transmit a real key-down signal without a key?

In light of that fact, we are proud to once again feature more beautiful keys, both new and old, in this column. We traditionally consider keys as adding a touch of glitz and glamour to any setup, so thanks to our guests Gordon Crowhurst, G4ZPY, Marshall Emm, N1FN, Jerry Pittinger, K8RA, Bill Sheehan, W1IXI, David Saylors, WK4DS, Ron McMullen, and Gil Schlehman, K9WDY, that is precisely the theme of this year's tour. Enjoy the views!

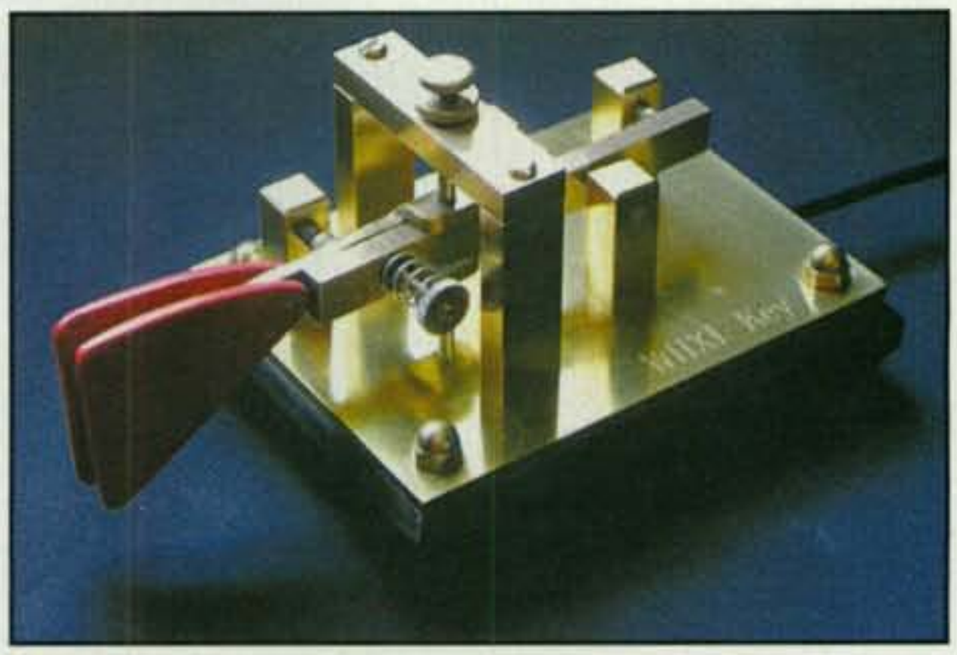

Photo 2– This classy item is one of several paddles Wilfred Sheehan, W1IXI, made for members of the Norwood and Norfolk County (Massachusetts) amateur radio groups in the past. It was moved over to W1TNH when past owner KA1INO became a Silent Key, and it still gleams with class and beauty. (Photo courtesy of Tom Hart, AD1B)

Glitz, Glamour, Class, and Flash!

If you are a serious CW buff, you probably have heard of (or own) one or two world-famous G4ZPY keys and/or paddles. Gordon's keys are handmade with precision adjustments, excellent feel, and the appearance of fine jewelry. They are genuine glitz and glamour items! Gordon is dedicated to quality rather than quantity and health problems are slowing him down, so there is usually a waiting list to purchase one of his keys. However, it is well worth the wait.

A shining example of G4ZPY's outstanding work is shown in photo 1. This "VHS" paddle is especially made for high-speed operation; it is quite agile and handles great. Notice the dot and dash levers are thick, solid brass to eliminate any possibility of flexing or flying apart during heavy use. The paddle's combination of brass, chrome, and beautifully shaped fingerpieces truly puts it in a class of its own. More details on Gordon's keys are available at <www.g4zpy.co.uk>, or you can write to Gordon Crowhurst, G4ZPY, at 41 Mill Dam Lane, Burscough, Ormskirk, Lancs, L40 7TG England.

In the "classy keys" area, we spotlight the exceptionally well-crafted iambic paddle made for

*4100 S. Oates Street #906, Dothan, AL 36301
e-mail: <k4twj@cq-amateur-radio.com>

Photo 1– G4ZPY's world-famous keys and paddles vividly reflect the glitz and glamour side of amateur radio telegraphy. Shown here is his popular "VHS" high-speed iambic paddle. It sports a high-luster 3-inch brass base, brass and chrome mechanism with fine adjustments, silver-to-silver contacts, and custom fingerpieces. Nice! (Photo courtesy of Gordon Crowhurst, G4ZPY)

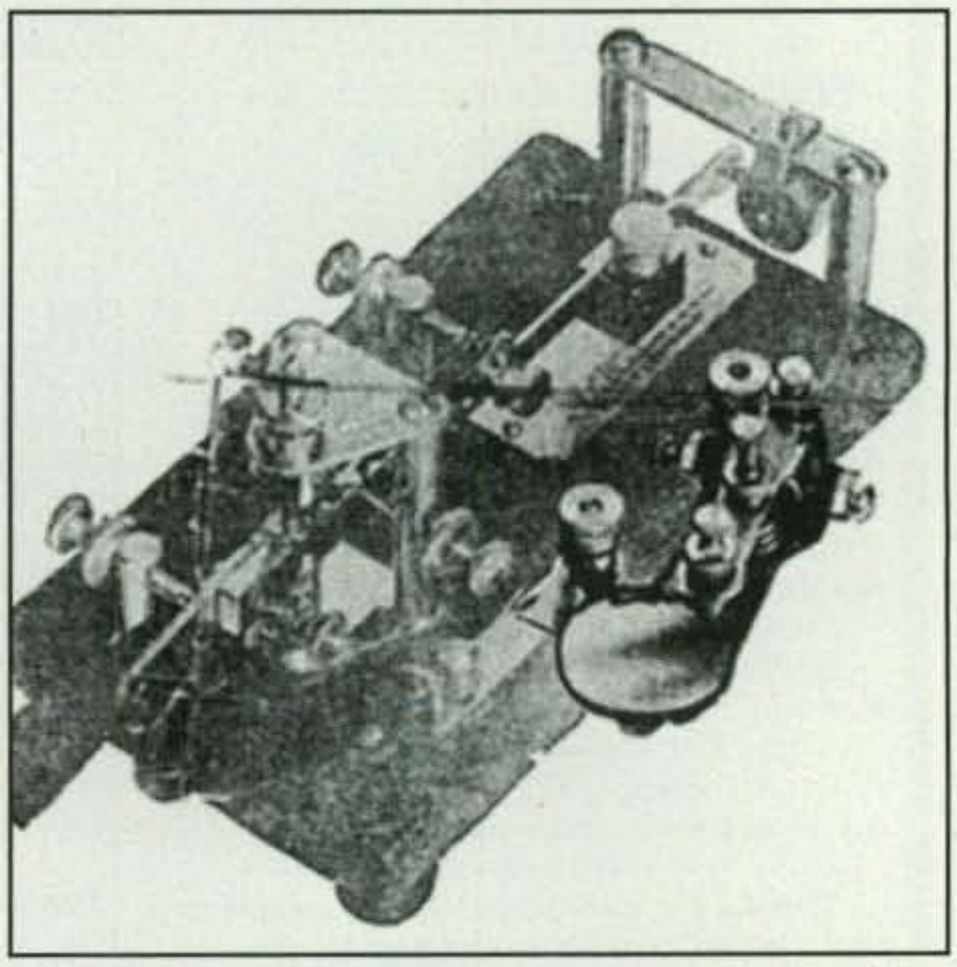

Photo 3– Here's the flash, an original 1937 advertisement of bug inventor H. G. Martin's rare Flash Key complete with a previously unknown frill—a Piggyback hand key. The little key attaches to a bug's binding post and produces a neat change of pace for slow QSOs.

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Photo 4– Possibly appearing in a magazine for the first time since the 1930s is this original-era logo for H. G. Martin's rare Flash keys.

Richard, KA1INO, by Wilfred Sheehan, W1IXI (photo 2). Richard is now a Silent Key, and the paddle has been moved into the shack of Joe, W1PNH, where it still looks classy and new. Meanwhile, W1IXI is now 97 years old—and still working CW with one of his highly acclaimed paddles. As an interesting side note, we understand W1IXI is quite mechanically inclined and even built a rare Heathkit wood-and-fabric airplane

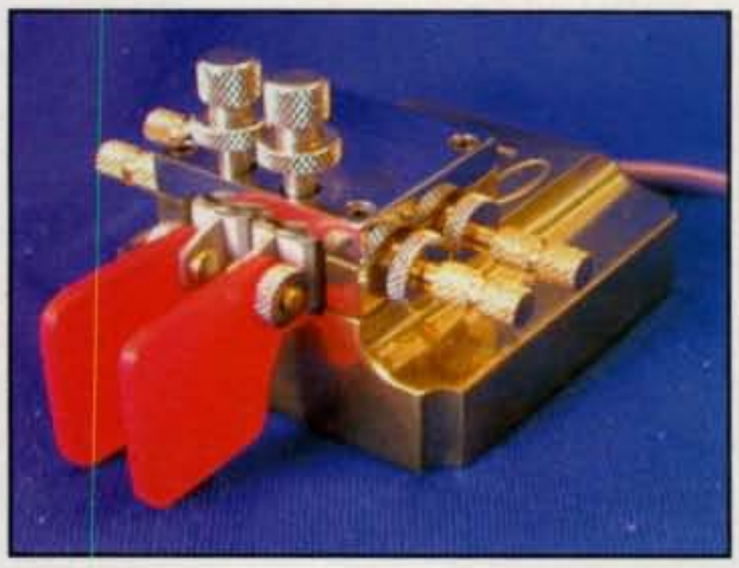

Photo 5– Meet the Saylors' Special, a neat and trim iambic paddle with low-slung brass base, aluminum arms, magnetic tensioning, and unique-style gap/tension adjustment screws, plus gold contacts. The paddle is made by David Saylors, WK4DS, and is available in single- or dual-lever versions. Details are at <www.saylorsmachine.com>. (Photo courtesy of WK4DS)

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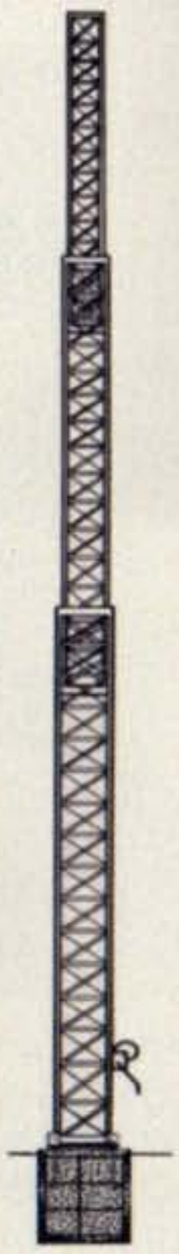

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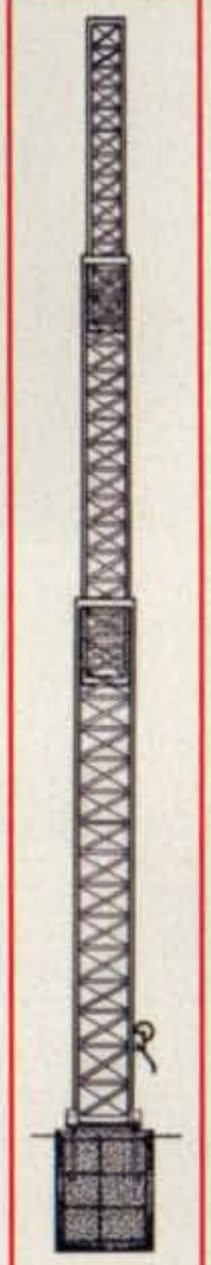
TX-472MDP	72'	22'8"	1210	$5,571	$5,049
TX-489MDPL	89'	23'4"	1800	$9,034	$8,239



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• MDPL models include motor drive

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HDX-555	55'	22'	870	$3,162	$2,889
HDX-572MDPL	72'	22'8"	1600	$8,281	$7,549
HDX-589MDPL	89'	23'8"	2440	$10,841	$9,899
HDX-689MDPL	89'	23'8"	3450	$20,943	$19,129
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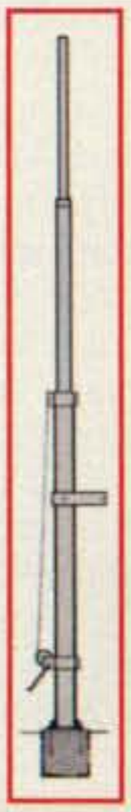

MA SERIES CRANK-UP MASTS							
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MA-550	55'	22'1"	435	22	9	$1,875	$1,699
MA-550MDP	55'	22'1"	620	22	9	$3,584	$3,249
MA-770	71'	22'10"	645	15.5	5.5	$3,091	$2,799
MA-770MDP	71'	22'10"	830	15.5	5.5	$4,890	$4,449
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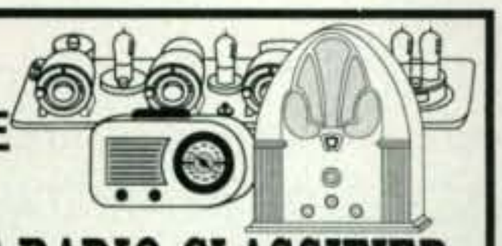

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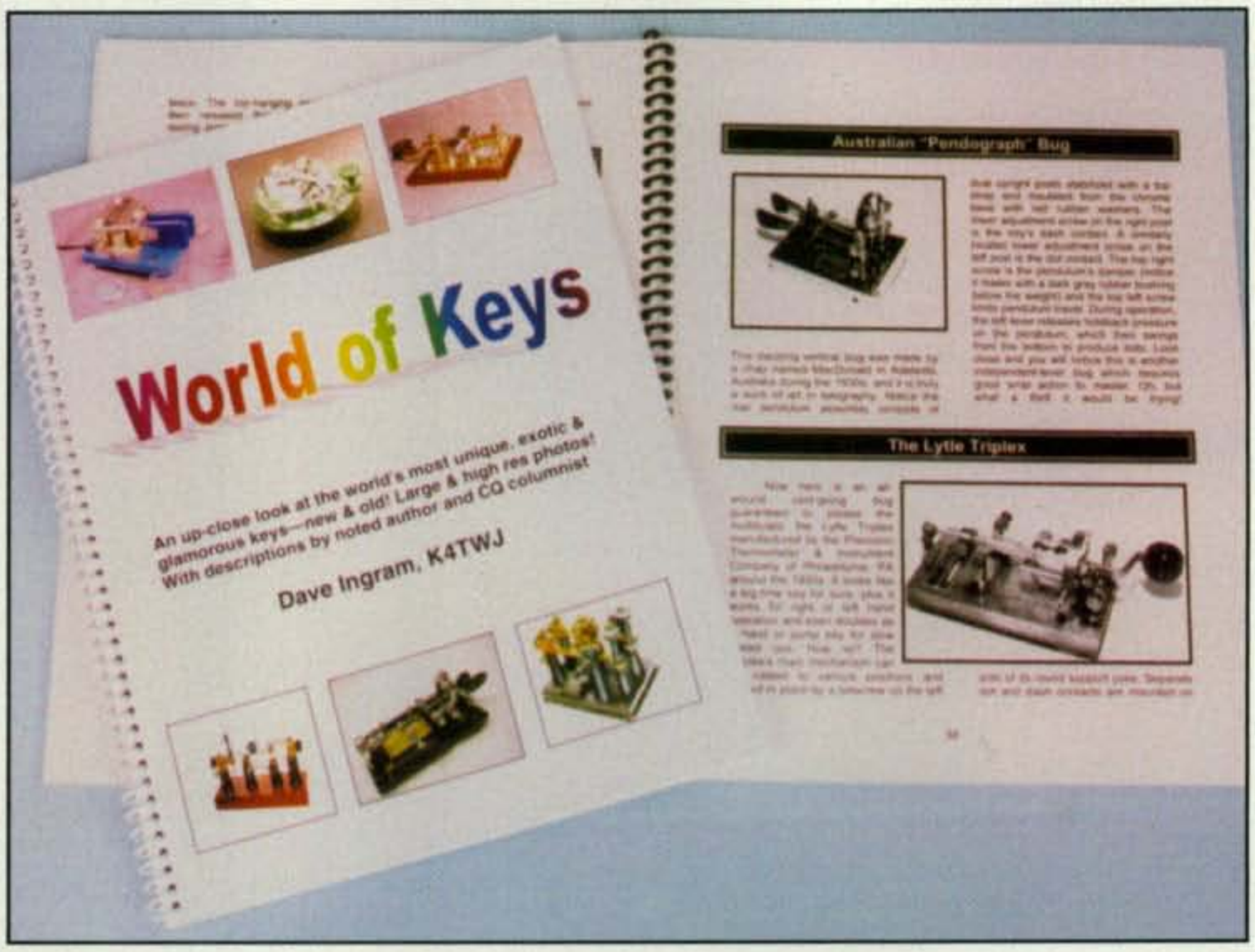

Photo 6– Would you like to continue this glitz and glamour tour? Check out my all-new World of Keys *book featuring extra-large pictures and fascinating details of the world's most dazzling keys, bugs, and paddles, new and old. It is the third in a series of keys books, and it is unquestionably the best and most exciting yet!*

called the *Parasol* during the 1930s. That's right: Ed Heath produced a kit airplane (priced at $199) well before the company began producing ham gear. Our thanks to Tom Hart, AD1B, for this information on both W1IXI and Heathkit.

With regard to "flash" and keys, we invite you to study the slightly worn 1937 advertisement for a rare H. G. Martin Flash Key bug complete with a previously unheard of (gasp!) Piggyback hand key (photo 3). Yes, and accompanying that ad is another attention-grabbing rare item—a genuine 1937 Flash Key Logo (photo 4). As you may recall from our previous keys columns, bug inventor Horace G. Martin and J. E. Albright started up the Vibroplex Company around 1902 and worked together until going their separate ways around 1935. Martin then produced several models of flash keys that, with the exception of their nameplate, were identical to Vibroplex bugs. During that time Martin also made the Piggyback key which attached to a bug's binding post. Truly it is a "Straight Key Night" special!

More interesting news: In talking with present Vibroplex Company owner Mitch Mitchell, W4OA, of Mobile, Alabama, I understand a modern equivalent of the Piggyback key is under development. It is expected to evolve as a new-style iambic paddle with a hidden hand key, and a prototype may even be presented at the Vibroplex booth at the Dayton Hamvention® next month. Step up and ask Mitch about the new paddle!

Another smart-looking item I am sure you will enjoy studying is the mid-size brass and aluminum iambic paddle

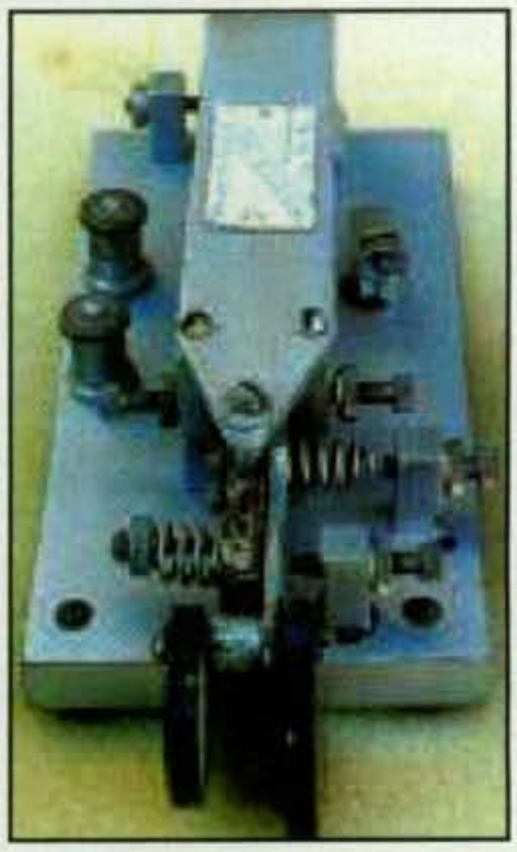

Photo 7– Here it is! The first and probably only available picture of the rare and elusive Ingram Master Key made in Perth, Australia. What a doll it is, with a metal nameplate atop its protective top shroud plus all the traditional bug adjustments. Look carefully and you will also notice this is a left-handed model. (Photo courtesy of Ron McMullen of Australia)

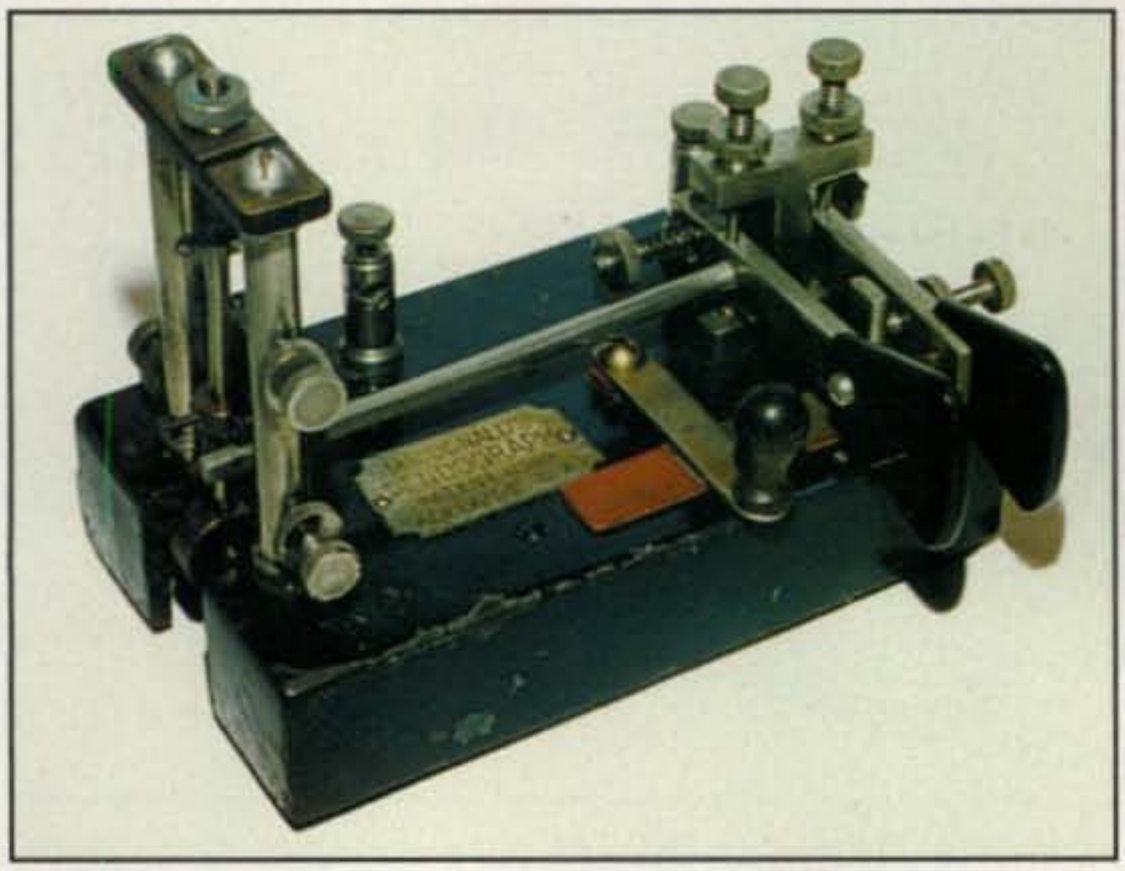

Photo 8– This McDonald Pendograph, also made in Australia in the past, uses twin levers with its dash contact on the key's right side and dot contact on the left front pendulum support post. When the dot fingerpiece is moved toward the right, its attached pushrod releases the pendulum so it can swing (from the top) and tap its associated contact/screw (on pendulum support). (Photo courtesy of Gil Schlehman, K9WDY)

being made by David Saylors, WK4DS (photo 5). This is a magnetically tensioned paddle with a low-to-desk design, a light feel, and a high-gloss finish. The feel is a bit light for me personally, but that is why there are different keys and paddles to fit different fists. Some folks like more tension and snap action, while others prefer very close gap/travel and a feather touch. It's a matter of matching key and operator personalities. The Saylors' special paddle, incidentally, is equipped with ball bearings at arm pivot points, fine-thread gapping tension screws, and gold-plated contacts. More details are available directly from David Saylors, WK4DS, at telephone 706-657-7944, or via e-mail at: <david.sailors@saylorsmachine.com>. Check it out!

Incidentally, if you enjoy studying unique CW instruments, you surely will appreciate knowing of my all-new book, *The World of Keys* (photo 6). The book has views and descriptions of keys, bugs, and paddles like few people have ever seen—monster spark keys, novel miniatures, far-out pumpers, bedazzling bugs, Vibroplexes galore, and much more. I describe the keys as works of art, but cannot resist adding some personal humor along the way (my famed "sideshow barker mode"). It is a gas and is available (autographed) direct to you from me (Dave Ingram, K4TWJ, 4100 S. Oates St. #906, Dothan, AL 36301) for $18 plus $2.50 book rate or $4.05 Priority Mail.

Delights from Down Under

After mentioning an Australian-made "Ingram Key" in last year's keys column, we received a picture of the little delight from Ron McMullen in New South Wales, Australia shown in photo 7. The Ingram Master Key appears to be 3.5 inches wide and 7 inches long with damper, yoke, and contact support posts custom molded into its base, which also has screw holes for mounting to a desk. Additional details are spotty, but I understand Ingram was a professional telegrapher (quite possibly a "lefty") in Perth and made the model shown plus another "mystery" model for use in telegraph facilities

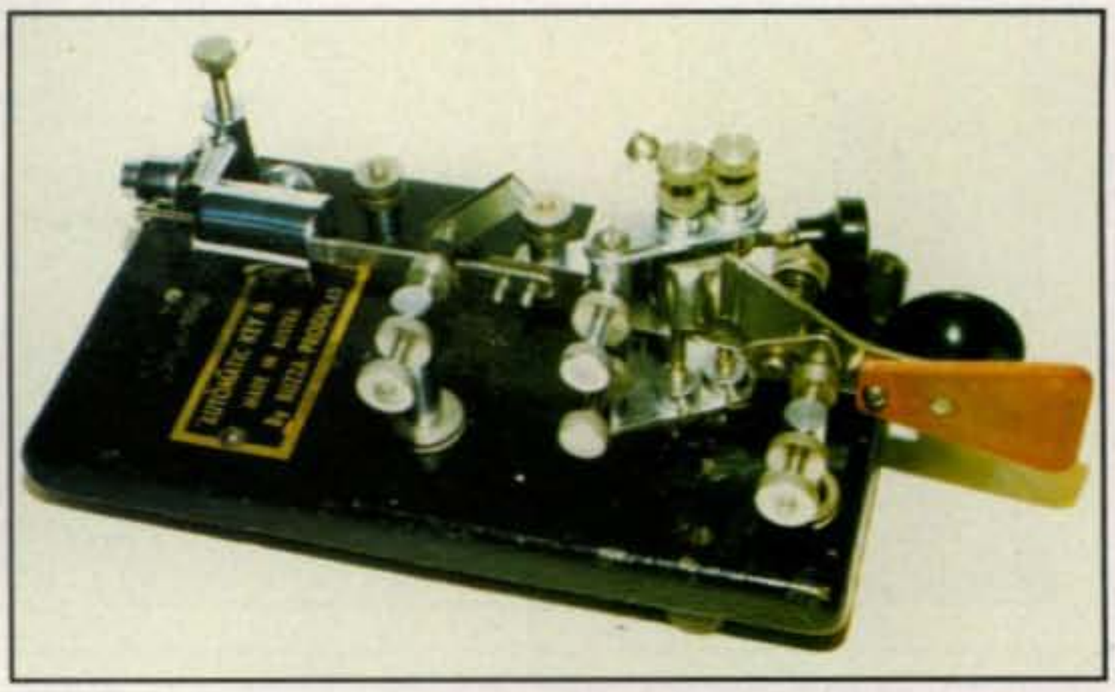

Photo 9– The remarkable Buzza Bug from Australia. Notice the tripod-with-flat-top type yoke/frame, flat pendulum, and yes, round weight. Notice also the double pivot screws atop the yoke, angled arm connected to the fingerpiece, and associated dot contact in front of the fingerpiece. It is a classic in Aussie-made bugs!

of eras past. Apparently, the bug was well received (why else would it have a metal nameplate stamped "Master Key manufactured by H. C. Ingram CTO Perth"?). We doubt if any readers actually own an Ingram key, but if you have any additional information on this sweet semi we definitely want to hear from you. My e-mail address is <k4twj@cq-amateur-radio.com>.

Continuing our views from Down Under, two more unique bugs also warrant mention. First is the Right Angle and Vertical Pendograph made in 1908 by Albert McDonald of Adelaide, South Australia (photo 8). It has independently operating dot/dash levers with no linkage or iambic action. That's right: Squeeze both levers simultaneously and the

Photo 10– This unique-design telegraph sounder was made by G. M. Phelps Company and was used on Western Union lines. Its monetary value may be low, but its historical significance is quite high. No true key collection is complete without one or two neat sounders. Look on page 24 of the February 2006 issue of CQ for a clever tone-to-voltage converter/interface for copying off-the-air CW on a sounder like this.

Photo 11– A KOB, or Key with sounder On Base, is another important part of a key collection. KOBs served as portable telegraph setups one could carry between jobs or use for in-field work when required. The one shown here sports an unusual Steiner key and was probably made during the late 1800s. (Photo courtesy of key collector extraordinaire K9WDY)

Photo 12– This neat KOB was made during the early 1900s by the Altoona Shops of places unknown, but it is still a piece of fascinating telegraphic history. (Photo courtesy of K9WDY)

result is just one extra-long dash! Using a Pendograph obviously requires good wrist action!

Notice the dash contact/screw is mounted on the bug's right side, and its dot contact/screw is mounted on the pendulum's front support post (to the left of the nameplate on the base). This arrangement works because the full pendulum assembly sits on rubber feed-through washers that insulate it from the base (that should have been a real kicker when used with a high-power vacuum-tube rig of the past!).

McDonald made two other versions of pendulum-associated bugs. One was an in-line model with both dot and dash contacts on its pendulum assembly, and the other was a single-lever bug. All three versions of Pendographs are rare and prized collectibles today.

The Buzza bug is another interesting item (photo 9). It was made by the Buzza products company of Sydney, Australia and boasts a triangular support yoke/frame similar to a Vibroplex Lightning Bug, but includes double top pivot screws. The pendulum is also flat like a Lightning Bug, but it has a round weight. Further investigation of Buzza products revealed the company also produced both double- and single-lever bugs, a neat hand key, and two practice keys/Buzza sets (Buzza, Buzzas?). Our thanks to Ron McMullen for the "Buzza Notes."

