45241

Amateur Radio

http://www.cq-amateur-radio.com

COMMUNICATIONS & TECHNOLOGY

FEBRUARY 2003

CQ

Two New Columns: • Mobile • Digital

Doing the Ducie DX

A High-Flying Vertical for 160

CQ Market Survey: VHF/UHF Handhelds

Restoring the Heathkit HW-202

On the Cover: Some of the many, many antennas "grown" by Paul Bittner, WØAIH, on his farm in Fall Creek, Wisconsin. Details on page 78.

U.S. $4.99

0 09128 45241 8

THE RADIO AMATEUR'S JOURNAL

Versatility Superiority

Free Pin
*w/every radio purchase

TH-22AT
2 meters

TH-G71A
2 meters
& 440 MHz

TH-D7A(G)
2 meters
& 440 MHz

TH-F6A
2 meters & 220MHz
& 440 MHz

TM-261A/461A
2 meters/440 MHz

TM-541A
1200 MHz

TM-331A
220 MHz

TM-742AD/642AD
2 meters & 440 MHz/2 meters & 220 MHz

TM-G707A
2 meters & 440 MHz

TM-V7A
2 meters & 440 MHz

TM-D700A
2 meters & 440 MHz

TS-50S
Compact HF All Mode

TS-570D/S(G) w/DSP
HF All Mode or HF + 6m All Mode

TS-870S w/DSP
HF All Mode

TS-2000
HF/VHF/UHF Multi-Mode

TS-B2000
HF/VHF/UHF Multi-Mode

RC-2000
Compact Mobile Controller

ARCP-2000
PC Radio
Control Program

KENWOOD
COMMUNICATIONS

Kenwood USA Corporation
3975 Johns Creek Court, Suwanee, GA 30024
P.O. Box 22745, Long Beach, CA 90801-5745, U.S.A.
Customer Support: (310) 639-4200 Fax: (310) 537-8235

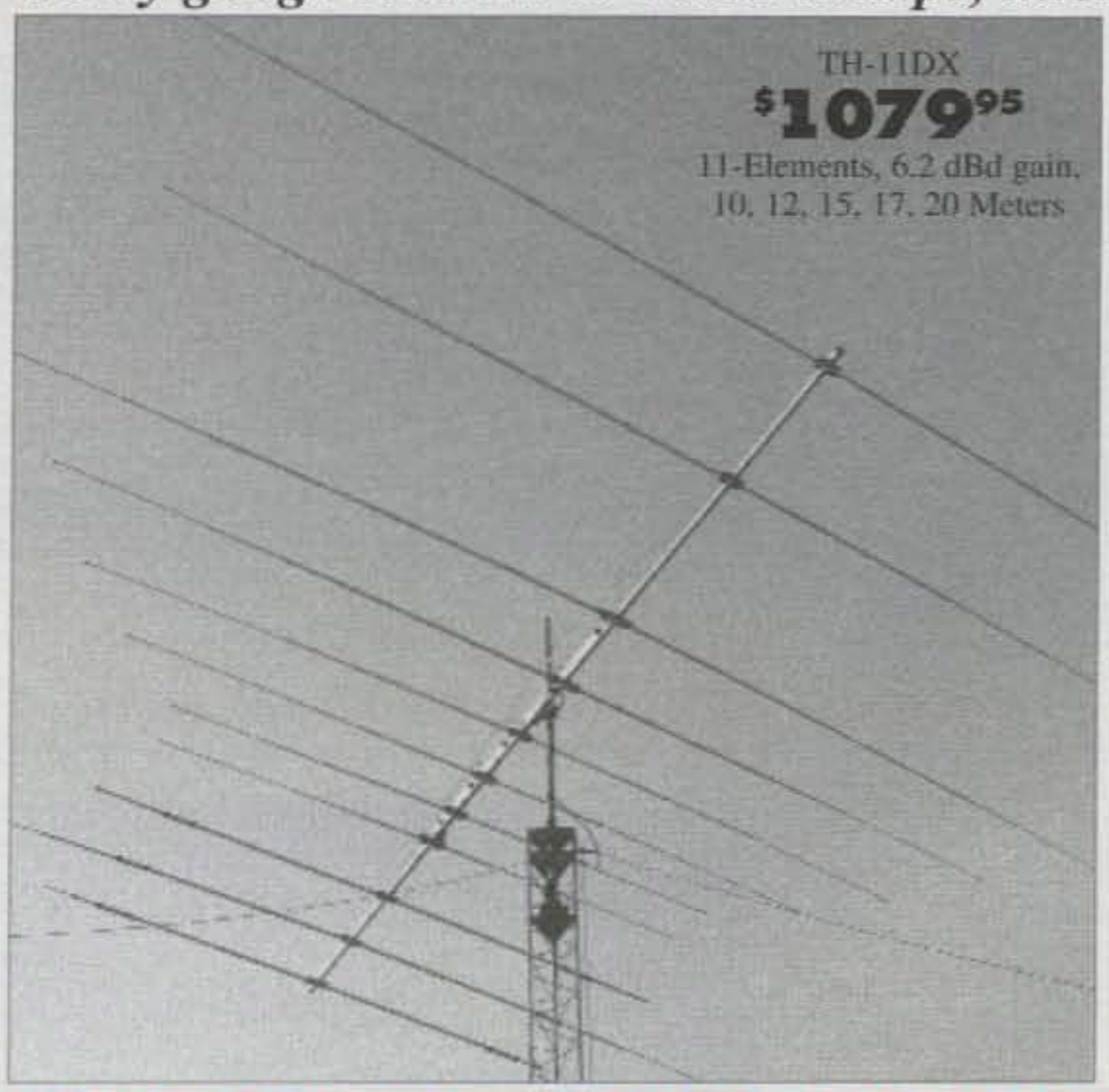
*Limited time only while supplies last. See your dealer for details.

INTERNET
Kenwood Website
http://www.kenwood.net
Kenwood Information
ftp://ftp.kenwood.net

ISO 9001
JQA-1205

hy-gain® HF BEAMS...

. . . are stronger, lighter, have less wind surface and last years longer.
Why? Hy-Gain uses durable tooled components -- massive boom-to-mast bracket, heavy gauge element-to-boom clamps, thick-wall swaged tubing -- virtually no failures!



TH-11DX
$1079.95
11-Elements, 6.2 dBd gain,
10, 12, 15, 17, 20 Meters

TH-11DX, $1079.95. 11-element, 6.2 dBd Gain, 10,12,15,17,20M

The choice of top DXers.

With 11-elements, 6.2 dBd gain and 5-bands, the super rugged TH-11DX is *the "Big Daddy" of all HF beams!*

Handles 2000 Watts continuous, 4000 Watts PEP.

Every part is selected for durability and ruggedness for years of trouble-free service.

Features a low loss log-periodic driven array on all bands with monoband reflectors, BN-4000 high power balun, corrosion resistant wire boom support, hot dipped galvanized and stainless steel parts.

Stainless steel hardware and clamps are used on all electrical connections.

TH-7DX, $819.95. 7-element, 6.57 dBd Gain, 10,15,20 Meters

7-Elements gives you an incredible avg *6.57 dBd gain -- the highest* of any Hy-Gain tri-bander!

Dual driven for broadband operation without compromising gain. SWR less than 2:1 on *all* bands.

Uniquely combining monoband and trapped parasitic elements give you an excellent 27 dB F/B.

Includes *Hy-Gain's* diecast aluminum, rugged boom-to-mast clamp, heavy gauge element-to-boom brackets, BN-86 balun. For high power, upgrade to BN-4000.

TH-5MK2, $699.95. 5-element, 6.1 dBd Gain, 10,15,20 Meters

The broadband *five element* TH5-MK2 gives you an outstanding 6.1 dBd average gain.

Separate air dielectric *Hy-Q* traps let you adjust for maximum F/B ratio on each band.

Also standard is *Hy-Gain's* exclusive *BetaMATCH*™, stainless steel hardware and compression clamps and BN-86 balun.

TH-3MK4, $439.95. 3-element, 5.9 dBd Gain, 10,15,20 Meters

The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander!

You get an impressive 5.9 dBd average gain and a whopping 25 dB average front-to-back ratio. Handles a full 1500 Watts PEP. 95 MPH wind survival.

Fits on average size lot with room to spare -- turning radius is just 15.3 feet. Four piece boom is ideal for DXpeditions. Rotates with CD-45II or HAM-IV rotator.

Features *Hy-Gain BetaMatch*™ for DC ground, full power *Hy-Q*™ traps, rugged boom-to-mast bracket and mounts on standard 2"O.D. mast. Stainless steel hardware. BN-86 balun recommended.

TH-2MK3, $339.95. 2-element, 3.4 dBd Gain, 10,15,20 Meters

The 2-element TH-2MK3 is Hy-Gain's *most economical* full power (1.5kW PEP) full size tri-bander.

For just $339.95 you can *double* your effective radiated power and hear *15-20 dB* (=F/B) better!

Ruggedly constructed, top-performing, compact 6 foot boom, tight 14.3 foot turning radius. Installs almost anywhere. Rotate with CD-45II or HAM-IV. BN-86 balun recommened.

EXP-14, $549.95. 4-element, 5.9 dBd Gain, 10,15,20 Meters

Revolutionary 4-element compact tri-bander *lets you add 40 or 30 Meters!* Has 14 foot boom and tight 17.25 feet turning radius. Fits on roof tri-pod, mast or medium duty tower.

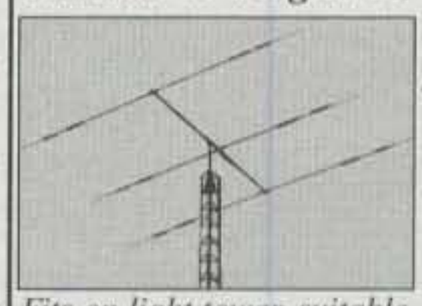
Hy-Gain's *patented* broadbanding *Para Sleeve* gives you less than 2:1 VSWR. 1.5kW PEP.

BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

Truly *competitive against giant tri-banders at half the cost!*

QK-710, $169.95. 30/40 Meter option kit for EXP-14.

Compact 3-element 10, 15, 20 Meter Tri-Bander
For limited space . . . Installs anywhere . . . 14.75 ft turning radius . . . weighs 21 lbs . . . Rotate with CD-45II, HAM-IV



Fits on light tower, suitable guyed TV pole, roof tri-pod

TH-3JRS, $329.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design.

Excellent 5.8 dBd gain and 25 dB F/B let *you* compete with the "big guns".

Tooled manufacturing gives you *Hy-Gain* durability with 80 MPH wind survival.

Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
TH-11DX	11	6.2	22	4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	**7**	**6.57**	**21**	**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	6.1	20	1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	**5.8**	**25**	**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	5.8	25	600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	**3.4**	**15-20**	**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4	5.9	25	1500	10,15,20	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

Tooled Manufacturing . . . Highest Quality Materials

1. Hy-Gain's famous super strong *tooled* die cast *Boom-to-Mast Clamp*

2. ***Tooled*** *Boom-to-Element Clamp*

3. Thick-wall *swaged* aluminum tubing

Tooled *manufacturing* is the difference between Hy-Gain antennas and the others -- they just don't have it (it's expensive!).

Die-cast aluminum boom-to-mast bracket and element-to-boom compression clamps are made with specially *tooled* machinery.

Hy-Gain antennas feature *tooled* swaged tubing that is easily and securedly clamped in place. All tubing is deburred and cleaned for smooth and easy assembly.

Durable precision injection molded parts.

Hy-Gain *antennas are stronger, lighter, have less wind surface area, better wind survival, need no adjustments, look professional and last years longer.*

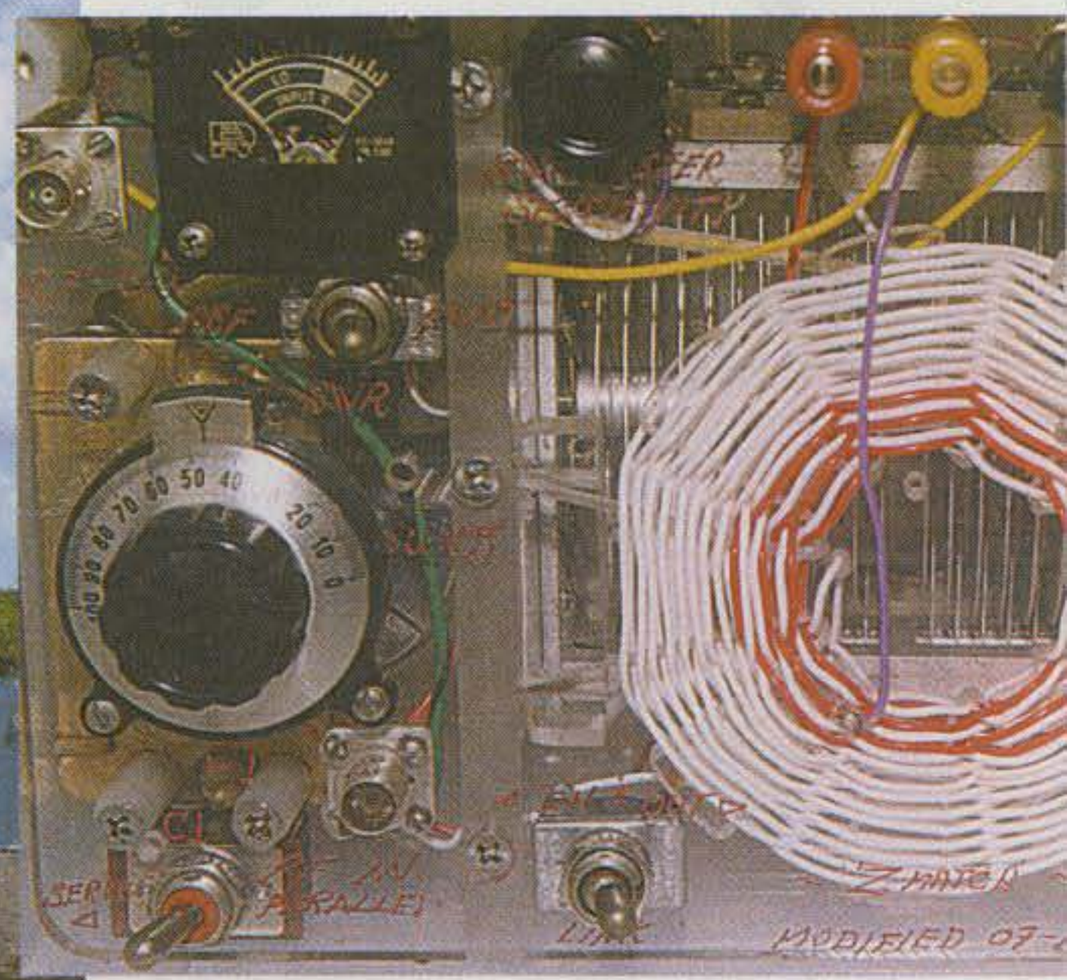
Free Hy-Gain Catalog
and Nearest Dealer . . . 800-973-6572
Call your dealer for your best price!

hy-gain®

Antennas, Rotators & Towers
308 Industrial Park Road, Starkville, MS 39759 USA
Toll-free Customer Sales Hotline: 800-973-6572
• **TECH:** 662-323-9538 • **FAX:** 662-323-6551
http://www.hy-gain.com

CQ contents

FEBRUARY 2003



features

Vol. 59 No. 2

departments

ALINCO

Unleash The Power

New

DR-620T VHF/UHF
Dual-Band Mobile/Base
First Amateur Twin Band Mobile To Support Optional Digital Voice Communications*

- RX-VHF 108-173.995 MHz, UHF 335-480 MHz
- TX-VHF 144-147.995 MHz, UHF 430-449.995 MHz
- Receives Airband and Wide FM
- Front control unit separation (optional EDS-9 kit required)
- Advanced 10F3 digital mode with speech compression technology (EJ-47U required)*
- 200 memory channels
- Advanced EJ-50U TNC (optional) supports digi-peat mode
- Remote control features including parameter setting and direct frequency entry through the microphone
- Dual-Band receiver with V/U, V/V, U/U capability
- CTCSS/DCS encode/decode plus four different Tone-bursts
- OUTPUT: H/M/L-50/10/5 watts VHF
- OUTPUT: H/M/L-35/10/5 watts UHF

DR-605TQ VHF/UHF
Dual-Band Mobile/Base
Full 2 Meter/440 Performance

- 100 memory channels, + a "call" channel for each band
- CTCSS encoded+decoded and tone scan
- Cross-band repeat and full duplex capability
- 9600 bps packet ready with dedicated terminals
- Internal duplexer - one easy antenna connection
- RX-VHF 136-173.995 MHz, UHF 420-449.994 MHz
- TX-VHF 144-147.995 MHz, UHF 430-449.994 MHz
- MARS capability (permit required)
- OUTPUT H/L - 50/5 watts VHF, 35/5 watts UHF
- Time-out timer (ideal for repeater and packet operation)

DJ-V5TH VHF/UHF
Dual-Band FM Transceiver
5 watts of output power, in a compact package.

- Alphanumeric Display, up to 6 characters
- TX-VHF 144-147.995 MHz, UHF 420-449.995 MHz
- 200 memory channels plus two call channels
- Full VHF + UHF Amateur Band Coverage
- Receive Range, (76 - 999MHz) includes Wide FM capability
- Up to 5 watts output, 3 output settings
- CTCSS encode+decode DTMF squelch and European Tone bursts
- 4 scan modes, 5 programmable scan banks
- MARS capability (permit required)

IronHorse®

Ask your dealer about the full line of Iron Horse antennas & accessories!

DJ-596T VHF/UHF Dual-Band HT with Digital Voice Option*

Loaded with features! The breakthrough design supports optional digital voice communications and you can easily switch the unit between analog and digital modes!

- Full 4.5 watts output VHF/4w UHF
- Powerful NiMH battery
- 100 memories in any combination of VHF or UHF channels
- Direct frequency input from keypad
- Each memory capable of "odd split" operation.
- Alphanumeric channel labels
- CTCSS/DCS encode+decode plus tone bursts
- Full 2m and 440 band coverage
- Accepts 6 to 16 VDC direct input
- Illuminated Keys and display
- Wide and narrow FM modes
- 10 autodial memories
- Theft alarm feature
- Optional EJ-40U Digital Voice Board!*
- Programming/Clone software available

Distributed in North America by Amateur Distributing LLC • 23 S. High St., Covington, OH 45318 • (937) 473-2840

Specifications subject to change without notice or obligation. *Digital communications require at least two similarly equipped transceivers. Digital mode may not be legal in some countries. See FAQ on digital at www.alinco.com. Products intended for use by properly licensed operators. Permits required for MARS use. Specifictions subject to change without notice or obligation.

First Transatlantic HF Digital Voice QSO

A 15 meter contact on November 22 between Doug Smith, KF6DX, in Tennessee, and Didier Chulot, F5MJN, operating as F8KGG in Paris, France marked a milestone in amateur radio communications, apparently the first-ever transatlantic HF digital voice QSO. Both work for the companies whose radios and software were used—Ten-Tec and Thales Communcations, respectively—but the tests were conducted under the auspices of the ARRL's Digital Voice Working Group, which Smith chairs.

According to the *ARRL Letter,* Smith said unmodified Ten-Tec transceivers were used, along with Thales' Skywave 2000 digital audio software. The HF digital link operated within a 3 kHz bandwidth (the same bandwidth of a standard SSB signal). A Ten-Tec news release said the several-minute contact "demonstrated the advantages of digital audio ... including noise-free, FM-like reception and the potential for simultaneous voice and data." Smith said the audio quality was roughly equivalent to that of a conventional telephone circuit.

The system is based on an international broadcasting standard for digital radio adopted in 2001 by the International Telecommunications Union and approved for broadcast use by the FCC. An amateur radio version of the Thales software is expected to be introduced this year.

NO First Transatlantic 2 Meter QSO

Hams in Canada, Ireland, and Germany hoped that last November's *Leonids* meteor shower/storm might provide the path needed to make the first-ever transatlantic QSO on 2 meters without the use of satellites or the moon. The *Leonids* were a disappointment, however (see "VHF Plus" on page 90), and efforts to complete a transatlantic meteor-scatter contact were unsuccessful. According to the *ARRL Letter,* one group operating on the Irish coast was hoping to make contact via FSK-441 with VO1AA at Signal Hill in Newfoundland, where Marconi received the first transatlantic radio signals over a century ago. No details were available on the German effort.