Click, Clack

Telegraph sounders and KOBs (Key plus sounder On Base) continue to prove high in popularity among key collectors and CW enthusiasts near and far—and with good reason. They are genuine artifacts of telegraphic history you can hold in your hand (some date back to the mid and late 1800s), and an interconnected pair also makes a neat in-shack demo item. Would you like to take that a step further? A deluxe tone-to-voltage converter for copying off-the-air CW with a sounder was featured on page 24 of February 2006 *CQ* ("Sounders, A New Challenge from Telegraphy's Past," by Heikki Lempola, OH2BGX). Learning to copy different-length clicks and clacks rather than dots and dashes may prove challenging, but it is a hoot, especially when running CW mobile!

KOBs served as portable telegraph setups professional telegraphers could carry from job to job or use for special assignments as required. Appearance was everything, and showmanship reigned supreme in KOBs. Consequently, they usually were made on beautifully finished wood bases, and many types were custom pinstriped for extra class and flash. The heartwarming beauty and sounds of a sounder add "presence" to any amateur setup. Try one and I'm sure you will agree!

A Snapple Key?

Once again we have overflowed available space and must bow out. Stand by, however, for more key views and CW tales coming in Part II next month. It is a real romper, featuring new keys, dazzling bugs, and more.

Finally, this month, I ask your help in locating an unusual Snapple bottle-cap key. Someone mentioned it in an e-mail after last year's "Keys Special" ran here in *CQ,* but the e-mail was lost before I could read the full details. I have seen handcuff keys, mini-stapler keys, balun keys, pump-handle keys, and more, but a Snapple Key is yet unknown—and it could be the wildest key of all. It definitely deserves recognition in this column. Have you seen one? 73, and keep on working CW with those incredible keys! Dave, K4TWJ

Photo 13– Check out this extra-classy KOB made by Jerome Redding. It features a rare Camelback key and a compact sounder, both with custom pinstriping and a beautifully finished wood base. Nice!

op ed

License Exams:
Let's Bring Back the Good Old Days

BY JERRY HILL,* KH6HU

From time to time, we make space available for our readers to voice their opinions on important subjects. Such "op-ed" pieces do not necessarily reflect the editorial views of CQ or of its publisher, CQ Communications, Inc. Here, author KH6HU is responding to a letter in the January issue, but his comments are also relevant to our editorial comments last month regarding the new Technician question pool. —W2VU

Over the years I have watched the debate on Amateur Radio licensing with interest and concern. One school of thought seems to say it is time to modernize the system to meet the needs of today's people, while the opposing side says it was much better in the "old days." After reading the letter to the editor from Steve, K4YZ, in the January issue of *CQ*, I would like to share some of my thoughts on the matter. Not that I have all the answers to the problem, but rather to try to focus on the real issues involved.

I had the privilege of working at ARRL headquarters for two years. While doing some research (for "The Big Project") in the ARRL library, I was looking at a copy of the 1962 license manual. The entire manual was less than a quarter-inch thick and contained the study information for all five Amateur Radio licenses. The "Novice" portion of the manual consisted of a total of *six pages* of Q&A. The material in this manual was precisely the same material that I studied for my Novice ticket in 1976. The point being, nothing had changed in the 14 years between these two manuals.

Indeed, when I started using Amateur Radio as enrichment to my regular curriculum as a high school teacher, I would spend about six weeks working with the students on the code and when they had mastered the required 5 wpm, I sent away for their written tests. I devoted one week of instructional time to studying for the test and, along with a member of the local amateur radio club, administered the test in my classroom. In those years I had a pass rate of 100%.

The overall point is that in the "good old days" getting a Novice license was easy. Yes, you had to learn the code, but the study material was relatively simple. And as someone who has 25 years experience teaching Amateur Radio to youngsters, the code is not a problem. The only complaints I have ever heard about learning the Morse code came from adults. The code is not an issue for youngsters. It never has been.

Another point to remember is that a Novice's first experiences in radio communications were on the HF bands, opening the world to him/her. All old-timers cut their Novice teeth on worldwide HF radio. Most of us built our first antenna (a dipole) and learned about propagation first hand from day one. In educational terms, we call this *contextual learning*.

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e-mail: <kh6hu@arrl.net>

Novice Enhancement

Somewhere around 1986 the world of Amateur Radio was introduced to "Novice Enhancement." Someone came up with the idea that by offering Novices more operating privileges, more people would become interested in ham radio. This was followed a few years later by the FCC's decision to drop the code test requirement for the Technician Class license. This changed the focus of the entry-level license from HF radio to VHF/UHF, as the Technician became the de facto entry-level license. The big change was the amount of information required to pass the "entry level" exam. The simple six-page entry-level Q&A manual morphed into a ten-chapter paperback three-quarters of an inch thick!

Now I can't quote you any statistics as to the impact of the Enhancement on Amateur Radio in general, but I can tell you what impact it had on my enrichment program at the high school level. After "Enhancement," instead of one week of instruction, it now required a full nine-week quarter to cover all the material. I attempted to incorporate the material into my basic electronics class, but after two years I dropped the idea and went to an extra-curricular enrichment program. My numbers of licensed students fell from 30 per year to approximately five or six.

I have mixed feelings about the open question pool issue. I have held classes for Novice and Tech licenses, and I have held "crash courses," and I have had varying degrees of success with both systems. The determining factor seems to be more the individual's interest and how soon he or she becomes "radio active," rather than which process was used to obtain the license. I'm sure there must be some research somewhere that can address the validity of using sample test questions for study purposes, but as it would be, these happen to be the actual test questions. I believe, however, the open question pool is a separate issue from the need for a new entry-level license.

As I mentioned at the beginning, in the good old days obtaining a Novice license was fairly simple. The basic reason for this was the privileges of the Novice license were limited to four HF bands and were CW only. I would suggest a similar license, but instead of CW, the privileges should include limited power (10 watts) on limited HF bands (10, 15, 40, and 80) using SSB and PSK-31. I would also suggest a new designation for Novice callsigns that would identify them and their limited requirements. Surely with the new technology available, having designated Novice callsigns should be a realistic possibility.

In conclusion, I would like to see a new entry-level Amateur Radio license here in the U.S. Its purpose should be to encourage the licensee to further study and experiment, and to upgrade to higher class licenses and operating privileges. It should be a simple test of not more than 20 questions relevant to rules and regulations and basic radio operation. Keep it simple, like the old days.

the weekender

BY PHIL SALAS,* AD5X

Fast Charge Your MFJ-259B Antenna Analyzer

Photo A– The fast-charge jack and connections of the three necessary wires.

Photo B– The location of the charging jack on my 259B. Note clearance around the jack to permit mounting as described in text.

This month I'm presenting a simple, yet very useful modification for the popular MFJ-259B Antenna Analyzer. From setting up antennas to measuring inductors and capacitors, and for measuring frequency, I've found this unit to be almost indispensable. My only problem is that I hate waiting for the internal NiMH batteries to charge, which always seems necessary when I need the unit the most! This can take a long time, especially with the very-high-current AA cells currently available (2300–2500 mAh). Therefore, I've modified my MFJ-259B so I can connect an external fast charger directly to the batteries.

Fig. 1 shows the extremely simple schematic/pictorial. I used a DC coax jack that disconnects the negative battery lead from the MFJ-259B when a charging plug is connected (see photo A). I used the disconnecting feature to ensure that no voltage transients are impressed on the MFJ-259B internal DC lines during the charging process in case the MFJ-259B is turned on while it is charging. The jack is a RadioShack 274-1583 jack-with-switch. The mating plug is a RadioShack 274-1573.

*1517 Creekside Drive, Richardson, TX 75081
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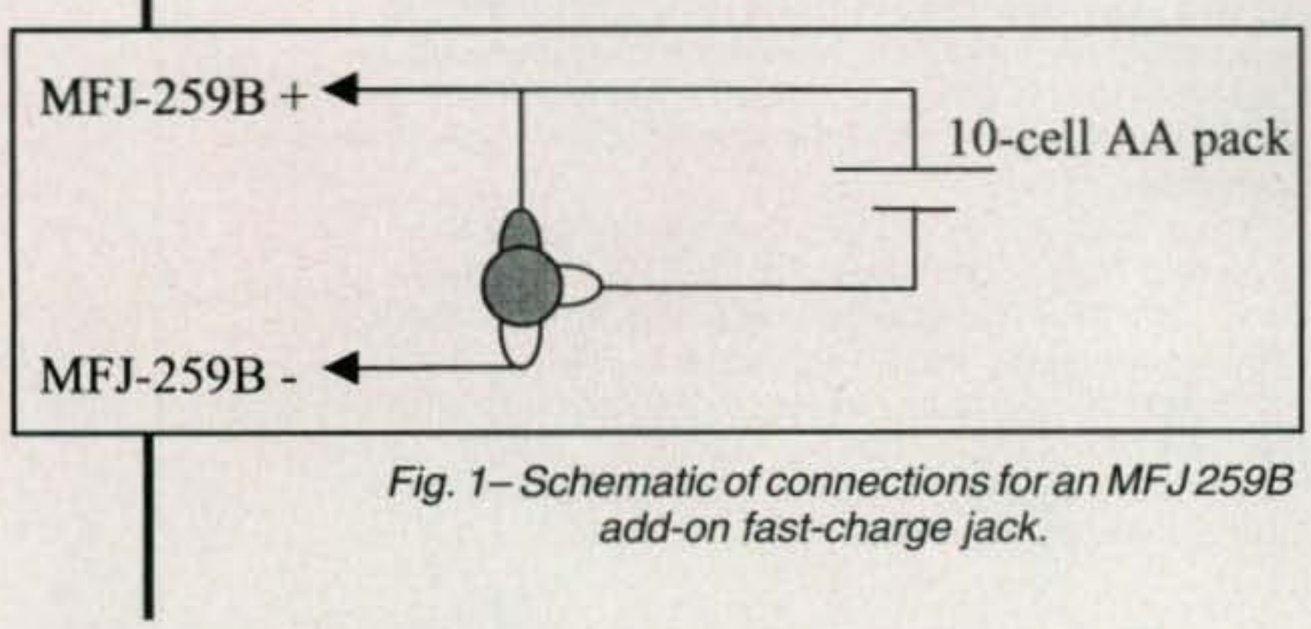

Fig. 1– Schematic of connections for an MFJ 259B add-on fast-charge jack.

Photo C– Here's the jack with wires soldered on and mounted on a piece of insulating printed circuit board.

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Photo D– Wire routing between the battery pack and the fast-charge jack.

You must isolate the charging jack from the metal cover of the MFJ-259B or the battery will still be connected to the MFJ-259B circuitry during charging. Therefore, first drill a 1/2-inch (or larger) diameter hole in a convenient location on the back of the MFJ-259B case to provide clearance for the jack. I located my jack as shown in photo B. Then drill a 3/8-inch diameter hole in a piece of bare PC board or other insulating material to mount the jack. Finally, drill 1/8-inch diameter mounting holes in the insulating material and MFJ case for #4 screws to mount the jack assembly to the case. A close-up of the jack wiring is shown in photo C. I used a piece of tape to hold the wires to the battery holder, as can be seen in photo D.

For a charger, I use a 900-ma/1800-ma switchable smart-charger available from <http://www. batteryspace.com> (Part No. CHUN-122 at $29). This charger auto-senses and fast-charges NiMH battery pack sizes from 7.2–12 volts. I charge the AA cells at the 900-ma rate, as I'm concerned that the 1800-ma rate is just too much for AA-size cells. Check out the deals on batteries as well. As I'm writing this, Batteryspace is selling twelve AA 2300-mAh NiMH batteries for $17 (Part No. MH-AA2300APZ12BOX3).

That's it for this month. Remember, we're looking for your input, again focusing on simple projects or ideas that can be completed in a weekend or less. See you next month.

73, Phil, AD5X

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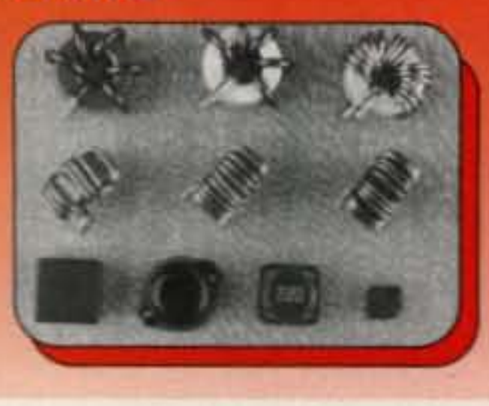


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BY BOB JOSUWEIT,* WA3PZO

Why Get Involved?

With all of the high-tech, state-of-the-art communications gear that exists, why would anyone rely on amateur radio? Just ask state officials in California. At the opening of a statewide public-health disaster-command center, officials said the last-resort backup to all the state-of-the-art, high-tech gear is still the decades-old, amateur/"ham" radio network. Most other states would agree with that, particularly following last year's hurricane season.

Earlier this year a revised International Telecommunication Union (ITU) Telecommunication Development Sector (ITU-D) recommendation came into force to promote "effective utilization of the amateur services in disaster mitigation and relief operations."

"This is an updated version of a *Recommendation* that administrations include the amateur services in their national disaster plans, reduce barriers to effective use of the amateur services for disaster communications, and develop memoranda of understanding with amateur and disaster relief organizations," explained ARRL CEO David Sumner, K1ZZ. It further advises cooperation among all parties in making available model agreements and "best practices" in disaster telecommunications.

The Federal Communications Commission recently adopted changes to its Part 97 Amateur Service rules to reflect these and other changes. One change provides that amateur radio stations may be used to transmit international communications on behalf of third parties in case of emergencies or for disaster relief. Another encourages administrations "to take the necessary steps to allow amateur stations to prepare for and meet communication needs in support of disaster relief."

According to the ARRL, the revised *Recommendation* ITU-D 13 recognizes that effective amateur radio disaster communication depends "largely on the availability of amateur operators located throughout a country," and that post-disaster international humanitarian assistance "often includes the provision of amateur operators and of equipment from an assisting country."

It further acknowledges that barriers in terms of gaining permission to operate and to move equipment and operators into a disaster zone "in many cases hindered the full use of telecommunications capabilities available from outside an affected country." Over the years frameworks have been established to reduce or remove these barriers.

An International Viewpoint

Hans Zimmermann, F5VKP/HB9AQS, IARU International Coordinator for Emergency Communications, offered the following comments on the role of the Amateur Radio Service in emergency communications:

International recognition with only a desire to serve. Some ask whether it is time for minimum requirements for membership in ARES.

Zimmerman says, *"Amateur Radio is a Service* in the sense of international regulations. As such, it enjoys privileges equivalent to those of the other recognized services such as the maritime, land-mobile, or aeronautical services. These privileges include the use of our internationally allocated frequency bands, and the protection from interference in these segments of the spectrum, as well as various degrees of self-administration of these amateur bands."

He continues:

Amateur Radio is, however, also expected to provide a service in the sense of service for the public. It has a long tradition in such work, and its role has not diminished with the introduction of new technologies. Ham radio has two major applications in support of emergency and disaster response:

The network of stations, many of which are particularly disaster-resistant thanks to independent power sources, has in many cases provided the first and often for some time only link between a location or area affected by a disaster and the "outside world." Advanced technologies provide real time connectivity for an ever-increasing part of the world, but at the same time their networks are increasingly vulnerable. Amateur Radio communications do not depend on any infrastructure other than the equipment under the direct control of the operators, thus having the best chance to remain operational even in the aftermath of a catastrophic event.

Skilled operators are in demand more than ever, to install, maintain, and operate the emergency telecommunication networks of the providers of emergency and disaster response. Quite a few amateurs are profes-

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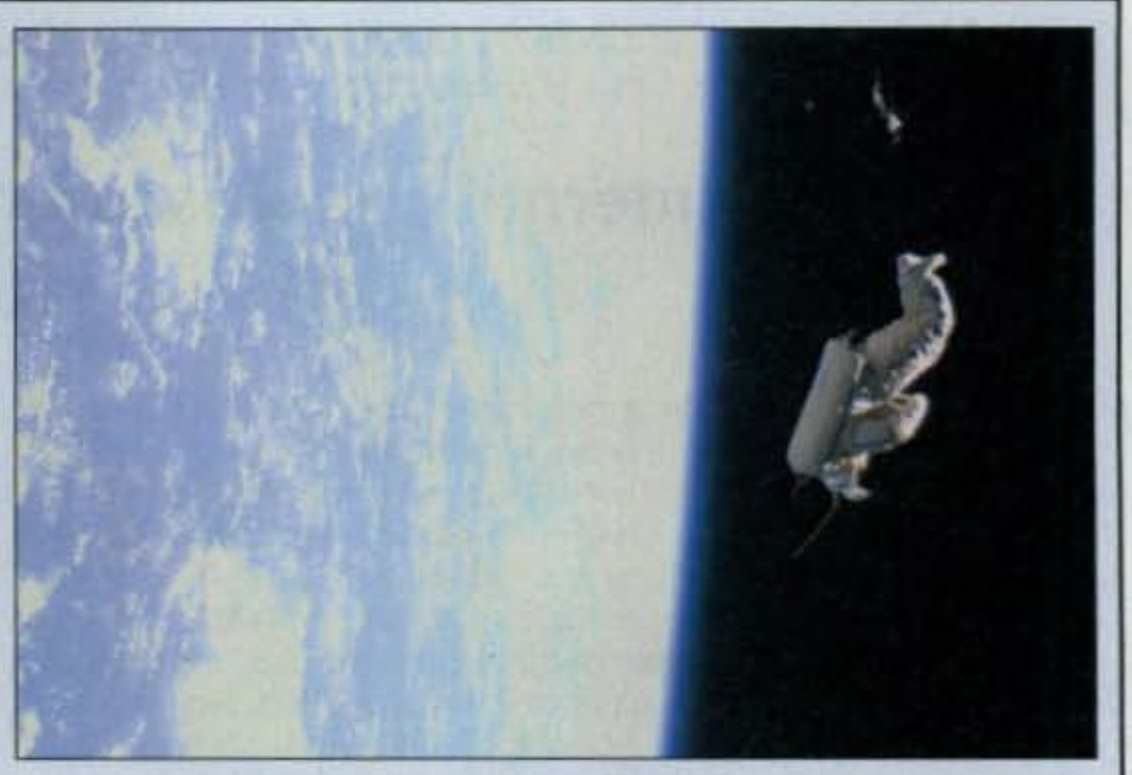
Public Service through Education

Amateur radio public service is not always done by providing emergency communications. There are many cases in which we can provide public service via education. Ham radio can help teach geography, language, math, earth sciences, and space science. In early February, International Space Station Commander Bill McArthur, KC5ACR, and Flight Engineer Valery Tokarev released an unneeded Russian Orlan spacesuit, which was outfitted by the crew with three batteries, internal sensors, and a radio transmitter. According to NASA, the spacesuit, known as Suitsat-1, faintly transmitted re-corded voices of school children to amateur radio operators worldwide.

Initial reports from NASA indicated that the suit stopped transmitting only minutes after launch, but Frank Bauer, KA3HDO, ARISS International Chairman and AMSAT-NA VP for Human Spaceflight Programs, paraphrased Mark Twain . . . "the demise of SuitSat-1 is high exaggerated!"

"SuitSat-1/Radioskaf is a space pioneering effort. Pioneering efforts are challenging. Risk is high. But the future payoff is tremendous," said Bauer. "As you have seen, we have not had total success. But we have captured the imagination of the students and the general public. And we have already learned a lot from this activity. This will help us and others grow from this experience." Not only did Suitsat-1 capture the interest of the international amateur radio community, it also captured the interest of students at all grade levels and earned over 630 news media hits at deadline.

Bauer indicated that there were over 2 million internet hits on <www.suitsat.org>. Student's creative artwork, signatures, and voices have been carried in space and are on-board the spacesuit; the students are now space travelers. As the suit rotates and orbits the Earth, there are CDs in the spacesuit carrying pictures of Roy Neal, K6DUE, and Thomas Kieselbach, DL2MDE, both of whom have contributed to the ARISS program and have since passed away.



Suitsat-1 began its orbit around the Earth after it was released by the Expedition 12 crew members during a session of extravehicular activity (EVA) on February 3, 2006. It transmitted a variety of prerecorded messages. See text for details. (Photo courtesy NASA)

Bauer said, "We successfully deployed an amateur radio satellite in a Spacesuit from the ISS, demonstrating to the space agencies that this can be safely done. This ARISS international team was able to fabricate, test, and deliver a safe ham radio system to the ISS team three weeks after the international space agencies agreed to allow SuitSat to happen. This was a tremendous feat in and of itself."

"Keep your spirits up and let's continue to be optimistic," said Bauer. As with any experiment, you learn from your tests and move forward, hoping to improve when the next opportunity comes."

sionally working as telecommunications officers for international organizations, many in senior positions. Many more are volunteers in national organizations having respective agreements with the national and local amateur radio societies and clubs. When it comes to establishing communications under the adverse and often also dangerous conditions in the aftermath of a disaster, nobody is more able than a ham to make the best from whatever is available.

A Desire to Serve...

That and an amateur radio license is all that's required to be a member of the Amateur Radio Emergency Service.

More and more leaders in amateur radio emergency communications are saying that membership should require more than just a desire to serve. Regardless of the number of names on the membership rolls, there are a far fewer number of members who are active. Some groups with a membership of over a hundred names have trouble staffing a public-service event with ten people. Therefore, the question has to be asked, "Is there a reason to have all of the names on the membership list?"

In a posting on E-ham.net, Pat Lambert, WØIPL, Colorado ARES Training Manager, suggests that "setting reasonable participation requirements and then holding people to that requirement is the most effective. To those who whine, 'But I can't do that this year!' say 'I understand. How about contacting us when you can?' If these people are really likely to be, or have been in the past, active participants, you could also grant them a temporary exemption for a few months."

What Qualifies as Participation?

Some groups would measure participation in terms of the number ARRL Emergency Communication Courses you took. Others would rate your preparedness by the number of Federal Emergency Management Agency courses or served agency courses such as one on the Incident Command System, Introduction to Disaster Services, or Skywarn Training. Still others would judge it by the experience you have with packet, Winlink, or APRS.

Lambert likes a combination of training classes, net participation, and exercises. In his opinion, the total time needed to meet the requirements is eight or more hours per year. Any person who pulls a full shift during an incident has fulfilled his/her obligation for the entire year.

A common reply from some hams is "I've been doing this stuff for so long." Rather than ignoring the comment, Lambert suggests you reply, "When can we count on you to teach a class?" If those people are that knowledgeable, they can then become "training resources" for the group.

Another Year Without Action?

In January the ARRL Board of Directors established an ad hoc ARRL National Emergency Response Planning Committee "to appropriately prepare for future large-scale disasters." According to the ARRL, the panel will develop a comprehensive recommendation for ARRL responses to national, regional, and international disasters. The Board will consider the recommendations at its 2007 annual meeting next January. With this year's hurricane season predicted to very active again, one has to question whether we can wait another year.

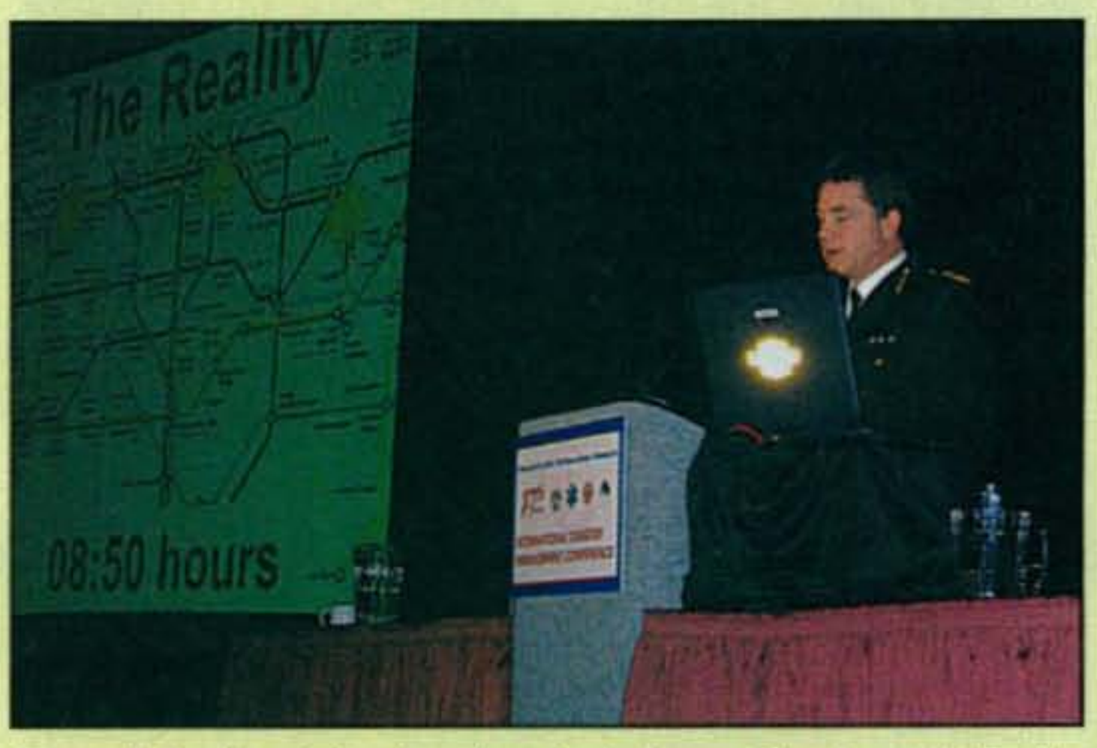
The resolution takes note of the fact that the emergency communications resources and organization needed for national and international disasters "are markedly different" from those required at the regional and local level. Given the unprecedented scope and devastation of the 2005 hurricane

"It's Not a Major Incident Until You Lose Your Comms"
—Russell Smith, Deputy Director of Operations, London Ambulance Service

The International Disaster Management Conference

BY RICH MOSESON, W2VU

I went down to Orlando a day earlier than necessary for the Orlando Hamcation® hamfest so I could attend part of the 2006 International Disaster Management Conference, which was being held at the same time. This conference—sponsored by the Emergency Medicine Learning and Resource Center—had a medical focus, with most of the participants coming from hospitals, fire departments, and health departments around the U.S. and Canada, with a few more from other parts of the world. There were several vendors in their exhibit hall, including DERA, the Disaster Preparedness and Emergency Response Association <www.disasters.org>, of which amateur radio has been an essential element since its founding. The emphasis at the conference was on how the emergency medical community responds to disasters, but communications was always front-and-center. I had the opportunity to sit in on two presentations.



Russell Smith of the London Ambulance Service details the sequence of events on the day that terrorists struck the city's transit system. There were no communications with paramedics in the subway tunnels, he said, leading to a decision that all future planning and training in London will be based on the assumption that there is no functional communication system. (W2VU photo)

Terrorist Attacks in London

Russell Smith, the Deputy Director of Operations for the London (England) Ambulance Service, gave a fascinating presentation on the EMS response to last year's terrorist attacks on the London transit system. After reviewing the timeline of the attacks and detailing the decision-making process behind the EMS response, Smith put up a PowerPoint slide titled, "What Went Well." It included several items, some the result of good training and good practice, and some the result of good luck (such as the bus bombing occurring right in front of the headquarters of the British Medical Association, which was holding a major conference at the time). The next slide was titled, "What Did Not Go Well." Here's what it said:

What did not go well?
Communications!
Communications!
Communications!
Communications!
Communications!

The ambulance service's communication system, Smith said, was not designed for a multi-site mass casualty incident (as you'll recall, there were five separate bombings in five different locations), and his staff's radios did not work at all in the tunnels of the London Underground. In addition, he said that while the phone company insisted the cell phone network never crashed, "all we know was that our calls did not go through."

The primary lessons learned, he said, were not to rely on cell phones and not to rely on radios, adding, "So what's left?" London's answer, at least as far as EMS is concerned, is nothing. Future planning, training, and exercises in London, says Smith, will work on the assumption that *there will be no communications*. Effective communications, he says, will be considered a bonus.

The quote used as the title of this piece was actually from another emergency official in London, quoted by Smith. He also shared a "mathematical formula" for a major incident derived by one of his colleagues:

MI = Cn > Cp - Cm

Translated into plain English, it says that a **M**ajor **I**ncident results when **C**asualty **n**umbers are greater than **Cap**acity minus **Com**munications. Smith also noted that, in Hurricane Katrina, "the first casualty was communications."

Tracking Packages Better Than Patients

The next speaker knew the truth of that first-hand. David LaCombe is a paramedic and Education Director of Acadian Ambulance in Lafayette, Louisiana, the largest private ambulance service in the United States. He was in the Superdome during Hurricane Katrina and the massive flooding of New Orleans that followed. His greatest frustration, he said, was that newscasters could communicate to the whole world from the same place he was, while he couldn't contact his headquarters 60 miles away, and that shipping companies could tell you where packages were better than the EMS system could tell you where patients had been taken. "How can we track packages better than we can track patients?" he wondered.

LaCombe also urged emergency managers to "plan but act," noting that many resources available for Katrina sat idle for too many hours while planners planned and nobody actually did anything. "There is a new currency in the world of disaster responses," said LaCombe, "water, communications, and time management," noting that too much of that "currency" was squandered in the response to Katrina.

He also discussed the need for a "unified safety plan" to protect all emergency responders, and noted that emergency managers need to understand both the psychology and the politics of disasters. "Emergency managers," he said, "have to protect political leaders from making bad decisions based on inaccurate information.

LaCombe also noted that big disasters appear to occur in the U.S. on a five-to-ten-year cycle, and passed along a quote that should be helpful to anyone who is first on the scene of an emergency or disaster:

"The first step when responding to an emergency is *defining the problem:* **Where is the hazard? Where is the hazard going? Where are the people? Where are the people going?"**

After his presentation, I spoke briefly with LaCombe and gave him my business card. "Amateur radio," he said, looking at our magazine's full title. "Am I glad to see you folks here. I just read a wonderful story on the way down here (in the Delta Air Lines in-flight magazine) about hams and Katrina. Keep up the good work."

My overall impression was that most of the people to whom I spoke were aware of amateur radio and acknowledged our communications expertise, even if they didn't know exactly what we do and how we do it. But that's OK. Their job, after all, is to save lives in a disaster. Our job is to help them do theirs by trying to make sure that communications is part of the solution, not part of the problem. (See this month's "Zero Bias" for more on this topic.)

Congressional Salute to Hams

The following salute to amateur radio operators and ARRL members was published in the Congressional Record *for February 8, 2006 by Rep. Mike Ross of Arkansas, who is also WD5DVR:*

Mr. ROSS.

Mr. Speaker, I rise today to recognize the contributions of American citizens who are members of the Amateur Radio Relay League, known as HAM radio operators. Citizens throughout America dedicated to this hobby a hobby that some people consider old fashioned or obsolete—were true heroes in the aftermath of Hurricane Katrina, as they were often the only line of communication available into the storm-ravaged areas.

Amateur radio operators are often overlooked in favor of flashier means of communication. As communities across the Gulf Coast and America learned this year, technology can be highly vulnerable. HAM radios, entirely self-contained transmitters, require no cell towers or satellites, simply a battery and a strip of wire as an antenna.

Just as after major earthquakes, tornadoes, and the terrorist attacks of 9/11, HAM operators around the country received an alert to stand by their radios to listen for calls for assistance. Following Hurricane Katrina, when cell phones and e-mail were useless, a HAM operator located in Connecticut alerted authorities about a woman trapped for four days without food or water, and a Coast Guard Auxiliary in Cleveland arranged for a medivac for a woman in labor in New Orleans. These are just a few examples of the many lives that were saved with the critical intervention of HAM operators throughout the country.

U.S. Rep. Mike Ross, WD5DVR (D-AR), praised ham radio operators in a statement published in the Congressional Record *in February.*

Now more than ever, I am proud to be a licensed amateur radio operator. It is important to realize that every HAM radio operator in the Amateur Radio Emergency Service is a volunteer. This year, when disaster struck, hundreds of HAMs moved to the Gulf Coast to help in every way they could. Every one of them did so on a volunteer basis and their only goal was to assist in what became one of the worst natural disasters in America.

The dedication displayed by HAM radio operators in the aftermath of Hurricane Katrina sets a tremendous example for us all. The people whose lives were rescued as a result of the tireless dedication of HAM radio operators will forever be grateful to these selfless public servants.

season in general and of Hurricane Katrina in particular, ARRL Headquarters was placed into a leadership coordination role through national-level requests for help from served agencies such as the American Red Cross.

The National Emergency Response Planning Committee will thoroughly evaluate the responses and actions of the ARRL and the Amateur Radio Emergency Service (ARES) during Hurricane Katrina, as well as lessons learned.

Ooops!

The computer doesn't work right. My fingers were too big for the keyboard. The keyboard on the laptop shrunk. . . .

Have you ever used one of these stories to cover a typographical error that you made? Well, sometimes you just have to admit that you made a typographical error and no spell check or word-processing fix is going to catch it. Unfortunately, that was the case in our December column. My apology to Charles Land, KC5NKK, of San Antonio, Texas. Land and members of Hill Country REACT and Travis County REACT deployed to Louisiana in response to the Hurricane Katrina disaster.

With Thanks....

As always, amateur radio public service is an adventure. You never know who will be called upon to supply communications at a moment's notice. You are never sure who will be in the right spot at the right time to provide valuable emergency communications. Do you have a story to tell of how you or your organization provided amateur radio public-service communications? Drop us a note.

This month we would like to thank the ARRL and AMSAT for providing some of the information. Until next time . . .

73, Bob, WA3PZO

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beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

The Baker to Vegas Challenge Cup Relay: A "Learn by Doing" Event

Each spring, law enforcement and related personnel from the U.S., Canada, and several foreign countries are deployed in a different sort of operation, the Baker to Vegas Challenge Cup Relay (B2V). The B2V is a 120-mile, 20-stage (or check point) relay foot race which starts in Baker, California (near Death Valley), runs through the California desert, and finishes in Las Vegas, Nevada.

Ham radio is an essential part of the event, and the B2V is a great modern example of one of the main functions for which ham radio was originally used: the relaying of messages to and from distant points. As a communications exercise, the Baker to Vegas event is a great way to learn about long-range simplex operations, operating in the field, staying self-sufficient, and using tactical call-signs. It is also a great way to enhance the ties between local law enforcement groups and public service-oriented ham groups.

Each stage averages from 4.2 miles to 8.2 miles over varying terrain. Ham radio volunteers follow each runner and his/her support team throughout the race. The ham operator volunteers' main function is to observe the baton pass and relay the exchange time along the radio network to the finish line in Las Vegas. Of course, a second and perhaps even more important function is to provide emergency communications if something were to go wrong, or if a runner or a team member were to become injured. This emergency communications network is vitally important to the race, since the mountainous terrain prevents most cellular phones from working.

Photo 2– To extend operating time, I equip my little Yaesu VX-5 dual-band HT with an external gel-cell carried in a small fanny sack. The fanny sack also includes several essential items, such as snacks, medications, a spare speaker-mic,and a small flashlight.

How can a small handful of ham radio opera-

*16428 Camino Canada Lane, Huntington Beach, CA 92649
e-mail: <kh6wz@cq-amateur-radio.com>

Photo 1– An easy way to make an external battery pack for your HT is to use the manufacturer's accessory cigarette-lighter cord, a lighter socket, some wire, and a small rechargeable lead-acid gel-cell. (Photos by the author unless otherwise noted)

Photo 3– When using an extended, gain-type antenna on your HT, remember to "cradle" the radio in your hand to prevent damage to the antenna connector.

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tors using VHF handie-talkie (HT) radios successfully keep tabs on the runners as they wind their way through the desert? The answer is, of course, that the radio hams must also "run" the course, following their teams' runners in chase vehicles and sometimes on foot. The technique used by the City of Huntington Beach Radio Amateur Civil Emergency Service (RACES) includes the use of several coordinated FM simplex and repeater frequencies for its team's race communications. Other groups may do different things for this event.

Failure is Not an Option

Since the event is very important and the venue is a long way from home, the communications team must be very well-prepared. The best way to be prepared to "do" B2V is to participate in communications drills and exercises. When possible, B2V "newbies" are paired up with more experienced personnel to watch and learn the tricks and techniques of doing a long-duration, long-haul communications event. In this case, "experienced" means the person has participated in a B2V event at least once.

The ham stations in this event must not fail. This means that preparations must include more than just a spare battery pack in your pocket. Using hand-held radios in the field without the assistance of a strong repeater is a challenge for both personnel and the radios. Battery packs, interference from other team communications going on at the same time, and unpredictable weather conditions in the desert can spell disaster for the communicator and the rest of the team if one is not properly prepared.

Equipment Readiness

One technique to use to ensure you have enough battery power for a small handie-talkie transceiver is to replace the

Photo 4– This "portable-mobile" station can be removed and installed into another vehicle in less than five minutes. The scrap-wood board has a comfortable handle to make it easy to carry. A magnet-mount antenna is used on the vehicle roof or the trunk lid to complete the station.

standard battery pack with another, larger capacity battery. The easiest way to do this is to use the radio manufacturer's accessory cable intended for powering the HT via a cigarette-lighter socket, and a 12-volt gel-cell (see photos 1 and 2).

The battery shown in the photo is rated at 5 Ah. I selected this particular battery and amp-hour rating based on its weight and size. It fits into a small fanny sack, and although a bit on the heavy side, fits comfortably on my belt. I can run the HT

Photos 5 & 6– The Huntington Beach Police Department B2V Follow Vehicle is equipped with amateur radios to maintain constant communication between all points along the 120-mile race course. The vehicle is also equipped with a GPS receiver interfaced to radio gear to enable real-time tracking using APRS.

all day using this battery with power to spare. When buying your gel-cell, don't forget to get a charger for it.

In addition to extending the operating time, a bonus feature is the transmit power, which on my radio goes up to 5 watts when 12 volts is applied. This is very useful when using non-repeater (simplex) communications.

Transmit and receive range can also be maximized by using an extended, gain-type flex antenna. When using a long antenna on an HT, you must be careful to not exert too much torque on the antenna, because the antenna connector might break off, rendering your radio useless and incurring an expensive, not-covered-under-warranty repair. Always remember to "cradle" the radio in your hand to prevent "antenna torque" on the connector. This is hard to show, but the idea is to hold the radio in the palm of your hand, and use your fingers to prevent the antenna from bending at the antenna connector. It is generally okay for the antenna itself to flex anywhere else along its length (see photo 3).

The on-foot operators (rovers) must have adequate personal supplies for the duration of their shifts, including food, water, clothing for hot and cold weather as well as rain, gloves, flashlights, sleeping gear, and medications. In other words, everything needed to be self-sufficient for an entire day.

For the vehicular mobile stations, the idea of interchangeability is important, since there is no way a radio can be fixed in the field. A broken radio must be replaced with a back-up unit. A power connector common to all radio equipment (and even all 12-volt operated gear) is highly desirable so that

Photo 7– Many portions of the Baker to Vegas relay must be run in the dark. The Follow Vehicle helps illuminate the road for the runner as a safety measure. A ham station inside the vehicle is used to relay information along the course and is also equipped with an APRS beacon to show the runner's location in real time. (Photo by Robert Thompson, KE6RKG)

Photo 8– Peter Shores, AD6TN, manned the portable communications command post in the city of Pahrump, NV, the mid-point of the race. Peter's communications van is equipped to operate on the HF to UHF ham bands as well as business (Land Mobile Radio) frequencies. Large antennas are mounted on masts to boost radio performance in both transmit and receive.

equipment can be swapped easily. Most, if not all, of the B2V communications team members have a standard DC power connector, the 30-amp Anderson Powerpole®. A similar and compatible power connector is the AMP Power Lock connector; the part number family is 53894-4.

Photo 4 shows a "portable-mobile" setup with an Anderson Powerpole cable feeding 12 volts to the rig. A mobile rig is securely mounted to a scrap wood board with a "Shaker style" handle cutout so that it can easily be carried. A magnet-mount antenna completes the station. When making a temporary mobile installation, remember to keep all the wires as neat as possible, and make sure nothing can interfere with safe and proper vehicle operation.

For antennas, if your group is not able to standardize on a single, specific antenna mount, it may be wise to be able to adapt from one type of mount to another, or keep a spare magnet-mount antenna on hand and in the trunk just in case something breaks or you need an additional aerial for setting up another station.

Operating Style and Procedures

With regard to frequency use, this event could be a perfect setting for "radio chaos," with several hundred teams (and radio transceivers) all transmitting at the same time. However, the B2V Communications Coordinators do an amazingly great job of keeping everyone organized by assigning specific frequency channels to use for specific purposes. To simplify frequency selection, the frequencies are renamed into "channels," and each channel has a specific function.

For example, "Green 1" is the main car-to-car simplex frequency, where most of the communications action takes place. There are also alternate channels to use in case something fails or interference becomes too severe. Repeaters are also renamed with a color-number name to simplify instructions to move to another frequency and to help minimize intentional interference from stations not actively part of the race communications network.

The use of the FM transceiver's sub-tone encode/decode feature by all members of the communications team is highly recommended to reduce interference. Although the use of a sub-tone is not guaranteed to eliminate interference, especially if stations are using the same frequency and the same tone, it will help. The sub-tone mutes the audio on an incoming radio signal, if the transmitted tone does not match the tone setting on the radio. In other words, if the HB RACES team has a setting of 127.3 tone encode/decode, and another team uses an encode/decode tone of 71.9, the feature prevents the transmitted audio from "the other team" from passing through the radio. The result is that multiple groups can use the same frequency channel and yet not interfere with one another. (It's very important in these situations to listen briefly before transmitting—turning down the squelch—to make sure you're not interfering with a contact in progress.)

The best way to avoid interference is to know when to *not* transmit and just listen. Unnecessary chatter is to be avoided on a busy communications network, and in fact, during the Baker to Vegas race a penalty is assessed against the running team for causing interference by talking too much. There is also a specific communications protocol to use, and the use of tactical callsigns is required to increase efficiency.

Tactical callsigns are fun to use. Each station has a specific job to do and is assigned a specific tactical callsign. This is done for several reasons, and the most important one is that in a long-duration event personnel might change, but the station and its function must remain the same. In order to

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Photo 9– Huntington Beach Police Officer Gaute "Bo" Svensbo completes the last leg of the 2005 Baker to Vegas Challenge Cup Relay in downtown Las Vegas, NV. The Huntington Beach Police B2V team completed the race in 15 hours 42 minutes and 00 seconds.

avoid confusion when operators change, the station tactical callsign remains the same.

For the B2V, tactical callsigns are a four-digit number. For example, the HB RACES Follow Vehicle is assigned tactical callsign 4201. A Rover Station on Team 1 is assigned tactical callsign 4250. A typical B2V conversation between these two stations during the race might go like this:

Follow Vehicle, 4201: "4250, 4201."
Rover 1, 4250: "4250."
Follow Vehicle, 4201: "Double-check to see if our runner is staged and ready to go at the staging area for leg 18."
Rover 1, 4250: "Roger. I have already checked the runner, and he is staged and ready to go. This is 4250, W6GOS."
Follow Vehicle, 4201: "Excellent, thanks. 4201, KE6OAQ, clear."

Notice two important things when operating with tactical callsigns: First, transmissions are extremely short, business-like and professional. Remember, there are hundreds of stations listening, and amongst the communications personnel are the spectators and the participants of the race and the race officials. Always remember that people are listening to what is being transmitted. Second, the station callsign being called is always transmitted first. This avoids confusion as to who is calling whom.

Of course, we all need to comply with FCC Rule 97.119(a) on station identification, which says that the amateur radio callsign must be transmitted at the end of each communication, and at least every 10 minutes during the communication.

Back to the Race

The course is divided near its half-way point, in the town of Pahrump, Nevada. The HB RACES communications team splits into two sub-teams. The first team meets the official "Follow Vehicle" at the designated staging area in California to install the ham radio mobile transceiver and an APRS beacon. APRS is the Automatic Position Reporting System, which interfaces a GPS receiver with a ham radio set, enabling real-time reporting of a station's location (see photos 5, 6, and 7). The radio installation is checked and certified by B2V communications officials, and the running team and the follow vehicle take their place at the starting line. The station in the Follow Vehicle is responsible for making sure the APRS beacon remains functional throughout the entire race. This enables spectators and race fans to see real-time location information of the team's progress along the 120-mile course.

Meanwhile, the "Rover Stations" for the first half of the race move out to their designated first stops. The Rovers are equipped with handie-talkies and travel on-foot as well as in their vehicles along the course. This position is probably the most exciting, since the Rovers get to watch the baton pass from runner to runner "up close and personal."

The Rover observes the baton pass, obtains the time, and passes the information to the Command stations. The Rover stations in vehicles act as a back-up for the HT communications, since their high-power mobile rigs and high-gain antennas can be used to relay the time information from the Rovers on foot to either Pahrump or Las Vegas Command, depending on where the runner is along the course.

Since it will be several hours before the runners arrive at the midway point, the second team continues to the town of Pahrump, and takes the time to verify equipment operation and get some rest before the second half of the race. At the same time, the Pahrump Command station and the Las Vegas command station are installed and checked for proper operation. Pahrump Command is responsible for relaying the baton-exchange timing information from the race course to the finish line in downtown Las Vegas. Las Vegas Command receives and posts the timing information for the runners' friends and family members. Photo 8 shows the Pahrump Command station from the 2005 race, and the HBPD runner crossing the finish line appears in photo 9.

The Baker to Vegas Challenge Cup Relay began in 1985 with 19 teams as a challenge for police officers to improve their physical fitness. The hams' role in this event goes back to ham radio's roots of public service and emergency preparedness and is a great example of how valuable ham radio communications can be in the desolate desert. It is also an excellent training event to learn the techniques of long-haul simplex communications and good practice in case your favorite repeater fails.

73, Wayne, KH6WZ

References

Official Baker to Vegas Challenge Cup Relay race site: <http://www.bakervegas.com>. Website dedicated to the ham radio activities for the B2V relay: <http://www.b2v.org>. A DVD showing ham radio's role in the B2V relay was shown at the ARRL Southwest Division Convention (Riverside, CA) on September 10, 2005. It is available for purchase via the site.

Anderson Powerpole by Anderson Power Products (APP): <http://www.andersonpower.com>.

Power Lock connectors by AMP/Tyco Electronics: Go to the Tyco Electronics website <http://www.tycoelectronics.com> and search for "Power Lock."

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BY DAVE INGRAM,* K4TWJ

Skeeters, 'Nauts, and more

Have you tried your hand at QRP contesting? It is great fun and everyone should give it a go, especially if you are new to QRP or still doubt its sheer communications/pull power. How to do it? Just listen around the popular QRP frequencies of 14.060 and 7.040 MHz on weekends (there are contests almost every weekend). Follow the format of the exchange and join the action. Typically, members of clubs sponsoring the events send RST, state, and club member number, while non-members send RST, state, and power level. You will be surprised how well low power works out, how many stations you can work in a short time period, and how sharp QRP operators are at copying weak signals. It is a most encouraging way to get started in QRP for sure! That's enough discussion about on-the-air fun, so now let's focus on . . .

Ten-Tec Time

If you have followed this column's topics over the last two years, you know we have been bringing newcomers up to speed by occasionally revisiting today's most popular QRP rigs. This month one of the most well-known names in QRP,Ten-Tec, is in the spotlight.

This Tennessee-based company started out producing 2-watt Power Mite QRP transceivers in both kit and factory-assembled form during the mid-1960s. It then dove headlong into the QRP market with the legendary Argonaut 505 and 509 transceivers. The tan-color-enclosure and "loaf of bread" size Argonauts were quite revolutionary for their time, with all solid-state circuitry and unbelievably smooth QSK.

During the late 1970s, Ten-Tec introduced a black-enclosure Model 515 Argonaut that boasted even greater performance and double the "eye appeal" (photo A). The 515 was surely Ten-Tec's most impressive Argonaut, but it was also the shortest lived—and the most difficult to find model today.

Several years later, Ten-Tec introduced the Argonaut II, a full-performance CW/SSB transceiver covering the 160- through 10-meter bands with 5 watts output and many of the deluxe features found in modern transceivers. This transceiver was followed a few years later by Ten-Tec's present QRP delight, the model 516, or Argonaut V (photo B).

The Argo V could easily be described as a dedicated QRPer's dream rig. It sports 160- through 10-meter operation, full shortwave reception, dual VFOs, 100 memories, scanning, built-in keyer and PSK-31 interface, Ten-Tec's famous QSK, and output power that is front-panel adjustable from a few milliwatts to 20 watts. Continuing the Argonaut tradition of embracing new technologies, the 516 also features IF-level DSP with 35 sharp-skirted bandwidths from 200 Hz to 2.8 kHz, passband tuning, and software-defined frequency coverage that can be upgraded from Ten-Tec's website.

*4100 S. Oates Street #906, Dothan, AL 36301
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Photo A– The somewhat scarce and oh-so-impressive Argonaut 515. This loaf-of-bread size gem was produced during the 1970s and solidified Ten-Tec's position in the QRP market. In addition to its illuminated dial and meter, a small lamp under its front bezel illuminates fine frequency marks on the tuning-dial skirt, while LEDs on each side of the bezel flicker with transmitted Morse. It is a real showpiece!

Photo B– Exhibiting even more glamour than its predecessor, Ten-Tec's present Model 516 Argonaut V is truly a QRPer's delight. It covers 160 through 10 meters with 0 to 20 watts output, has features galore, and sports Ten-Tec's world-famous QSK. (Details in text.)

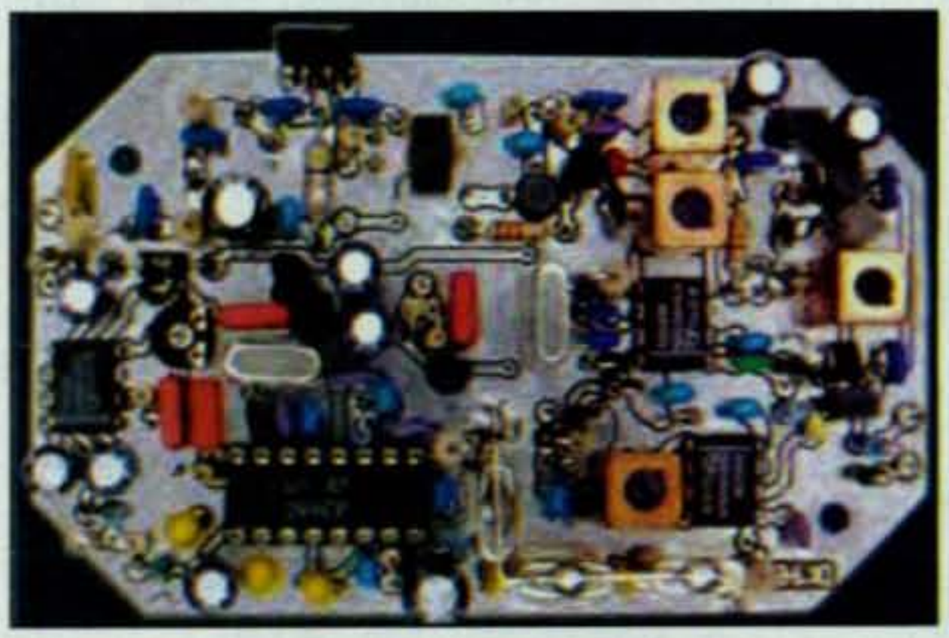

Photo C– This little one-board kit transceiver is produced in Germany, available to U.S. amateurs, and called Miss Mosquita. It has a quite sensitive superheterodyne receiver, a 5-watt transmitter, full break-in operation, and is easily powered by a 12-volt battery.

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Photo D– Miss Mosquita in her optional palm-size case bears a striking resemblance to those dear little pocket crystal radios of the 1950s. Now this is retro radio supreme!

Finally, the Argonaut V's small size and smart-looking front display give it an overall appearance of "big time QRP." This little rig let's you feel like you can work the world with QRP. Want more details? Check with Ten-Tec at 1185 Dolly Parton Parkway, Sevierville, TN 37862, telephone 1-800-833-7373, or at <www.tentec.com>.

Skeeters from Germany

Now shifting into the homebrew category, we invite you to study the neat-looking Miss Mosquita 40-meter mini-transceiver shown in photos C and D and fig. 1. This little gem is designed by Peter Solf, DK1HE; produced by Peter Zenker, DL2FI; and is a project of the German QRP Club. It can be ordered by U.S. amateurs via the internet. It sports a single-conversion superheterodyne receiver with IF AGC, full QSK, CW sidetone, 500-Hz crystal filter, .4 microvolt sensitivity, and a

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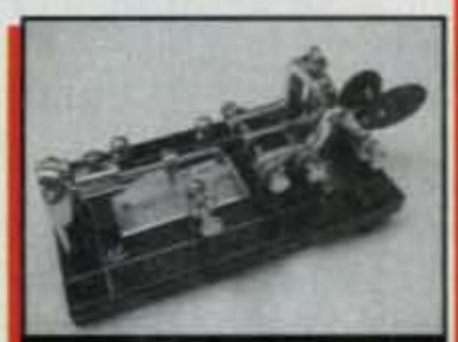
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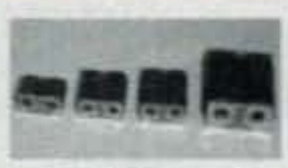
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dynamic range of 90 dB. The transmitter delivers up to 5 watts output, and the mini rig is variactor tuned by an FET VFO operating at 3 MHz for good frequency stability. Typical operating current requirements of 30 ma receive and 400 ma transmit make it ideal for portable operation using batteries. It is also fully contained on a single PC board for easy assembly.

The big attraction of Miss Mosquita and the feature that most captured our attention, however, is its optional palm-size case (photo D). The case has a marvelous retro look just like those dear Palm Radio crystal sets we enjoyed dinking with during the 1950s. Oh, the memories . . . the heartwarming glamour! A QRP rig in such a case is simply irresistible.

As we look closer at Miss Mosquita's block diagram (fig. 1), we see it uses a popular NE602 for mixing the VFO's 3-MHz carrier with incoming 7-MHz signals to produce a 4-MHz IF signal. A three-crystal filter then narrows bandwidth to 500 Hz for single signal reception. A desired signal is then IF amplified, sampled for AGC voltage, detected, and audio preamplified by an A244/TCA440 (apparently a German-produced IC). Resultant audio is then further amplified by a TDA 7050 IC (often found in commercially made transceivers) and directed to an earphone or speaker.

On the transmit side, the 3-MHz signal from the VFO heterodynes with a 4-MHz carrier generated by another NE602 to yield a 7-MHz signal. That signal is amplified by a BF199, further boosted by a BFR98 transistor, and used to drive a 2SC1969 transistor at up to 5 watts output. Overall, I would say the circuitry is slightly more complex than a RockMite but still in the "easy brew" category.

Is your time for homebrewing and winding coils limited? No problem. This kit is even available with pre-wound and tested (in a working Skeeter) coils and VFO section, and it still fits in that beautiful retro case! For more details, check <www.QRPproject.de> or e-mail Peter, DL2FI, at <support@QRPproject.de>.

Beam in a Bag

Looking for a lightweight and field-expedient antenna for portable and/or home use? Need something you can quickly install to boost your success in weekend contests yet hide before those pesky CC&R patrols discover you having fun? Like a reasonable amount of signal gain to boot? Check out the two-element six-

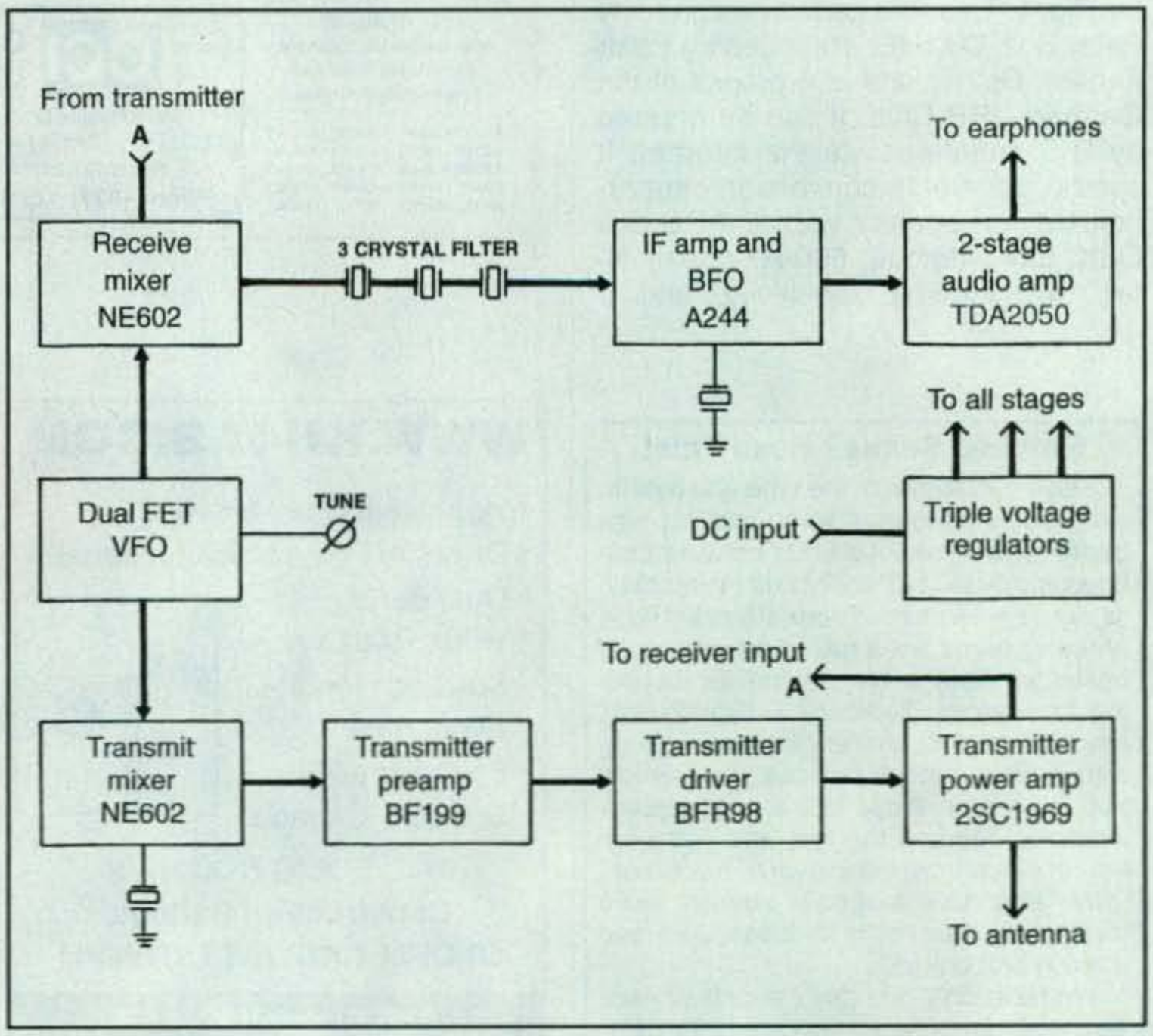

Fig. 1– Basic block diagram of the Miss Mosquita kit transceiver. (Discussion in text.)

Photo E– The Super Antennas' two-element Minibeam laid out and ready for quick on-the-spot assembly. Everything–including loading coils, balun, boom-to-mast plate, and even a tape measure—stores in that 36-inch-long shoulder-strap bag. The antenna goes together in approximately 20 minutes and can be set for 20-, 17-, 15-, 12-, 10-, or 6-meter operation. (Details in text.)

band minibeam being produced by Vern Wright, W6MMA, of Super Antennas fame (photos E and F). It works 20 through 6 meters (coil swaps and element resets required for each band), handles up to 250 watts, and also has respectable front-to-back and forward gain figures. The minibeam has been on the market three or four years and has proven to be a winner. We are delighted to revisit it this month. It is also very compact and easy to install, a most important factor for those of us working alone on antenna projects. Somehow those big multi-element beams get larger and heavier every year.

The W6MMA Super Antennas Minibeam is supplied with its own 36-inch-long shoulder-strap bag for carrying. On-sight assembly and installation simply involve snapping together the three-piece boom, extending the elements to preset band lengths, attaching the loading coils and balun, and connecting the feedline. Clever QRPers use colored felt pens to mark each element's length for easy and foolproof assembly. W6MMA packs full dimensions and a deluxe tape measure with each antenna , so even "first time assembly" is a cinch.

Every time I have used this minibeam it worked like a champ. Due to low sunspot activity, I have only used it on 20 and 17 meters. It should prove a real romper on 10 and 15 during the better times ahead. It is the only beam antenna I have found that can be half-assembled in a hall or on a den floor, carried outside, and installed on each end of a boom attached to a leaned-over mast and hoisted up for use in only a few minutes. It is perfect for use at condos—now you see it; now you don't. More details on this minibeam are available at <www.superantennas.com>. Check it out!

Photo F– The Super Antenna two-element Minibeam assembled and ready for action on 20 meters. The boom is 84 inches long and tip-to-tip element length is approximately 210 inches. It is a neat medium-gain antenna one person can handle/erect and remove without assistance. It is the perfect answer for low-profile hamming.