North Korea Off the Air

The only authorized amateur radio operation from North Korea has been shut down. Without explanation, North Korean officials on November 22 asked Ed Giorgadze, 4L4FN, to stop operating P5/4L4FN and to tear down and pack up all of his equipment. According to the AMSAT News Service, officials then sealed the boxes and told Ed to take all the gear with him when he left the country for vacation in December. The information comes from Bruce Paige, KK5DO, who is AMSAT's Awards Manager and Ed's QSL manager.

After finally getting verbal permission from authorities to operate in 2001, Ed made more than 16,000 contacts as P5/4L4FN and, according to the ARRL, earned the first-ever DXCC award *from* North Korea.

Multiple Options for 40 Meter "Harmonization"

Six different proposals for trying to separate hams and broadcasters on 40 meters were placed on the table at the Conference Preparatory Meeting (CPM) in late November, where delegates from around the world met to finish work on a 700-page technical report for this summer's World Radiocommunication Conference (WRC-03).

According to the *ARRL Letter,* five of the six plans proposed phasing in various changes to broadcasting and/or fixed-and-mobile (mostly military) allocations, while keeping the amateur allocation where it is. Depending on the plan, hams in Europe, Africa, and Asia would see their 40 meter allocations expand from the current 100 kHz to either 200 or 300 kHz, and there might be continued sharing with either broadcasters or fixed/mobile services between 7200 and 7300 kHz. The sixth plan called for leaving things as they are. The ARRL's Dave Sumner, K1ZZ, who attended the meeting, said the conference could choose to adopt any of the six options or do something completely different. WRC-03 will be held this summer in Geneva.

"Mr. DXCC," W1CW, Silent Key

Bob White, W1CW, died in November at age 83, according to the ARRL. As manager of the ARRL's DX Century Club (DXCC) program from 1952–1976, White codified the rules for the award and set the program's high standards. He was so closely associated with the award that he was known by many as "Mr. DXCC." White was also a member of the CQ DX Hall of Fame, into which he was inducted in 1998. Memorial donations may be made to the W1CW Memorial Fund – Florida Contest Group, c/o Frederick M. Perkins, Jr., 3437 Lake Josephine Dr., Lake Placid, FL 33852.

New Technician Class Question Pool Released

The question pool for Technician Class amateur radio license exams given as of July 1, 2003 has been released by the Question Pool Committee (QPC) of the National Council of Volunteer Examiner Coordinators (NCVEC). The new pool for the Element 2 written exam contains 511 questions, 35 of which are selected for each exam. The questions are posted on several websites, including the CQ magazine site <http://www.cq-amateur-radio.com> and the ARRL VEC site <http://www.arrl.org/arrlvec/pools.html>. There are two files, one containing the questions and answers and another containing diagrams for use with certain questions.

The Question Pool Committee is now looking for input on topics and questions to be covered in a revised General Class (Element 3) question pool. Suggestions should be e-mailed by January 31 to <qpc@arrl.org>.

FCC Cracks Down on Testing Irregularities

The FCC has recommended to the ARRL/VEC that it no longer permit five Tennessee amateurs to work as Volunteer Examiners, based on an audit of two test sessions in Cookeville, Tennessee. According to the FCC, in one instance the group knowingly gave a test to a relative of one or more of the VEs (That's against the rules, and the candidate's General Class license was downgraded to Technician after he did not appear for a retest). In the other session, the FCC says the group provided deceptive information about the time and location of a test session for a person with disabilities.

The Commission is also looking into a June, 2000 ARRL/VEC test session in Pelham, Georgia, in which a candidate received a perfect score on the Technician Class exam and got only one wrong on the General Class exam. This was brought to the FCC's attention by ARRL/VEC Manager Bart Jahnke, W9JJ, who noticed that the same person had taken and failed the Technician exam seven times previously. The candidate was asked to sit for a retest in April 2002 but did not appear and the FCC cancelled his license.

In a third test-session review case, the FCC found nothing improper in the administration of exams by a Trumbull, Connecticut VE team in May 2002, but noted in a letter to Jahnke that there were ten VEs at the session and only eight candidates, making "supervision and control by a VE team leader more difficult."

New Russian Ham Satellite Launched

The newest amateur satellite to be placed in orbit, RS-20, was launched November 28 from the Russian launch facility at Plesetsk, according to the AMSAT News Service and the ARRL. This is apparently a downlink-only "bird," transmitting telemetry in CW and possibly FSK on 435.319 and 145.828 MHz. It is a payload on the Mozhayets navigational and scientific satellite. Reception reports may be e-mailed to <plis@kaluga.ru> or <zaitzevizmiran.rssi.ru>.

The German Amateur Radio Association (a different group from DARC, the Deutsche Amateur Radio Club) planned to launch an amateur radio payload aboard a scientific satellite on December 20. The satellite is named RUBIN-2 and the amateur payload has been dubbed "SAFIR-M." According to ANS, it has a dual-speed packet transponder, with a 1200-baud uplink on 435.275 MHz and a 9600-baud downlink on 145.825 MHz, plus an optional voice message beacon. The main purpose of the satellite is to promote amateur radio in schools by giving students easy access to space communications.

In other amateur satellite news, the AMSAT News Service reports that UO-22 "is operating OK at the moment," although its transmitter is being turned off during passes over areas with very few active stations, such as the middle of the ocean and central China. Controllers note that the satellite's Ni-Cad batteries are starting to show their age after some 60,000 charge/discharge cycles, and they're not sure what will happen when UO-22 goes into an eclipse period fairly soon and has no sunlight for recharging the batteries. "Enjoy the bird while you can," notes control operator G7UPN/ZL2TPO. "At 11 1/2 years, it's doing well but it may not be available for a lot longer."

New All-Ham Crew Aboard Space Station

The sixth International Space Station crew has settled into its new home away from home for a four-month stay that began in late November. According to the ARRL, the all-male, all-ham crew includes Commander Ken Bowersox, KD5JBP; Flight Engineer Nikolai Budarin, RV3FB; and Science Officer Don Pettit, KD5MDT. At press time it was uncertain how active the new crew would be on ham radio.

Two members of the Expedition Five crew, Valerie Korzun, RZ3FK, and Peggy Whitson, KC5ZTD, were very active on the station's ham rig, with Whitson focusing primarily on school contacts.

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.

zero bias

BY RICH MOSESON, W2VU

The Glass is Half Full

The *Washington Post* ran an article about ham radio in mid-December, titled "Ham Radio Buffs Find a New Calling." The focus was on the renewed emphasis since September 11 on public service and emergency communications as recruiting tools for new hams. The article had a generally positive focus, but the demonstration contact made by interview subject Tom Dawson, WB3AKD, with a ham named Larry in Clarksburg, West Virginia, gave everything a negative cast.

"Dawson, 48, tells Larry that he's providing a demonstration for a guest who's never experienced ham radio," wrote *Post* reporter Abhi Raghunathan, adding that Larry replied, "Well, give him a book ... I mean, they're giving away the tests now."

Raghunathan continues, "Much of the talk these days among enthusiasts of two-way amateur radio, who call themselves hams, concerns their diminishing ranks." Later, after describing ham radio's response to 9/11 and the ARRL's federal grant for additional training in emergency communications, the reporter adds, "But that hasn't kept ham radio from slowly fading. The league, a nonprofit organization based in Connecticut, says its membership has fallen from 175,000 in 1997 to 157,000 today."

There's just one problem here—a big problem: Our ranks are *not* diminishing. Ham radio is *not* slowly fading. In fact, at the end of November, 2002, there were more licensed hams on the FCC's books than at any time in the past five years, and quite possibly, the most ever. (And don't blame the reporter, who was no doubt the recipient of incorrect information.)

According to online statistician Joe Speroni, AHØA, the number of FCC-licensed hams on November 30 stood at 685,302, his highest monthly total in the five-plus years for which he has statistics posted. Fred Maia, W5YI, who's been collecting FCC statistics seemingly forever, has a slightly lower figure for the same date, just under 683,000, based on different ways of arriving at the totals (Fred explains that "the FCC database" is really six databases and the way the figures are merged accounts for the differences).

Some of you may recall that back in the mid-1990s, total licensing numbers were up above 720,000. This is not a valid comparison to current figures, says Maia, who explains that those numbers included hams whose licenses had expired but were still within the FCC's two-year grace period, and that the currently-reported figures filter out those hams.

According to Fred and FCC sources, those grace-period numbers tend to range between 30,000 and 45,000 at any given time. So if you subtract 45,000 from the August, 1997 peak of 721,835 FCC-licensed hams, you get 676,835—some 7,000 to 9,000 *fewer* than the number of hams we have *right now!* The FCC's "whole number" of current amateur licenses (including clubs, etc.) as of mid-December was between 732,000 and 733,000–plus 42,000 "grace period" licenses. No matter how you count the numbers, though, we are either at or near our *all-time high* right now.

Fred says new licensees are just barely replacing the number of people who are dropping out each year and that the numbers are creeping upward at a rate of less than 1% per year. That's the "glass-is-half-empty" view. Obviously, we want to do better than that, but the fact remains that up is up, and while our ranks may not be climbing rapidly, neither are they diminishing—at all. I'll say this again so no one misunderstands: *As of late 2002, we were at or near our all-time high—ever—in numbers of FCC-licensed hams. Ham radio is not "slowly fading." It is growing—slowly— but growing nonetheless.* The glass is half full.

One more note on licensing numbers: Twenty-five years ago, in 1978, W5YI's statistics show a total of 356,336 licensed hams in the US. Accepting his current figure of 682,591, our ranks have increased during that time period by more than 91%! Slowly fading, my foot!

Other Interesting Statistics

In 2002, the number of Extra Class licensees exceeded 100,000 for the first time, ending November at 103,125 (AH0A stats). Compared with 77,530 Extras in April, 2000, when the Advanced Class license was discontinued and the code speed for Extra was dropped to five words per minute, that's an increase of 33%. Fred correctly notes that most of that growth (23%) was in the 12 months following the start of restructuring, but it has continued as a slower rate (8%) since then. Currently, Extras make up 15% of the total amateur population, compared with 10% just a few years ago. The ranks of the General Class have also grown since restructuring, but the percentage of Technicians (including remaining Tech-Plus licensees) has essentially held steady. As expected, numbers have decreased for Advanced and Novice classes, as no new licenses are being issued for either group.

Obviously, the growth in the higher license classes—about 6000 in the past year—has come from the pool of Tech and Tech-Plus licensees, but there were some 20,000 new licenses issued in the same period. This suggests that the bulk of new Techs simply balanced out the losses of those (primarily Techs, it appears) who are not renewing their licenses as they expire. As I've pointed out here before, we need to do more to reduce the number of dropouts each year from our hobby. It should be easier to keep people who have already passed their tests than to recruit new people. We must work harder at this, and the effort must start with our national organization.

The ARRL's Declining Numbers

As for the ARRL's loss of nearly 20,000 members in the past five years, as cited in the *Washington Post*

The Wood Show is Back!

If you've been reading this page for any length of time, you know that both my predecessor, K2EEK, and I have had a long-running affinity for the woodworking show that traditionally shared the convention hall each March with the Charlotte (NC) Hamfest. Last year, it was rescheduled and many hams—including hamfest vendors (and yours truly)—were quite unhappy. We're pleased to report that the wood show sponsors have seen the error of their ways and have scheduled the 2003 show on the same weekend as the Charlotte Hamfest. If you're planning to be in or near Charlotte on March 8–9, and especially if you enjoy woodworking as well as amateur radio, please make it a point to visit both the hamfest (one of the best on the east coast) and the wood show ... and if you go to the wood show, be sure to wear your callsign badge! — *W2VU*

article, perhaps it's time for the League to take a close look at itself and not only the services it provides its members but also the attitude of its elected leadership toward newcomers. Clearly, there are those amateurs who want nothing to do "organized ham radio," whether it's the ARRL, a local radio club or a magazine subscription. But I have heard more than one ARRL elected official say publicly that the League is focused on HF operators and really has little interest in attracting VHF-only Technicians to membership. I recall that when I was Editor of *CQ VHF*, the ARRL occasionally bought an ad—but only to sell books and never to solicit new members. If the League wants to grow, and wants to remain a true representative of the entire amateur radio hobby in the United States, it must aggressively court new hams to become members.

The fact of the matter is that the ARRL invests a huge amount of time, effort and money in protecting amateur VHF, UHF and microwave allocations; sponsors more VHF+ contests than anyone, provides resources to help the umbrella organization of repeater coordinators operate, and provides other benefits to hams who don't operate HF. But it does a terrible job of communicating this to VHFers. A big part of the problem is that the ARRL directors tend to be dyed-in-the-wool HFers, elected by their fellow HFers (since very few VHFers are League members), and perpetuate the long-standing attitude that a ham who hasn't passed a code test and doesn't operate HF isn't really a ham at all.

The only way to change this attitude is for more Technicians to join the ARRL, get active in League leadership, and start getting elected to the Board of Directors. Otherwise, membership will likely continue to fall, and the League will experience what N0AX described in a guest editorial in January's *QST* (of all places) as "controlled flight into terrain." The ARRL's excellent new Sales and Marketing Manager, Dennis Motschenbacher, K7BV, told me last fall that he was working on a program to aggressively promote League membership among Technicians and other new hams. I wish him luck and hope he wasn't being too optimistic about getting the board to approve such a radical proposal.

Encouraging Survey Numbers

One of the problems with looking at overall licensing figures is that we really don't know how many of those 682,000 or 685,000 licensees are active, or how that number (whatever it is) compares to the number of active hams 20, 30, or 50 years ago. We *do* know that virtually *all* readers of this magazine (roughly 97%) consider themselves active hams. And our monthly reader surveys, while admittedly unscientific, provide a valuable glimpse into the activities and views of a large group of active hams.

We were quite surprised—somewhat amazed, in fact—to see that 17% of the readers who responded to our September survey (see results on page 43) had participated in some sort of amateur radio communication *directly related* to the attacks on our country of September 11, 2001. That's nearly one in five, and that's pretty amazing. The experiences of 9/11 have also had a profound effect on how we view ourselves and the importance of ham radio as a hobby and a service. Nearly two in five readers (38%) said they felt much more positive now about ham radio's continued importance than they did before 9/11, and another 25% said they felt somewhat more positive. There was another 30% who felt positive about it to begin with and still did. That's 93%. That's *very* positive, and with all due respect to W5YI, the ARRL, and Larry in West Virginia, I continue to see the glass as half full.

73, Rich W2VU

announcements

• **Southeastern VHF Society Conference –** The SVHFS is calling for the submission of technical papers for this conference, to be held in Huntsville, Alabama on April 25–26. Deadline for submissions is March 11. Papers and questions regarding format of submissions should be sent to Dick Hanson, K5AND, e-mail: <k5and@adelphia.net>. *(For more information on the conference, see this month's "VHF Plus" column.)*

• **W3C –** This Special Event Station will be on the air from the Washington County Sportsman's Show, Washington, Pennsylvania, from 1700Z February 6 to 2200Z February 9 on 80, 40, 20, and 15 meters. QSL with SASE to WACOM, c/o Ed Oelschlager, N3ZNI, 60 Carl Avenue B-2, Eighty Four, PA 15330.

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

Feb. 1, **Hiawatha ARA Swap & Shop**, Negaunee Township Hall, Negaunee, Michigan. Contact Bob Serfas, N8PKN, 906-226-9782; e-mail: <n8pkn@aol.com>. (Talk-in 147.27)

Feb. 8, **Cabin Fever Reliever Hamfest**, Sr. Elz. Ann Seton School, St. Cloud, Minnesota. Contact Jack Maus, WØMBD, e-mail: <w0mbd@arrl.net>, 320-685-8295; <www.w0sv.org>. (Exams 10 AM to 12 noon; Talk-in 147.015)

Feb. 8, **Cherryland ARC Swap-n-Shop**, Immaculate Conception Middle School, Traverse City, Michigan. Contact Joe, W8TVT, 231-947-8555, e-mail: <w8tvt@arrl.net>. (Talk-in 146.860)

Feb. 8–9, **Dixiefest 2003**, Shelby County Building, Mid-South Fairgrounds, Memphis, Tennessee. Contact Melinda, KE4DXN, 901-743-1949, or Ben, KU4AW, 901-372-8031; <www.dixiefest.org>. (Exams both days)

Feb. 9, **Richmond Frostfest 2003 & ARRL VA Section Convention**, The Showplace, Richmond, Virginia. Information 804-790-0077, opt. 4; <www.frostfest.com>.

Feb. 9, **Mansfield Mid*Winter Hamfest & Computer Show**, Richland County Fairgrounds, Mansfield, Ohio. Contact Dean Wrasse, KB8MG, 1094 Beal Road, Mansfield, OH 44905 (SASE); or call 419-522-9893 (leave message for return call); <www.MASER,org>. (Talk-in call W8WE on 146.34/94)

Feb. 15, **Algonquin ARC Fleamarket**, Marlboro Middle School, Marlboro, Massachusetts. Contact Ann, KA1PON, 508-481-4988 before 9 PM. (Exams 9–11 AM, walk-ins okay; Talk-in 146.61, 233.94, 449.925)

Feb. 22, **LaPorte ARC Hamfest**, Civic Auditorium, LaPorte, Indiana. Contact Neil Straub, WZ9N, P.O. Box 30, LaPorte, IN 46352 (219-324-7525). Table reservations: <tables@k9jsi.org>; <www.k9jsi.org>.

Feb. 22, **Northern Vermont Winter Hamfest & ARRL Vermont State Convention**, Milton High School, Milton, Vermont. Contact W1SJ, 802-879-6589, e-mail: <w1sj@arrl.net>; <http://www.ranv.org>. (Exams 9 AM and 1 PM, commercial exams 1 PM; Talk-in 145.15 repeater, bulletins 146.67)

Feb. 22, **Central Dakota ARC Hamfest**, St. Mary's Grade School, Bismarck, North Dakota. Contact CDARC, P.O. Box 7162, Bismarck, ND 58507-7162. (Exams; Talk-in 146.94[–])

Feb. 23, **WASHFest 2003 Hamfest & Computer Show**, Castle Shannon VFD Memorial Hall, Castle Shannon, Pennsylvania. Contact Steve Lane, W3SRL, 412-341-1043, or Bill Hill, W3WH, 724-746-1776 (evenings); e-mail: <washarc@yahoo.com>; <www.washarc.org>. (DXCC card checking; Talk-in 146.955[–], 443.650[+], 131.8 PL)

Feb. 23, **LIMARC Winter Hamfest**, Levittown Hall, Hicksville, Long Island, New York. For table and general information contact LIMARC hotline 516-520-9311; <www.limarc.org>. (Exams)

Feb. 23, **Vienna Wireless Society Hamfest**, Northern Virginia Community College, Annandale, Virginia. Tables info Dave, K3MV, 703-925-0584. General info Jim, AG4MA, 703-971-4812; <www.viennawireless.org>. (Exams 9 AM Saturday the 22nd, walk-ins okay)

Offices: 25 Newbridge Rd., Hicksville, NY 11801, Telephone 516--681--2922; Fax 516-681--2926. E-mail: cq@cq-amateur-radio.com. Web site: www.cq-amateur-radio.com. Periodical postage paid at Hicksville, NY 11801 and additional offices Statement of Ownership, Management and Circulation, October 10, 2002. CQ Amateur Radio, 25 Newbridge Rd., Hicksville, NY 11801. Publication #007-893X. Issued monthly, subscription price $31.95 per year (12 issues). Publisher: Richard A. Ross; Editor: Richard S. Moseson; owned by CQ Communications, Inc. Stockholders: Richard A. Ross. Circulation (Average of Preceding 12 Months): Net Press Run 46,198, Mail Subscriptions 23,336, Sales Through Dealers and News Agents 14,729, Other Classes Mailed 225, Total Paid 38,290, Free Distribution 332, Total Distribution 38,622, Copies Not Distributed 1,383, Total 40,005. Circulation (single issue nearest filing date): 44,432, Mail Subscriptions 22,205, Sales Through Dealers and News Agents 14,775, Other Classes Mailed 225, Total Paid 37,205, Free Distribution 341, Total Distribution 37,546, Copies Not Distributed 1,168, Total 38,714 s/Dorothy Kehrwieder, Business Manager.