Wrap Up

There is no doubt about it, friends: Running low power is one of the most fascinating aspects of amateur radio (naturally, and that's why QRP is booming in popularity!). Like many QRPers, I enjoy occasionally "pushing the envelope" in unusual ways to prove the merits of low power. During a recent 160-meter contest, for example, I operated Topband mobile CW using a home-concocted whip antenna. The loading coil was exceptionally long and made of fine wire, so I held power to only 20 watts. Factoring in the short antenna and high IR losses, radiated power was 5 watts at best. In only 45 minutes I filled a full log page with contacts. Reviewing the log afterwards revealed an approximate 70-percent QSO-to-call ratio. Truly, a little QRP goes a long way!

73, Dave, K4TWJ

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BY DON ROTOLO,* N2IRZ

This and That

Ah, the cruel fates. I truly believe that they are conspiring against me to prevent you from seeing this column. I, however, have more fortitude and ingenuity than they do. You see, after spending the last few months discussing the computer and internet side of digital, it was time to swing back the other way and get into some operating issues. I just love playing with new software, and based on the responses to my columns, many of you do, too.

However, it is not yet to be. N2IRZ is presently QRT, having accidentally severed my hardline runs out to the tower. You see, I live on a decent-size suburban lot, and to ensure the neighbors did not have to suffer the attractive nuisance of my Rohn 45 tower, I put it way in the back yard, about 90 feet from the house, right next to the garden shed. When I installed it, I also installed two PVC pipes and ran six pieces of hardline and some auxiliary control cables out to the shed. (As a side note, both the hardline and the tower were salvaged from the QTH of the late Hazard "Buzz" Reeves, K2GL. That's a story in itself, but some other time).

While excavating for the footings of a new sun deck (using the exact same backhoe, in fact), I accidentally dug up the hardline pipes, doing irreparable damage before I realized it. I really thought I knew exactly where the pipes were and was supposedly digging three feet away from them, but it turns out I hit them dead center.

The moral of the story is make sure you identify where stuff is buried. I'm now in the process of deciding what to do about it. There's no way I can afford to replace the hardline, and all the pieces I have are now too short to reach the shed. As soon as the weather cooperates (i.e., we get a major snowfall or ice storm), I'll put in a temporary run of Belden 9913. For now, though, QRT it is. I'm hoping that by June I can get on the air again and write about some new modes.

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e-mail: <n2irz@cq-amateur-radio.com>

Wait for It . . .

I had considered writing about building a new computer. The one I have now is getting on in years, being a 300-MHz AMD machine with a 6-GB hard disk. Actually, I'm really not all that unhappy with its performance, since most of what I do with it is write these columns, along with a lot of PSK-31 and the like. What's prompting me to upgrade is the fact that it takes well over 12 minutes to boot up, and then I have to immediately restart one out of every two or three boots. The problem is easily under-

Photo 1– A local computer show, which in many ways is like a hamfest for commercial vendors, is often a good place to buy the components for a new computer. Caveat Emptor, of course.

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stood: The Windows® Registry is just so full of junk from installed and uninstalled software that it simply takes a long time for everything to happen. I suppose I could just format the hard drive and reinstall what I need, but I have my reasons for not wanting to do so.

Perhaps you have the same problem. I don't have any easy solutions, though. One idea was to buy the cheapest IDE hard drive I could find and make that the *boot disk*, but I'd still lose the ability to run some of the software I have. Thus, a new computer it shall be, with this one booted only once in a while when I need something I couldn't back up.

Something about all this struck me as funny. When I was a kid, we'd have to sit and wait a minute or two for the television to come on. First you'd hear the audio crackle to life, and then the picture tube would slowly light up (anyone with a tube rig knows what I mean). Today, with everything solid state, there's no need to wait for the tubes to warm up. Instead, we have to wait for the instant-on, solid-state devices to boot. It's amazing to me: For all the movement forward we have made since the 1960s, we're still waiting for our electronic gadgets to "warm up" before we can use them.

G3RZP, explained in great detail why my estimates were off just a little bit. I will admit that it took me a week to figure out exactly what he was saying to me, but once I did, I was certain that he is correct. While Peter did not dispute 5 kb/s, his experience shows that a more realistic bandwidth of around 7 to perhaps 10 kHz would be adequate, even considering Forward Error Correction and other overhead.

His comments were based on real-world experience and some back-of-the-envelope calculations, and relied upon a scheme such as 16-carrier OFDM (Orthogonal Frequency Division Multiplexing, like the Digital SSTV system I described last year) with Reed-Solomon encoding, allowing for something like a 1 in 10e5 final Bit Error Rate from a raw BER of around 1 in 100. While there are some issues that would need to be addressed, such as the potential for a high PEP requirement if all of the carriers ended up in phase, that's an exercise for the future. The bottom line is that something around 9-kHz bandwidth should be adequate.

By the time you read this, the time for comments to the FCC on the ARRL's Regulation by Bandwidth proposal will have expired, although there will be an

D-Star ID-1

Just a few days ago, Rich Moseson, W2VU, loaned me a brand-new ICOM ID-1 D-Star-capable 1.2-GHz transceiver (one of two loaned to *CQ* by ICOM). After February's column on D-Star, I'm ready to check it out for myself and see if it's all it seems to be. Rich didn't loan me an antenna, so it's off to the local store to buy one. Since my commute is only a few minutes, I think I'll try a small Yagi, since most of my operating time is from home. I need to hit the Empire State Building from here, which is not quite line of sight, so it will be an interesting experiment. I doubt that I'll be able to mount the antenna on the tower. That would be well over 150 feet of coaxial cable, and at 1.2 GHz attenuation is high, so I'm thinking that it will have to be on the roof somewhere. I hope to have some experience and helpful comments for June.

Regulation by Bandwidth

The December column on HF bandwidth generated quite a number of comments. One, in particular, took me to task for my "requirement" of 25-kHz bandwidth for HF digital operations. In what turned into a series of pleasant e-mail exchanges, Peter Chadwick,

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Photo 2– When you open the box of an ICOM ID-1 D-Star Transceiver, there's some stuff you might not expect, such as Ethernet and USB patch cables and a CD-ROM for programming the radio. As W2VU said in February's issue, "This ain't your father's radio." I can't wait to get it on the air.

additional opportunity when and if the FCC issues a Notice of Proposed Rule Making based on that petition and on the preliminary comments received. In mid-January, CQ Communications, Inc., the parent company of *CQ Amateur Radio* magazine, filed comments that are generally supportive of the proposal, but highlight a number of possible improvements that should be considered. One of these was a proposal to allow bandwidths of up to 9 kHz in the top 50 kHz of each band, which would "accommodate AM and other modes that are wider than a current SSB signal, such as expanded SSB, which is currently legal and would be prohibited under the ARRL proposal." CQ's proposal, if adopted, would resolve the issues I brought up in December, and of course it has my support.

Encryption under Part 97

Another issue that has surfaced regarding emergency communications in times of disaster is encryption. We all know that encryption is generally prohibited on amateur bands, except under very specific circumstances (which essentially makes the encrypted data easily decrypted by anyone). While most would agree that this is a good rule, we seem to have run into a roadblock: Federal law (HIPAA) sets certain standards for the confidentiality and privacy of medical records, and this means that amateur radio would be in violation of the law if medical information was sent "in the clear."

This is quite a dilemma. Emergency traffic that would be needed the most—someone's medical condition—may not be sent via amateur radio under current regulations. I see at least two ways to resolve this: Either provide for a blanket exemption in times of disaster, or allow encryption on the ham bands.

The first idea would go a long way towards resolving the issue. The only problem is that the legislative process is often slow and cumbersome and realistically might not come to pass before the next major disaster. The second idea creates a whole different set of problems, such as how to ensure that authorized users can see the data, while keeping everyone else's prying eyes away, especially considering that the list of "authorized users" changes rapidly and frequently in a volunteer organization such as ours.

Before I hear from you that "encryption is prohibited by international treaty," please note that I am speaking about frequencies above 50 MHz, where the treaties do not apply. In most cases, such information would be running on frequencies where there are a significant number of Part 15 users, such as an 802.11b WLAN on 2.4 GHz. The ARRL's High Speed Multimedia (HSMM) working group is studying this issue at the moment, so I expect that we'll all be hearing more once they have a chance to consider the details. If you think this is a good idea, I urge you to mention it to your ARRL representatives.

Speaking of WLANs, we've discussed the use of Part 15 equipment, such as 802.11 gear, in building a high-speed LAN under Part 97. Even though we have priority over and are protected from Part 15 users, we would be wise to remember that there are more of

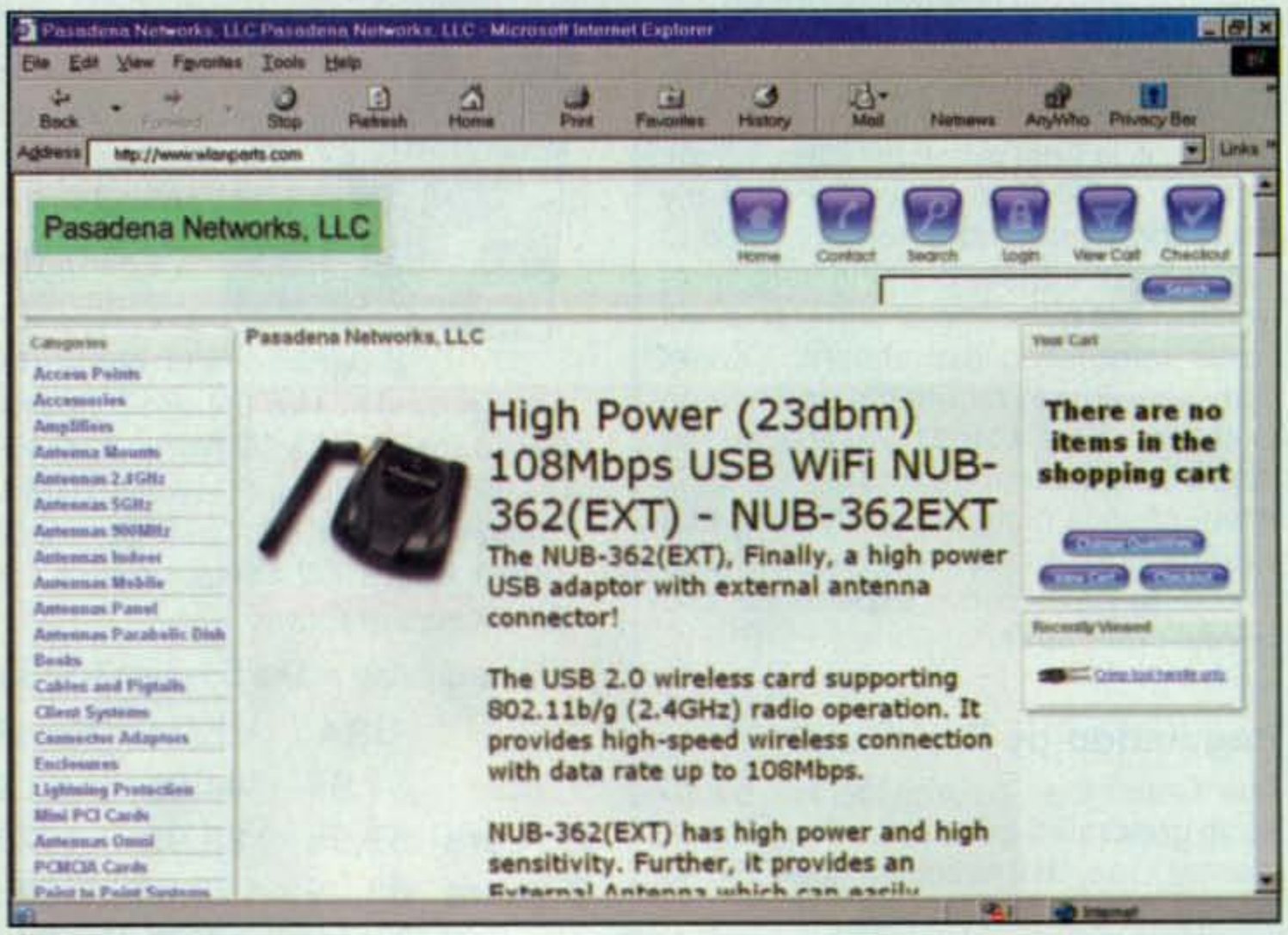

Photo 3– The home page of <www.wlanparts.com>, a great resource for professional-grade wireless LAN equipment at discount prices. See text for a special discount offer for radio amateurs.

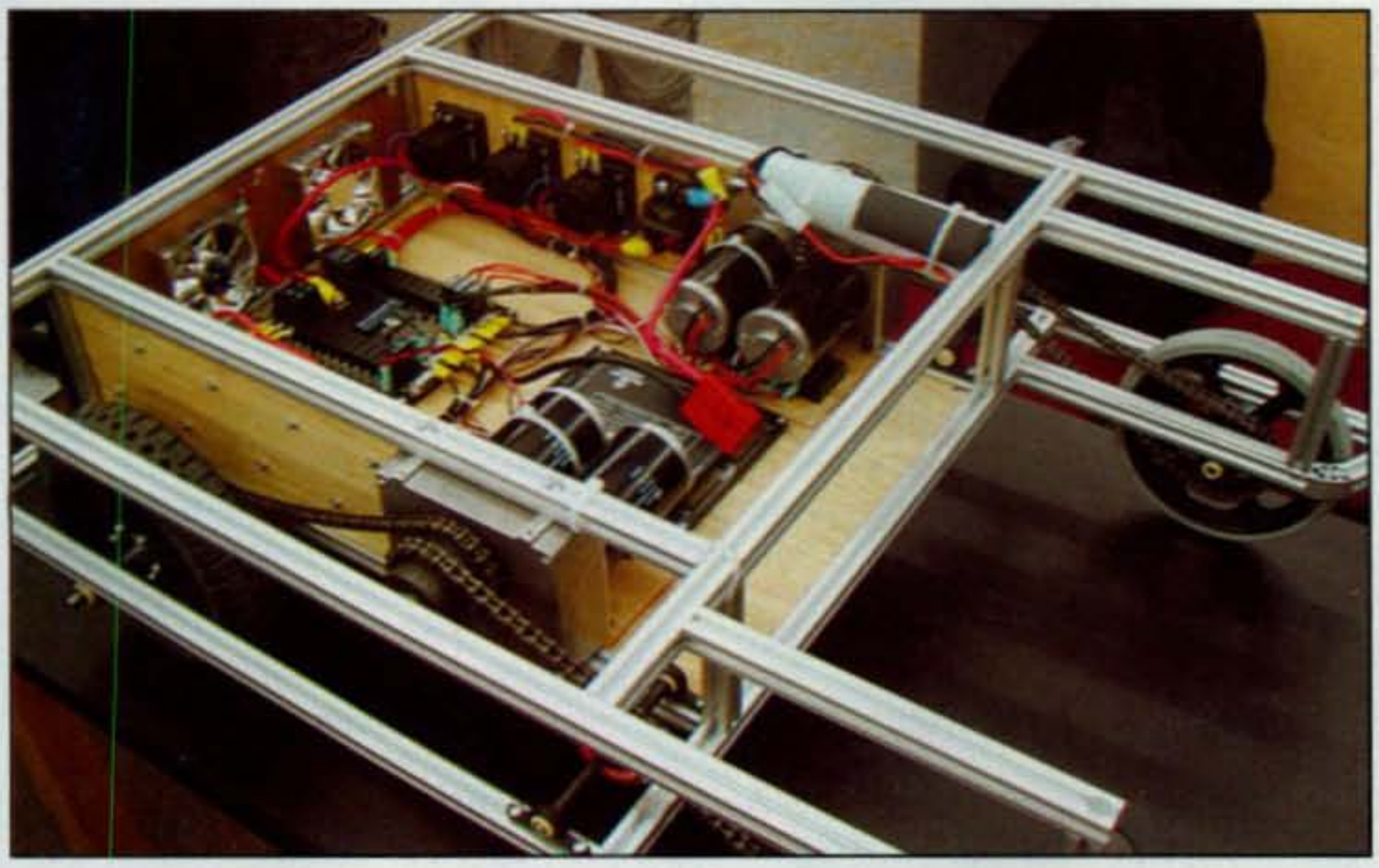

Photo 4– The state of FIRST Robotics team 1676's robot four weeks into the six-week build window. The plywood will eventually be replaced by polycarbonate, and the ball shooter and picker-upper conveyer still need to be fabricated and installed. It is completely designed and mostly built by high school students. (Photo by Zara S.; used with permission)

them than us. In other words, use your advanced radio expertise to avoid interfering with Part 15 devices wherever possible; that's just good engineering practice, and neighborly, too.

WLAN Gear

Through the HSMM Working Group, I have learned that Frank Keeney, KG6JVE, of Pasadena Networks LLC, is offering an additional 5% discount off the published discount prices at <www.wlanparts.com> for amateurs who indicate their callsign or ARES information and HSMM in the checkout "notes." The <wlanparts.com> website carries a wide selection of access points, bridges, wireless cards, amplifiers, antennas, coaxial cable and connectors, and I recommend their site. Frank has also suggested a free PDF book, "Wireless Networking in the Developing World," found at <http://us.wndw.net>, which is described as "a practical guide to planning and building low-cost telecommunications infrastructure." This book is exactly what you have been looking for—a practical how-to guide written by people who are doing it for real. Best of all is the price.

FIRST Robotics

Before I sign off for this month, I want to bring a unique organization to your attention. FIRST (For Inspiration and Recognition of Science and Technology) Robotics uses a challenging robotics competition to get high-school-age kids interested in science and technology. Over 1000 teams participate now, from all over the world. Every team starts with the same Kit Of Parts, learns what the year's challenge will be on the same day, and then has just six weeks to design, build, and test a 120-pound robot which is tele-operated (like an R/C car) to perform the task. This year's game, named "Aim High," has teams shooting 7-inch foam basketballs into a goal almost 9 feet off the ground. This isn't battlebots. Instead, teams cooperate for the common good, under the credo of "Gracious Professionalism."

No matter where you are there is probably a FIRST Robotics team at a local high school. While you can find all the details at <www.usfirst.org>, what many of these teams need are technically competent mentors—people who know their way around technology and don't mind sharing that with some kids. I have been spending literally all of my free time—and sometimes that really isn't free (such as time spent writing this column)—helping Team 1676, "The Pascack Pi-oneers," (www.team1676.com) build their 2006 robot. By the time you read this, the 2006 season will be nearly over (the nationals, at the Atlanta Superdome, take place April 27–29), but just think of it as getting in early for the 2007 season. I've been having much more fun with this than anyone deserves, and I also see it as fertile ground for the next generation of amateur radio operators. If you are interested and don't know whom to contact at your local high school, start with the principal.

That just about covers it for this month. As I had mentioned, I am now taking some time to assemble a new computer and need to run some wires out to the tower so I can play with some new digital modes. Next time I'll tell you what I found. Until then . . .

73, Don, N2IRZ

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BY JEFF REINHARDT,* AA6JR

Trash, Treasures, and A Whole Lot of Fun

It was a unique gathering for our radio club. Most of the members had their wives with them and had already enjoyed a fine evening of conversation and a most delicious pot-luck dinner. It was time for the fun to expand.

A few weeks earlier the club's board had decided to try a slightly different format for its year-end gathering. In response to the ARRL's request for donations to the holiday toy fund for hurricane victims, we decided to do a "Trash & Treasures" auction, taking donated gear before the assembled multitude. Anything electronic was fair game.

Look Out, Christie's!

In the door came a wide variety of items, including spools of hard line, radios that didn't work, a few like-new transceivers, older 2-meter crystal-controlled FM transceivers, mobile antennas, some computer gear, SWR meters, antenna tuners, obsolete printers, some packet gear, and more. For the non-technical crowd, there was a gift basket full of snacks and some bottles of something or other inside. Known for being the quiet, shy, and retiring type, I was designated as the auctioneer.

Nostalgia's a Powerful Thing

The sight of those old crystal-controlled rigs was too much for some to resist. Perhaps it was the appeal of simpler days or owning a radio that could actually be worked on, but amazingly, the rock-bound units fetched some nice double-digit prices. They also make excellent packet or APRS radios, as their stability is terrific and they're very quick to switch into the transmit mode.

An older Kantronics KAM terminal node controller (TNC) also brought on a spirited bidding war, making its new owner happy with the acquisition of a unit that could do packet, RTTY, and several other digital modes. Throughout the bidding, the auctioneer knew he had a few "live ones" on the line and fed the flames of good-natured competition.

Not every item was in demand, however. A circa 1986 computer that probably cost around $3000 when new drew no bids. Not even the most guilt-laden plea—"Aw c'mon . . . it's for the kids"—loosened the purse strings. Then the lady sitting in the second row made a mistake. She scratched her nose. "SOLD to the lady in the blue top for one dollar!" "What? Who me?" Our good sport coughed up the dollar amid gales of laughter and a lesson was learned: Don't flinch around an anxious auctioneer!

Two Winners for The Same Item

A like-new, 2-meter mobile transceiver came up for auction. Eying a bargain, a bidder who several folks liked was hoping to pick up the rig to get active in ham radio. Some folks were really pulling for him, as he had also been overcoming some adversity in his life, but another bidder was very intent on making the purchase. As the price ascended into triple

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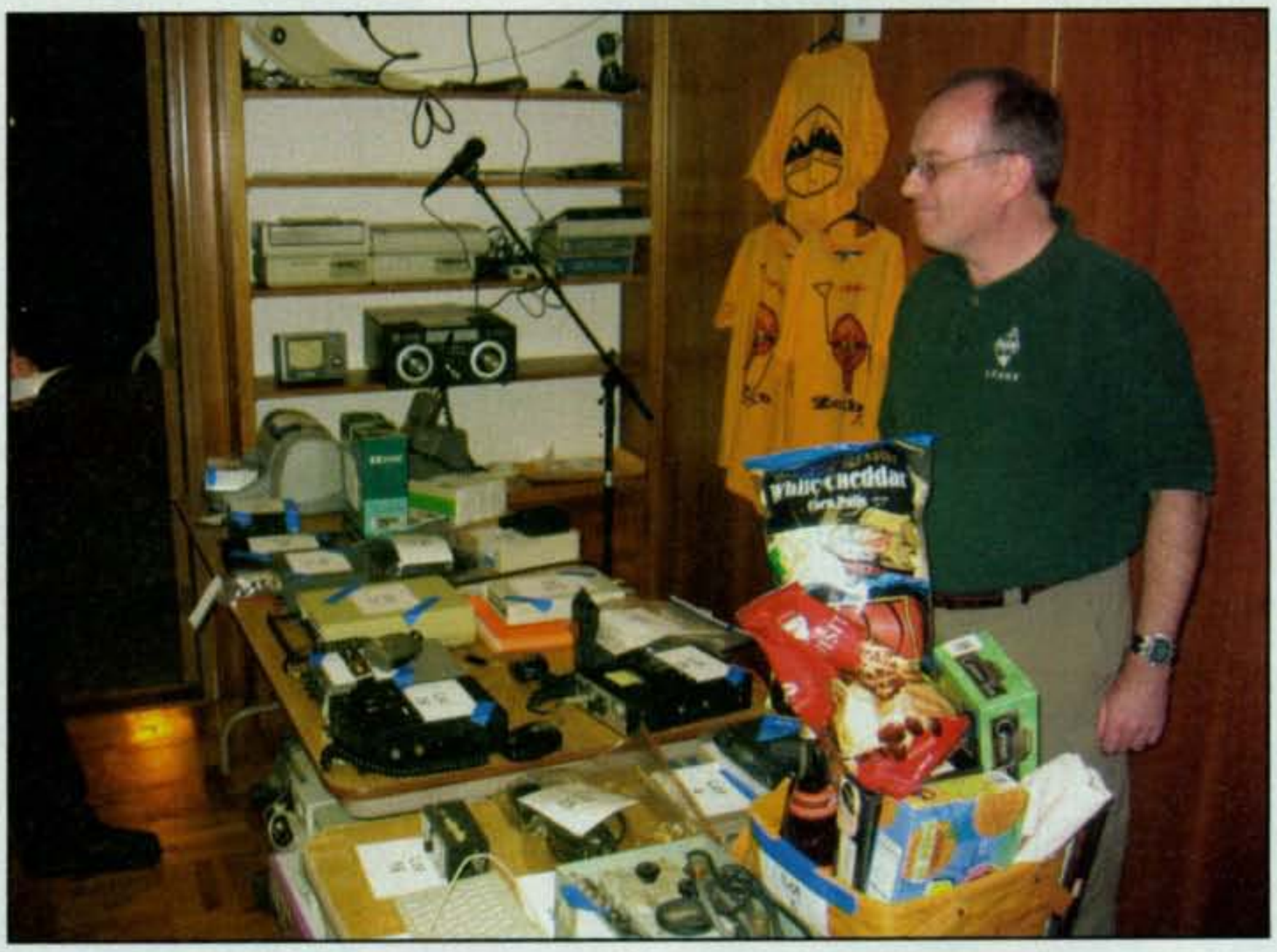
e-mail: <aa6jr@cq-amateur-radio.com>



Conejo Valley ARC president Steve Champion, AE6NX, looks over the table full of donated items to be used as fund-raisers for the Thousand Oaks, CA club's "Trash & Treasures" auction.

digits, there were some gasps as the price went higher and higher. Finally, the new ham hit his limit and dropped out. "Going once, going twice, SOLD."

The winner came up to the stage, peeled off the bills from an ample war chest, and accepted the radio. He then went to the back of the room, walked over to his competitor, and simply gave the transceiver to the other bidder. Gave it to him. Didn't bat an eye. It's one of the classiest things I ever saw.

For Every Treasure, a New Owner

"This little SWR meter has a meter on the left that works and one on the right that could." Sold for five dollars.

"This old handheld comes complete with the original packaging, which is probably worth more than the radio." Sold for seven dollars.

"We're not taking bids on this power supply; we're selling it by the pound..." Sold for ten dollars.

"I have no idea what this box does, but you can throw out a bid and try to discover its function yourself..." Three dollars for the mystery box.

"I have a gaggle of HF mobile antennas we're selling as a lot..." Forty dollars for the bunch.

Join The Fun

If you're looking for a different kind of club meeting, try the Trash & Treasures night. Not only is it fun, but it can get folks talking about old gear, interacting with one another in new ways, and raise some money for your Field Day fund, club equipment purchase, or a charity.

Don't forget to have some goodies for folks of all ages—and genders. Ladies can be very active bidders if the item has appeal. You don't have to restrict your fund raiser to ham gear, and very often local food outlets or "big box" stores will donate items to a charitable cause.

Be sure to publicize your event in advance (so folks can plan to bring some money), and don't be afraid to invite a neighboring club over to join the fun. It can also lead to some spirited bidding. Basically, when it comes to auctions, the more the merrier.

The Real Winners

When all was said and done, we raised $550 for the ARRL Toy Drive. We had a few laughs, found new homes for a lot of gear, and put some dust catchers back into useful applications. However, the folks at the auction were just part of the picture. We'll never see or know the "real winners"—that is, the kids who enjoyed a nicer holiday as a result of the fund-raiser. Kudos to the ARRL and all the volunteers who made the toy drive a huge success.

The storms of last year inflicted severe hardships to be sure. Hopefully, they're fading from the memories of some children, those dark Katrina moments being driven away because of generous hams sharing the joy they derive from the "Magic In The Sky."

73, Jeff, AA6JR

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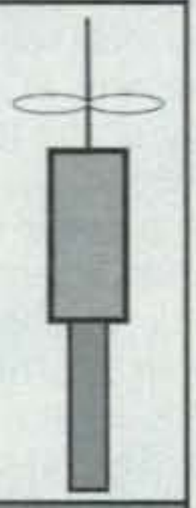

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Oops...

The table of maximum bandwidths proposed by the ARRL in its FCC petition and reported in February's "Washington Readout" (p. 69) contained an error in the row for 6 meters. The band segment of 50.100 to 50.300 MHz should have been in the 3.5 kHz column rather than the 500 Hz column. There are no frequencies on 6 meters proposed to have a bandwidth limitation of 500 Hz. *(Tnx K1SG)*

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BY KARL T. THURBER, JR.,* W8FX

Signal Generator, OCF Antenna, RF Ammeters, and more

This month, we again shine *CQ*'s bright product spotlight on a wide variety of accessories for the radio shack, antennas and antenna accessories, and books, taking a look at "what's new" in our great radio hobby. Are you ready to proceed? Well, then, let's dig right in.

Accessories for the Shack

Novatech Model 408A Signal Generator. Novatech Instruments, Inc. is a manufacturer of high-end, top-quality Direct Digital Synthesizer (DDS) Signal Sources and Rubidium Frequency Standards. The firm has been in business since 1989, and it manufactures its products in Seattle. All the products can be shipped worldwide.

One of Novatech's newest lab-quality products is the Model 408A 100-MHz Quadrature Signal Generator. The Model 408A is a 100-MHz direct digital synthesized signal generator in a small tabletop shielded enclosure (see photo A). The unit generates sine/cosine and ACMOS/TTL output signals simultaneously up to 100 MHz in 1-µHz steps under serial control.

The RS232 interface uses simple text commands to control the module and also allows non-volatile storage of all settings. The 408A is equipped with a built-in, high-accuracy ±2-ppm clock, or it can be set to accept an external clock source up to 300 MHz. The Model 480A operates from +12 VDC supplied by the provided AC adapter, and host software is included with the unit.

For more information and product pricing, contact Novatech Instruments, Inc., P.O. Box 55997, Seattle, WA 98155-0997 (206-301-8986; e-mail: <sales@novatech-instr.com>; on the web: <http://www.novatech-instr.com>).

Photo A– One of the newest, lab-quality products from Novatech is the Model 408A 100-MHz Quadrature Signal Generator. The Model 408A is a 100-MHz direct digital synthesized signal generator in a small tabletop shielded enclosure. (Photo courtesy of Novatech)

Photo B– The Alpha Delta Model DX-OCF Off-Center-Fed 6-Band Antenna is designed for 75/80, 40, 20, 17, 12, and 10 meters. Unlike many antenna designs, the Model DX-OCF covers the entire 80/75-meter band with low SWR. (Photo courtesy of Alpha Delta Communications)

Antennas and Antenna Accessories

Alpha Delta Model DX-OCF Off-Center-Fed 6-Band Antenna. Alpha Delta is well known in the amateur radio community for high-quality products, notably antennas. Among these products is the new Alpha Delta Model DX-OCF Off-Center-Fed 6 Band Antenna designed for 75/80, 40, 20, 17, 12, and 10 meters (photo B). Unlike many antenna designs, the Model DX-OCF multiband antenna covers the entire 80/75-meter band with low SWR; its broadband design makes moving from band edge to band edge quick and easy.