Printed in the U.S.A.
Postmaster: Please send change of address to CQ Amateur Radio, 25 Newbridge Rd., Hicksville, NY 11801

hy-gain® Rotators

. . . the first choice of hams around the world!

Hy-Gain rotators are the first choice of hams around the world!

Hy-Gain's world famous Bell Shaped Rotator™ design is the standard that other rotators are measured against.

Its bell construction gives you total weather protection for super reliable operation. Its super heavy duty steel gear drive gives you years of superior and trouble-free performance. Many Hy-Gain rotators still provide excellent service after over 25 years of outstanding performance.

The last thing you want to fall apart is your rotator that's mounted on the top of your tower. You won't make any compromises when you buy and install high quality Hy-Gain rotators.

And we're the only manufacturer to offer a full line of rotators that are completely MADE IN THE USA.

HAM-IV, $559.95. *The heavy duty Ham-IV is the most popular rotator in the world!* It is designed for medium size antenna arrays up to 15 square feet wind load area when mounted in-tower, or 7.5 square feet when mast mounted with an optional lower mast bracket. New alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. New low temperature grease permits normal operation down to -30 degrees Fahrenheit. New wire-wound potentiometer gives reliable and precision directional indication, new ferrite beads reduce RF susceptibility, new Cinch plug connector plus 8-pin plug at control box (no screwdriver needed). Dual 98 ball bearing race for load bearing strength. Strong electric locking steel wedge brake prevents wind induced antenna movement. Easy-to-use Control Box has illuminated directional meter with North or South center of rotation scale, separate snap-action brake and rotation switches. Uses low voltage control for safe operation. Accepts masts up to 2 1/16 inches diameter. Rotator size is 13 1/2Hx8D inches.

T-2X, $649.95. *Extra heavy duty Tailtwister antenna rotator!* For large antennas up to 20 square feet wind load when mounted in-tower, or 10 square feet when mast mounted with optional support bracket. Triple 138 ball bearing race, strong electric locking steel wedge brake. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches. Accepts masts up to 2 1/16 inches diameter. Rotator size is 14 1/16Hx9 3/16D in.

CD-45II, $389.95. *Medium duty antenna rotator.* Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches with disc brake release. Accepts mast sizes up to 2 1/8 diameter. Includes light duty lower mast support, Rotator size is 17 3/8Hx8 D inches.

AR-40, $289.95. *Lightweight antenna rotator.* Handles smaller ham antennas and large TV/FM antennas up to 3.0 square feet windload area when mounted in-tower, or 1.5 square feet when mast mounted using the supplied lower support bracket. Dual 12 ball bearing race, disc brake system. Silent, automatic control box -- just dial and touch for desired direction. Accepts mast sizes up to 2 1/8 diameter. Includes light duty mast support. Rotator size is 17 3/8Hx8D inches.

Call your dealer for your best price!

Rotator Specifications	T2X	HAM-IV	CD-45II	AR-40
Wind Load capacity (inside tower)	20 sq. ft.	15 sq. ft.	8.5 sq. ft.	3.0 sq. ft.
Wind Load (with mast adapter)	10 sq. ft.	7.5 sq. ft.	5.0 sq. ft.	1.5 sq. ft.
Turning Power (in pounds)	1000	800	600	350
Brake Power (in pounds)	9000	5000	800	450
Brake Construction	Electric wedge	Electric wedge	Disc brake	Disc brake
Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
Mounting Hardware	Clamp plate	Clamp plate	Clamp plate	Clamp plate
Control Cable Conductors	8	8	8	5
Shipping Weight (pounds)	28	24	22	14
Effective Moment (in tower)	3400 ft/lbs.	2800 ft/lbs.	1200 ft/lbs.	300 ft/lbs.

HAM IV

$559.95
Suggested Retail

T-2X

$649.95
Suggested Retail

CD-45II

$389.95
Suggested Retail

AR-40

$289.95
Suggested Retail

Free Hy-Gain Catalog
Nearest Dealer/Free Catalog . . . 800-973-6572

hy-gain®

Antennas, Rotators & Towers
308 Industrial Park Road, Starkville, MS 39759 USA
Toll-free Customer Sales Hotline: 800-973-6572
• **TECH:** 662-323-9538 • **FAX:** 662-323-6551
http://www.hy-gain.com

12 STORE BUYING POWER

HAM RADIO OUTLET®

WORLDWIDE DISTRIBUTION

CALL FOR YAESU WINTER SPECIALS

YAESU

FT-897 VHF/UHF/HF Transceiver

- HF/6M/2M/70CM • DSP Built-in
- HF 100W (20W battery)
- Optional P.S. + Tuner

Call Now For Our Low Pricing! NEW!

FT-1000MP MKV HF Transceiver

- Enhanced Digital Signal Processing
- Dual RX
- Collins SSB filter built-in
- 200W, External power supply

FT1000MP MKV field unit 100w w/built-in power supply in stock

Call For Low Price!

FT-100D HF/6M/2M/70CM Transceiver

- Compact Transceiver w/detachable front panel
- Rx 100kHz to 970mHz (cell blocked)
- Tx 100W 160-6M, 50w 2M, 20W 70CM
- Built-in DSP, Vox, CW keyer
- 300 Memories

Call Now For Low Pricing!

FT-817 HF/VHF/UHF TCVR

- 5W @13.8V ext DC • USB, LSB, CW, AM, FM
- Packet (1200/9600 Baud FM)
- 200 mems, built in CTCSS/DCS
- TX 160-10M, 6M, 2M, 440
- Compact 5.3" x 1.5" x 6.5", 2.6 lbs
- 9.6v Nicad or 8 AA battery capable

Call Now For Low Pricing!

FT-2600M 2M Mobile

- Compact 2M 60W mobile • 12000/9600 baud
- 4 selectable power levels • Built-in CTCSS/DCS
- 175 mems, 8 character alpha-numeric display
- Low intermod Rx, Rugged

Call Now For Low Pricing!

VX-7R/VX-7R Black

50/2M/220/440 HT

- Wideband RX - 900 Memories
- 5W TX (300mw 220Mhz)
- Li-Ion Battery
- Fully Submersible to 3 ft.
- Built-in CTCSS/DCS
- Internet WIRES compatible

NEW!

Now available in Black!
Great Price, Call Today!

VX-5R/VX-5RS

50/2M/440HT

- Wideband RX • 6M-2M-440TX
- 5W output • Li-Ion Battery
- 220 mems, opt. barometer unit
- Alpha Numeric Display
- CTCSS/DCS built-in

Call For Low Price!

FT-50RD

2M/440mHz Compact HT

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

Call For Your Low Price!

FT-847

Ultimate Base Station, HF, VHF, UHF

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

Call for Low Price!

FT-90R

2M/440 Mini Dualbander Transceiver

- 50w 2m, 40w 440mHz
- Wide Rx • Detachable Front Panel
- Packet Ready 1200/9600 Baud
- Built-in CTCSS/DCS Encoder/Decoder
- Less than 4" wide!

Call for Your Low Price!

FT-920 HF+6M Transceiver

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

Call For Low Pricing!

NEW!

FT-8900R Quadband Transceiver

- 10M/6M/2M/70CM • Wires capable
- 800+ memories • Built-in CTCSS/DCS
- Remotable w/optional YSK-8900

Call Now For Special Pricing

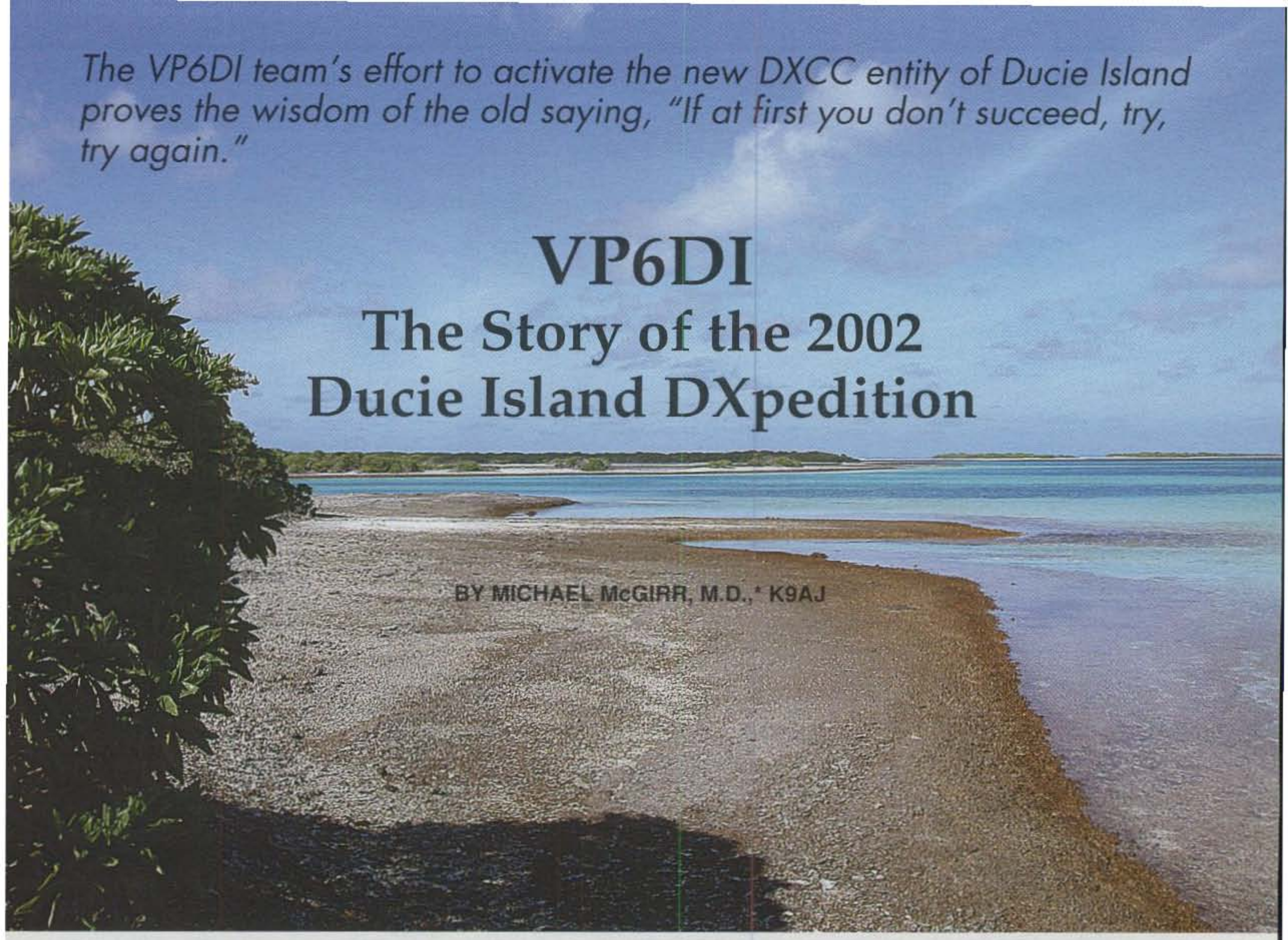
AZ, CA, CO, GA, VA residents add sales tax. Prices, specifications, descriptions subject to change without notice.

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

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

The VP6DI team's effort to activate the new DXCC entity of Ducie Island proves the wisdom of the old saying, "If at first you don't succeed, try, try again."

VP6DI
The Story of the 2002 Ducie Island DXpedition



BY MICHAEL McGIRR, M.D.,* K9AJ

Every DXpeditioner's dream is to participate in the first DXpedition from a new DXCC entity. Thus, I was excited to be invited to participate in the Pitcairn Island Amateur Radio Association's DXpedition to Ducie Island. What I didn't realize at the time was that I would have part of the experience not once, but twice.

Ducie Island, located east of Pitcairn Island in the South Pacific Ocean, attracted the attention of DXers when it was added to the DXCC List in November 2001. It is over 325 miles (523 km) from Pitcairn, at 24°40'S, 124°48'W, and is about 2 1/2 square miles (6.5 sq. km) in area. Ducie was annexed by Great Britain in 1902 and attached to the remote Pitcairn colony, which is the closest populated island. The closest airport to the Pitcairn Islands is in the Gambier Islands, French Polynesia. Once in Gambier, one must arrange for boat transportation to Pitcairn and Ducie Islands.

The First Effort

Our first attempt to activate Ducie Island took place in November 2001. We were within 70 miles (113 km) of the island when bad weather, high seas, and engine trouble forced us to turn back. The team members were dejected as we left Gambier to return home. Perhaps we would never be able to return. However, after two days of reflection at home, team leader Kan Mizoguchi, JA1BK, began to contact team members to see who would want to make a second attempt to activate Ducie Island. Tom Christian, VP6TC, was consulted and the decision was made to try for March 2002, when weather and sea conditions would be more conducive to a good voyage and landing.

We needed a more substantial and reliable ship than we had had on the first Ducie attempt, and we were fortunate to charter *Braveheart,* which is based in Auckland, New Zealand. *Braveheart* is 134 feet (41 m) long and diesel powered. She was built in the 1980s in Japan for oceanographic research in the North Pacific.

In February *Braveheart* returned the VP8THU/VP8GEO (South Sandwich/South Georgia) DXpedition team to Port Stanley, Falkland Islands, then traveled directly to the Gambier Islands, making only one stop in Chile to take on fuel and supplies. She was to rendezvous with our team in Rikitea harbor, Gambier Islands, on March 12.

Take Two

The second VP6DI team was made up of most of the original team members: Kan Mizoguchi, JA1BK; Jin Fujiwara, JF1IST; Vince Thompson, K5VT; Mike McGirr, K9AJ; Tom Christian, VP6TC; and Dave Brown, VP6DB. Jim Mornar, N9TK, a veteran of the FOØAAA DXpedition, also signed on. In addition, since our first attempt to activate Ducie had created a great deal of interest in the Pitcairn community, many locals—hams and non-hams alike—wanted to come along on the second attempt. Mike Warren, VP6AZ; Meralda

*3441 W. Oak Hill Drive, Crete, IL 60417-1965
e-mail: <mcgirr@interaccess.com>

VP6DI team photo (left to right): VP6TC, VP6AZ, K9AJ, JA1BK, N9TK, VP6DB, K5VT, JF1IST, and VP6MW.

Warren, VP6MW; Andrew, Brenda, and Randy Christian; and the Rev. John O'Malley joined us. More than 20 percent of the Pitcairn population was on our team!

On Tuesday, March 12, the Japanese and U.S. team members took the weekly flight from Papeete to Gambier. Our plane passed over countless picture-postcard atolls on the three hour flight.

The airline could not guarantee that all our gear would fit on the small prop plane. However, once at the airport in Gambier, a quick check showed that all our gear had arrived. The airport is on its own island, and a boat ride is necessary to get to the main city of Rikitea. Our ferry passed *Braveheart*, anchored in Rikitea harbor, and we all gave a collective sigh of relief that she had safely made the long journey from the Falklands. Captain Robert Williamson was waiting for us on Rikitea wharf and took us out to *Braveheart* on one of the ship's inflatable boats, commonly known as Zodiacs, a brand name of a major inflatable boat manufacturer.

The *Braveheart* crew had noticed some coral heads in the harbor that did not show on their marine charts. Fortunately, we had sufficient daylight to watch for these as the ship left the harbor for the voyage to Pitcairn Island.

Braveheart dropped anchor at Pitcairn at around 5 AM local time on Thursday, March 14. All morning the ship's Zodiacs ran back and forth between Pitcairn and *Braveheart*, bringing aboard Pitcairn team members and gear stored on Pitcairn from the aborted November attempt. Just before noon the island radioed *Braveheart* that a doctor was required on land, so I made a brief "house call" to check a leg infection. We left Pitcairn for Ducie 12 hours after we arrived, at 5 PM local time.

In contrast to our experience in November, the voyage to Ducie this time was smooth. In spite of this, several team members were plagued with seasickness. We spent our free time checking computers, teaching the CT computer logging program to the Pitcairn hams, discussing strategy, and operating maritime mobile.

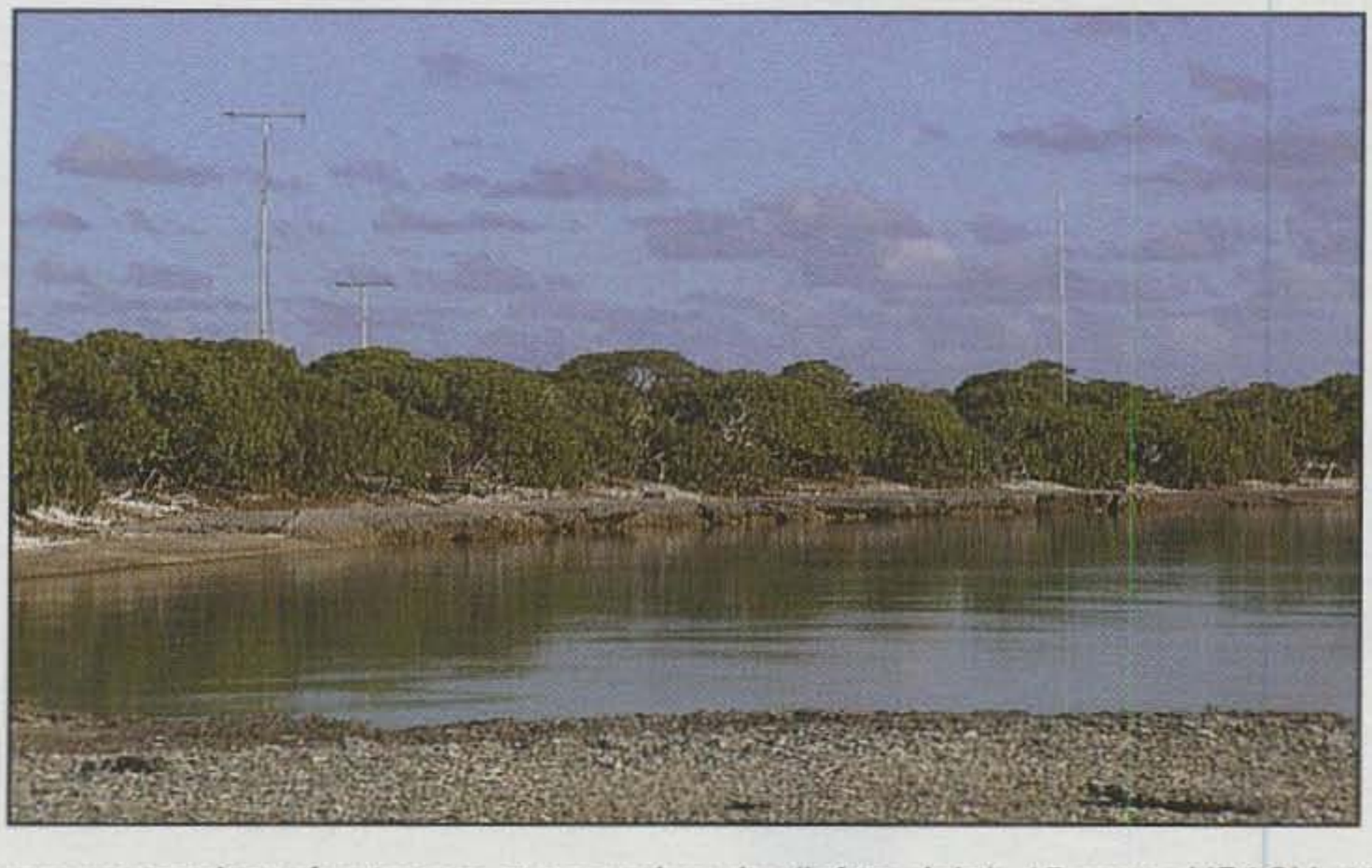
Braveheart dropped anchor at Ducie Island at 5 AM local time (1300Z) on March 16. We waited for high tide (at around 10 AM), and then JA1BK and JF1IST went ashore to scout for station sites. After suitable locations were determined, two Zodiacs were used to ferry supplies and team members onto the island.