The antenna also offers excellent performance across the entire 40-, 20-, 17-, 12-, and 10-meter bands with low SWR, meaning no more "fiddling with tuners." The unique, broadband off-center-fed (OCF) design reportedly makes this possible with

Photo C– The custom designed, integral 6:1 balun used in the Alpha Delta Model DX-OCF multiband antenna is permanently potted in a special epoxy potting compound for moisture- and corrosion-free operation. (Photo courtesy of Alpha Delta Communications)

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excellent efficiency. There is no external hardware to loosen or corrode—no external splices, connectors, or soldering in the antenna wire.

The custom-designed, integral 6:1 balun (photo C) is permanently potted in a special epoxy potting compound for moisture- and corrosion-free operation. It's internally crimped and hard-soldered to a gold pin, Teflon®-barrel, high-quality SO-239 coax connector. An integral PVC moisture-drip ring around the connector shields and protects the coax connection. A heavy-duty, 1-inch stainless lock-nut eyebolt supports the center insulator/balun for your support rope. According to the Alpha Delta folks, there is no other design like it.

The antenna also is said to be unique because the antenna wire is something you've probably never seen before: It is a flexible, 65-strand, 12-gauge PVC-coated wire, with every strand tinned to prevent corrosion. Thus, you should be able to erect this antenna and forget it even under severe weather conditions.

The antenna is custom designed for Alpha Delta by Buckmaster Antennas, and earlier versions have been providing excellent DX performance for many years. The antenna is said to represent the culmination of all the best design features of an OCF antenna.

The Model DX-OCF 6-Band Antenna is rated at 300 watts CW/SSB and is priced at $199.95 each, plus $8.00 s/h in the U.S. The Model DX-OCF-HP 6-Band Antenna, rated at 3 kW CW/SSB in designated bands, is sold as a prepaid special order only, for $259.95 each plus $12.00 s/h in the U.S.

Contact Alpha Delta Communications, Inc., P.O. Box 620, Manchester, KY 40962 (telephone 606-598-2029 for orders or 928-284-5553 for OCF antenna tech information; e-mail: <sales@alphadeltacom.com>; on the web: <http://www.alphadeltacom.com>).

Ameritron SDC-102 Programmable 10-Memory Screwdriver Controller. The Ameritron Model SDC-102 (photo D), at $119.95, is said to be a great new antenna accessory for mobiling, letting you save ten screwdriver antenna positions in memory. With the push of a button, you can quickly return to any saved position, and Up/Down buttons let you manually move the antenna to any desired position. A four-digit turns counter with bright, "see-in-the-sun" LEDs gives you precise antenna position.

The SDC-102 causes the antenna to always move to its desired position from the bottom, ensuring the motor is always loaded the same. The AutoPark™ feature automatically bottoms your antenna for parking in your garage, and it resets and calibrates your counter each time to eliminate antenna slippage and turns-count errors. Also, Ameritron's Dead-OnSTOP™ feature eliminates overshoot for dead-on stops, and the StallProtector™ feature shuts off stalled motors to prevent motor burnout.

Photo D– The Ameritron Model SDC-102 Programmable 10-Memory Screwdriver Controller is a great new antenna accessory for mobiling, letting you save 10 screwdriver antenna positions in memory. Details? Check this month's column. (Photo coutesy of Ameritron)

You also can monitor motor current for signs of trouble and to determine stall current; motor direction can be reversed so the Up button is always up. The SDC-102 is compatible with single/dual magnetic sensors, and sensor kits are available for using the SDC-102 with High Sierra and Hi-Q Antennas.

To order, check out various product details, get a free catalog, or find the name of your nearest dealer, contact Ameritron, 116 Willow Road, Starkville, MS 39759 (1-800-713-3550; e-mail: <ameritron@ameritron.com>; on the web: <http://www.ameritron.com>).

Antenna Update from Antenex. Antenex, designer and manufacturer of premier wireless communications antennas, has introduced SpringGuard™, designed as an economical accessory to protect mobile antenna coil springs from debris (photo E). Designed to fend off airborne particles as well as other natural debris such as small foliage, SpringGuard comes fully assembled and ready for use with Antenex Mobile Load Coil Antennas, which are whip-style antennas available for the frequency range 26.75 to 970 MHz. SpringGuard is sold with the spring accessory; buyers can add this accessory to their original antenna order or replace their existing Antenex spring with the Spring/SpringGuard combination. The MSRP for the SpringGuard is $17.36 with a chrome spring, or $19.50 with a black spring.

Photo E– Antenex has introduced SpringGuard ™, designed as an economical accessory to protect Antenex mobile-antenna coil springs from debris. See the column for details. (Photo courtesy of Antenex)

We also should mention that while most Antennex products are designed for business, commercial, and government applications, Antenex also offers a large family of amateur radio antenna products and accessories. The centerpiece of its amateur product line includes the patented Phantom® "whipless design" antenna series (not pictured here), which means that the antennas don't actually look like antennas, and they also allow for car washes without removing the antenna. Check out the Antenex website at <http://www.antenex.com> for more details on these interesting and unique products.

It's also interesting to note what spectrum users other than radio amateurs are "using and doing" in the antenna department. Antenex, for example, says it's poised to support anticipated future demand for 700-MHz communications technology. Forecasting incredible growth in the 700-MHz region of the

Photo F– Forecasting high growth in the 700-MHz spectrum region, Antenex is prepared with a complete family of mobile and fixed-station models; representative examples are depicted here. (Photo courtesy of Antenex)

spectrum, Antenex is already prepared with a complete family of mobile and fixed-station models (representative examples in photo F). They are looking to the future as 700-MHz public-safety and broadband providers are poised to take advantage of newly available frequencies while traditional television broadcasters turn to HDTV in the near future.

Antenex also is looking to the advanced technologies available with the 700 MHz band, including faster transmission of voice, video, and data over the same equipment. The necessity of local, state, and federal agencies to communicate through simultaneous police, fire, and EMS communications also will drive the demand for new antenna technology.

For more information and pricing, contact Antenex, 2000-205 Bloomingdale Road, Glendale Heights, IL 60139 (1-800-323-3757; e-mail: <sales@antenex.com>; on the web: <http://www.antenex.com>).

New RF Ammeters from MFJ. The MFJ-834 Coax In-Line Calibrated RF Ammeter ($69.95, photo G) can easily be connected between your antenna and tuner/transmitter/amplifier to measure antenna feedline current in three calibrated ranges. You can use it for tuning your antenna tuner/transmitter/amplifier for maximum radiated power, determining antenna feedpoint impedance, comparing antennas and tuners, troubleshooting, and checking for antenna system changes that can cause problems. You also can productively use the MFJ-834 to determine the best antenna tuner settings and to compare various tuners.

The new MFJ RF ammeters are said to be rugged, read accurately over 1–30 MHz in three linear ranges (0.3, 1, and 3 amps), and barely perturb the antenna. The meters have a large 3-inch lighted meter and use 12 VDC, or 110 VAC with the MFJ-1312D adapter ($14.95). The MFJ-834H is $79.95; it's like the MFJ-834, but has 3, 10, and 30 amps high current ranges.

Also offered is the new MFJ-836 "all-in-one" RF Ammeter/SWR/Wattmeter (photo H). The MFJ-836, priced at $129.95, is an all-in-one RF Ammeter/SWR/Wattmeter. With it you can quickly determine feedpoint impedance and monitor the antenna system for detrimental changes under power. The unit lets you read RF current in three calibrated ranges: 0.3, 1, and 3 amps. A large, 3-inch, lighted, easy-to-read cross-needle meter lets you read SWR, forward (300/3000 watts) and reflected power (60/600 watts) simultaneously.

With the MFJ-836, you are offered MFJ's exclusive TrueActive™ circuit which gives you true peak or average power readings; power it with a 9-volt battery and/or 12 VDC, or with 110 VAC with the MFJ-1312D adapter ($14.95). Also available is the MFJ836H, at $139.95; it's like the MFJ-836, but it offers 3, 10, and 30 amps high current ranges.

MFJ-929 IntelliTuner-Compact™. Also new from MFJ is the MFJ-929 IntelliTuner-Compact™, with the included new VirtualAntenna™ Memory System, at $219.95 (photo I). It lets you automatically tune any coax-fed or random-wire antenna over the range 1.8–30 MHz at full 200 watts SSB/CW. The tuner can match 6–1600 ohms, with SWR up to 32:1.

In the MFJ-929, you get a digital SWR/Wattmeter with a backlit LCD, an antenna switch for two antennas, a built-in radio interface, and built-in internal "Bias Tee" circuitry for remote tuner operation. MFJ's exclusive IntelliTune™, Adaptive Search™, and InstantRecall™ algorithms are said to give you ultra-fast automatic tuning with over 20,000 VirtualAntenna™ memories.

MFJ's new VirtualAntenna™ Memory System gives you four antenna memory banks for each of two antenna

Photo G– The MFJ-834 Coax In-Line Calibrated RF Ammeter can be connected between your antenna and tuner/transmitter/amplifier to measure antenna feedline current in three calibrated ranges. You can use the MFJ-834 to determine the best antenna tuner settings and to compare various tuners. (Photo courtesy of MFJ)

Photo H– The MFJ-836 is an all-in-one RF ammeter/SWR/wattmeter. With it you can quickly determine feedpoint impedance and monitor antenna system for detrimental changes under power. (Photo courtesy of MFJ)

Photo I– The MFJ-929 IntelliTuner-Compact™, with the unique VirtualAntenna™ Memory System, lets you automatically tune any coax-fed or random-wire antenna over the range 1.8–30 MHz. See text for details. (Photo courtesy of MFJ)

connectors; you can select up to four antennas on each antenna connector, and each antenna has 2500 memories. Thus, the MFJ-929 gives you 256 values each of capacitance and inductances for 131,072 matching solutions. This reportedly is four times the 32,768 matching solutions of competing products with only 128 L/C values each!

The MFJ-929 IntelliTuner-Compact™ measures complex impedance, R and X, of your antenna, computes the L-network values needed, and snaps in those components to give you an instant match. If the load is out of measurement range, the AdaptiveSearch™ feature determines the smaller subset from all solutions that can match a safe load, and then it searches only that subset.

A fast-response, high-resolution bargraph gives you an autoranging 20/200-watt power meter. In addition, The StickyTune™ mode gives you one-hand tuning by locking the TUNE button—just transmit to tune regardless of SWR. The new unit also has a highly efficient L-network, 10-amp/1000-volt relays, and RF-duty silver-mica capacitors. It operates from 12–15 VDC/1 amp or 110 VAC with the optional MFJ-1316 adapter ($19.95).

Also available is the MFJ-928, at $199.95; it's like the MFJ-929, but it is less the LCD and manual tune buttons. The MFJ-927 is $259.95; it's a weather-protected remote auto tuner for coax/ wire antennas, and it includes the MFJ-4116 Power Injector for remote usage. The MFJ-927 has most MFJ-929 features, but no LCD/buttons. Various other accessories are available.

All the MFJ products we have mentioned are protected by MFJ's famous No Matter What™ one-year limited warranty. Under it, MFJ will repair or replace (at their option) your MFJ products, no matter what, for one complete year.

To order any of these MFJ products, find the name of your nearest MFJ dealer, or request a free catalog, contact MFJ Enterprises, Inc., 300 Industrial Park Rd., Starkville, MS 39759 (1-800-647-1800; e-mail: <mfj@mfjenterprises.com>; on the web: <http://www.mfjenterprises.com>).

From the Bookshelf

Cisco 802.11 Wireless Networking Quick Reference. Wireless networking seems to be practically everywhere today. The *Cisco 802.11 Wireless Networking Quick*

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  - A simple way to adjust the transmit deviation on the FM GRC gear
  - Align a BC-611 handy-talkie without the special fixture
  - Get around the stuck-coil-slug problem in your TRC-77
  - Put your PRC-74B or 74C on 17 meters (and other useful PRC-74 mods)
- The HFpack Phenomenon – low-power HF portable operation
- Special section on simple, effective field expedient HF wire antennas
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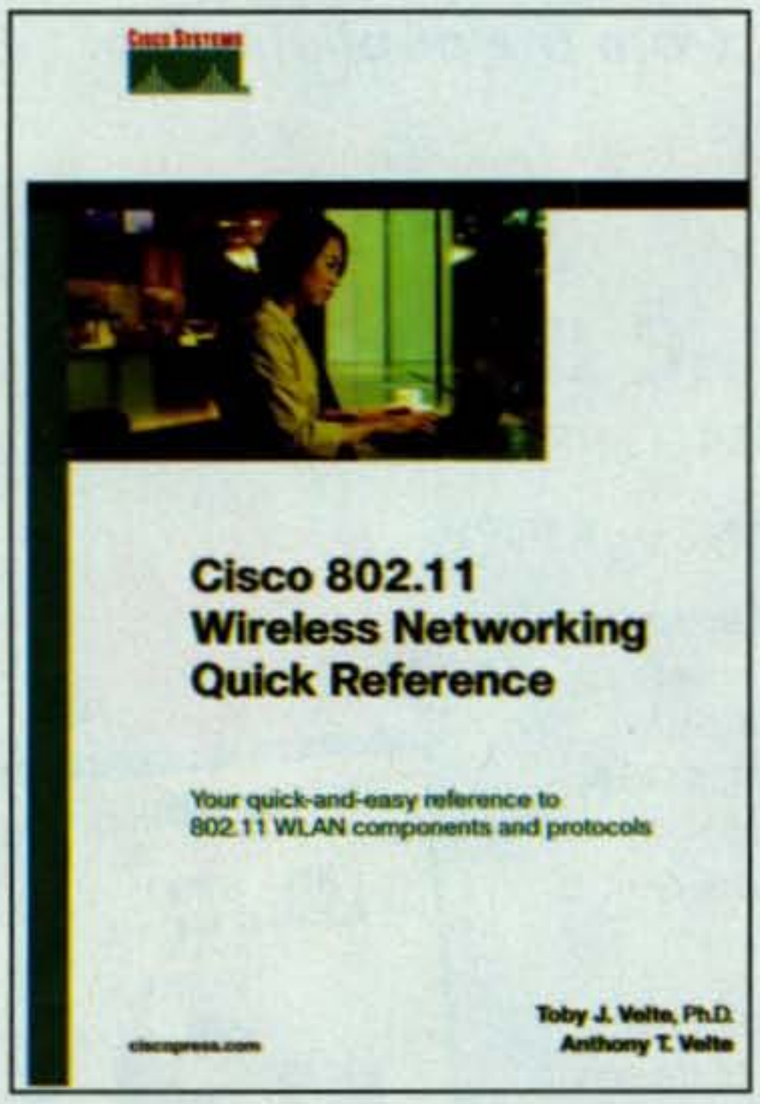

Fig. 1– The Cisco 802.11 Wireless Networking Quick Reference *is a portable guide to Cisco wireless technologies. This easy-to-use, hands-on pocket guide helps readers readily perform on-the-job tasks on wireless networks. (Graphic courtesy of Cisco Press)*

Reference (see fig. 1), by Toby Velte and Anthony Velte, at $25.00, is a portable guide for network engineers and administrators who are implementing or have implemented Cisco wireless technologies. This easy-to-use, hands-on pocket guide helps readers readily perform on-the-job tasks on wireless networks, and it serves as a quick reference to 802.11 WLAN (Wireless Local Area Network) components and protocols.

With it you can access wireless Cisco product information, including coverage on wireless client adapters and IP phones; learn the ideal configuration of access points, bridges, antennas, and routers for your specific situation; integrate a Cisco solution with various wireless networking gear; configure and troubleshoot access points and client devices promptly; optimize, secure, and tune your WLAN by following helpful tips and hints; refer to charts and tables that both network beginners and professionals can easily scan; and make the right overall wireless networking decisions.

Compact and convenient, the Cisco book is a concise reference that is divided into three easy-to-follow sections. It can be browsed occasionally or consulted regularly for a glance at a technical specification or that elusive command argument. Meant to be used in a hands-on capacity, this transportable guide is a practical tool when performing a variety of tasks on your wireless network.

The new book is part of the Networking Technology Series from Cisco Press. Cisco Press itself is a partnership between Cisco Systems® and Pearson Education, a part of the Pearson international media company, and is the official publisher of Cisco networking technology and Cisco certification self-study materials for networking students and professionals.

For complete information and ordering details, go to the Cisco Press product page at <http://www.ciscopress.com>. While at the website, you can download a sample book chapter. Also, if you buy the book, you will get free access to the online edition for 45 days.

We Get Letters

Before wrapping up things this month, your "What's New" column editor would very much like to acknowledge some of the good folks who took the time and trouble to correspond with us in recent months. We do appreciate your input to the column.

In no particular order, a tip of the ol' W8FX hat goes to Brian Wood, WØDZ; Ron Cook, VK3AFW; Don Sanders, W4BWS; Tom Schwinn, W4NBS; James Gatlin, N4YB; Dean Wathen, KF9DL; Floyd Sense, K8AC; Dean Straw, N6BV; Don Tyrrell, W8AD; and Donn Robidoux, N1XFS. By all means, gang, please be sure to keep those many cards, letters, faxes, messages, and e-mails coming to us—they indeed help energize your "What's New" column!

A special note to our column readers: If you e-mail us, please be sure to include with your e-mail your full name and amateur radio callsign, if you hold one. While you certainly need not hold an amateur callsign, it would be nice to know we're corresponding with a real, live person who actually reads the column, and not just acknowledging an e-mail address!

To contact your "What's New" column editor, just e-mail us at our *CQ* address, <w8fx@cq-amateur-radio.com>.

Wrap-Up

That's all for this time, gang. Next time, more "What's New." See you then.

Overheard: Don't forget that one really great but simple idea can change everything for the better.

73, Karl, W8FX

Note: *Listings in "What's New" are not product reviews and do not constitute a product endorsement by CQ or the column editor. Information in this column is primarily provided by manufacturers/vendors and has not necessarily been independently verified. The purpose of this column is to inform readers about new products in the marketplace. We encourage you to do additional research on products of interest to you.*

Looking Ahead in CQ

Here's a look at articles we're working on for upcoming issues of *CQ:*

- Results, 2005 CQ WW RTTY DX Contest and 2005 CQ National Foxhunting Weekend
- "Selective Fading," by Bob Shrader, W6BNB
- "Another Ham Radio Family Story," by Jimmy Walker, WA4ILO
- "Build a Hustler/Hamstick Combo Antenna," by Hugh Paul, W6POK
- "Design Your Own Coaxial RF Choke and Balun," by Benson Smith, KA4LBE

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BY JOE LYNCH,* N6CL

Peter I DXpedition: On the Moon and in Space

The highly successful 3Y0X Peter I DXpedition, which took place during February, managed both several EME contacts and at least one QSO with the International Space Station.

EME QSOs: Operating both JT65 and CW, what follows is the list of EME QSOs the 3Y0X DXpedition team completed, in callsign alphabetical order. Note that all contacts were made on 144 MHz. No QSOs were completed on 50 MHz and no 432 MHz station was ever set up. The principal VHF operator on the 3Y0X end was Gordon Hardman, W0RUN.

Unique callsigns: 9H1PA, AA7A, AA9MY, DF2ZC, DG6JF/P, DH3YAK, DJ7OF, DJ9CZ, DK1KO, DK3BU, DK3WG, DK8ZJ, DL1GGT, DL7UAE, DL8EBW, DL8GP, DL8YHR, DL9MS, DM2BHG, EA2AGZ, EA3DXU, EA6VQ, EI4DQ, ES6RQ, F1DUZ, F1TE, F6BKI, F6FHP, F6HVK, F8DO, F9HS, G0UWK, G4CBW, G4FUF, G4IGO, HA0DU, HA5OV, HB9Q, I1ANP, I2RV, I6BQI, I6WJB, IK1UWL, IK2DDR, IK7EZN, JH0MHE, JH2COZ, JH5FOQ, JM1GSH, K2BLA, K2TXB, K5GMX, K7MAC, K7XQ, K9KNW, K9MRI, KB8RQ, KC7V, KE7NR, LU6KK, LZ1DP, N9LR, OE3FVU, OH7PI, OM3WBC, OZ1LPR, PA0JMV, PA1GYS, PA1T, PA2CHR, PA3CMC, PA3FPQ, PE1BTX, PE1L, RA0FCA, RA0FU, RA0FW, RA3AQ, RA6AX, RA6DA, RK3FG, RN6BN, RU1AA, RX1AS, S52LM, S53J, S54T, SM2ILF, SM3MXR, SM5CUI, SM7BAE, SP2OFW, SP6GWB, SV3KH, SV5BYR, SV8CS, UR5LX, VK2KU, W4SW, W5UN, W7GJ, W7IUV, W8PAT, W8WN, YU1CF, and ZL3TY.

*e-mail: <n6cl@sbcglobal.net>

VHF Plus Calendar

April 2	Moderate EME conditions
April 5	First Quarter Moon
April 9	Moon Apogee and moderate EME conditions
April 13	Full Moon
April 16	Good EME conditions
April 21	Last Quarter Moon
April 22	*Lyrids* Meteor Shower Peak
April 23	Poor EME conditions
April 25	Moon Perigee
April 27	New Moon
April 30	Moderate EME conditions

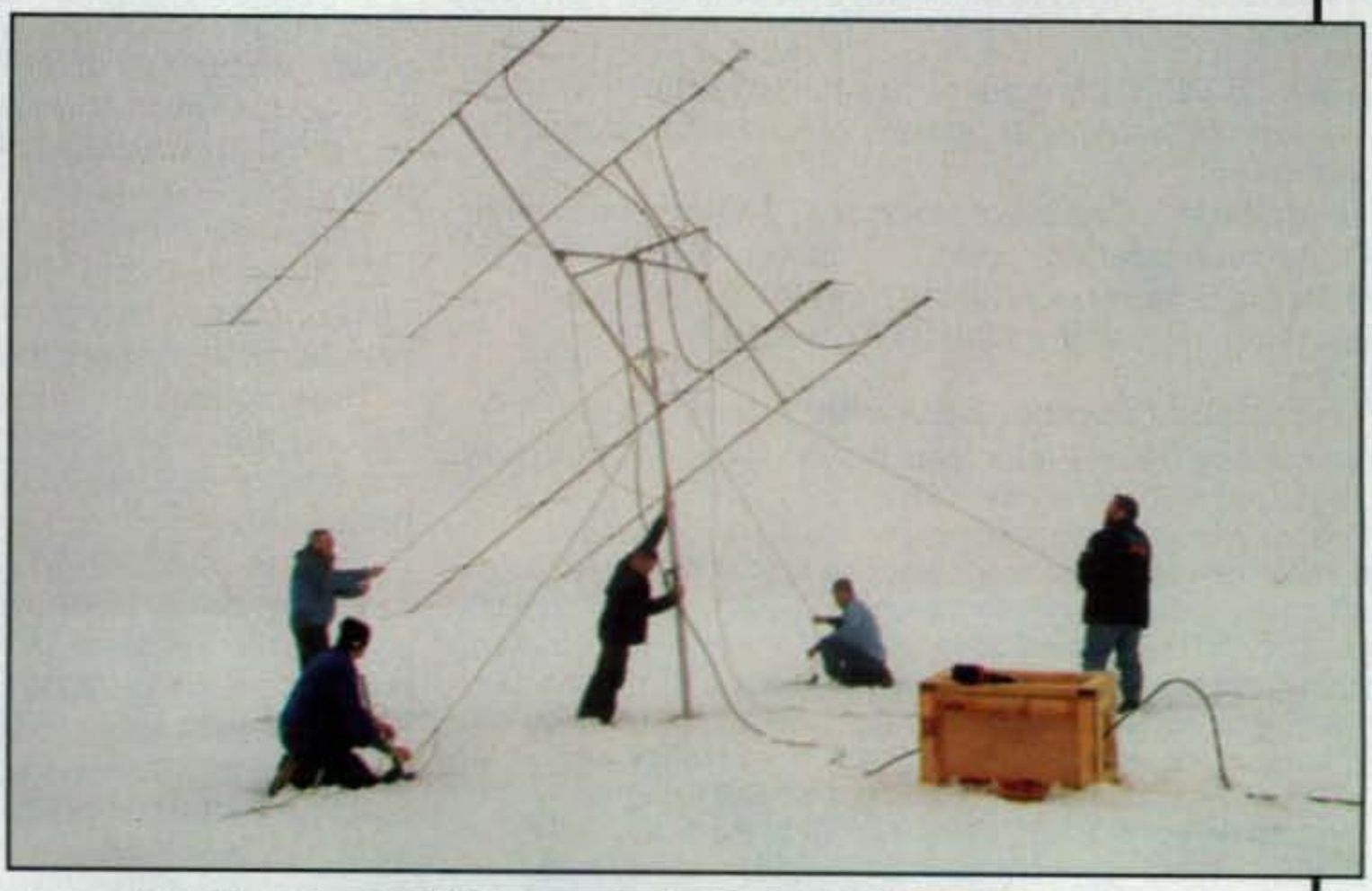
—EME conditions courtesy W5LUU.

The business end of the 2-meter EME station consisted of four 9-element M^2 Yagis (full az-el) and 300 watts from a TE System solid-state amplifier. The amplifier was to have been mounted remotely at the base of the antenna to minimize feedline loss.

The Murphy problems affecting the 2-meter EME station consisted of arcing in the battery charger for the amp, high winds affecting the positioning of the antennas, huge interference issues from the 80-meter CW station, and occasional power failures that would take the station off the air during prime moon time.

Even with Murphy's input, however, the EME operations were a very important part of the overall team effort to activate this very rare QTH. Devoting hardware and radios to the EME operations repre-

Gordon Hardman, W0RUN, principal operator for the 3Y0X operations. (Photo courtesy of the Peter I DXpedition team)



Assembly of the 2-meter EME array for the Peter I 3Y0X DXpedition. (Photo courtesy of the Peter I DXpedition team)

sented a significant recognition of this mode of communications and of the VHF ham bands in general. Thanks for their tireless efforts to make the VHF operations possible go to Bob Allphin, K4UEE, and Ralph Fedor, KØIR, both veteran DXpedition operators, and both veterans of DXpeditions to the Antarctic area, as well as Gordon Hardman, WØRUN, also a veteran DXpedition operator.

It was Gordon who made sure that the stations were working properly by making JT65 QSOs before the equipment was shipped. Also playing an important role was Lance Collister, W7GJ, who managed the QSO scheduling and was a lifeline, keeping the moon-net reflector up to date with reports from Gordon during the operations. It was from his preliminary report posted on his website (http://www.bigskyspaces.com/w7gj/3Y0XMoonbounceUpdate.doc) that I developed part of this story.

In spite of the failure of the 6-meter and 70-cm operations, the overall success of the 2-meter operations, coupled with the icing-on-the-cake ISS QSO, has given a significant boost to the idea of including a VHF and above component on future major DXpeditions.

Commenting on the EME QSOs, the Peter I team wrote on February 14th: "We're all excited about our nine 2M EME contacts last night, especially because it's never been done before. The Qs were widely celebrated by the whole team!"

ISS QSO: The first ISS QSOs took place on February 13th between Expedition 12 Commander Bill McArthur, KC5ACR, operating as NA1SS, and Gordon Hardman, WØRUN, at the controls of 3YØX. A subsequent QSO was made between a Russian operator at 3YØX and ISS crew member Valeri Tokarev, who used the Russian callsign RSØISS.

The following additional information pertaining to the NA1SS ISS QSO is courtesy the *ARRL Letter*, February 14, 2006:

> The contact occurred during a barely viable 2-degree pass. The 3YØX QSO pushed McArthur's count of DXCC entities worked from space to 104. McArthur already has worked all states and all continents during his duty tour aboard the ISS.
>
> Because the Amateur Radio on the International Space Station (ARISS) Phase 2 gear was in crossband repeater mode for SuitSat-1, McArthur used the lower-power Phase 1 Ericsson 2-meter gear for the contact. He reported good copy on 3YØX, which was using its moonbounce equipment and array for the event. The 3YØX team already was celebrating the nine moonbounce contacts it had made over the weekend.

This was Bill's 104th country. He had previously worked all states and all continents, including Antarctica, during his tour on the ISS.

More on Peter I: One other story on 3YØX pertains to longtime DXpedition operator John Thompson, W1BIH. John is known for his 6-meter operations from PJ9JT in years past. This following story is from the 3YØX website:

Just another QSO with Peter I

But was it? The call was from John, W1BIH, a veteran DXer. Now some of you are probably saying, "So what?"

John is 90 years old. He sold his complete station last year and moved into a retirement community. John was at his winter home of PJ9JT during the last two Peter I Island DXpeditions. On Thursday 09 Feb., Don, N1DG, picked John up and took him to his station. About thirty minutes later there was a big smile on BIH's face.

You see, that was John's last country (335 current) and he can now get back on the top of the Honor Roll. Oh, and by the way, Peter I was his country number 390 (including deletes)! Congrats, John!

Update, 13 February 2006: There's more to the "John and Peter I" story. He worked 3YØX from his retirement community station on 20 meters CW with 100 watts and a G5RV strung from his window 20 feet above the ground!

One more note pertaining to 3YØX: Each station was linked together via a local area network. This made it possible to link the logging software together so as to furnish the outside world a delayed access to the QSO records.

Hopefully, we will have more VHF related coverage on the Peter I DXpedition in next month's column and in a future issue of *CQ VHF* magazine.

(*Note:* This expedition was *very* expensive, with each operator shelling out thousands of dollars of personal funds to be a part of the operation. Your generous contributions to the operation will be most welcomed. Individual contributions of $50 or more should be made payable to the Northern California DX Foundation (NCDXF). Non-deductible contributions (such as from clubs) should be made payable to DX Expeditions, LLC. North and South American contributions are to be sent to Bob Allphin, K4UEE, 4235 Blackland Dr., Marietta, GA 30067-4705. Contributions made by individual taxpayers filing with the U.S. IRS should be tax deductible.)

SuitSat Deployed

The surplus Russian Orlan space suit outfitted with a 2-meter radio was deployed by the ISS Expedition 12 crew during a space walk on February 3rd. According to the *ARRL Letter* of February 3, 2006: "ISS Expedition 12 flight engineer Valery Tokarev released the unique and enthusiastically anticipated satellite into orbit February 3 at 2303 UTC as he and ISS Expedition 12 Commander Bill McArthur, KC5ACR, began a six-hour space walk. SuitSat-1 consists of a discarded Russian Orlan spacesuit reconfigured to function as a free-floating Amateur Radio transmit-only satellite. Activated at 2259 UTC, the satellite was programmed to come to life some 16 minutes later on 145.99 MHz. The 16-minute delay is said to be a crew safety measure. SuitSat-1's deployment over the south-central Pacific Ocean was the first task of the space walk." SuitsSat-1 later acquired the AMSAT designation AO-54.

Early-on reports of weak signals and of stations not hearing the satellite led to speculation that the transmissions had ceased. However, subsequent receptions by stations using large antenna arrays (including EME operators) confirmed that the satellite was still transmitting.