Two Operating Sites

Ducie is an atoll shaped like a reverse "C." The outer surface of the "C" is the ocean side, and the inside of the "C" is the lagoon.

There were two main operating sites. Site one was established on the lagoon side just across the island from our ocean-side landing point. This site had SSB stations for 15 and 20 meters, and a 6 meter station. The antenna system was a 15 meter HB9CV beam up approximately 35 ft. (11 m), a four-square array for 20 meters, and a 6 meter Yagi. Adjacent to this site was the Pitcairn camp that had the sleeping area for the Pitcairn team and a commissary. Site two was also on the lagoon side, approximately 1500 ft. (457 m) from site one. This separation was needed to minimize interaction between the two 15 meter stations. Site two had three separate operating tents: a CW station

Operating site one antennas (left to right): 15 meter HB9CV and 6 meter Yagi. (Photos by the author)



Long-range view of antennas at operating site (left to right): 15 meter HB9CV, 10 meter HB9CV, and R8.

on 15 meters with another HB9CV beam, a 10 meter phone station with yet another HB9CV beam, and a 12 meter station with an R-8 vertical.

At some undetermined time in the remote past, Ducie was the site of volcanic activity, leaving areas of the lagoon shoreline with a lava crust on top of broken coral and shells. It was along this volcanic surface that gear and supplies had to be carried to site two. The temperature in the shade on the lagoon side was 120° F (49° C) with no significant breeze, making setting up site two a difficult undertaking.

Primary operator assignments were JF1IST and N9TK on 15 meters SSB, JA1BK and VP6TC on 20 meters SSB, JA1BK on 20 meters RTTY and 6 meters, K5VT and K9AJ on 15 meters CW, VP6AZ and VP6DB on 10 meters SSB, and VP6MW on 12 meters CW and SSB.

Our plan was to keep the 15 meter SSB and CW stations QRV (on the air) for most of the operation, so as to work as many different stations as possible (unique calls) on at least one mode. As the DXpedition progressed, we would also be active on the other bands.

On the Air

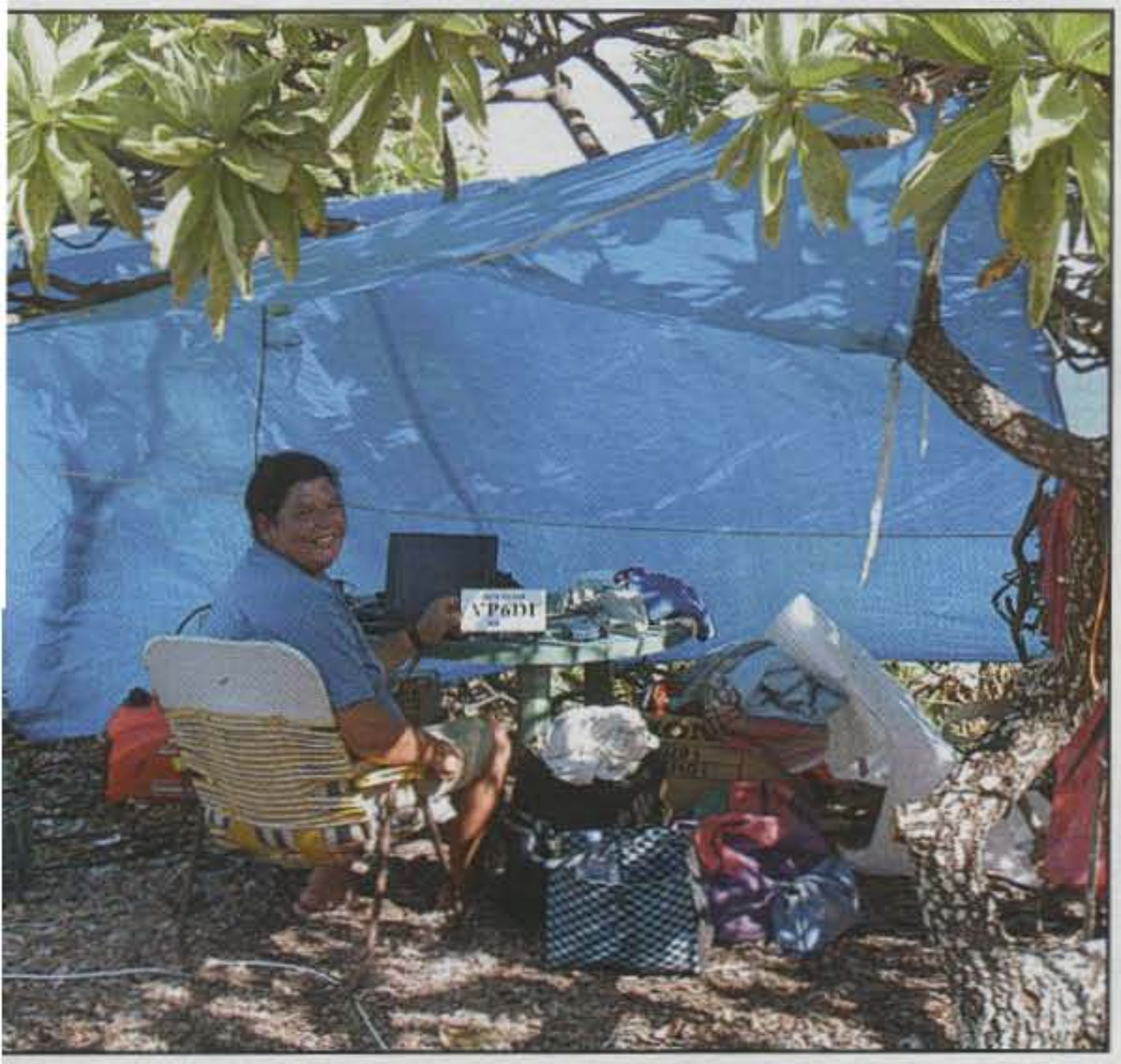
The first station QRV was 20 meters SSB. JA1BK sat down in front of the Yaesu FT-1000MP Field and tuned to 14.195 MHz. The rest of the ops gathered in the tent. Kan called the first CQ from the DXCC entity of Ducie Island, and at 1910Z on March 16, FK8GM was in the log with the first QSO.

Within the next several hours the other stations came on line, giving us the potential for six stations QRV simultaneously. The 1500 ft. (457 m) site separation and ICE bandpass filters at each station allowed all stations to operate without interference.

The pile-ups had to be heard to be believed. Across 20, 30, or 40 kHz, all we could hear the first few days was "white noise." On even the rarest places from which I've operated, there usually would be one or two "holes" in the pile-up where signals could be picked out. Not here! On CW we could pick up calls off the periphery of the pile-up, but that was a double-edged sword: When we did this, the pile-up would expand in bandwidth. The SSB ops—without the benefit of the narrow filters we could use on CW—had an even greater challenge with their pile-ups, and used calling by numbers and/or geography to help keep the pile-ups manageable.

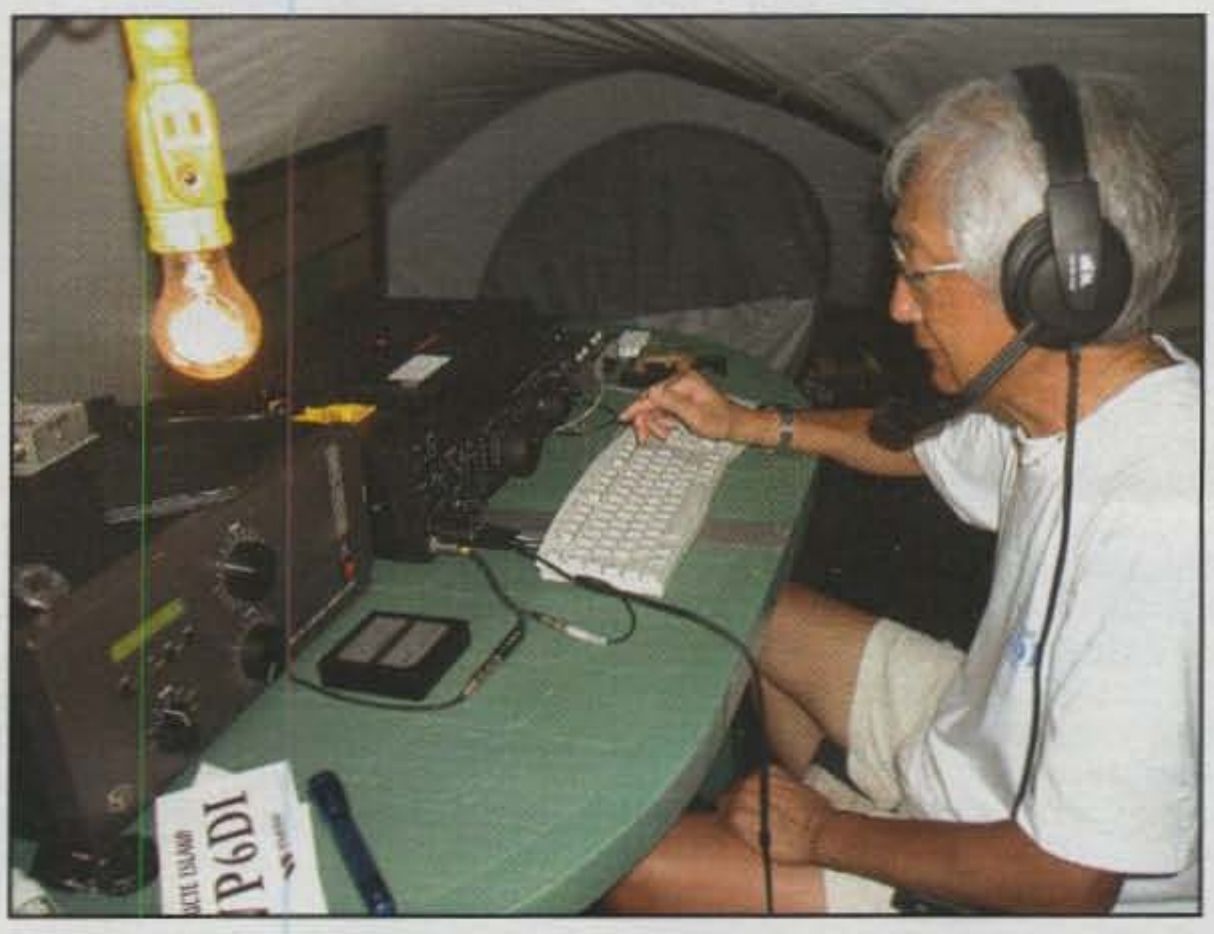
We also had to share with another DXpedition. We knew XRØX would be QRV from San Felix during our operation. Mike Mraz, N6MZ, a member of the XRØX DXpedition team, was most cooperative in coordinating operating frequencies with us, so we knew ahead of time where to position our pile-ups so as to minimize any QRM to their operation, and vice versa.

Operations quickly fell into a routine. Propagation was typical of the tropics,



← *Meralda Warren, VP6MW, operating 12 meters.*

Team leader Kan Mizoguchi, JA1BK, operating 20 meters SSB.



BEST OF THE BEST IN HTs!
ULTRA-RUGGED, SUBMERSIBLE TRI-BAND MAGNESIUM HANDIE

The exciting new YAESU VX-7R sets new standards in ruggedness, water resistance, and versatility, and its memory capacity is unparalleled. Own the VX-7R, and you'll own the best.

Actual Size

50/144/430 MHz 5W FM Transceiver

VX-7R

Magnesium Silver

50/144/430 MHz 5W FM Transceiver

VX-7R(B)

New Black Version Available

Features

- SUBMERSIBLE (3 feet for 30 minutes)
- SHORTWAVE BROADCAST MEMORY BANK
- WEATHER BROADCAST MEMORY BANK WITH "SEVERE WEATHER" ALERT
- MARINE BAND MEMORY BANK
- MULTI-COLOR STROBE LED
- LOW-POWER 222 MHz TX (U.S. version)
- RUBBER CASE PROTECTOR
- TRUE DUAL RECEIVE (V+V/U+U/V+U/HAM+GEN)
- WIDE-RANGE RECEIVER
- MAGNESIUM CASE
- OVER 500 MEMORY CHANNELS
- MIXED TONE (CTCSS/DCS) CAPABILITY
- INTERNET KEY FOR ACCESS TO WIRES
  Wide-Coverage Internet Repeater Enhancement System

For the latest Yaesu news, visit us on the Internet:
http://www.vxstdusa.com

Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

YAESU
Choice of the World's top DX'ers™

Vertex Standard
US Headquarters
10900 Walker Street
Cypress, CA 90630 (714)827-7600

Reach the HF Summit!

The New MARK-V Field

The world's top DX and Contest operators have lauded the leading-edge performance of the MARK-V FT-1000MP. Now you can experience the Mark-V for yourself in the exciting new MARK-V Field, a 100-Watt all-in one HF transceiver with built-in power supply! With all the great features of the MARK-V: the Integrated Digital Bandwidth Tracking, Variable RF Preselector, Class-A SSB transmission, and bullet-proof front end. . .you'll have all the tools to come out on top in the next pile-up.

The MARK-V Field. From the Yaesu DX Professionals.

HF 100W ALL MODE TRANSCEIVER

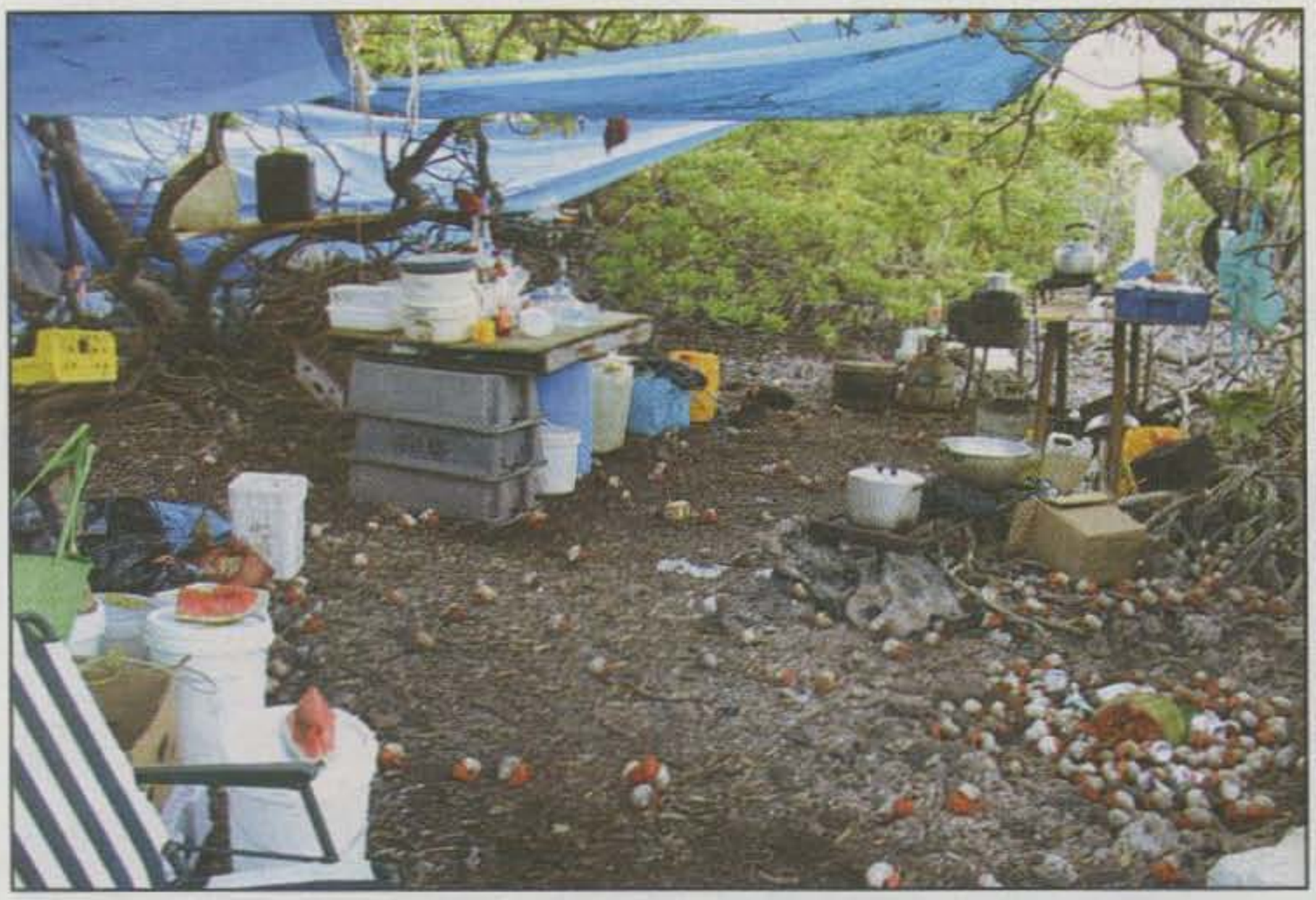
MARK-V FT-1000MP *Field* NEW

YAESU
Choice of the World's top DXers

Vertex Standard
US Headquarters
10900 Walker Street
Cypress, CA 90630 (714)827-7600

For the latest Yaesu news, visit us on the Internet:
http://www.vxstdusa.com

Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.



Camp commissary. Note the hungry orange-and-white hermit crabs all over the ground (see text for details).

A souvenir for the next DXpedition—a fishnet float found on Ducie and autographed by the VP6DI team.

with several hours in the middle of the day with poor to no propagation outside the Pacific area. This afforded us some time to catch up with chores, maintenance, and rest. Brenda Christian, who serves as the police officer on Pitcairn, did most of the cooking and provided three meals a day (if we could break away from the pile-ups). Randy and Andrew Christian were invaluable with their muscles and camping expertise. Rev. John O'Malley, who is the Seventh Day Adventist minister on Pitcairn, logged for the 10 meter SSB ops. Meralda, VP6MW, was QRV on 12 meters almost every day and made the YL DXCC chasers happy.

We had daily skeds with our pilot stations, Stu Greene, WA2MOE; Jay Musikar, AF2C; and Yoshi Tsutsumi, JE2EHP. Their input helped us fine-tune our operation so we could try, to the best of our abilities, to log stations from all continents.

Biting Crabs and Airborne Tents

Some of the operators chose to sleep on *Braveheart* while others stayed on the island. However, even the latter group went back to the ship for an occasional well-deserved shower and cold drink! Those who slept on Ducie had to contend with the crabs. These are the hermit crabs typical of the Pacific islands. They can squeeze through the smallest opening in a tent, and kept us awake at night by nibbling at our toes. K5VT had a crab crawl into his sleeping bag and bite him in a location that required him to sit on a pillow for several days!

I was the medical officer for VP6DI. It has been my experience that the main medical problems faced on tropical DXpeditions are trauma and skin related, and this trip was no different. I treated some nasty insect bites, a foot abscess that required draining and a painful back bruise.

We had some excitement on Wednesday, March 20. Late in the afternoon the sky darkened and the wind picked up. We could see a squall approaching, and we did our best to secure the tents. On the CW side, this meant K5VT literally had to lie across portions of the 15 meter tent to keep it from becoming airborne. On the SSB side they weren't so lucky. As the main tent started to lift off the ground, it was barely secured by several of the Pitcairn team who ran to the rescue. When the squall passed, the SSB tent was moved to a more sheltered area, inland from the lagoon shore.

Toward the end of the operation, we put stations on whatever additional bands we could. We know we didn't work everyone who wanted a QSO on all bands, but that was not our goal on this trip, and we will leave this for future Ducie Island DXpeditions.

Early Departure

Our original plans were to leave Ducie on Wednesday, March 27. However, word came from *Braveheart* on Sunday that they were watching a storm front on radar and advised we leave a day early. On Monday, March 25 site two was secured and its gear was stowed on *Braveheart*. Monday night would be our last night on Ducie. We kept a phone station and a CW station QRV all night. The last station logged was EA3KB on 17 meters CW at 1542Z. VP6DI went QRT with 51,137 total QSOs and 22,413 unique calls in the log.