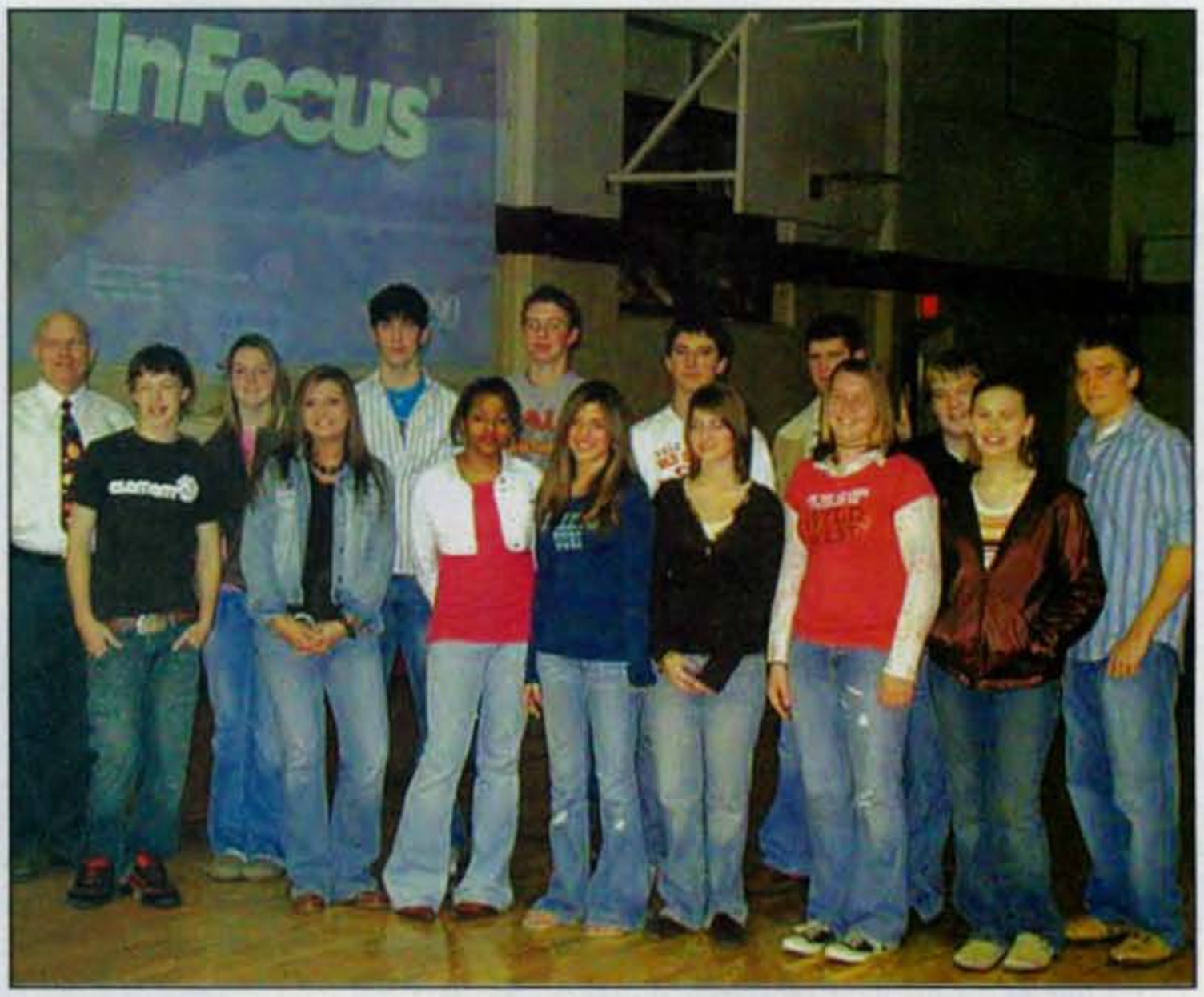
According to ARISS International Chairman Frank Bauer, KA3HDO, the cause of the loss of signal strength had been narrowed to the antenna, the feedline, the transmitter output power, and/or any of the connections in between. The anticipated output power of 500 mw was not achieved, and the measured output was estimated to be around 10 mw. As of this writing on February 16th, the satellite was still transmitting.

Transmitting on 145.990 MHz, the satellite identified itself as: "This is SuitSat-1 RSØRS." Included in its repeating transmissions were telemetry and an SSTV image on an eight-minute cycle as it orbited Earth.

The uniqueness of this satellite piqued the interest of media around the world. Your editor watched a brief report at the end of the Saturday edition of CBS's Weekend News broadcast.

A not so much talked about objective of the deployment of the spacesuit satellite was to test the feasibility of receiving a radio transmission from an astronaut or cosmonaut who had become separated from the mother ship and was floating helplessly away in space. Would it be feasible to communicate with this person? More important, could enough electronic information transmitted by the lost-in-space astronaut be gathered together in order to mount a rescue attempt? Hopefully, data gathered from SuitSat-1 and SuitSat-2, which is scheduled for deployment later this year,

SuitSat-1 ready for deployment. (Photo courtesy of NASA/ARISS)



The first back-to-back ARISS QSOs took place on the morning of February 7, 2006. The first of the two QSOs was with the Dale, Oklahoma public schools. Shown here are Dale High School ninth grade science students with teacher Gary Burkhart (left). (Photo courtesy of Coy Day, N5OK)

will go a long way toward answering these questions—and once again amateur radio will have played a major role!

(For more details on SuitSat-1, see this month's "Public Service" column, sidebar "Public Service through Education."—ed.)

ARISS Crew Change

The following is from the *ARRL Letter,* January 27, 2006: "The Expedition 13 crew of US Astronaut Jeff Williams, KD5TVQ, and Russian Cosmonaut Pavel Vinogradov, RV3BS—accompanied by Brazilian astronaut Marcos Pontes—is set to launch on a Soyuz rocket from the Baikonur Cosmodrome, Kazakhstan on March 29. It will dock on April 1. Expedition 12 is scheduled to return home April 8."

Back-to-Back ARISS QSOs

The first-ever back-to-back ARISS QSOs took place on the morning of February 7, 2006. The first of the two QSOs, this one with the Dale, Oklahoma public schools, took place shortly before 9 AM CST. This QSO was also the first with a school within the state of Oklahoma. The previous ARISS QSO in Oklahoma was with the Tulsa Air and Space Museum on December 22, 2004, when nine students from various schools in the Tulsa area and Texas had the opportunity to ask ISS Expedition 11 commander Leroy Chiao, KE5BRW, 18 questions during the nine-minute window.

Listening to the Dale public schools QSO were students from DeGolyer Elementary School in Dallas, Texas. Their turn would come on the next orbit.

However, for the first QSO in Dale, Ron Cochrane, KD5GEZ, guided 14 students through the procedure of asking their questions of Expedition 12

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Commander Bill McArthur, KC5ACR, operating as NA1SS. The QSO was the culmination of a school-wide assembly involving students from the elementary school as well as the middle and high schools and several parents. While their QSO was in progress, the students at DeGolyer Elemetary were listening to Bill's responses.

About 90 minutes later, the situation was reversed. It became DeGolyer Elementary School's turn, while students at Dale listened to Bill give his responses to the DeGolyer Elementary School students. At the Dallas end of the QSO was Bob Landrum, W5FKN, using the school's callsign, K5DES. During that QSO the 17 students each asked questions of Bill.

DeGolyer Elementary School has a long history of amateur radio involvement. It is one of the ARRL's Big Project schools. Students who participated in the contact are licensed amateur radio operators.

For the Dale students it was the icing on the top of an exciting morning. Although the school-wide assembly had long been completed, teachers gave special permission to the students who participated in the earlier QSO to stay out of class and witness the DeGolyer contact.

Fortunately for both schools, each had the other's question list, so the students of the non-QSO school were informed of the questions before Bill responded to them. In both cases local print and television media were present to cover the events, with articles appearing in the local newspapers and on local TV stations following the QSOs.

Keith Pugh, W5IU, was the mentor for the Dale public school contact and is planning to write an article about both contacts for the Spring 2006 issue of *CQ VHF* magazine. My appreciation goes to Keith and to John Thomason, WB5SYT, the ARRL Oklahoma section manager, for assisting me in covering the Dale QSO.

Bob Landrum, W5FKN, assists students with the microphone while Harold reasoner, K5SXK, operates the 2-meter radio and controls an azimuth/elevation rotor for the antenna on the roof. (Photo courtesy of Tom Blackwell, N5GAR, and the ARRL Letter*)*

Meteor Scatter and Tropo-scatter Extensions of Tropo-Ducting

The following by Rex Moncur, VK7MO, was taken from Shelby Ennis, W8WN's website: <http://www.qsl.net/w8wn/hscw/papers/met_ext.html>:

On 27 January 2006, Bob, ZL3TY, worked Dave, VK2AWD; Dave, VK3HZ; Rhett, VK3VHF; and Rex, VK7MO on JT65 on 2 meters. There were two interesting things:

First, there was a strong tropo-duct opening to Sydney that was allowing Bob to work this VK2 (around Sydney) on SSB, but the Hepburn chart showed this did not extend to VK3 (around Melbourne) and VK7 (around Hobart) and no SSB contacts were made more than 100 km south of Sydney. The extra sensitivity of JT65 allowed an extension well beyond that indicated by Hepburn, but still took advantage of the tropo-duct at ZL3TY's end. From the Hepburn chart it would appear that the first 500 km or so from VK3/7 would have been achieved by tropo-scatter and the last 1500 km by tropo-duct. From this one can conclude that it is worth attempting JT65 contacts when ducts do not

Students who previously participated in the Dale public school QSO, plus others, gathered to listen to Expedition 12 Commander Bill McArthur, KC5ACR, respond to the DeGolyer school students' questions. ARISS QSO mentor Keith Pugh, W5IU, is at the controls of the Dale ham radio station. (N6CL photo)

extend over the full path–up to a farther 500 km or so to take advantage of possible multimode propagation.

Second, the JT65 contacts were affected by meteors, and both Bob, ZL3TY, and Dave, VK3HZ, Melbourne, noted many meteor pings on a path of 2287 km. In the past, attempts at meteor scatter over this path have not shown any pings at all. The fact that meteors were being received suggested that tropo-ducting might be extending the range of meteor scatter. A little later, Garry, VK5ZK (at Goolwa, 2892 km from ZL3TY), reported he could see some pings from Bob's JT65 transmission and a sked was set up using FSK441. Bob decoded a number of pings from Garry. Peter, VK5ZLX, at Angaston (2919 km) then reported pings from Bob and started transmitting. Bob also saw pings from Peter. The best was a short burn of 1.1 seconds reported by Peter.

The following day, ZL3TY made numerous SSB and JT65 contacts into VK3/7, as far as Melbourne, indicating that the duct had extended farther south and farther towards VK. A further attempt was made between ZL3TY and VK5ZK/VK5ZLX, but only one decodable ping was received by ZL3TY. A few hours later, when the duct was no longer reaching Melbourne, a second attempt was made and VK5ZK received five decodable pings, but nothing was received by ZL3TY or VK5ZLX. During the same day Ian, VK3AXH, near Ballarat, reported pings when listening to ZL3TYs JT65 signal over a path of 2387 km at the time when Bob was working JT65 into Melbourne—but JT65 was not detectable on tropo at Ian's QTH.

While a VK5 contact was not completed, this exercise was sufficient to show that the normal limit of around 2300 km for meteor scatter can be extended if there is a good tropo-duct at one end.

It is worth some conjecture about what conditions allow a tropo-duct extension of meteor scatter. It would be expected that for efficient entry to a duct the signal would need to arrive at a very low angle, and thus the meteor-scatter component of the path would need to be reasonably long—say, 1500 km or more. Inspection of the Hepburn chart indicates this was the case between ZL3TY and the VK5s. However, the pings received by VK3AXH and VK3HZ are unlikely to have entered at the start of the duct, which was within a few hundred km, as the entry angle would be several degrees and also meteor scatter is unlikely over such a short path. This in turn suggests that some of the meteor extensions were entering the duct somewhere in the middle of the region which is shown on the Hepburn chart to suggest a duct. There is some evidence on the Hepburn chart of variability in the strength of the duct nearer to ZL. Thus, while the best situation might be a strong duct at one end combined with a non-ducted region of around 1500 to 1800 km, it seems one should not overlook the possibility of entry somewhere in the middle of a duct.

On an international level, this work suggests it is well worth looking at meteor-scatter extensions using FSK441 at the end of long tropo-ducting paths. The work also suggests that stations who are well inland and normally cannot participate in ducts over water can reach these ducts by meteor scatter where the terrain is not a factor.

This last paragraph has also caused your editor to do some speculating. I wonder if it is possible for the use of JT65 to extend distances on that circuit. Perhaps the same may be true on the East Coast. The Brandon Trophies remain to be claimed. Maybe JT65 could be the key that opens the door to the successful North America to Europe terrestrial QSO.

Current Contests

European Worldwide EME Contest 2005: Sponsored by DUBUS and REF, the EU WW EME contest is intended to encourage worldwide activity on moonbounce. Multipliers are DXCC countries plus all W/VK/VE states.

The contest dates and bands are as follows: third weekend, 144 MHz and 2.3 and 3.4 GHz, CW/SSB, 8–9 April, 0000 to 2400 UTC; and fourth weekend, 1296 MHz CW/SSB, 6–7 May, 0000 to 2400 UTC. Sections and Awards include the following: QRP 144 MHz <100 kW EIRP, 432 MHz <400 kW EIRP, 1296 MHz <600kW EIRP, but no separate QRP/QRO categories.

All QRP/QRO band winners and QRP/QRO multiband winners will receive a year's free subscription to *DUBUS* magazine. In each band/section, certificates will be sent to the top five entries and to the highest-scoring station in the southern hemisphere.

Contest entries must be sent no later than 28 days after the end of the last contest weekend (i.e., in the mail or e-mail by 7 June 2006). Mail address: Patrick Magnin, F6HYE, Marcorens, F-74140 Ballaison, France. You can also e-mail your contest entry in ASCII format to: <f6hye@ref-union.org>.

Complete rules can be found at: <http://www.marsport.demon.co.uk/EMEcont2006.pdf>.

Spring Sprints: These short duration (usually four hours) VHF+ contests, sponsored by the East Tennessee Valley DX Association, are held on various dates (for each band) during the months of April and May. This year's dates are as follows: 144 MHz, April 4, 7–11 PM local time; 222 MHz, April 12, 7–11 PM local time; 432 MHz, April 20, 7–11 PM local time; Microwave, May 6, 6 AM to 1 PM local time; and 50 MHz, May 13–14, 2300 UTC Saturday until 0300 UTC Sunday. Logs and summary sheets should be e-mailed or snail mailed to the below addresses. Logs

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should be submitted within 30 days of the end of each contest. Contact information: Jeff Baker, WU4O, 2012 Hinds Creek Rd., Heiskell, TN 37754. E-mail: <springsprints@ etdxa.org>. Up-to-date information on these contests can be found at: <http://www.etdxa.org>. At this URL, click on the Spring Sprints link to get to the contest information.

2 GHz and Up World Wide Club Contest: Sponsored by the San Bernardino Microwave Society, the contest will run from 6 AM on April 29 to 12 midnight on April 30 (36 hours). The object is for worldwide club groups of hams to work as many amateur stations in as many different locations as possible in the world on bands from 2 GHz through Light. Rules are available at: <http://www.ham-radio.com/sbms>.

Conference and Convention

Southeastern VHF Society: The 10th annual SVHFS conference will be hosted in Greenville, South Carolina, April 28–29, 2006 at the Embassy Suites Golf Resort and Conference Center, 670 Verdae Boulevard, Greenville SC 29607 (864-676-9090 or fax 864-676-0669). Hotel registration cut-off date April 4. Mention the Southeastern VHF Society Conference when reserving to get the group rate. Registration forms and information are available at: <http://www.svhfs.org/>.

Dayton Hamvention®: The Dayton Hamvention® will be held as usual at the Hara Arena in Dayton, Ohio, May 19-21, 2006. For more information, go to: <http://www.hamvention.org>.

Calls for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings*, or both. For more information, questions about format, media, hardcopy, email, etc., please contact the person listed with the announcement. The following organization or conference organizer has announced a call for papers for its forthcoming conference:

Central States VHF Society Conference: The Central States VHF Society is soliciting papers, presentations, and poster/table-top displays for the 40th Annual CSVHFS Conference to be held in Bloomington, Minnesota (across from the Mall of America) July 27–29, 2006. Papers, presentations, and posters on all aspects of weak-signal VHF and above amateur radio are requested.

Deadline for Submissions: For the *Proceedings*, May 1. For presentations at the conference and for notifying them that you will have a poster to be displayed at the conference: July 3. (Bring your poster with you on the 27th of July.)

Further Information is available at the CSVHFS website: <http://www.csvhfs.org>. Also available are the following: "The 2006 Conference" and "Guidance for Proceedings Authors," "Guidance for Presenters," and "Guidance for Table-top/Poster Displays."

Contacts: Technical Program Chairman, Jon Platt, WØZQ, at <W0ZQ@aol.com>; Proceedings Chairman, Donn Baker, WA2VOI/Ø, at <Proceedings.WA2VOI@OurTownUSA.net>.

EME Conference 2006: The EME Conference 2006 will be held in Wuerzburg, Germany on August 25–27. Interested authors are invited to present a paper(s) for the conference. Electronic submissions in Word97, Word2000, Acrobat5 (PDF), or text format will be accepted by e-mail or on CD (ask if you are using another format).

If you are interested in writing and/or presenting a paper for the conference, send an e-mail to Rainer Allraun, DF6NA, at: <df6na@df6na.de>. Please contact him as soon as possible with an abstract or even a general idea. This will help the conference team with its planning activities. For more information about the EME Conference 2006 see: <http://www.eme2006.com>.

Meteor Showers

The *Lyrids* meteor shower is active during April 19–25. It is predicted to peak at around 1630 UTC on 22 April. This is a north-south shower, producing at its peak around 10–15 meteors per hour, with the possibility of upwards of 90/hr.

A minor shower and its predicted peak is *pi-Puppids* (peak around 2130 UTC on April 23). Other April and May minor showers include the following and their possible radio peaks: April *Piscids*, April 20, 1500 UTC; *δ-Piscids*, April 24, 1500 UTC; *η-Aquarids*, May 6, 0600 UTC; *ε-Arietids*, May 9, 1300 UTC; May *Arietids*, May 16, 1400 UTC; and *o-Cetids*, May 20, 1300 UTC.

For more information on the above meteor showers, please see Tomas Hood, NW7US's "Propagation" column elsewhere in this issue. Also visit the International Meteor Organization's website: <http://www.imo.net>.

And Finally . . .

There are lots of great things happening in the wonderful world of the VHF-plus ham bands. Please let me hear of your activities so that I can include them in a future edition of this, your column.

Until next month . . .

73, de Joe, N6CL

CQ VHF Ham Radio Above 50 MHz

The magazine for the VHF/UHF Enthusiast

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Operating the Pile-ups

BY CARL SMITH,* N4AA

As I listened to the huge pile-ups for 3YØX on the first several days of their operation from Peter I, I found myself wondering where I was and what I was listening to. I could hardly believe my ears. It was so disgusting that I finally just turned off the radio and walked away.

On February 1, 2006, in "QRZ DX" No. 2006-05, I published an article entitled "Suggestions for DX Pile-ups" written by my good friend Uncle DX. Many readers responded positively to it, and one DX club even asked for permission to post it on its website. I felt good about the response . . . not one negative comment from anywhere. My high expectations were soon to be dashed by the conduct I observed on the air.

The 3YØX DXpedition came on the air. It was obvious, almost from the start, that a large number of so-called DXers didn't get the message. I realize that "QRZ DX" does not reach every DXer in the world, but it does reach a large number of them. I can only hope those whom it did reach were not part of the hostility directed at the 3YØX group. I can say with certainty that a large part of the *bad* behavior came from Europe, and I say to those people, *shame on you!*

I also observed many negative comments being put forth on the cluster, again mostly coming from Europe. Those comments were totally inappropriate for anyone who claims to be a DXer. If you don't understand propagation and the capabilities of your own station, don't blame the DXpedition. As I write this, these men are enduring serious discomfort and severe weather conditions to put that island on the air for your benefit. They are not being paid, but rather *they* paid substantial sums of money to go there. They chose to make the journey, sacrifice up to six weeks of their personal time, and put their very lives in jeopardy to do nothing more than sit there in a cold tent making every effort to put you in their log. Would you even consider doing that?

There is absolutely *no* excuse for the intentional QRM and inconsiderate behavior toward others, especially the DXpeditioners. These men should be shown our best, not our worst, behavior on the air.

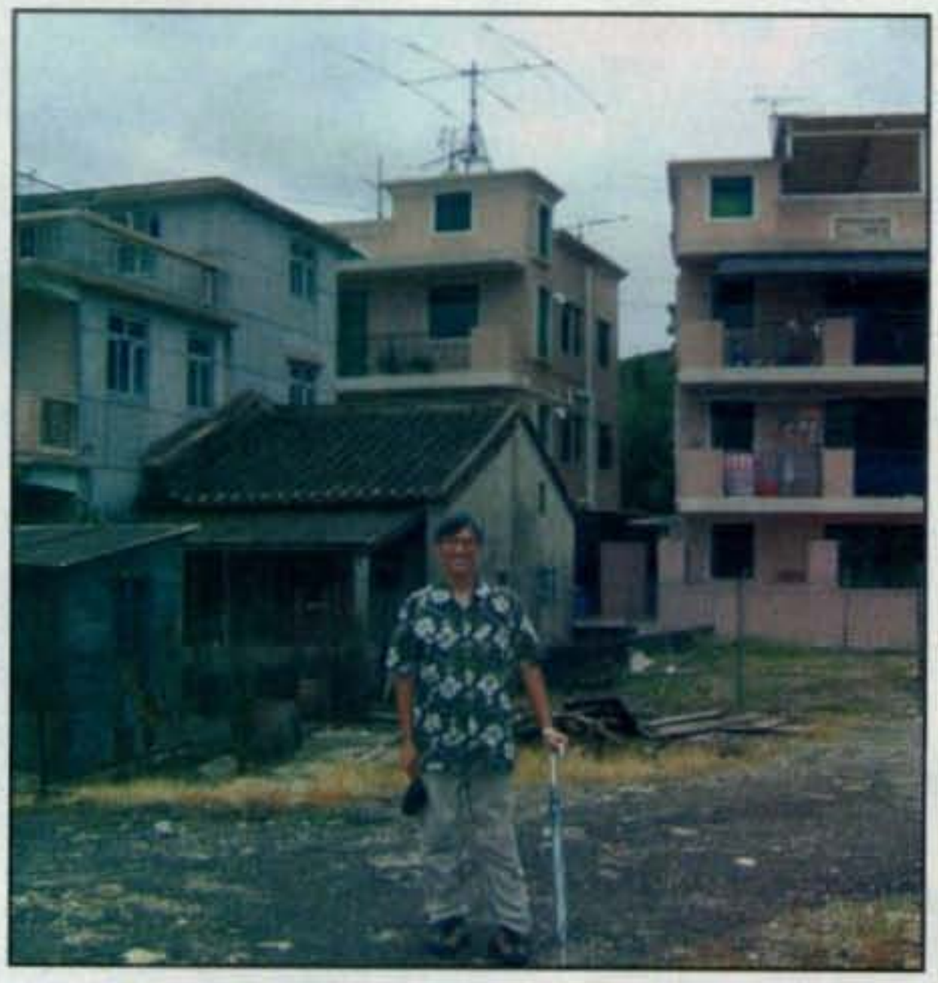
If you cannot behave in a respectful manner, perhaps you should consider giving up DXing. It's for certain we will not miss you. The QRM, etc., would be gone, and we could once again enjoy what we love doing—chasing DX.

If my comments offend you, perhaps you should be thinking, "Is he talking about me?" It would do all of us good to step back and listen to ourselves on the air and ask, "Is this what I would want to hear if I were on the other end of the pile-up?" We each have to answer that question for ourselves.

My comments may not have any effect on the problem, but at least I have expressed my feelings and hopefully the feelings of most DXers.

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

Here we have the "A" shift operating from Peter I Island (3YØX). Outside was not nearly as "comfortable," with snow and high winds. (Photo courtesy of the Peter I website)



Charlie, VR2XMT, standing in front of his home with his tri-bander visible on top of the building in the background. (Photo courtesy of Jack, WB8FSV)

Many of you know who those are causing these problems. It's time we stand up and take them to task for their behavior. What's that old saying? "If you don't stand for something, you'll fall for anything." It's time we take a stand and stop just talking about the problem.

The article by Uncle DX follows so you can see for yourselves just what he thinks about operating a pile-up.

Suggestions for DX Pile-ups

By Uncle DX

By addressing some of the basics of DX behavior in pile-ups, we will increase our awareness/knowledge, help our ham buddies, and make the DX journey successful and pleasurable. It takes two to tango, and both sides of the pile-up have responsibilities.

The WPX Program

CW

3166 .....UN8GA

CW: 450 UN8GA. 1200 OM7CA.
SSB: 500 N2VRA, WZ3AR. 650 LY3BY.
Mixed: 650 YU7GMN. 900 SV1EOS. 1300 W9BOK. 1400 SV1EOS. 1900 KWØU. 5550 W2FXA.

Africa: OM7CA
15 meters: LY3BY
20 meters: WO3Z, LY3BY
40 meters: LY3BY
80 meters: OM7CA

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, KØDEQ.

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 USA. *Note: WPX will not accept prefixes/calls which have been confirmed by computer-generated electronic means.*

Please Note: the price of the 160 meter bar for the Award of Excellence is $6.50.

The WAZ Program

15 Meter SSB

626 .....JA3KM

17 Meter SSB

41 .....I8SAT

17 Meter CW

60 .....I8SAT

30 Meter CW

72 .....I8SAT

40 Meter CW

249 .....T99Y 250 .....W3DRY

160 Meters

218 .....N5GH 220 .....S54E
219 .....4N7ZZ

All Band WAZ

SSB

4984 .....EA1APV

Mixed

8395 .....JEØIUR 8396 .....WOØZ

All CW

476 .....W3DRY 477 .....KB8NTY

RTTY

164 .....HB9AAA 165 .....SV1FJA

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 Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

Operators of the PZ5C operation from Suriname and Parrot Island (left to right): Ronald, PA3EWP; Rob, PA2R; and Ramon, PZ5RA. (Photo courtesy of Ronald, PA3EWP)

We can agree that most of the differences in how we deal with these issues have to do with which side of the pile-up we are on, whether we are a little pistol or a so-called big gun, and perhaps just the size of our egos. DXers may have an ego!

Below are some of the terms/issues for DX pile-ups and Uncle DX's opinion on how to deal with them from both sides.

1. The DX station operators are in charge. Yep, you bet. They are the ones who spent the money, lost sleep, have crabs and spiders crawling up their legs, perhaps risked their lives, and been cold, hot, seasick, abused, etc. They are the boss—period.

2. Operating Rules. The DX station ops should make and adhere to their rules quietly and respectfully. The rules should be followed the same way by the other side.

3. By the numbers (call areas or areas of the world). When the pile-ups are large (this is relative, but again the DX operator decides what is large), restricting the calling area is good and prevents using too much spectrum to enable a decent rate. By the call areas or numbers is good for SSB, but EU, Asia, NA, SA, US, JA, VK/ZL, Pacific, etc., do well for CW or all modes much of the time.

4. Split and spread out. *Always, please,* even from the first QSO. The DX operator should listen where the DXpedition says, never using more space than absolutely necessary and being aware that existing QSOs may be in progress where they are listening. Some may say "200 to 210" and never get off 200! I'm still working on that one.

5. Signing calls by the DX stations. I like giving the DX callsign to end a QSO and to indicate it's time for others to call, serving two purposes. If not the callsign, make and stick with the same thing, such as "TU," "QRZ," etc., giving the DXpedition callsign at least every 10 minutes as well.

6. Timing. I put a *lot* of stock in timing and pattern for a DX operator. Famous DXpeditioners Roger, G3SXW, Nigel, G3TXF, and Andy, G3AB, are very good at this. Listen to them and learn, as it adds to their rate and improves the success and accuracy for *all*.

CQ DX Field Award Honor Roll

The CQ DX Field Award Honor Roll recognizes those DXers who have submitted proof of confirmation with 175 or more grid fields. Honor Roll listing is automatic upon approval of an application for 175 or more grid fields. To remain on the CQ DX Field Award Honor Roll, annual updates are required. Updates must be accompanied by an SASE if confirmation is desired. The fee for endorsement stickers is $1.00 each plus SASE. Please make all checks payable to the Award Manager, Billy F. Williams. Mail all updates to P.O. Box 9673, Jacksonville, FL 32208.

Mixed

K2TQC	225	JN3SAC	194	K2SHZ	182	K2AU	177
VE3XN	217	N4MM	194	N4NX	182	NØFW	176
HAØDU	217	W4UM	191	KØCA	181	ON4CAS	175
KØDEQ	207	BA4DW	188	W5ODD	177	K8OOK	175
N8PR	200	F6HMJ	182				

SSB

VE7SMP	182	W4ABW	177	N4MM	176	W4UM	176
KØDEQ	180	NØFW	176				

CW

KØDEQ	198	JN3SAC	181	KØCA	175	N4MM	175
W4UM	182						

5 Band WAZ

As of February 1, 2006, 687 stations have attained the 200 zone level and 1481 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:

LZ1PM SV1FJA

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

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
IK1AOD, 199 (1)
DF3CB, 199 (1)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (25)
W6DN, 199 (17)
W3NO, 199 (26)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
SP5DVP, 199 (31 on 40)
W8AEF, 199 (40)
K8RR, 199 (26)
UU5JR, 199 (4)
W8GF, 199 (22)
N4NX, 199 (26)
N4MM, 199 (26)
EA7GF, 199 (1)
N4PQX, 199 (26)
N6HR/7, 199 (37)
JA5IU, 199 (2)
CT3DL, 199 (26)
NØIJ, 199 (21)
RU3DX, 199 (6)
WAØQII, 199 (26)
N4XR, 199 (27)
WØPGI, 199 (26)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
RX9TX, 198 (2, 6)
F5NBU, 198 (19, 31)
OE2LCM, 198 (1, 31)
HA1RW, 198 (1, 31)
WK3N, 198 (23, 24)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
WA5VGI, 198 (34, 37)
K7BG, 198 (17,22)

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

IK3DVY (156 zones)
IKØPEA (161 zones)
NA5C (194 zones)
WOØZ (164 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $100 ($120 if airmail shipping is requested).**

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 Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

The CQ DX Field Award Program

Mixed

65 ..... KF8UN
66 ..... WA2RZJ
67 ..... SM5INC
68 ..... OK1AOV
69 ..... KA5AGM

SSB

40 ..... SM5INC

CW

36 ..... WA2RZJ
37 ..... SM5INC
38 ..... OK1AOV
39 ..... W3RSR

Endorsements

Mixed

200 ..... KF8UN/205
175 ..... W4UM/193
175 ..... OK1AOV/181
100 ..... WA2RZJ/148
50 MHz OK1AOV
50 MHz KF8UN
28 MHz OK1AOV
28 MHz SM5INC
3.5/7 MHz OK1AOV
3.5/7 MHz KF8UN
1.8 MHz KF8UN

SSB

50 MHz W4UM
28 MHz SM5INC

CW

175 ..... W4UM/184
150 ..... OK1AOV/172
100 ..... WA2RZJ/101
50 MHz OK1AOV
28 MHz OK1AOV
28 MHz SM5INC
3.5/7 MHz OK1AOV

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Please make all checks payable to the award manager.