Breaking camp always takes less time than setup. Ferrying the gear and team back to *Braveheart* went well, and we all did "high fives" on arriving back on board. We were ahead of schedule by several days, so Captain Williamson offered our team the opportunity to visit Henderson Island on the way back to Pitcairn. We jumped at the opportunity to activate this rare IOTA (Islands On The Air) counter, but that's another story!

10 Bands -- 1 MFJ Antenna!

Full size performance . . . No ground or radials

Operate 10 bands: 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with one antenna Separate full size radiators . . . End loading . . . Elevated top feed . . . Low Radiation Angle . . . Very wide bandwidth . . . Highest performance no ground vertical ever . . .

Operate 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with this MFJ-1798 vertical antenna and get *full size performance* with no ground or radials!

Full size performance gives high efficiency for more power radiated. Results? Stronger signals and more Q-5 QSOs.

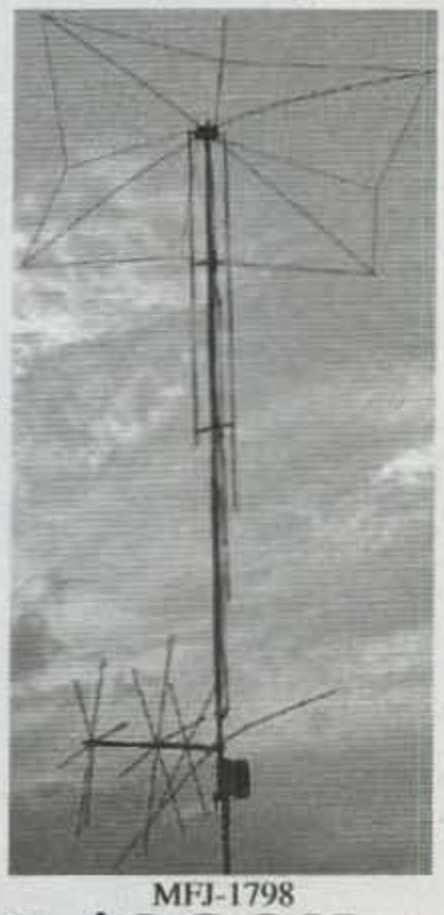
Full size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

Full size performance is achieved using separate full size radiators for 2-20 Meters and highly efficient end loading for 30, 40, 75/80 Meters.

Get very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, low SWR. Handles 1500 Watts PEP SSB.

MFJ's unique *Elevated Top Feed*™ elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

It's easy to tune because adjusting one band has minimum effect on the resonant frequencies of other bands.



MFJ-1798
$289.95
Ship Code F

Self-supporting and just 20 feet tall, the MFJ-1798 mounts easily from ground level to tower top -- small lots, backyards, apartments, condos, roofs, tower mounts.

Separate Full Size Radiators

Separate *full size* quarter wave radiators are used on 20, 17, 15, 12, 10 and 2 Meters. On 6 Meters, the 17 Meter radiator becomes a 3/4 wave radiator.

The active radiator works as a stub to decouple everything beyond it. *In phase* antenna current flows in all parallel radiators.

This forms a very large equivalent radiator and gives you incredible bandwidths.

Radiator stubs provide automatic bandswitching -- absolutely *no loss* due to loading coils or traps.

End Loading

On 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

MFJ's unique *Frequency Adaptive L-Network*™ provides automatic impedance matching for lowest SWR on these low bands.

Tuning to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

No Ground or Radials Needed

You don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation.

You can mount it from ground level to roof top and get awesome performance.

No Feedline Radiation to Waste Power

The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

Built to Last

Incredibly strong solid fiberglass rod and large diameter 6061 T-6 aircraft strength aluminum tubing is in the main structure.

Efficient high-Q coils are wound on tough *low loss* fiberglass forms using highly weather resistant *Teflon*® covered wire.

MFJ's Super High-Q Loop™ Antennas

MFJ-1786
$379.95
Ship Code F

MFJ's *tiny* 36 inch diameter loop antenna lets you operate 10 through 30 MHz *continuously* -- including the WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics, or mobile homes.

Enjoy both DX and local contacts mounted vertically. Get both low angle radiation for excellent DX and high angle radiation for local, close-in contacts. Handles 150 watts.

Super easy-to-use! Only MFJ's super remote control has *Auto Band Selection*™. It auto-tunes to desired band, then beeps to let you know. No control cable is needed.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- not a lossy thin flat-strip -- *gives you highest possible efficiency.*

Each plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning.

Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

NEW! **MFJ-1788, $429.95.** Same as MFJ-1786 but covers 40 Meters-15 Meters continuous. Includes super remote control.

MFJ-1782, $339.95. Like MFJ-1786 but control has only fast/slow tune buttons.

MFJ-1780, $249.95. *Box Fan* Portable Loop is about the same size (2x2 foot) as a box fan, complete with handle. Covers 14-30 MHz. Control has fast/slow tunes.

MFJ Portable Antenna

MFJ-1621 **$89.95** Ship Code A

MFJ-1621 lets you operate in most any electrically free area -- apartment, campsite, hotel, the beach, etc. DXCC, WAZ, WAC, WAS have been won with MFJ-1621! Work 40, 30, 20, 17, 15, 12 and 10 Meters with a telescopic whip that extends to 54 inches. Mounted on a sturdy 6x3x6 inch cabinet. Built-in antenna tuner, field strength meter, and 50 feet of RG-58 coax cable. Handles 200 Watts.

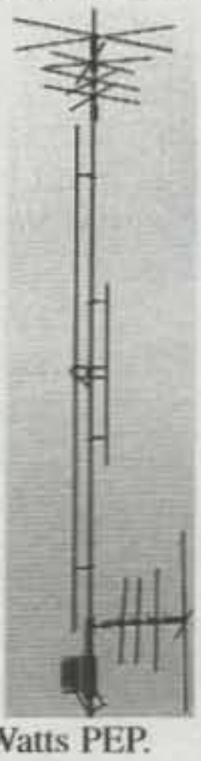
MFJ's G5RV Antenna

MFJ-1778, Ship Code A

Covers all bands, 160-10 Meters with antenna tuner. 102 feet long, shorter than 80 Meter dipole. Use as inverted vee or sloper to be more compact. Use on 160 Meters as Marconi with tuner and ground. Handles full legal limit power. Add coax feedline and some rope or other nonconductor and you're *on the air!*

MFJ halfwave vertical

6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed



MFJ-1796
$209.95
Ship Code F

Only 12 feet high and has a tiny 24 inch footprint! Mount anywhere -- ground level to tower top -- apartments,small lots, trailers. Perfect for vacations, field day, DXpedition, camping.

Efficient end-loading, no lossy traps. Entire length is always radiating. Full size halfwave on 2/6 Meters. High power *air-wound* choke balun eliminates feedline radiation. Adjusting 1 band has minimum effect on others.

MFJ-1792, $169.95. Full size 1/4 wave radiator for 40 Meters. 33 feet, handles 1500 Watts PEP. Requires guying and radials.

MFJ-1793, $189.95. Like MFJ-1792 but has full size 20 Meter 1/4 wave also.

Free MFJ Catalog
and Nearest Dealer . . . 800-647-1800

http://www.mfjenterprises.com

•1 Year *No Matter What*™ warranty •30 day money back guarantee (less s/h) on orders from MFJ

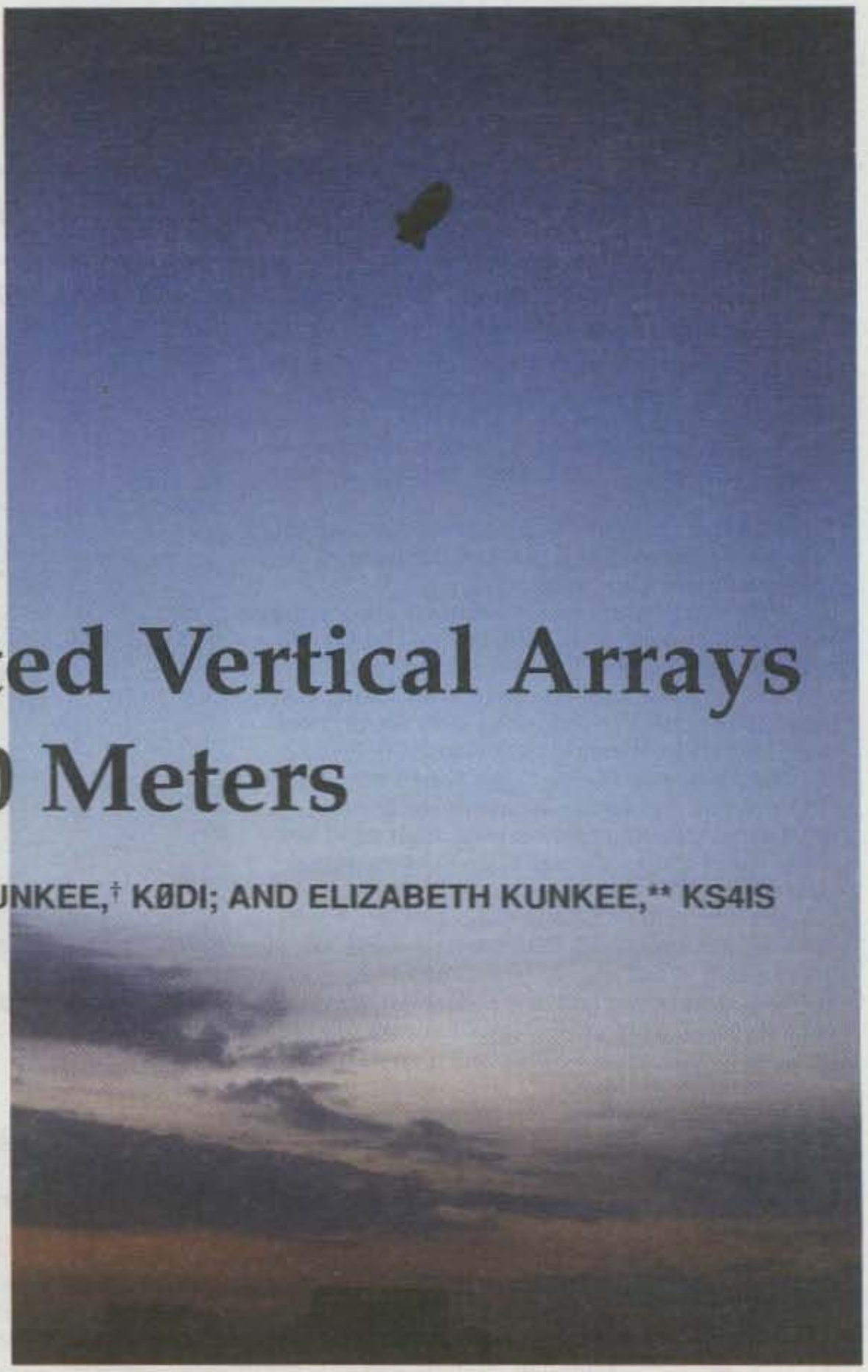
MFJ ENTERPRISES, INC.
Box 494, Miss. State, MS 39762
(662) 323-5869; 8-4:30 CST, Mon.-Fri.
FAX: (662) 323-6551; **Add s/h**
Tech Help: (662) 323-0549

MFJ . . . the world leader in ham radio accessories!

Antennas for 80 and 160 meters are long, which means they usually need a fair amount of space over which to spread out. However, if your horizontal space is limited, you might think about vertical space. . . . That's right; look up!

Balloon-Supported Vertical Arrays for 160 Meters

BY PETER M. LIVINGSTON,* W3CRI; DAVE KUNKEE,† KØDI; AND ELIZABETH KUNKEE,** KS4IS



On the air with the balloon-supported vertical antenna at sunset during the 2001 CQ World-Wide 160 Meter Contest.

Have you ever wished you could set up a low-emitting-angle vertical array for the long wavelength bands? Work all states and a few foreign countries on 160? "Sure," you say, "I just happen to have a spare back 40 acres, an infinite supply of money, and hundreds of ground wires forming the counterpoise!" It's true that this project can't be done for a 10-dollar bill and a little time, but it is within the capabilities of many clubs. With all preparations in place, we can erect and take down this two-element vertical array in a little under two hours, making it ideal for Field Day, 160 meter contests, and emergency operation (see photo A).

This article will tell you how we of the TRW Radio club did it and with what results. First, however, here is a little background on how this project got started.

Some Background

I (W3CRI) began experimenting with antenna designs about five years ago when I bought Roy Lewallen's EZNEC, an easy-to-use, Windows®-oriented, antenna-modeling program. Although I have been licensed continuously for slightly more than a half century, I was inactive for many years and recently came back to active ham status—to a completely changed amateur radio vista.

As a teenager, I saved up my paper-route money to buy military-surplus gear, which I modified and put on the air mostly on 80 and 40 meter CW. In those days, stripping down a surplus chassis and building your own transmitter was fun and gave us an outlet for whatever creativity we could bring to bear. After waking up from a 30-year snooze like Rip Van Winkle, I found that amateur radio had changed completely. Rigs are almost 95% professionally built, and the technology no longer prizes 807 and 813 transmit tubes as it did back then. In fact, many hams may not even recognize these tubes!

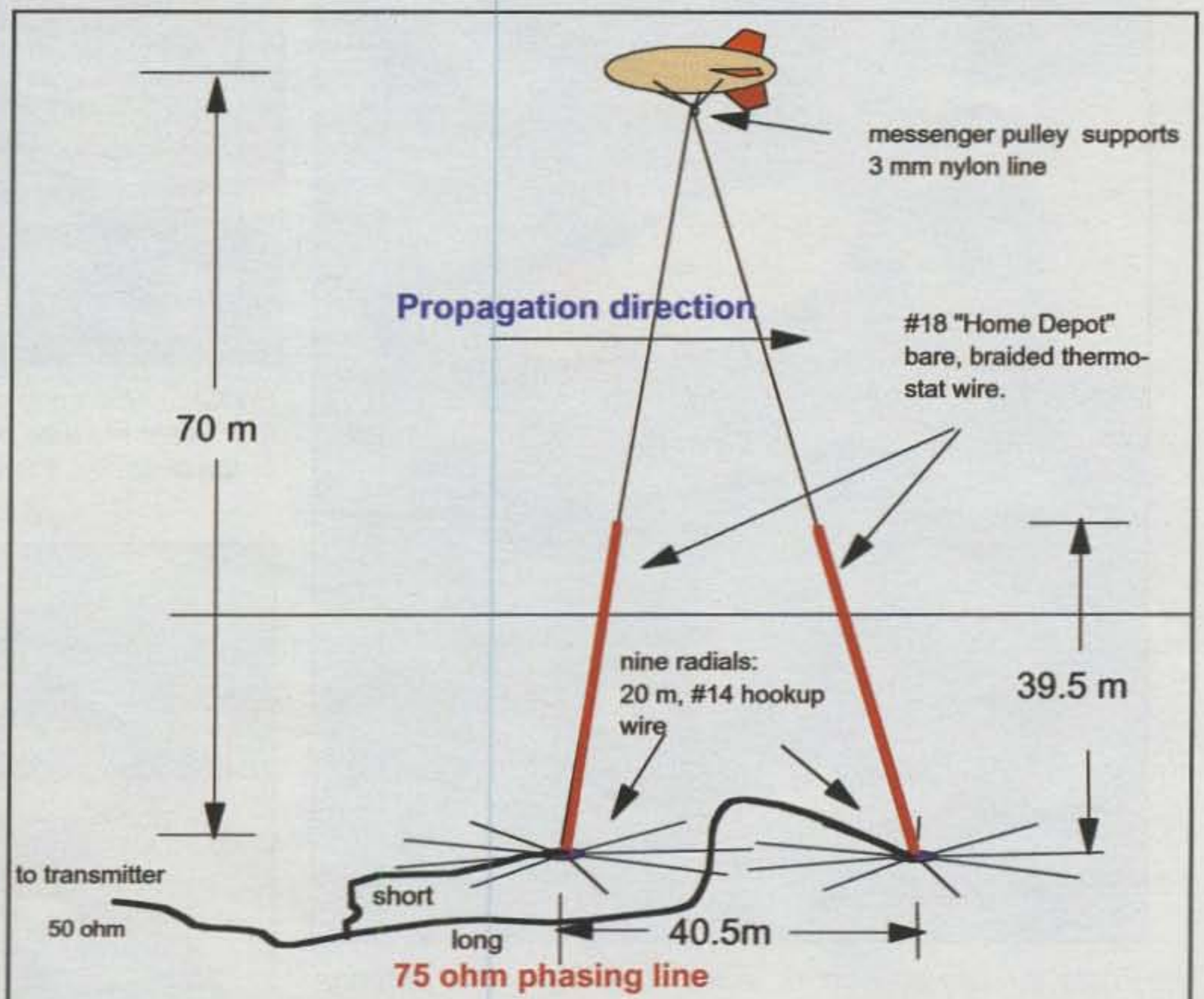
After getting reacquainted with the hobby, I cast around for the modern equivalent of rig building with surplus parts. I found that there still were a lot of wire-antenna ideas waiting to be invented, so I happily set about my new amateur radio hobby! I experimented with fat dipoles, and fat deltas, mostly on paper, until I met Dave and Elizabeth Kunkee, members of TRW's radio club. Dave had bought a small aerostat (balloon) and had used it for several years to hoist a quarter-wave vertical anchored by a mag-mount to the roof of his auto for the annual international 160 meter contest.

I persuaded Dave to loan the balloon to the club for the year 2000 Field Day. He complied, and with it we hoisted an open-

*1321 Via Zumaya, Palos Verdes, CA 90274
e-mail: <Pete.Livingston@trw.com>
†e-mail: <kunkee@seal.aero.org>
**<elizabeth.kunkee@ieee.org>

Photo A– The authors operate various 160 meter contests from the shore of the inland Salton Sea, using a rental truck to transport their equipment, including the aerostat (balloon) to support the antenna.

Fig. 1– Schematic illustration of the balloon-borne, two-element phased array designed and flown for several contests and during the last Field Day in a scaled-down 80 meter version.



topped, corner-fed fat delta of my own design for 80 meters. It worked, but it wasn't clear that all that extra wire had much of an advantage over a simple quarter-wave vertical and ground plane.

After Field Day I went off to mull over why the delta didn't do much better than a quarter-wave vertical. It should have, because as I later deduced, the two arms of the delta acted as a phased array with the bottom of the delta as the phasing line between them. However, if that was the case, maybe it would be better to just consider a vertical phased array instead.

How High Should It Be?

Now vertical phased arrays are not new; two- and four-element vertical phased arrays are described in the ARRL's *Antenna Compendium*, for example. The wrinkle in this case was that we had only one point of suspension causing the two phased elements to "lean" toward one another. Obviously, the higher the balloon, the more vertical the wires would be. The design question was, "How high must the balloon be in order to get a decent front-to-back ratio?" We'll answer this question in the following paragraphs.

Fig. 1 shows a schematic of the balloon-borne, two-element phased array that formed the basis for a NEC-2 analysis (EZNEC 3.0 for Windows®).

While Dave's balloon might have worked, we all thought it was too small to give us adequate lift margin to support phased arrays. After some research we settled on the balloon described next.

The balloon, or aerostat, that the club bought is an aerodynamic lifting body buoyed by helium, the same type commonly seen carrying advertising above large auto dealerships. Unlike a round balloon, this blimp structure is very stable in moderate to strong winds, because air flows around it without creating excessive vortices in its wake. Aerial Billboards, Inc.[1] built our aerostat out of 150-denier nylon coated with urethane. Its 18' × 7' size contains 380 cubic feet of helium at full inflation, which takes about two-and-a-half helium cylindrical tanks filled with welding helium to a standard pressure. Although the balloon can be filled without a gas regulator, it is somewhat more risky to do so, and we highly recommend that you use a gas regulator[2] with the helium gas cylinders. As with all high-pressure gas cylinders, there is an element of risk in handling them, so be well aware of how to handle these gas cylinders safely.

There is a harness attached to the aerostat as shown in fig. 1 and photo B. We used a pulley and swivel to attach the antenna apex to the balloon. For the most part, motions of the dirigible back and forth, as well as "clocking" rotations, did not result in antenna-support fouling.

The net lift of the balloon is about 16 pounds in still air and somewhat stronger with the wind blowing because of aerodynamic lift. Not shown in the drawing, but visible in photo B , is a very important safety tether, which although slack, nonetheless would have prevented our balloon investment from tak-

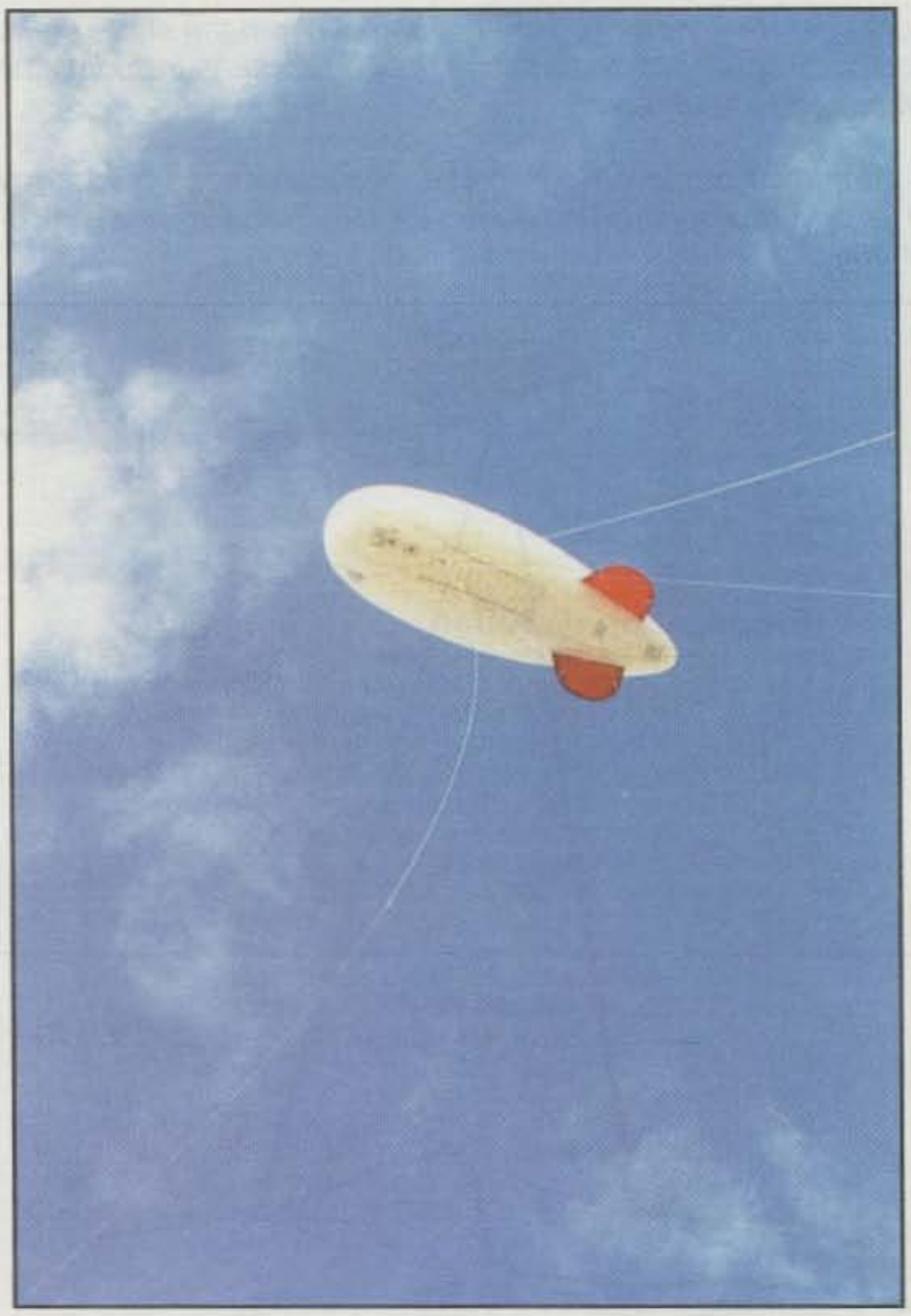


Photo B– The balloon, or aerostat, in flight. The antenna lines are attached to the nylon via the first and third of the lines running up to the attachment point. The middle line is a 400 lb. test nylon safety tether.

Photo C– Bringing down the balloon after a successful contest. Note the size of the man (co-author W3CRI) compared to the aerostat, the technical name for a balloon of this type.

Photo D– Co-authors KS4IS and W3CRI force helium out of the balloon by lying on it and pushing, a process that takes about 40 minutes to empty the gas bag. A vacuum cleaner would have been much quicker...

ing off for Kansas had the antenna wire parted. Pulling down the balloon and deflating it requires careful effort (see photos C and D).

I found that Home Depot sold a #18 braided copper wire used for some sort of ground strapping for low-voltage house (thermostat) wiring. A 42.1 meter length of this wire tied to a 3 mm nylon line having a total length necessary to allow the balloon to fly at an altitude of 70 meters (230 ft.) formed one side of the vertical array "triangle." *Flying the balloon at this height requires permission of the FAA.* We found the FAA at our local airport very cooperative when we flew a reduced version of this vertical array for Field Day last June. I gave them several days notice and received permission easily and well before Field Day. After September 11, it is possible that it now may take longer for permission to be granted, so allow plenty of time to "cross the t's and dot the i's."

As mentioned above, the balloon height of 70 meters for the 160 meter vertical array is not arbitrary, but was decided upon by setting up the antenna in EZNEC for various suspension heights. We chose each antenna base to be made up of nine radial wires (#14 insulated hook-up wire) each cut to 20 meters (65.6 ft.) long. (More about the radial choice below.)

We compared vertical radiation patterns for identical antennas suspended at several different altitudes (see fig. 2). It turns out from this study that nearly full vertical phased-array performance is recovered if the angle that the antenna makes with the ground is 74 degrees or greater. However the fact that 70 meters is the right balloon altitude does not mean that 140 meters will give twice the performance. A little trigonometry will convince one that the cost of the added tether and support weight will offset any marginal gain increase.

The Site

Hoping for better conductivity to give us a low radiation angle and high efficiency, we chose our 160 meter contest site at the shore of a large inland salt-water lake in southern California called the Salton Sea (see fig. 3). The area is a broad salt plain about 200 feet below sea level formed from an ancient inland sea that dried up millions of years ago. An accidental levee collapse filled this 14 × 7 mile long lake in 1905. Presently, Salton Sea State Park occupies its eastern shore, where we flew the balloon for the CQ World-Wide 160 Meter Contest

ASTRON CORPORATION
9 Autry Irvine, CA 92618
(949) 458-7277 • (949) 458-0826
www.astroncorp.com

E151765 E151765

...POWER ON WITH ASTRON

SWITCHING POWER SUPPLIES...

MODEL SS-10TK

MODEL SS-12IF

SPECIAL FEATURES:

- HIGH EFFICIENCY SWITCHING TECHNOLOGY SPECIFICALLY FILTERED FOR USE WITH COMMUNICATIONS EQUIPMENT, FOR ALL FREQUENCIES INCLUDING HF
- HEAVY DUTY DESIGN
- LOW PROFILE, LIGHT WEIGHT PACKAGE
- EMI FILTER
- MEETS FCC CLASS B

PROTECTION FEATURES:

- CURRENT LIMITING
- OVERVOLTAGE PROTECTION
- FUSE PROTECTION.
- OVER TEMPERATURE SHUTDOWN

SPECIFICATIONS:

INPUT VOLTAGE: 115 VAC 50/60HZ OR 220 VAC 50/60HZ SWITCH SELECTABLE

OUTPUT VOLTAGE: 13.8VDC

AVAILABLE WITH THE FOLLOWING APPROVALS: UL, CUL, CE, TUV.

MODEL SS-18

DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅜ x 6 x 9	3.4
SS-18	15	18	1⅜ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅝	4.2
SS-30	25	30	3¼ x 7 x 9⅝	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅝	4.2
SS-30M*	25	30	3¼ x 7 x 9⅝	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅝	6.5
SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅝	6.5
SRM-30M	25	30	3½ x 19 x 9⅝	7.0

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30-2	25	30	3½ x 19 x 9⅝	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅝	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
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
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

CIRCLE 134 ON READER SERVICE CARD

NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

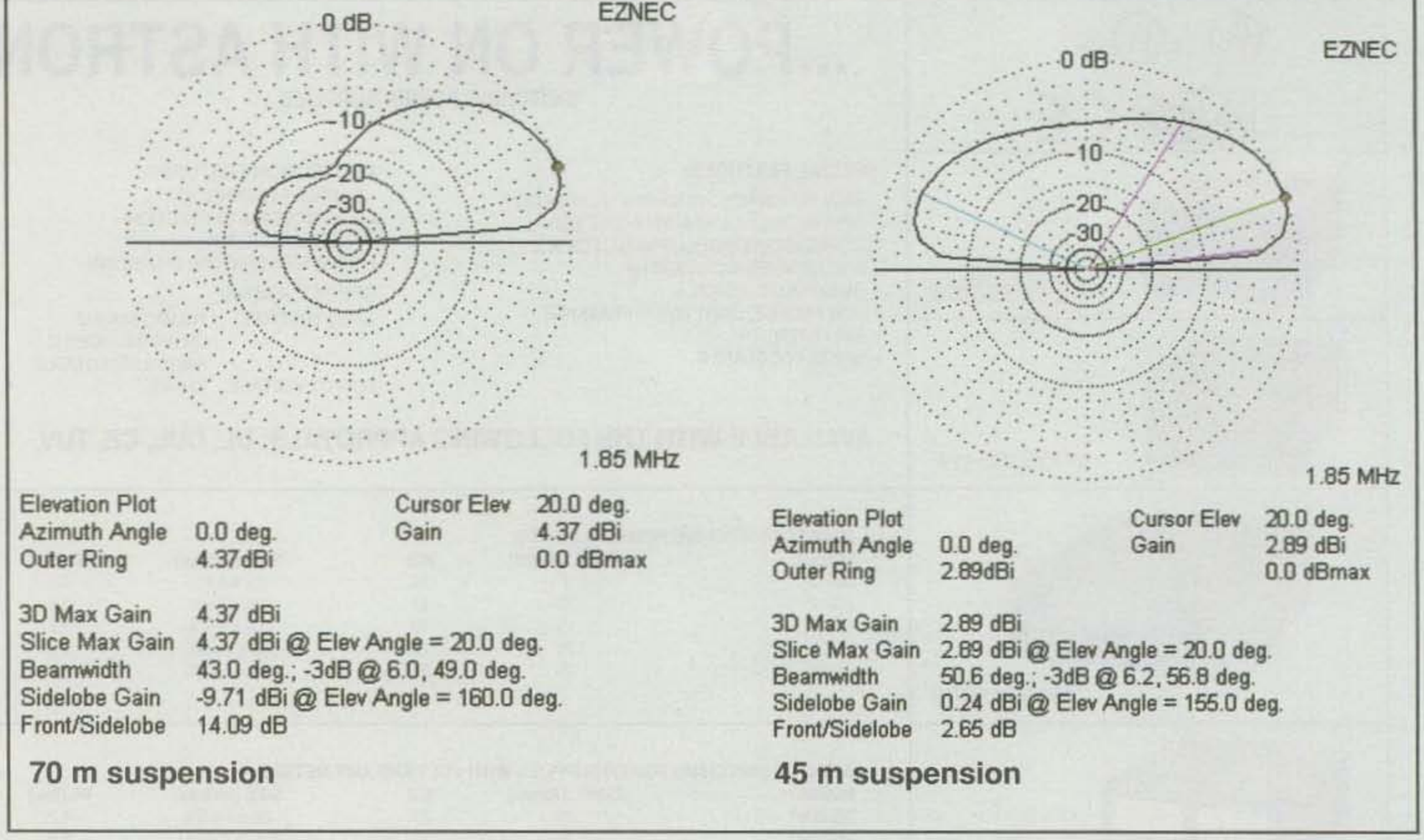


Fig. 2– Comparison of front-to-back ratio of antenna array at different altitudes. Note the significant loss of F/B ratio when the height is reduced by a factor of approximately 3/5, from 70 to 45 meters.

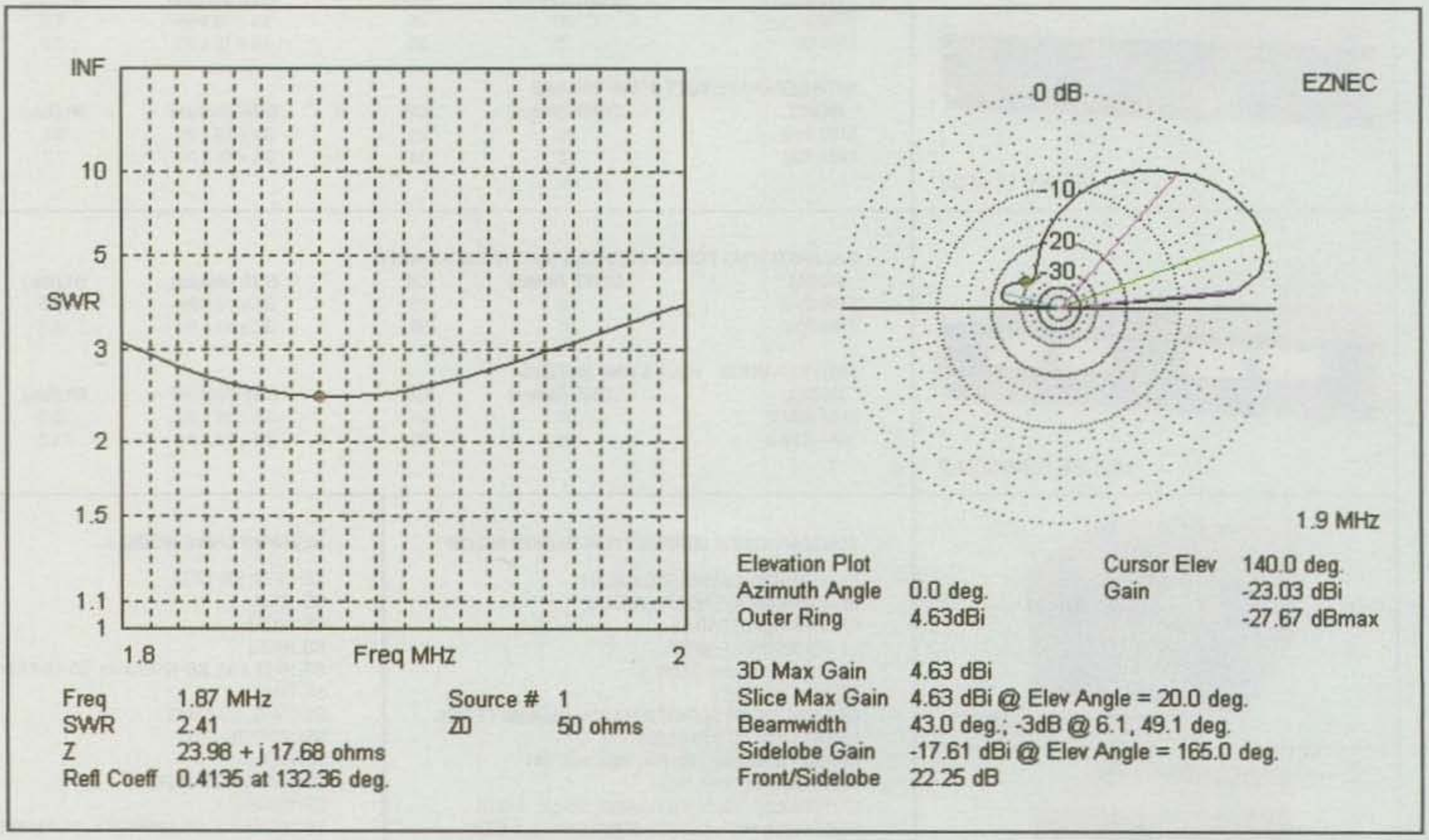


Fig. 3– Calculated VSWR curve (left) and ideal vertical radiation pattern of antenna array over real, high-precision ground with moderately good conductivity (right). Measured VSWR in use was substantially better than predicted. (See text for details.)

and the most recent ARRL International CW 160 meter contest. For our purposes, the site is electrically quiet (S5 noise background on the vertical), unpopulated, flat, and right on the shore of the lake. In fact, the ends of some radials actually were in the water. The park rangers were most cooperative and assisted us in setting up in an unused portion of a lakeside campground.

During the CQ WW 160 SSB Contest in February 2001, we did bring along a network analyzer, and after a bit of experimenting we got it to work. Our team, now including club member Wayne Hogenkamp, KI6GM, measured the base impedance magnitude and phase angle separately at each antenna. Fig. 4 shows a bar graph indicating efficiencies for our two-element phased array over various grounds. According to our measurements of individual antenna base impedances at resonance, we expected an antenna efficiency at the site of 0.65 or better. According to the bar graph, our measurement suggested a soil type somewhere between very rich pasture land and salt water.

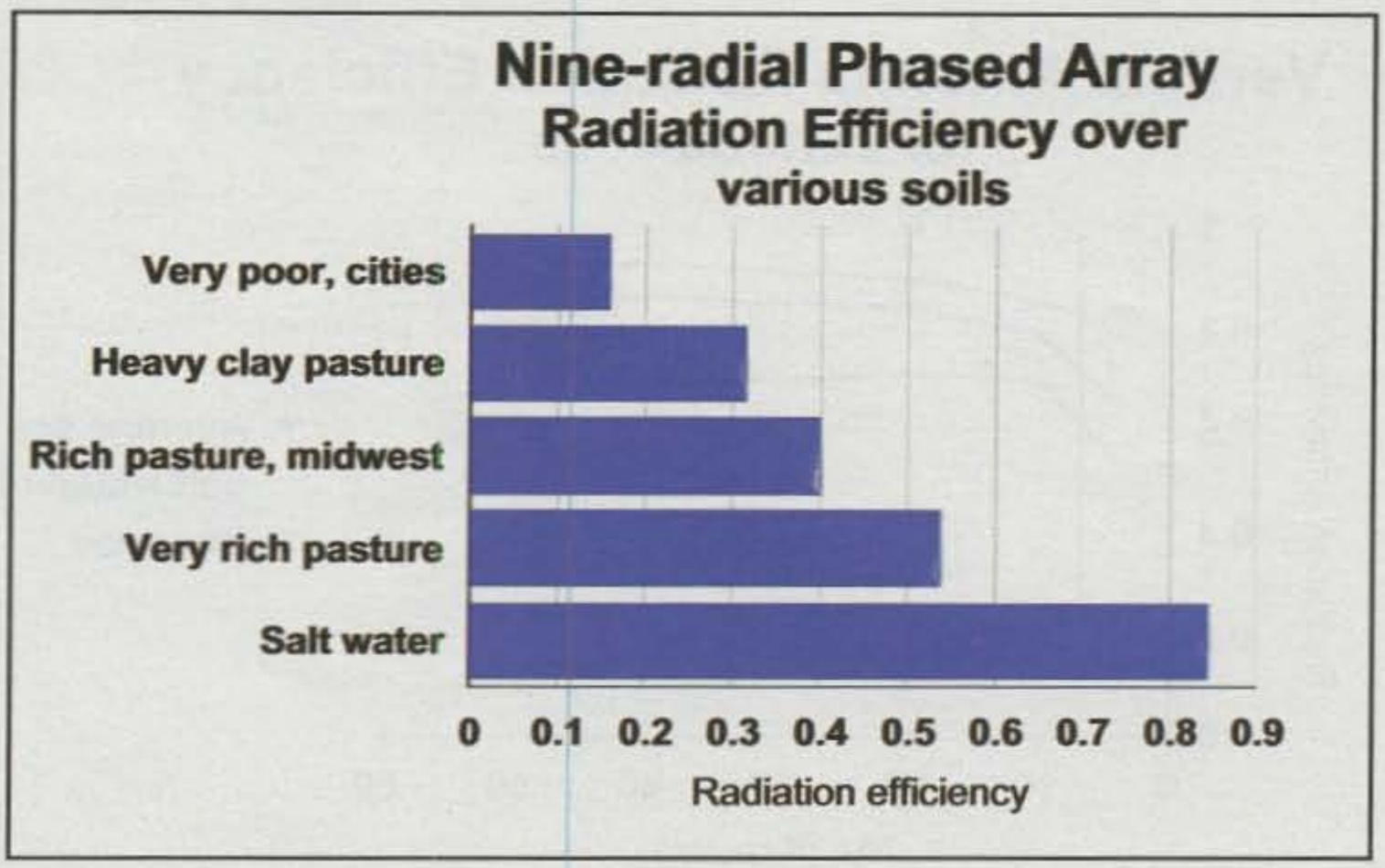


Fig. 4– Our two-element phased-array antenna efficiency as computed by EZNEC over various soil types. Given 36.5 ohms as the base impedance of a lossless vertical dipole, our measurement shows an efficiency of 0.65, which lies between "Very rich pasture" and "Salt water" as expected. Soil characterizations are those given in EZNEC.