Here is Pop, YU7EF, operating from the station of Stig, LA7JO/9N7JO, in Kathmandu, Nepal. (Photo courtesy of Pop, YU7EF, and Gary, K4MQG)

indecent amounts of resources, spilling blood, and climbing for days trying to put out a "big" signal. Those ops darn well deserve to be loud and work the DX first if possible.

9. Lectures (on the air). Never, never, ever should that be done by anyone, period. Rise above.

10. Full calls. Always. Any questions?

11. Gray line. Know it—both sides—and live it.

12. Everyone should know his equipment and how best to use it. Take pride in your CW note, the quality of your SSB audio, the correct TX frequency, and operating techniques. Listen and listen some more to instructions by the DX station and then abide by those instructions. Call when you can actually hear them—enough ESP, poor timing, and guessed QSOs. Give a chance to others to complete their QSOs.

13. KC cops. Forget it. It only builds the egos of those intentionally causing the prob-

7. Dupes. If the QSO is not certain, do it again, and the DX station should keep on trucking and not waste time saying "B4" or "dupe." Don't break rhythm. We should all try to be better operators and not be dupes, though.

8. "Who first?" This is hard. However, I believe the DX station should work the easiest contacts to complete and the ones which will provide them with the best rate, keeping in mind specific areas where the need may be greater (see #3 above). As the pile-ups become smaller, work the edge to give little pistols and those using low power a chance to have a QSO. It must be said that this practice will make better operators and station builders out of all of us who are trying to work the DX station. Just as important is the fact that many hours are spent in building and installing better antennas/stations, spending

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THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

5264 9A2AA	3980 I2PJA	3520 I2MQP	3227 K9BG	2752 W9IL	2399 K5UR	1773 W7CB	1556 W2OO	742 K5IC
4846 W2FXA	3968 YU1AB	3475 YU7BCD	3019 W9OP	2704 K2XF	2172 VE6BF	1741 AB5C	1242 K6UXO	648 KWØH
4552 W1CU	3956 VE3XN	3420 KØDEQ	3011 W2WC	2637 OZ1ACB	2142 I2EAY	1705 W2EZ	1141 K5WAF	
4343 EA2IA	3703 I2UIY	3375 WB2YQH	2897 9A4A	2457 JN3SAC	2024 AE5B	1651 KX1A	1016 RA1AOB	
4111 N4NO	3621 S53EO	3262 IK2ILH	2873 W2ME	2426 W6OUL	1897 KØKG	1643 N1KC	825 KL7FAP	

SSB

4710 IØZV	3225 N4NO	2609 KF7RU	2209 IK2QPR	1848 K3IXD	1591 SV3AQR	1330 VE7SMP	984 KX1A
4239 VE1YX	3155 I2UIY	2595 EA1JG	2196 W2WC	1827 AE5B	1580 DL8AAV	1305 SV1EOS	978 EA7HY
3956 I2PJA	3142 CT1AHU	2479 IN3QCI	2082 I3ZSX	1763 W2FKF	1480 AB5C	1258 N1KC	901 KU4BP
3765 F6DZU	3046 I4CSP	2431 G4UOL	2076 K2XF	1719 KQ8D	1458 JN3SAC	1202 AG4W	895 IK8OZP
3424 OZ5EV	2857 4X6DK	2326 CX6BZ	2075 N6FX	1716 W6OUL	1444 W3LL	1145 EA3EQT	816 VE6BF
3395 EA2IA	2734 OE2EGL	2235 NQ3A	2042 W9IL	1688 KI7AO	1386 IK4HPU	1059 AE9DX	729 K7SAM
3365 I2MQP	2711 LU8ESU	2227 YU7BCD	2038 K5UR	1611 W2ME	1340 I2EAY	1042 IZØBNR	

CW

4524 WA2HZR	3339 VE7DP	2503 KA7T	2401 YU7BCD	2093 IK3GER	1939 K5UR	1744 EA7AAW	1227 K6UXO
4229 K9QVB	3094 LZ1XL	2476 W2WC	2213 OZ5UR	2089 K2XF	1863 W6OUL	1402 WO3Z	1202 WA2VQV
3674 N4NO	2688 I2UIY	2440 I7PXV	2167 N6FX	2017 VE6BF	1821 I2MQP	1386 AC5K	1109 KX1A
3374 EA2IA	2632 W2ME	2437 EA7AZA	2120 JN3SAC	1987 W9IL	1767 I2EAY	1334 RUØLL	915 N1KC

lems (and they are sick). For those who are still learning to operate their radios, this is not the place and time to teach, and for those who make honest mistakes (and we all make them), they will discover their mistake without any cop's QRM. Perhaps an "UP" once is okay under some situations. Respectful help is authorized, but quickly and seldom, for it will cost others that critical letter in their call and all that goes with it.

14. Spots. Yes and often by *everyone*, not just a few. We should help others and not just sit back reaping and never sowing. However, please make the spots accurate. Sloppy spots are on the increase. Take pride. After all, your callsign is attached to the spot!

15. Comments on spots. Keep any comments in the true ham spirit and not personal or with a political/religious agenda. We all are equal in ham radio—no exceptions.

16. CW. To run callsigns together at a fast speed, such as butting the prefix and suffix too close together, is a poor operating practice. We generally can figure out the DX callsign but think about the DX station trying to get *you* in the log. Also, add a little time before that first letter after the DX is ready for the next caller. Often it is too quick and slows the rate by requiring an "AGN?"

There may be more, but these are the high spots for both sides. Ladies and gents, let's clean up our act. Common sense always applies as well in helping our brothers and sisters in ham radio make that special Q.

73/DX Uncle DX

I urge all DXers to make an effort to live up to the suggestions given here by Uncle DX. It could make things a whole lot better for all of us.

Until next time, enjoy the chase and Have Fun!

73, Carl, N4AA

CQ DX Awards Program

CW

1077 ..... JA7ARM

SSB Endorsements

320 ..... W2FKF/332
275 ..... KU4BP/291
275 ..... N2LM/291

CW Endorsements

320 ..... N6AW/331
320 ..... KF8UN/323
300 ..... EA3ALV/309
200 ..... N2LM/248
150 ..... PP6CW/150

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 335 active countries. Please make all checks payable to the award manager.

QSL Information

H22H via 5B4MF
H40HL via HL1XP
H44HL via HL1XP
H79W/YN4 via K9AJ
HBØ/OK1FBH via OK1FBH
HBØ/OK1FZM via OK1FZM
HBØ/OM3IAG via OM3IAG
HC4/EA1BT via EA1BT
HC4/EA9CP via EA9CP
HC8/EA1BT via EA1BT
HE1G via HB9AOF
HG8N via HA8VK
HI3/SP9XCN via SP9XCN
HI3TEJ via ON4IQ
HI7/DL1JFI via DL1JFI
HI9CF via DL4NCF
HI9NY via DL4NYL
HI9T via KU9C
HP1/OA4WW via EA4BQ
HR2DMR via HR2DMR
HR9/WQ7R via N6FF
HSØAR via E21YDP
HSØT via HS6NDK
HSØZCW via K4VUD
HSØZDJ via W2YR
HSØZFI via SM5GMZ
HSØZGH via HSØZGL
HSØZGH via G4UZN
HSØZGL via IT9GSF
ID9/IT9CVO via IT9CVO
ID9/IW9EJP via IW9EJP
ID9/IW9GUR via IW9GUR
ID9/IW9HLM via IW9HLM
IH9/I2IFT via I2IFT
IH9/IK2AHB via IK2AHB
IH9/IK2ANI via IK2ANI
IH9/IK2CIO via IK2CIO
IH9/IK2HKT via IK2HKT
IH9/IK2RZP via IK2RZP
IH9/IK7JWY via IK7JWY
IH9/IK8ETA via IK8ETA
IH9/IN3QGY via IN3QGY
IH9/IT9BLB via IT9BLB
IH9/IT9VDQ via IT9VDQ
IH9/IT9WPO via IT9WPO
IH9/IT9ZGY via IT9ZGY
IH9/IV3SKB via IV3SKB
IH9GPI via IH9GPI
IH9P via IZ8GCB
IH9P via KR7X
II3G via IV3RJT
IK5DHM/ANT via I5GWO
IO1ALP via I1JQJ
IO1ARI via I1JQJ
IO1BOB via I1JQJ
IO1CRO via I1JQJ
IO1CUR via I1JQJ
IO1FRE via I1JQJ
IO1FSK via I1JQJ
IO1HOC via I1JQJ
IO1JUM via I1JQJ
IO1LUG via I1JQJ
IO1NOR via I1JQJ
IO1OWG via I1JQJ
IO1SHO via I1JQJ
IO1SKE via I1JQJ
IO1SNO via I1JQJ
IO1SPE via I1JQJ
IQ8DO via IZ2FDU
IR2M via IR2M
IR3J via IK3TCH
IR4X via IZ7AUH
IR7C via OK1MG
IR7C via IZ7AUH
IR8C via IZ8EDJ
ISØ/DF1IM via DF1IM
ISØ/DL3EW via DL3EW
ISØ/DL3EW via BUREAU
ISØ/K7QB via IN3QBR
ISØ/K7QB via IK1SPR
ISØ/OL5Y via IN3QBR
ISØ/WHØQ via IZ3ZNR
ISØ/WHØQ via WHØQ
ISØGYZ via ISØGYZ
ISØ/F5CWU via F5CWU
IT9AC via IT9JLG
IU1A via IK2BCP
IU2R via SM4DHF

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)

BY TED MELINOSKY,* K1BV

The Ten Commandments of an Awards Custodian

The following points are something to think about if you are, or are contemplating becoming, an awards custodian.

The Ten Commandments of an Award Custodian

1. Promptly reply to applications.
2. Use either e-mail or regular mail to communicate changes or questions to applicants.
3. Maintain reasonable records showing applicant data, serial numbers of issued awards, and endorsements issued.
4. Annually review all rules and requirements.
5. Be an advocate of reasonable fees. The lower the fee, the more likely there will ne a substantial number of applicants.
6. If you represent a club or group, make a periodic accounting of activity and funds received and spent.
7. Suggest changes to keep the award current.
8. Protect the mailed certificate with a cardboard stiffener or padded envelope.
9. Keep publicizing your award; use magazines, directories, the web, QSL cards, etc.
10. See #1.

(Thanks to AB7PG for inspiring this reminder for awards custodians.)

The Cornish Amateur Radio Club offers an award for working 15 authorized International Marconi Day stations.

DX Awards

International Marconi Day Award. Every April, on or about the anniversary of the birth of Guglielmo Marconi, the Cornish Amateur Radio Club (UK) sponsors International Marconi Day and its on-the-air activities with stations operating on sites associated with the famous Italian inventor and entrepreneur. This year the date to mark on your calendar is the 24-hour period starting at 0000Z Saturday, April 22. All HF bands 160 to 10 meters may be used. Look for commemorative and special event stations from Italy, the United Kingdom, Canada, the United States, and other countries where Marconi either operated, experimented from, or had manufacturing facilities in the early years of the 20th century. The award is based on a 1912 Stock Certificate from the Marconi Wireless Telegraph Company.

The Cornish ARC offers an award for working 15 different authorized International Marconi Day Award stations. All contacts must be made within the 24-hour period of activity this year. Contacts from previous years do not count. SWL okay. A list of the qualifying Marconi stations is provided on the club's website: <http://www.gb4imd.org.uk/>. At least 36 different stations are expected to participate.

Your application must be made in writing giving a *full* extract of your log together with your callsign and address. The log extract may be a certified copy of the original log or a certified computer printout. Send the data along with the fee of $US10, £5.00 Sterling, or12 IRCs to: IMD Awards Manager, Cornish Amateur Radio Club, P.O. Box 100, Truro, Cornwall, TR1 1XP, England.

Koprivnica City Award. Koprivnica is a small city located in the northernmost part of Croatia, close to the borders of Hungary and Slovenia. It was a part of the Roman Empire, bearing the Latin name *Capronсensis*. During 2006 the city is celebrating its 650th anniversary of having the status of a free town. The award is issued for contacts with Croatian amateur radio stations located in the city. The members of the Amateur Radio Club Koprivnica will be active during all of 2006 with the special anniversary callsign 9A650C. The callsign will be in use from the January 1st until through December 31st (QSL manager is 9A7K). All QSOs after July 5, 1992 are valid. SWL okay.

Basic Award

Class I: 2 QSOs with different amateur radio stations in the city of Koprivnica

USA-CA Honor Roll

500

WA2ZYM	3369
W3LL	3370

1000

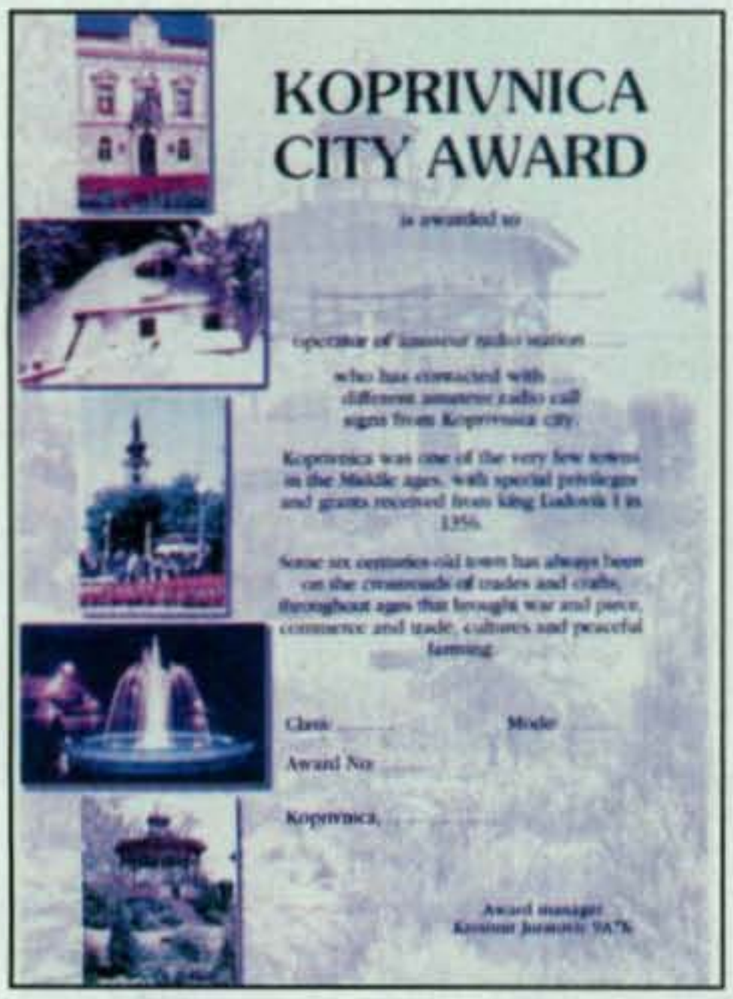
WA2ZYM	1707
W3LL	1708

1500

WA2ZYM	1430

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>



The Koprivnica City Award is issued for contacts with Croatian amateur radio stations located in this city.

Class II: 1 QSO with an amateur radio station in the city of Koprivnica

Gold Medal

Class I: 3 QSOs with different amateur radio stations in the city of Koprivnica, or

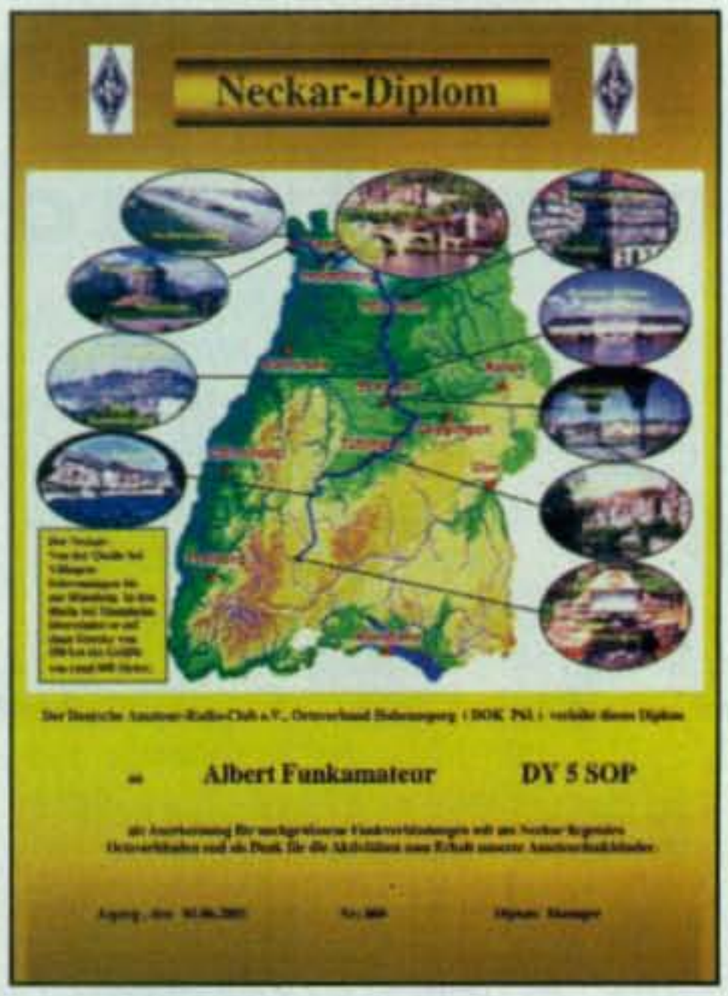
Class II: 3 QSOs with the special callsign 9A650C on 3 different bands

The award is issued for the following categories: CW, Phone, RTTY, PSK-31, and Mixed. All contacts on HF and WARC bands are allowed. The award is available for both 50-MHz and 144-MHz contacts as well. Contacts through repeaters, packet radio, or satellites are not allowed. The award fee is 5 Euros, and the medal fee is 15 Euros. QSL cards do not have to be in the applicant's possession. GCR list (with callsign, date UTC, band, and mode) must be certified by two licensed amateurs or by your national award manager. All applications for the Koprivnica City Award should be directed to Koprivnica City Award Manager, Kresimir Juratovic, 9A7K, P.O. Box 88, HR - 48001 Koprivnica, Croatia (<http://www.9a7k.com/>).

The Neckar Diplom. The Neckar Diplom can be earned by contacting members of German clubs located in the State of Baden-Wurttemberg in localities along the historic Neckar River. The certificate features images of buildings, bridges, and monuments found along the river. German operators reliably list their club designation (DOK) on their QSL cards, so finding DOKs for many of the German awards is an easy task.

The German local federation Hohenasperg, DOK P61, sponsors this award for contacts on or after January 1, 2005, with amateurs and SWLs in any of the 25 local federations in or close to the Neckar River. The valid DOKs include P02, P05, P06, P08, P10, P11, P12, P31, P35, P36, P40, P47, P48, P51, P60, P61, Z17, Z18, Z48, Z55, A06, A10, A14, A19, and F50.

Stations from the district "P" need 75 points; other DL stations need 50 points; other European Union stations need 30 points; and DX stations need 20 points.



The Neckar-Diplom can be earned by contacting members of German clubs located in the State of Baden-Wurttemberg in localities along the historic Neckar River.

Each station counts two points. Club stations of the 25 local federations count 5 points. Contacts with stations of the local federation P61 count double, and at least one of these is mandatory. German stations will need to make contacts with at least 10 different DOKs. All modes of operation except packet and Echolink may be used, as well as all bands. Send GCR list and a fee of 5 Euros for German stations, or 8 Euros or $US8 for all others to: Edward

Country	Motor Racing Track	Administrative Territory
Argentina LU/LW	Almirante Brown, Buenos Aires	Province of Buenos Aires
Brazil PY1–2	Interlagos, Jacarepagua	State of S. Paulo, Rio De Janerio
South Africa ZS6	Johannesburg	Prov. of Transvaal
San Marino T7, I4	Imola	Rep San Marino, Reg. Emilia, Rom.
Spain EA–ED	Montmelo, Montjuich, Jerez Front	Reg. of Catalonia, Aragona, Estremuda
Monaco 3A	Monte Carlo	Montecarlo & Princedom Monaco
Canada VE2	Notre Dame Isl. (Montreal)	Montreal, Prov. of Quebec
France F	Magny Cours, Le Castellet	Reg. of Provence of Bourgogne
Great Britain G	Silverston, Brands Hatch	County Northamptonshire, Kent
Germany DF–DL	Nurburging, Hockenheim	Renania Palatin, Baden Wutt.
Austria OE	Zeltweg	Graz & Lander Stiria
Hungary HA–HG	Budapest	Budapest
Portugal CT	Estoril	Lisbon, Dist of Lisbon.
Belgium ON	Spa Francochamp, Zolder	Prov Liege (Wallon), Prov. Limburg
Italy I	Monza Park	Monza and Prov. Brianza
Netherlands PA–PI	Zandwoort	Amsterdam & Prov. North Holland
Mexico XE	Mexico City	Dist. Fed. of Mexico City
Japan JA–JE, etc.	Suzuka, Fujieda (Fuji)	Pref. Mie, Suzuka, Pref. Shizuoka
Australia VK–VI	Melbourne Albert Park, Adelaide	State of Victoria, St. Southern Australia
USA N-K-W	Long Beach, Indianapolis, Watkins Glen	California, Indiana, New York
Malaysia 9M	Sepang	State Selangor Capital Kuala Lumpur
Bahrein A9	As Sakhir	Al Manamah—entire emirate
China BY4	Shanghai	Municipality and Northern region

Table I– List of Grand Prix locations for the Diploma Formula Uno.

The Diploma Formula Uno (Worked All Grand Prix) award certificate displays outlines of 17 of the world's top race tracks which have participated in the Grand Prix over the years.

Deneke, DL5SO (DIG 5942), Nagolder Weg 15, D-71732 Tamm, Germany.

Diploma Formula Uno (Worked All Grand Prix). Auto-racing enthusiasts might be interested in the Worked All Grand Prix award from Monza, Italy. The certificate displays outlines of 17 of the world's top race tracks which have participated in the long tradition of the Grand Prix over the years.

Contact stations located in a combination of countries that have sponsored this world-famous auto race, and stations that are located in the specific locality of the race. The basic award is available for contacts with the listed (see Table I) administrative districts of the 23 countries (column 3) and at least 10 specific localities of the Grand Prix (column 2).

An application form is available at <http://www.arimonza.it/Diplomi/>. Award fee is 10 Euros or $US12. Send the application, fee, and Xerox copies of all appropriate cards to: A.R.I. Monza, P.O. Box 1, Monza (Milano), I-20052, Italy.

SP9IFH Award Series. Janusz, SP9FIH, sponsors two awards. The first commemorates the contribution of Polish DXpeditioners, and the second is in honor of expeditions made by amateurs of any country to the tropical Pacific island paradise Tonga.

General Requirements: SWL okay. Send GCR list and fee of 5 Euros for Europeans, and $US6 or 8 new-style valid IRCs for all others, with GCR list *(the award manager reserves the right to ask for original QSL cards)* to Janusz Wegrzyn, SP9FIH, P.O. Box 480, 44-100 Gliwice, Poland (e-mail: <sp9fhi@poczta.onet.pl>; on the web: <http://www.awards.wyprawy.webd.pl/>).

Polish World Tour Award. Provide evidence of contacts with five Polish amateur radio expeditions from three continents. List of expeditions:

Europe: 3A/SP9PT, 3A/SP3FYM, EI/ SP4Z, HBØ/SP2FAX, HBØ/SP2JMB, LX/SP5UAF, LX/SP7VC, LX/SP5HNK, LX/SP5MBQ, LX/SP7NJX, LX/SQ5IRO, LX/SP6T, LX5A, MUØULC, MU/SP5UAF, MU/SP5MBQ, MU/SP5LCC, OHØHSV, OY/SM6RXS, SP9FIH/OHØ, SP6BGB/OHØ, SP6LHI/OHØ, TK/SQ5RK, ZA/SP5EAQ.

Africa: V5/SP6IXF, V5/SP7VC.

Asia: 5B4/SP5UAF; 9N1MM – SP9LJD operation (1989); 9N7WE; A61/SP9MRO; AP2BJ; BY1QH – SP9LJD operation (1986) and SP9FIH operation (1988); EKØB (October 2005); JT1/SP5DRH, YKØA (1976).

South and Central America: CEØY/SP9PT, CEØY/SP9EVP, CE1/SP9PT, CE1/SP9EVP, J3/SP9PT, J3/SP9BQJ, SP9FIH/OA4, TI2/SP9MRO, YN1/SP9MRO.

Oceania: 9M6APT, 9M6EVP, A35WE, FOØWEG, FOØPOM, FO/SP9FIH, KH6/SP9MRO, VK2JBR, VK2JBQ, VK6KVP, VK9KNE, VK9KND, VK9KCP, VK9KXP, T30NA.

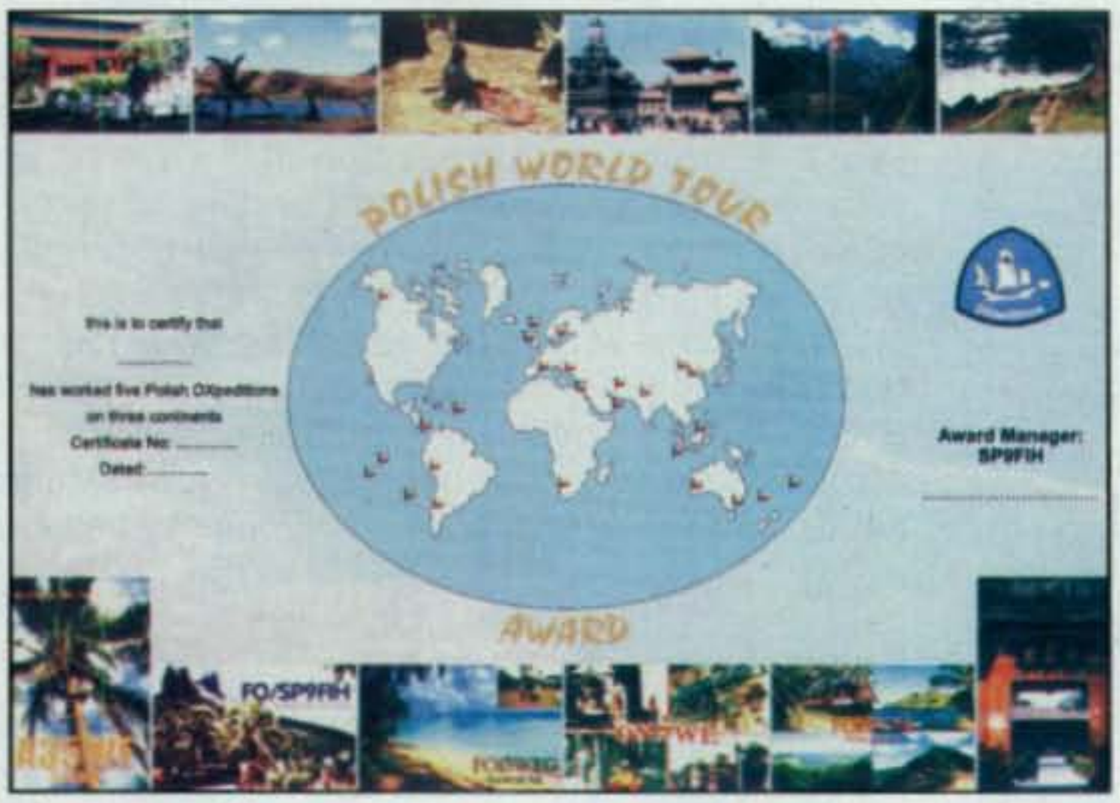
North America: SP9PT/VE8.

The Tonga DXpediton Award. Confirm at least two contacts with expedition stations operating from the island of Tonga (A35) on two different bands and two different modes.

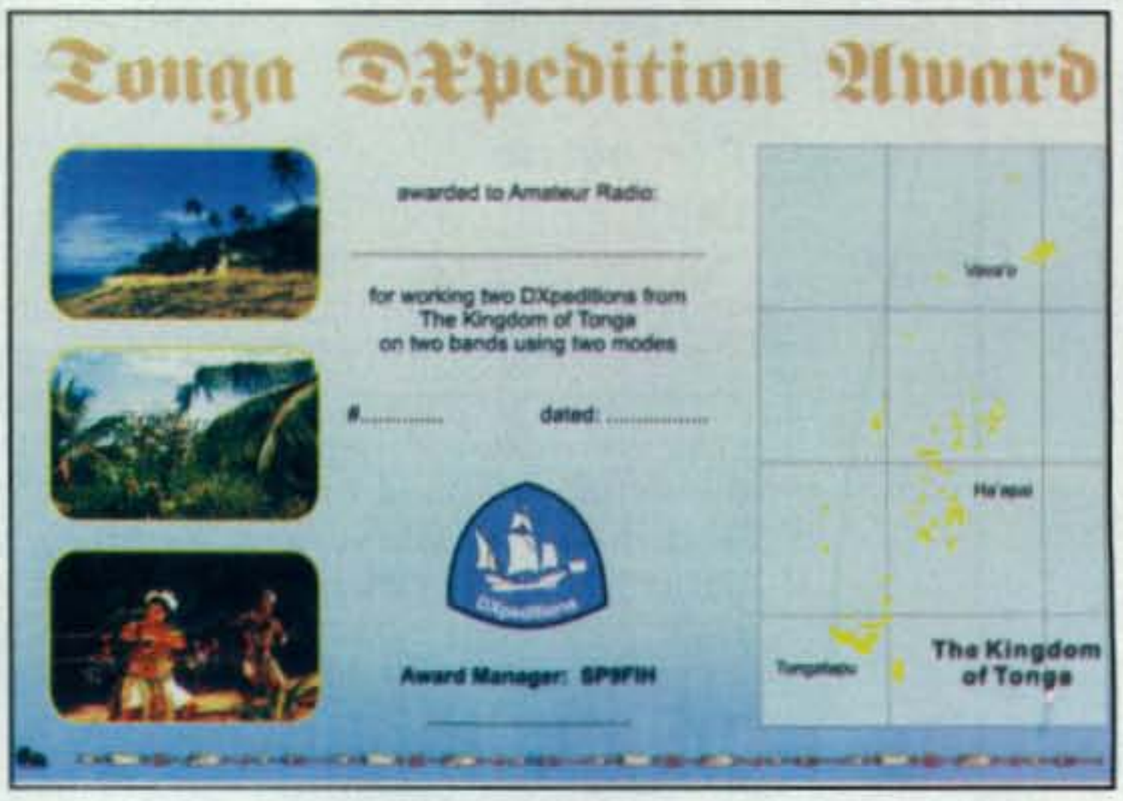
Award Rule Change

Ray, WA7ITZ , the sponsor of the newly announced Utah Award Series featured in the January column, has removed the 50-mile limitation rule on contacts. This will help the ham who has moved around in his/her life and made contacts from a number of locations.