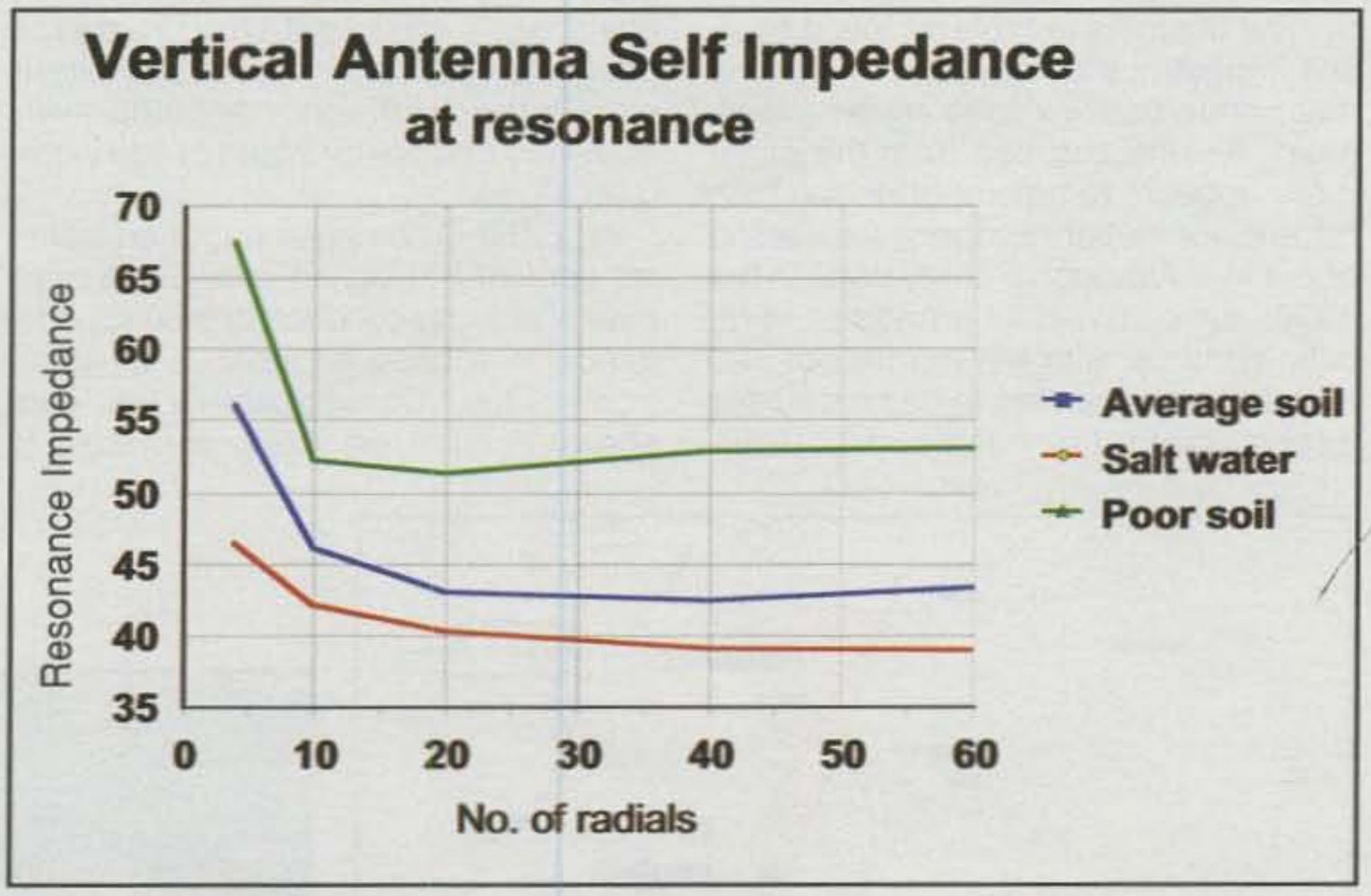


Fig. 5– Resonant self-impedances of an isolated vertical antenna, shown as a function of radial number and ground type. Note the diminishing improvement above about ten radials.

Antenna Specifics

The two antennas are driven out of phase by a nominal 90 degrees. (In fact, the EZNEC computation shows that the phase difference is more like 112.6 degrees for the maximum front-to-back ratio at the operating frequency.) In our case, the quarter-wave slanting "verticals" are separated by a quarter wave each. If each antenna radiates a nominally cylindrical wave, then the quarter-wave spacing provides maximum reinforcement of the overlapping cylinders in the plane of the antennas in one direction and a near cancellation in the other. In other words, the phased array is end-fired. As it turns out, our no-tune (described below) phasing lines connecting each antenna are unequal in length.

Avoid a mistake that cost us a few QSOs the first time we used it—connect the phasing lines correctly. For example, if the antennas lie in an east-west plane and you wish to beam east, connect the easterly antenna with the long line and the westerly one with the short piece. Array direction can be selected from the comfort of the operating position with a switchbox and three DowKey coaxial relays.

There are several ways to achieve an out-of-phase feed from a common source. One is to use a quadrature feed system shown in the *ARRL Antenna Book* (p. 8-14, fig. 17).[3] This method will guarantee maximum front-to-back ratio at any frequency within the antenna's operating range, but requires tuning. For contesting, we sought a phasing method that requires no tuning, even at the expense of optimum front-to-back ratio.

Roy Lewallen's article "The Simplest Phased Array Feed System . . . That Works,"[4] has the answer. We've elaborated some on his ideas in Appendix A, which appears on the *CQ* magazine website[5] as a companion to this article. For those mathematically inclined hams (I'm one) interested in the definition and computation of the antenna mutual impedance and the answer to the question "Why are the phasing line lengths different?" refer to the appendix.

The Radials

The last element of the antenna design to be discussed is the radial layout. Generally speaking, the self-imped-

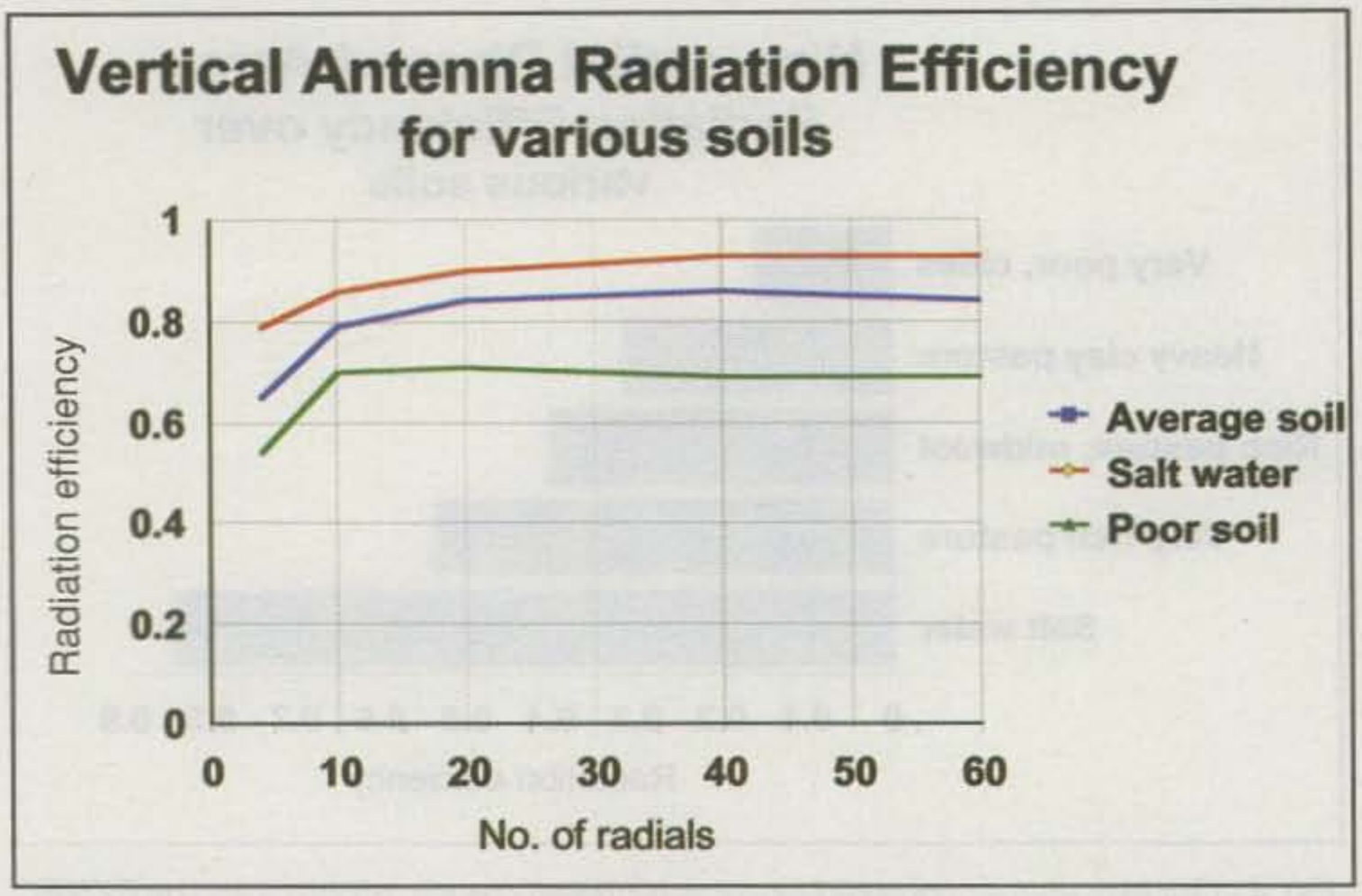


Fig. 6– Vertical antenna efficiency shown as a function of number of radials. Again, note that there is little benefit from having more than ten radials.

ance of an isolated vertical antenna decreases with added radials (see fig. 5). The desire is to have as low a base self-impedance as possible, indicating that non-radiative losses are at a minimum. As one can see from the plots, there appears to a point of diminishing returns for radial numbers exceeding about ten. Although a study done in the 1930s for commercial broadcast verticals came up with the number of 120 radials, there appears to be no detailed justification for that number over different soil types. It is also clear from the plots that one cannot completely overcome one's basic soil type. That is, a poor, low-conductivity urban soil will still yield a lower efficiency antenna array than very rich pasture land or salt water (see fig. 6).

An EZNEC computation for an isolated vertical having no resistive losses over a perfectly conducting ground plane indicates a base impedance of about 36.5 ohms. Consequently, the data shown in fig. 6 are easily converted to efficiencies by dividing the base impedances into 36.5 ohms. Again, the payoff for more than ten radials is relatively small and is worth the effort only if you are working QRP and need to make every milliwatt count. The curves do not cross, so according to this calculation, one cannot make up for poor soil by lots of radials. This argument does *not* apply to a true ground plane, such as screening or a chicken-wire layout.

Thus, based on the curves above, we selected nine radials per antenna as being the best compromise between handling ease and antenna efficiency. We attached the radials to a ground rod and the antenna feed at the feedpoint (see fig. 7 and photo E).

The VSWR performance of the array was quite a bit better than expected based on the EZNEC model. Fig. 8 shows a comparison of measurements made last January with the EZNEC prediction. We don't fully understand why this is so, but it may be that the random length of 50 ohm feed line partially compensated for some excess capacitive reactance presented to it by the antenna/phasing-line combination. Although we brought along an antenna tuner for the contests, we found that for the most part it was unnecessary.

It can't be expected that the antenna array and phasing line will provide maximum front-to-back ratio over the entire 160 meter band. However we found that we had good front-to-back behavior except at the high band edge. (*Note:* This estimation assumes phasing-line

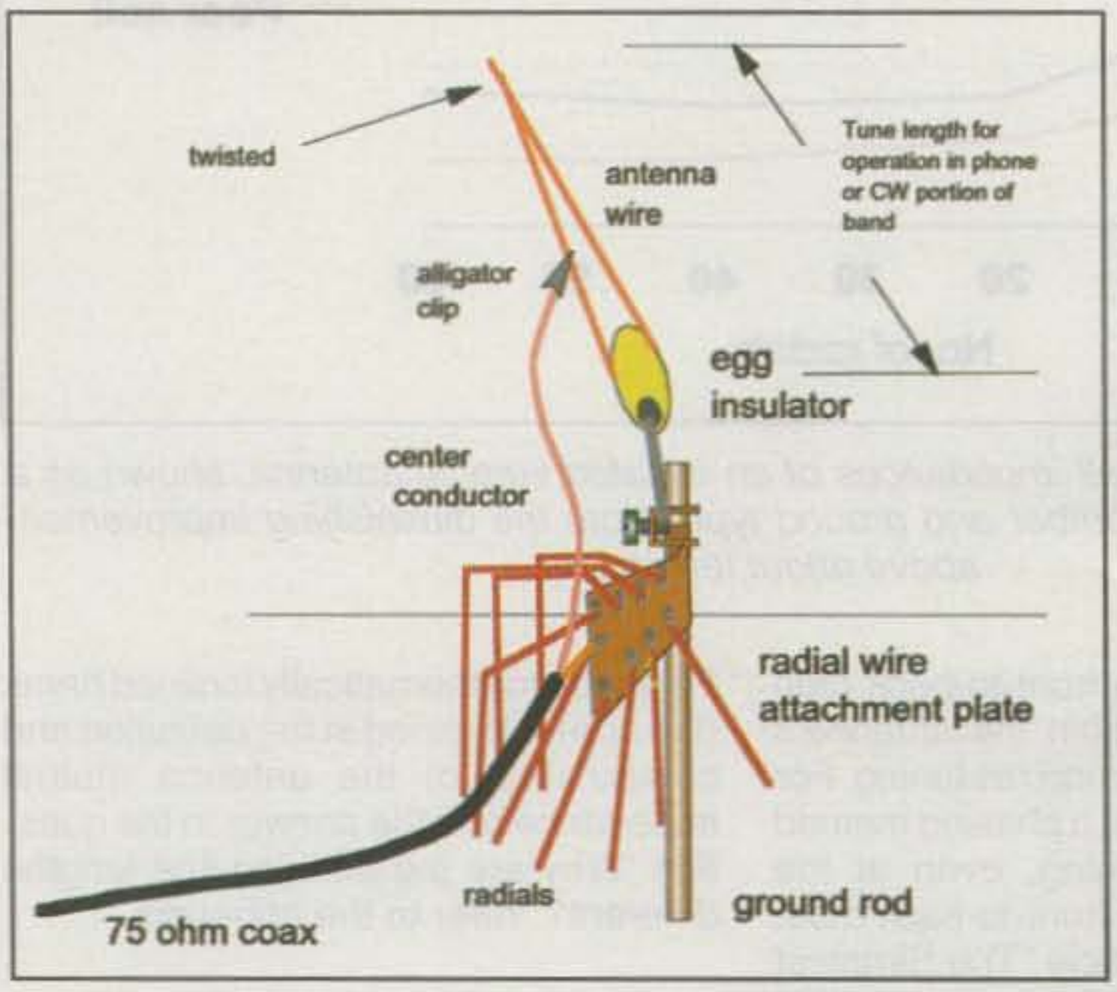


Fig. 7– Details of the nine-radial attachment to the ground rod and antenna feed (see also photo E). Antenna length may be fine-tuned by adjusting the length of the antenna loop through the egg insulator.

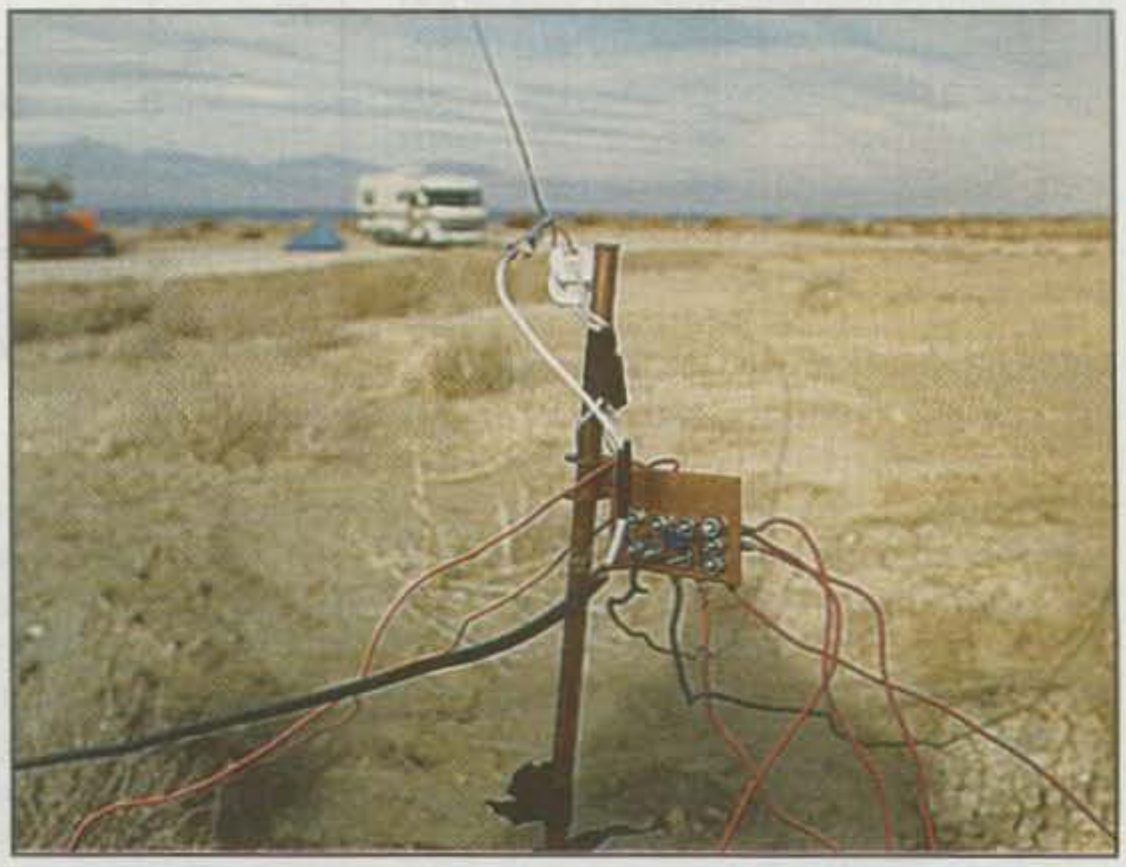


Photo E– The antenna, radials, and feedline come together at this combination anchor/ground rod. See fig. 7 for additional details.