Looking for award publicity? *CQ* magazine is the only U.S. amateur radio magazine with a monthly awards column. Please contact me with full details of interesting awards you sponsor or might have discovered. 73, Ted, K1BV



The Polish World Tour Award, sponsored by SP9FIH, requires providing evidence of contacts with five Polish amateur radio expeditions from three continents.



Confirm at least two contacts with expedition stations operating from the island of Tonga (A35) on two different bands and two different modes to earn the Tonga DXpedition Award.

contesting

BY JOHN DORR,* K1AR

Contest Preparation Tips

April's Contest Tip

This is less of a tip and more of a wish. I'm sure many of you can relate to my dream. Maybe you share it, too. Imagine a contest in which operators have to tune around on their own, finding guys and actually copying their callsigns. Imagine a contest where guys don't call you illegally outside the U.S. band. Imagine a DX station that actually has a manageable pile-up without a herd of unruly callers all screaming at someone based on what their computer screen is telling them and not what they actually copied. Imagine a contest without packet spotting. Imagine . . .

Working our way through all the material written about contest operating, it's not surprising that the majority of the available information focuses on operating technique and strategy. That being said, one of the most significant parts of a contest takes place before the event even begins. Are you prepared for a contest? Let's explore some topics you should be considering, and you can grade yourself.

Sleep

I don't know about you, but sleeping is one of my favorite pastimes. The ironic part of it all is that contesting is an activity that generally deprives us of sleep. As most of you know, contesting can be an endurance sport, especially if you operate 48-hour DX contests. You can be completely prepared in every other aspect of a contest, but fail miserably if you've ignored your sleeping requirements before a contest. My experience has been that there are three key aspects to sleep preparation:

- Working in extra hours of sleep the week before the contest.
- Ensuring you capture a few hours in the period before a contest starts.
- Working on your ability to take power naps during the contest.

If, going into a contest, you find yourself tired and sleepy, it's going to be a long weekend indeed!

Computers

Like it or not, computers rule the roost in contesting, and the Friday afternoon before a contest is no time to check out your computer situation in the shack. Whether it's your logging program, radio controls, propagation tools, or networking setup for your first multi-op, there is no excuse not to have these things ironed out ahead of the big event. Also, make sure you've downloaded the latest multiplier files for your logging software. It's not fun trying to do that while operating during a contest, and it may result in your missing a needed multiplier.

Propagation

I have found that intimate understanding of current propagation/conditions is a huge competitive advantage. Start by looking at the prior year's logs. While things change from year to year, you'll be reminded of the timing of certain seasonal openings. Spend some time on the air the week before the contest and monitor the latest WWV propagation numbers and other data sources. Here is a really good internet site that consolidates much of the data: <http://dx.qsl.net/propagation/propagation.html>. If you don't understand what all of this means, there are a number of on-line resources that can help you. As one good example, check out: <http://www.rdxa.com/index.cfm?page=WWV&section=Propagation>.

Rules

Whether you've been operating contests for one year or for decades, familiarity with the rules is an important consideration for proper contest preparation. In many major contests, there are often subtle (and sometimes major) rule changes that take place from one year to the next. It's a good idea to be on top of the game, or you may find yourself either violating a new rule or not taking advantage of one that will improve your score. In today's internet world there's no excuse. . . . Contest rules are everywhere!

Food

Just as in normal life, not all contest food is considered equal. While I don't intend to turn this contesting column into a culinary lesson, there are some tips to consider in the food department of contest preparation. The first point is to have a plan. Try to make your food ahead of the contest (when

Calendar of Events

All year	**CQ DX Marathon**
Mar. 25-26	**CQ WW WPX SSB Contest**
Apr. 1	Poisson d'Avril Contest
Apr. 1–2	Kids' Roundup
Apr. 1–2	SP DX Contest
Apr. 1–2	EA RTTY Contest
Apr. 1–2	QCWA Spring QSO Party
Apr. 1–2	Missouri QSO Party
Apr. 8	EU Spring CW Sprint
Apr. 8–9	JIDX CW Contest
Apr. 8–9	ARCI Spring QSO Party
Apr. 8–9	Georgia QSO Party
Apr. 8–9	Yuri Gagarin Int'l DX Contest
Apr. 8–9	Montana QSO Party
Apr. 9	UBA Spring SSB Contest
Apr. 15	EU Spring SSB Sprint
Apr. 15–16	Michigan QSO Party
Apr. 15–16	Ontario QSO Party
Apr. 15–16	YU DX Contest
Apr. 22–23	SP DX RTTY Contest
Apr. 22–23	Florida QSO Party
Apr. 29–30	Helvetia Contest
May 6–7	ARI Int'l DX Contest
May 13–14	**CQ National Foxhunting Weekend**
May 27–28	**CQ WW WPX CW Contest**

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e-mail: <K1AR@contesting.com>

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that makes sense). the second is to plan your eating around the contest, and not your operating around eating.

Station/Antennas

If you're like most busy people, it's fairly normal to not have checked out your station in great detail before a contest. I've done it, and we've all been there at one time or another. However, if you're serious about maximizing your score, there's nothing like running the station through its paces and making sure at least the basics are working. Here's a small checklist to consider:

- Try your transceiver and amplifier on all bands to make sure it properly transmits and receives.
- Take a short test drive with all of your antennas. Check the SWRs and look for intermittent connections.
- If you have advanced antenna switching, check out your system together with your computer interfaces. It's amazing how much stuff can break and you don't even realize it.
- Make sure everything is clearly labeled. You'll be glad it is, especially if you are hosting a multi-op effort or are struggling to stay awake during a lonely Saturday evening.
- Make sure you also do a visual inspection of your antenna farm. You really need to walk the length of your beverages, looking for twisted or missing elements and fallen wires. It's ugly outside, and there are a million things waiting to ruin your hard work of the previous summer.
- Have a handy stockpile of spare fuses, solder, connectors, torroids, and other adds and ends to make quick repairs a reality. There is nothing more frustrating than looking around a messy shack for a spare fuse when you've been operating for 27 hours straight.

A Thousand Other Things

Last, in addition to the above, there is an endless list of other loose ends that complete the preparation checklist for your next contest. Here are just a few:

- Keep your TVI/RFI kit handy for when the neighbors come knocking.
- Make sure you have the prior year's results handy as a reference point for the current contest.
- If possible, arrange with a buddy for a spare radio/amplifier as a backup should something go irreparably wrong with your gear during the contest.
- Have an operating game plan prepared—at least in your head. If you only have 10 hours to operate, pick the 10 hours that will best match your objective (high score, most operating fun, etc.). Set a goal for yourself or your team and beat it!
- Prepare a list of items that needed improvement from your last contest and make sure you've considered each one of them, looking for areas that result in tangible action.

Final Comments

Well, that's it for this time. Just as with anything else in life, preparation leads to success. With a little advanced thinking, you'll already be ahead of the competition and the contest hasn't even started yet!

As you can see by this month's calendar on the first page, April is a busy time for contest activity. It's also a good time to be checking out your station to see what needs to be fixed this summer (if you haven't already learned the bad news from this past contest season). See you on the bands!

73, John, K1AR

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Practical Projects

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RSGB 2002 Ed, 224 pages
Packed with around 50 "weekend projects," Practical Projects is a book of simple construction projects for the radio amateur and others interested in electronics. Features a wide variety of radio ideas plus other simple electronic designs and a handy "now that I've built it, what do I do with it?" section. Excellent for newcomers or anyone just looking for interesting projects to build.

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propagation

BY TOMAS HOOD,* NW7US

HF Propagation in April

A Quick Look at Current Cycle 23 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, January 2006: 15
Twelve-month smoothed, July 2005: 48

10.7 cm Flux
Observed Monthly,January 2006: 84
Twelve-month smoothed, July 2005: 91

***Ap* Index**
Observed Monthly, January 2006: 6
Twelve-month smoothed, July 2005: 13

April is one of the most interesting months for propagation. The seasonal change plays out on HF with activity moving up from 40 meters and down from 10 meters.

Ten- and 15-meter propagation suffers during April and the summer months due to lower MUFs (Maximum Usable Frequencies) in the Northern Hemisphere. MUFs peak very late in the day during summer. Summertime MUFs are lower due to solar heating, which cause the ionosphere to expand. An expanded ionosphere produces lower ion density, which results in lower MUFs. Short-path propagation between countries in the Northern Hemisphere will drop out entirely. Ten-meter propagation peaks in the fall. April and May are fall months in the Southern Hemisphere, making long-path DX possible. Short-path propagation to South America, the South Pacific, and other areas south of the equator will be strong and reliable when the paths are open. However, with the decline of the current solar cycle, solar activity is not supporting the higher HF-band propagation, so don't expect a lot from 10, 12, and 15 meters, except on short-path runs such as occur via sporadic-*E* propagation.

From April to June, fair to good propagation occurs on both daytime and nighttime paths on the middle high-frequency bands. The strongest propagation occurs on paths that span areas of both day and night, following the MUF. During April, peaking in May, and continuing in June, the 17- and 20-meter bands may offer occasional 24-hour DX to all parts of the world. If you hear a lot of echo on a signal, you might be beamed in the wrong direction. Try the opposite azimuth. The 20-meter band is more stable at night, with propagation following grayline and nighttime paths.

Low-band propagation is still hot on 40 meters, with Europe coming in the evenings and Asia in the mornings. Occasional DX openings will occur on 80 meters around sunrise. However, these bands are quickly being degraded by the seasonal increase in noise.

VHF Propagation

The April *Lyrids* meteor shower occurs from April 16–25, peaking on the UTC the night of April 22, 2006 at 1110 UT, give or take 12 hours. The hourly visual meteor rate is expected to be only 15 or so, with average meteor velocities of about 48 kilometers per second with broad outbursts.

The debris expelled by comet Thatcher as it moves through its orbit causes the *Lyrids*. It is a long-period comet that visits the inner solar system every 415 years or so. Despite this long period, there is activity every year at this time, so it is theorized that the comet must have been visiting the solar system for quite a long time. Over this long period, the debris left with each pass into the inner solar system has been pretty evenly distributed along the path of the comet's orbit.

This material isn't quite evenly distributed however, as there have been some years with outbursts of higher than usual meteor activity. The most recent of these outbursts occurred in 1982, with others occurring in 1803, 1922, and 1945. These outbursts are unpredictable and one could even occur this year. The best time to work this shower should be from midnight to early morning.

The unpredictability of the shower in any given year always makes the *Lyrids* worth watching, since we cannot say when the next unusual return may occur. If this year's event is average or better (30 to 60 good-size meteors entering the Earth's atmosphere every hour), it should make possible meteor-scatter-type openings on the VHF bands. Check out <http://www.meteorscatter.net/metshw.htm > for a very useful resource covering meteor scatter and upcoming showers.

A seasonal increase in sporadic-*E* ionization usually begins during April and continues through the spring and summer months. Expect an increase in short-skip openings on both 15 and 10 meters during April, as well as a possible occa-

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e-mail: <cq-prop-man@hfradio.org>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for April 2006

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1, 3-10, 12-14 20-28, 30	A	A	B	C
High Normal: 2, 11, 16-17, 19, 29	A	B	C	C-D
Low Normal: 15	B	C-B	C-D	D-E
Below Normal: 18	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 S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.
2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be excellent (A) on April 1st, exceleent (A) again from the 3rd through the 10th, good (B) on the 2nd, fair to good (C-B) on the 15th, poor to fair (D-C) on the 18th, etc.

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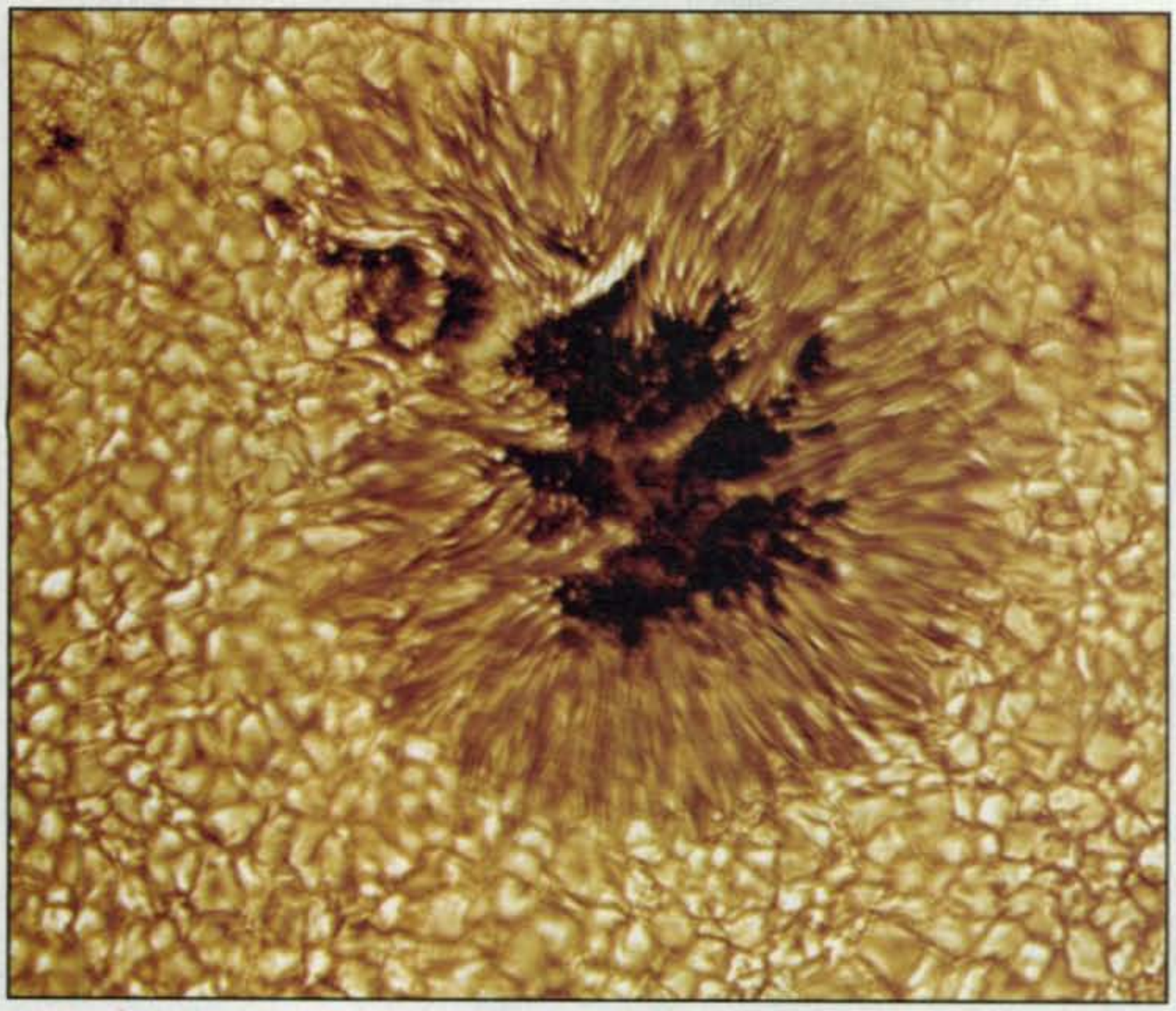

Why would a small part of the sun appear slightly dark? Visible above is a close-up picture of a sunspot, a depression on the sun's face that is slightly cooler and less luminous than the rest of the sun. The sun's complex magnetic field creates this cool region by inhibiting hot material from entering the spot. Sunspots can be larger than the Earth and typically last for only a few days. Solar Cycle 23 is just about over, so sunspots are not an every-day feature. More often this year there are days when no sunspots are visible. The current sunspot cycle is expected to end by December 2006. This high-resolution picture also shows clearly that the sun's face is a bubbling sea of separate cells of hot gas. These cells are known as "granules." A solar granule is about 1000 kilometers across and lasts about 10 minutes. After that, many granules end up exploding. (Courtesy of Vacuum Tower Telescope <http://www.nso.edu/nsosp/pr/vtt.html>, NSO <http://www.sunspot.noao.edu/>, and NOAO <http://www.noao.edu/noao.html>)

sional opening on 6 meters. While sporadic-*E* openings may occur at any time, they tend to peak between 8 AM and noon, and again between 5 and 9 PM local time.

Widespread auroral displays can occur during April, bringing with them unusual ionospheric short-skip openings on the VHF bands. The best times for these to occur are during periods of radio storminess on the HF bands. Check the Last-Minute Forecast at the beginning of this column for the days in April that are expected to be Below Normal or Disturbed. Also, don't forget to check out *CQ VHF* magazine for more details on VHF propagation and conditions.

Current Solar Cycle Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 83.8 for January 2006, down from December's 90.8. The 12-month smoothed 10.7-cm flux centered on July 2006 is 90.9. The predicted smoothed 10.7-cm solar flux for April 2006 is about 75, give or take around 16 points.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for January 2006 is 15.4, a huge dive downward from December's 41.2, but just a bit lower than November's 18.0. This is still higher than October's 8.5. The lowest daily sunspot value during January—recorded on January 13, 30, and 31—was zero (0). The highest daily sunspot count was 37 on January 23. These high and low marks are significantly lower than the spread in December. The 12-month running smoothed sunspot number centered on July 2005 is 48.1, just

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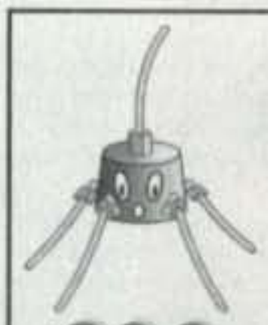
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slightly higher than June's reading. A smoothed sunspot count of 11.9 is expected in April 2006, give or take about 12 points.

The observed monthly mean planetary *A*-index (*Ap*) for January 2006 is 6. The 12-month smoothed *Ap*- index centered on July 2005 is 13.1, just lower than in June. Expect the overall geomagnetic activity to be quiet to active during most days in April, with some isolated periods of storm-level activity, since we are in the equinoctial season. Refer to the Last-Minute Forecast for the outlook on what days this might occur.

Please come and participate in my online propagation discussion forum at <http://hfradio.org/forums/>. I've also enhanced my Space Weather and Radio Propagation center at <http://prop.hfradio.org>, so please take a look. These resources may also be viewed on a cellphone or other wireless device that has WAP/WML features, by browsing to <http://wap.hfradio.org>.

Drop me an e-mail or send me a letter if you have questions or topics you would like to see me explore in this column. I'd also love to hear any feedback you might have on what I have written. Until next month . . .

73, de Tomas, NW7US

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and Ø areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

April 15 - June 15, 2006
Time Zone: EDT (24-Hour Time)
EASTERN USA To:

Reception Area	*10/15 Meters*	*20 Meters*	*40 Meters*	*80 Meters*
Western & Central Europe & North Afnca	12-17 (1)	05-07 (1) 07-10 (2) 10-11 (1) 11-13 (2) 13-14 (3) 14-16 (4) 16-18 (3) 18-19 (2) 19-20 (1)	18-19 (1) 19-21 (2) 21-01 (3) 01-03 (2) 03-04 (1)	20-22 (1) 22-01 (3) 01-02 (2) 02-03 (1) 22-00 (1)* 00-02 (2)* 02-03 (1)*
Northern Europe & European CIS	11-16 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-16 (2) 16-18 (1)	19-20 (1) 20-23 (2) 23-01 (1)	20-00 (1)
Eastern Mediter-anean & Middle East	14-16 (1)	12-14 (1) 14-16 (2) 16-18 (3) 18-19 (1) 22-00 (1)	19-21 (1) 21-23 (2) 23-00 (1)	21-23 (1)
Western Africa	12-14 (1)** 10-12 (1) 12-15 (2) 15-16 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-17 (3) 17-19 (2) 19-20 (1)	20-22 (1) 22-02 (2) 02-03 (1)	00-02 (1)
Eastern & Central Africa	10-13 (1) 13-14 (2) 14-15 (1)	07-09 (1) 13-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	21-01 (1)	22-00 (1)
Southern Africa	12-14 (2) 14-15 (1)	16-17 (2) 17-18 (3) 18-20 (1) 23-01 (1)	22-02 (2) 00-02 (1)	*Nil*
Central & South Asia	17-19 (1)	07-10 (1) 14-16 (1) 19-21 (1)	05-07 (1) 19-21 (1)	*Nil*
Southeast Asia	*Nil*	08-10 (1) 18-20 (1)	*Nil*	*Nil*
Far East	17-19 (1)	08-10 (1) 18-19 (1) 19-21 (2) 21-23 (1)	04-06 (1)	*Nil*
South Pacific & New Zealand	15-18 (1)** 09-11 (1) 15-17 (1) 17-19 (2) 19-20 (1)	07-08 (1) 08-09 (2) 09-10 (3) 10-12 (2) 12-16 (1) 16-18 (2) 18-20 (1) 20-23 (2) 23-02 (1)	02-03 (1) 03-04 (2) 04-06 (3) 06-07 (1)	02-03 (1) 03-05 (2) 05-06 (1) 03-05 (1)*
Austral-asia	17-20 (1)	07-08 (1) 08-10 (2) 10-11 (1) 15-16 (1) 16-18 (2) 18-21 (1) 21-23 (2) 23-01 (1)	03-05 (1) 05-07 (2) 07-08 (1)	04-07 (1) 04-06 (1)*
Caribbean, Central America & Northern Countries of South America	11-14 (1)** 14-16 (2)** 16-17 (1)** 10-11 (1) 11-13 (2) 13-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	04-06 (1) 06-07 (2) 07-08 (3) 08-10 (4) 10-11 (3) 11-15 (2) 15-17 (3) 17-19 (4) 19-20 (3) 20-22 (2) 22-00 (1)	19-20 (1) 20-21 (2) 21-04 (3) 04-06 (2) 06-07 (1)	21-02 (1) 02-05 (2) 05-07 (1) 03-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-15 (1)** 15-16 (2)** 16-17 (1)** 08-09 (1) 09-11 (2) 11-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-18 (3) 18-19 (4) 19-20 (3) 20-22 (2) 22-00 (3) 00-01 (2) 01-03 (1)	20-21 (1) 21-04 (2) 04-06 (1)	23-03 (1) 03-05 (2) 05-06 (1) 03-05 (1)*
McMurdo Sound, Antarctica	*Nil*	07-08 (1) 08-09 (2) 09-10 (1) 16-20 (1) 20-23 (2) 23-00 (1)	01-05 (1)	*Nil*

Time Zones: CDT & MDT
(24-Hour Time)
CENTRAL USA To:

Reception Area	*10/15 Meters*	*20 Meters*	*40 Meters*	*80 Meters*
Western & Southern Europe & North Africa	14-16 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-15 (2) 15-16 (3) 16-17 (2) 17-19 (1)	19-21 (1) 21-23 (2) 23-01 (1)	21-00 (1)
Northern Europe & European CIS	*Nil*	07-08 (1) 08-10 (2) 10-14 (1) 14-16 (2) 16-18 (1) 20-22 (1)	20-00 (1)	21-22 (1)
Eastern Mediter-ranean & Middle East	*Nil*	07-09 (1) 13-15 (1) 15-17 (2) 17-18 (2) 22-00 (1)	20-00 (1)	*Nil*
Western Africa	12-14 (1) 14-15 (2) 15-16 (1)	07-09 (1) 12-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	20-01 (1)	*Nil*
Eastern & Central Africa	13-15 (1)	07-09 (1) 13-16 (1) 16-19 (2) 18-19 (1)	21-00 (1)	*Nil*
Southern Africa	09-11 (1) 11-13 (2) 13-14 (1)	14-16 (1) 16-18 (2) 18-21 (1)	20-22 (1) 22-00 (2) 00-01 (1)	22-00 (1)
Central & South Asia	17-19 (1)	08-10 (1) 17-19 (1) 19-21 (2) 21-22 (1)	05-07 (1) 19-21 (1)	*Nil*
Southeast Asia	*Nil*	08-10 (1) 19-22 (1)	05-07 (1) 19-21 (1)	*Nil*
Far East	18-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 18-20 (1) 20-22 (2) 22-23 (1)	03-05 (1) 05-06 (2) 06-07 (1)	05-06 (1)
South Pacific & New Zealand	15-17 (1)** 11-15 (1) 15-17 (2) 17-18 (3) 18-19 (2) 19-20 (1)	16-19 (1) 19-21 (2) 21-23 (3) 23-03 (2) 03-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-13 (1)	00-02 (1) 02-04 (2) 04-05 (3) 05-06 (2) 06-07 (1)	02-04 (1) 04-05 (2) 05-06 (1) 04-05 (1)*
Austral-Asia	16-18 (1) 18-20 (2) 20-21 (1)	06-08 (1) 08-09 (2) 09-11 (3) 11-12 (2) 12-16 (1) 16-18 (2) 18-21 (1) 21-00 (2) 00-02 (1)	02-04 (1) 04-06 (2) 06-07 (1)	04-06 (1)
Caribbean, Central America & Northern Countries of South America	11-13 (1)** 13-16 (2)** 16-17 (1)** 09-11 (1) 11-12 (2) 12-14 (3) 14-15 (4) 15-16 (3) 16-17 (2) 17-19 (1)	00-07 (1) 07-08 (2) 08-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-23 (2) 23-00 (1)	19-21 (1) 21-22 (2) 22-03 (3) 03-05 (2) 05-07 (1)	21-23 (1) 23-04 (2) 04-06 (1) 00-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-15 (1)** 15-16 (2)** 16-17 (1)** 08-10 (1) 10-12 (2) 12-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	06-08 (1) 08-09 (2) 09-10 (3) 10-16 (1) 16-18 (2) 18-19 (3) 19-20 (4) 20-21 (3) 21-23 (2) 23-01 (3) 01-02 (2) 02-04 (1)	21-22 (1) 22-00 (2) 00-02 (1) 02-04 (2) 04-05 (1)	00-04 (1) 01-03 (1)*
McMurdo Sound, Antarctica	15-17 (1)	08-10 (1) 16-18 (1) 18-22 (2) 22-00 (1)	00-06 (1)	*Nil*

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Time Zone: PDT (24-Hour Time) WESTERN USA To:

Reception Area	10/15 Meters	20 Meters	40 Meters	80 Meters
Western & Southern Europe & North Africa	Nil	07-09 (1) 09-11 (2) 11-13 (1) 13-15 (2) 15-18 (1) 22-00 (1)	20-21 (1) 21-23 (2) 23-00 (1)	21-23 (1)
Northern Europe & European CIS	Nil	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-16 (1) 22-00 (1)	20-23 (1)	21-22 (1)
Eastern Mediter-ranean & Middle East	Nil	07-10 (1) 10-12 (2) 12-13 (1) 22-00 (1)	20-23 (1)	Nil
Western Africa	10-14 (1)	07-09 (1) 12-15 (1) 15-17 (2) 17-19 (1)	20-23 (1)	Nil
Eastern & Central Africa	10-12 (1)	07-09 (1) 12-14 (1) 14-15 (2) 15-17 (1)	20-22 (1)	Nil
Southern Africa	10-13 (1)	07-09 (1) 13-14 (1) 14-16 (2) 16-17 (1) 22-00 (1)	19-22 (1)	20-22 (1)
Central & South Asia	19-21 (1)	08-09 (1) 09-11 (2) 11-12 (1) 17-19 (1) 19-21 (2) 21-23 (1)	04-07 (1)	Nil
Southeast Asia	19-21 (1)	07-08 (1) 08-10 (2) 10-11 (1) 21-22 (1) 22-23 (2) 23-01 (1)	04-07 (1)	05-06 (1)
Far East	19-21 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-16 (1) 18-21 (1) 21-23 (2) 23-01 (1)	02-03 (1) 03-06 (2) 06-08 (1)	03-07 (1)
South Pacific & New Zealand	15-18 (1)** 11-13 (1) 13-16 (2) 16-19 (3) 19-20 (2) 20-22 (1)	06-08 (1) 08-11 (2) 11-17 (1) 17-20 (2) 20-21 (3) 21-23 (4) 23-00 (3) 00-02 (2) 02-04 (1)	23-01 (1) 01-02 (2) 02-06 (3) 06-07 (2) 07-08 (1)	01-02 (1) 02-05 (2) 05-06 (1) 02-05 (1)*
Austral-Asia	16-18 (1)** 13-16 (1) 16-17 (2) 17-19 (3) 19-20 (2) 20-22 (1)	06-08 (1) 08-10 (2) 10-12 (1) 18-20 (1) 20-22 (2) 22-02 (3) 02-03 (2) 03-04 (1)	01-02 (1) 02-04 (2) 04-06 (3) 06-07 (2) 07-08 (1)	02-03 (1) 03-05 (2) 05-06 (1) 03-05 (1)*
Caribbean, Central America & Northern Countries of South America	11-14 (1)** 14-16 (2)** 16-17 (1)** 09-10 (1) 10-12 (2) 12-14 (3) 14-16 (4) 16-17 (2) 17-18 (1)	00-06 (1) 06-08 (2) 08-10 (4) 10-12 (3) 12-15 (3) 15-17 (3) 17-19 (4) 19-21 (3) 21-00 (2)	19-20 (1) 20-21 (2) 21-02 (3) 02-04 (2) 04-06 (1)	21-00 (1) 00-03 (2) 03-05 (1)* 01-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina	13-16 (1)** 09-10 (1) 10-12 (2) 12-14 (1) 14-15 (2) 15-16 (3)	06-08 (1) 08-10 (2) 10-15 (1) 15-17 (2) 17-18 (3) 18-20 (4)	20-22 (1) 22-02 (2) 02-04 (1)	21-03 (1) 00-03 (1)*
& Uruguay	16-17 (2) 17-18 (1)	20-21 (3) 21-23 (2) 23-01 (1)		
McMurdo Sound, Antarctica	16-19 (1)	07-09 (1) 16-18 (1) 18-19 (2) 19-21 (3) 21-22 (2) 22-00 (1)	03-06 (1)	Nil

**Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.*
***Indicates best time for 10 meter openings.*
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
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