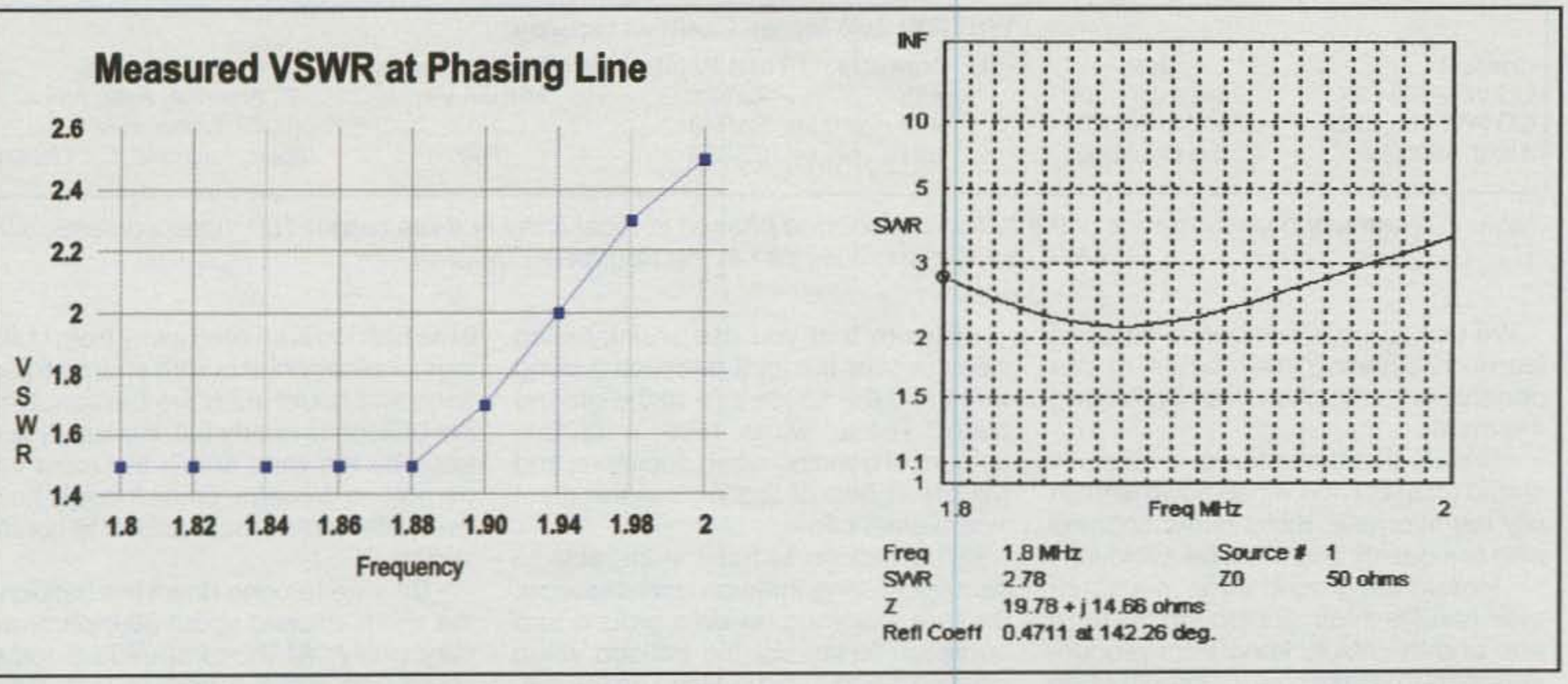


Fig. 8– Actual vs. predicted VSWR for 160 meter phased array. Chart on left shows actual VSWR measured with an MFJ VSWR meter. Chart on right is the EZNEC prediction for the same antenna. The authors still are not certain why the actual performance was so much better than predicted (but they're certainly not complaining!).

W6TRW Balloon-Supported Phased-Array Design

Balloon altitude: 70 m (230 ft.)
Center frequency: 1.87 MHz
Phasing-line impedance: 75 ohms
Feedline impedance: 50 ohms
Short phasing-line length: 53.41 deg.
Long phasing-line length: 155.36 deg.
No. of radials: 9 per antenna
Radial wire size: #14
Radial wire length: 20 m (65.6 ft.)
Antenna length: 42.08 m (138.06 ft.)
Antenna wire size: #18 braided copper
Antenna ground spacing: 40.51 m (132.9 ft.)
Ground type (model): Real, high accuracy
Ground material (model): "Good pasturage" to "salt water"
Maximum front-to-back ratio est.: 25 dB
Beamwidth: 43.3 deg.; –3 dB
Gain: 4.44 dBi
Elevation angle for max. gain: <20 deg.
Radiation efficiency: 0.41 <eff<0.85 depending on choice of ground conductivity

Table I– Design parameters of the balloon-supported phased array that we successfully used in three 160 meter contests. A scaled version was also used on 80 meters for Field Day.

lengths are constant in degrees, not in meters. Therefore there may be an additional 5- to 10-percent droop in the front-to-back ratio for fixed phasing-line lengths.) Note that the peak F/B ratio is the highest for high-conductivity grounds as expected, because the ground-reflected antenna "image" is the least attenuated. For the same reason, the radiation angle becomes lowest with the highest ground conductivity.

Table I shows the balloon-supported phased-array design parameters that we successfully used in three 160 meter contests and a scaled version for 80 meters for Field Day.

How Does it Work?

Now that the design and theory have been fully explored, many will ask, "But how well did it work?" Table II provides the answer.

W6TRW 160 Meter Contest Scores

Contest	Date	No. Contacts	Total Points	Worked All States?	DX Worked
CQ WW 160 CW	28–29 Jan. 2001	465	73,580	Missed VT	S. America, Asia, Africa
CQ WW 160 SSB	23–24 Feb. 2001	419	53,940	No	6 countries
ARRL 160 CW	7–8 Dec. 2001	621	102,560	Yes	Japan, Australia, Caribbean

Table II– Real-world performance of the balloon-supported phased vertical array in three recent 160 meter contests. The ARRL contest score was #1 in the Southwest Division.

We picked up a number of "lessons learned" covering the details of our portable aerostat phased array. Among the many:

• Ensure that the antenna is carefully stored on a reel and wiped down with an oily rag after use. Kinks in the antenna wire are deadly and must be avoided.

• Roll up the ground wires in a hand-over-hand fashion, not around the forearm and thumb, to keep from producing snags that take time to unravel when in the field.

• Ensure that you use shrink-tubing sleeves over the joint between ground wires and the spade lugs at the ground plate. These wires take a certain amount of bending when deploying and will break free of the lugs at the most inconvenient time.

• The balloon is most vulnerable to damage during inflation and deflation. Be sure that you provide a ground tarp on which to lay out the balloon when inflating it and avoid walking on the balloon fabric at all costs! It is also helpful if the balloon is inflated away from buildings or other objects with sharp projections that could snag the balloon. Until the balloon is nearly full, it is easily buffeted by the wind and is the most vulnerable to damage. Once it is full, however, it becomes much easier to control and "fly."

• Be sure to bring down the balloon if the winds exceed about 30 mph or are very gusty. At these speeds a tether could part and the balloon lost. Dave learned this lesson when his balloon nosedived into a cactus patch at Anza-Boreego State Park during very gusty wind conditions.

It is also helpful to review the federal regulations governing balloons, kites, and so forth. These are contained in FAA Part 101, Subpart B—Moored Balloons and Kites. The source is Docket No. 1580, 28 CFR 6722 June 1963, and the relevant paragraph is Sec. 101.15, "Notice Requirements." It has been our experience that the FAA is most cooperative particularly when the balloon is more than 3 miles distant from an airport or heavily traveled air corridor.

Finally, we want to emphasize that our successful 160 meter Balloon-Supported Phased Array is a TRW club project. While the authors did much of the design and construction, others offered help and encouragement, and the club underwrote the project costs! We couldn't have done it on our own. Look for us in the next 160 contest!

Notes

1. 426 Constitution Ave., Camarillo, California (800-700-5995).

2. Our thanks to John Cheatham, KE6OJM, for donating a suitable gas regulator.

3. *The ARRL Antenna Book*, 17th Edition, American Radio Relay League, 1994.

4. *ARRL Antenna Compendium*, Volume 2, American Radio Relay League, 1989.

5. Go to the January *CQ* highlights page at <http://www.cq-amateur-radio.com/Jan.2003Highlights.html>, then click on the appropriate prompt. ■

AMERITRON *True Legal Limit™* Tuner

Easily handles 1500 Watts continuous carrier even on 160 Meters . . . High-current edge-wound silver plated Roller Inductor . . . Two 500 pf high capacitance tuning capacitors with 6:1 vernier reduction drives . . . 3 core choke balun . . . Six position antenna switch . . . True peak reading Cross-Needle SWR/Wattmeter . . .

Call your dealer for your best price!

AMERITRON ATR-30

$599

Suggested Retail

- *Handles 1500 Watts carrier*
- *Super High Current edge-wound silver plated Roller Inductor*
- *500 pf tuning capacitors with 6:1 vernier reduction drives*
- *3 core choke balun*
- *6 position antenna switch*
- *True peak reading meter*

AMERITRON's ATR-30 *True Legal Limit™* roller inductor antenna tuner is ham radio's toughest! It'll handle 1500 Watts *continuous carrier output* on *all* modes and *all* HF bands into most antennas -- even on 160 Meters where most antenna tuners fail.

It's perfect for Ameritron's most powerful amplifiers where the ATR-30 just loafs.

All band coverage lets you operate 1.8-30 MHz including all MARS and WARC bands.

Super High Current Roller Inductor

You'll see Ameritron's new *super high current* air core roller inductor. It's *edge wound* from a thick solid copper strip and silver plated. This produces a large surface area and a massive conductor. It can carry huge circulating RF currents and withstand tremendous heat that'll melt or burn ordinary roller inductors.

A gear driven turns counter and crank knob gives you precise inductance control.

Two 500 pf Tuning Capacitors

Two 500 pf -- *the highest of any antenna tuner* -- variable transmitting capacitors give you no-arc wide range impedance matching for true high power performance.

6:1 vernier reduction drives makes capacitor tuning smooth and easy.

Super Balun, 6 position Antenna Switch

Super heavy duty three core choke balun lets you match virtually any balanced feedline antenna without core saturation.

A 6 position antenna switch lets you select your desired operating antenna.

Read *true* Peak Power

Ameritron's active electronic *true* peak reading meter accurately reads forward and reflected power and SWR *simultaneously* on a lighted Cross-Needle meter.

Roomy Cabinet maintains High-Q

Roomy extra-strong .080 inch thick aluminum cabinet gives highest efficiency and lowest loss. 13¼Wx5⅝Hx17½D inches.

AMERITRON ATR-15 Antenna Tuner

ATR-20, $459. Handles a full 1.2 kW SSB and 600 Watts CW. It's designed to safely handle the full SSB power of Ameritron's AL-811/811H/80B, ALS-500M/600 and other 1.2 kW SSB amplifiers. Compact all metal cabinet.

Ameritron has the best selection of *TrueLegalLimit™* HF Amplifiers

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

Ameritron's most powerful Amp

with Eimac® 8877 ceramic tube

AL-1500

$2995

Suggested Retail

TrueLegalLimit™

Ameritron's *most powerful* amplifier uses the herculean Eimac® 8877 ceramic tube. It's so powerful that 65 Watts drive gives you the full output power -- and it's just loafing because the power supply is capable of 2500 Watts PEP. All HF bands, all modes. 77 pounds, 18½Dx17Wx10H in.

Ameritron's toughest Amp

with Eimac® 3CX1200A7 tube

AL-1200

$2545

Suggested Retail

TrueLegalLimit™

Get ham radio's *toughest* tube with AL-1200. The Eimac® 3CX1200A7 has a 50 Watt control grid dissipation and the lowest history of field replacement of any modern transmitting tube that we use. 90 Watts in gives you full power out. All HF bands, all modes. 76 pounds, 18½Dx17Wx10H in.

Ameritron's classic Amp

with 2 graphite plate Amperex® 3-500ZG tubes

AL-82

$2495

Suggested Retail

TrueLegalLimit™

Most linears using 3-500s can't give you 1500 Watts because their lightweight power supplies *can't* use these tubes to their full potential. AL-82 is ham radio's *only* super 3-500 amp! 100 Watts in gives you full power out. All HF bands, all modes. Hefty 76 pounds, 18½Dx17Wx10H inches.

1.5 *plus* kW SSB HF Amp

with 2 Eimac® 3CX800A7 tubes

AL-800H, $2595 suggested retail. Two Eimac® 3CX800A7 tubes produces 1500 *plus* Watts SSB PEP with 55 Watts drive. 52 lbs., 8½Hx16½Dx14¼W in. **AL-800, $1775** suggested retail, single 3CX800A7, 1250 Watts out with 70 Watts drive.

NearLegalLimit™ Amp

with four Svetlana® 572B tubes

AL-572, $1395 suggested retail. New class of *Near Legal Limit™* amplifier gives you 1300 Watts SSB PEP power output (70 Watts drive) for 65% of price of full legal limit amps! Instant 3-second warm-up. 40 lbs. 8½Hx15½Dx14½W inches.

1 kW Desktop HF Amp

with Amperex® 3-500ZG tube

AL-80B, $1299 suggested retail. Gives you full kilowatt SSB PEP output (85 Watts in) from a whisper quiet compact desk- top linear. 8½x14x15½ in. Plugs into 120 VAC outlet. Graphite plate *Classic®* 3-500Z tube. Nearly 70% efficiency. Weighs 48 lbs.

Precision SWR/Wattmeter

AWM-30, $149 suggested retail. Active circuit gives *true* peak/average readings on lighted Cross-Needle meter. 3000/300 Watt ranges. Remote sensor.

Call your dealer for your best price!

Free Catalog: 800-713-3550

AMERITRON®

. . . the world's high power leader!

116 Willow Road, Starkville, MS 39759
TECH (662) 323-8211 • **FAX** (662) 323-6551
8 a.m. - 4:30 p.m. CST Monday - Friday

For power amplifier components call (662) 323-8211

http://www.ameritron.com

Market Survey

Amateur radio handhelds range in price from $79 to $459. What are the differences in features and performance that account for such a wide variation? WB6NOA takes a special look at that question in this year's CQ Market Survey.

VHF-UHF Handhelds

BY GORDON WEST,* WB6NOA

Prices shown in this article and comparison tables have been carefully researched for the lowest price ever seen at the dealer and catalog sales point. Many of these prices reflect manufacturer coupons for dealers and customers during holiday promotions as well as at local hamfests. Dealers are selling ham equipment nearly at cost, so don't expect any lower prices to be found. Also don't expect to see these low prices prevail after winter and spring hamfests take place.

Those under-$99 handheld transceivers have sparkling transmit audio just like an HT twice, three times, and four times the price. On receive, sensitivity, selectivity, and intermod rejection are usually comparable to any other HT three times the cost. Power output on the inexpensive HT is right up there with most other handhelds three times the cost, so on the test bench and hooked into an outside antenna, it may seem hard to justify a higher priced handheld radio.

However, the seasoned communicator, taking the HT in the field, may soon discover the benefits of a more expensive HT with "field features" that may be indispensable. This could include alphanumerics in the LCD display, backlit control buttons for nighttime use, submersible capabilities for river rafting and fire scenes, shortwave and VHF weather-alert capabilities, or even the experimental digital voice mode when working a T-hunt for a pair of stolen ham transceivers. Of course, the seasoned communicator will also want a handheld that can take all of those optional charging and headset accessories to maximize hands-free HT radio capabilities.

On the other hand, you don't necessarily need to spend $300–400 for some of these features, so let's start from the least expensive and see all you get for your HT buck.

Here is an assortment of the handhelds available at Ham Radio Outlet in Anaheim, California. Terry Dean, N6WI, is the HT specialist of this branch of HRO.

Under $99

Alinco, now based out of Covington, Ohio, and distributed by ATOC Amateur Distributing, comes in with the lowest priced single-band, 2 meter or 440 MHz HTs for under $79 each. These single-banders appear to have been born out of a Family Radio Service (FRS) mold, featuring rugged construction, a non-detachable flip-up antenna, 20 memory channels, and built-in CTCSS encode plus decode capabilities. Their half-watt output to the fixed antenna could adequately work local simplex and close-in repeaters.

The $89 price level brings in two major manufacturers of amateur radio equipment—ICOM America with its powerful T2H 2 meter handheld and Vertex-Standard with the feature-packed Yaesu VX-150. Both ICOM and Yaesu know the importance of a new ham operator's choice of radio, and each single-bander truly

*CQ Contributing Editor, 2414 College Dr., Costa Mesa, CA 92626
e-mail: <wb6noa@cq-amateur-radio.com>

Best Buys for Beginners

	Yaesu VX-1	Yaesu VX-110	Yaesu VX-150	Alinco C5T	Alinco S11	Alinco S-40T	Alinco DJ-296	Alinco DJ-196	Alinco DJ-496	ICOM T2H Sport	ICOM Q7A	ICOM V8	Kenwood TH22	Cherokee AH-50
Ham Bands	2m/440	2m	2m	2m/440	2m	440	222	2m	440	2m	2m/440	2m	2m	6m
Output Power	1/2W	5W	5W	1/2W	1/2W	1W	4-5W	5W	4W	6W	1/2W	5.5W	5W	5W
RX Coverage (MHz) (cellular blocked)	76/999	140-174	140-174	108-174 420-479	Ham	"Extended"	216-249	130-147	420-450	136-174	.5-999	136-174	135-174	Ham
Air Receive	Yes	No	No	Yes	No	No	No	No		No	Yes	No	No	No
Memories	291	209	209	50	21	100	41	41	41	40	200	100	40	5
Alphanumerics	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	Yes	No	No
Dual RX	No	No	No	No	No	No	No	No	No	No	No	—	No	No
Dual Knobs	No	No	No	No	No	No	No	No	No	No	No	—	No	No
Auto Rptr Shift	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No
Tone Scan	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No
Backlit Keypad	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No	—	Glows	No
Cloning	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	No	Yes	No	No
Computer Prog.	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No
Ant. Connector	SMA	SMA	SMA	Fixed ant.	Fixed ant.	SMA	BNC	BNC	BNC	BNC	SMA	BNC	BNC	BNC
12 VDC Operation	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	—	No	—	Yes	Yes
CTCSS Encode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS Decode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DCS Tone	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	Yes	No	No
Power Levels	2	3	3	2	2	2	2	2	2	2	1	2	3	2
Audio Output	1/4W	1/2W	1/2W	1/3W	1/4W	1/4W	1/2W	1/3W	1/3W	2/3W	1/10W	1/3W	1/4W	1/2W
Power Saver	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DTMF Slots	8	9	9	—	—	—	8	8	8	5	—	5	—	—
Seen Selling $$	$169	$159	$169	$150	$88	$109	$199	$189	$199	$89	$119	$129	$199	$150

was designed as a powerful HT with more than 5 watts output, detachable antenna, plenty of memory, and direct keypad frequency entry.

The cost of the ICOM T2H "Sport" is kept down by allowing the ham AA alkaline battery operation. This makes the radio a favorite among emergency communicators, because they don't have to worry about a rechargeable battery pack slowly self-discharging over perhaps a year of non-use. The ICOM 2 meter HT offers 43 memories plus 10 preprogrammed weather channels. It is also designed for extra-heavy-duty use, meeting Mil Spec C/D/E shock and vibration limits. It is a tough little handheld that be used with its own optional rechargeable battery pack and charger circuit if you begin using it on a daily basis.

The Yaesu VX-150 is also Mil Spec'd for heavy-duty use, and likely comes from the same mold as the company's line of commercial land mobile and military portable radios. The VX-150 also has a detachable antenna, but blossoms with features never before seen on a handheld below $99! The unit has 5 watts of power output, over 200 memory channels, back-lit keypad for direct frequency entry, 7-digit alphanumeric memory labels, battery-voltage monitor, and the capability of running off 12 volt DC car-battery power. It also ships with a rechargeable battery system.

As Yaesu and ICOM both battle for the low-cost radio market with full-featured, computer-programmable, and cloneable equipment, any ham who wants a new 2 meter HT selling for around $89 has spectacular choices awaiting at a local dealer or catalog company. I am also told that many independent ham radio dealers are cloning and programming these two radios ahead of time for local area repeaters. This gives the buyer a "local advantage" when pricing the units at a dealer down the street rather than purchasing them from the well-respected store/catalog companies.

Best buy: *The store that sells you the radio will preprogram your local area repeaters, high-band public-safety receive frequencies, and local weather frequencies.*

The $120 Micros

If you are looking for a *really small* HT, Yaesu and ICOM both have a choice below $120. The Yaesu VX-1R and ICOM Q7A are dual-band, 2 meter/440 MHz TX/RX handhelds, each with about a half watt out. These micros also have enormous receive capabilities, well beyond the 2 meter and the 70 cm ham bands. Both units include VHF and UHF TV audio reception, and the AM broadcast band, FM broadcast band, AM aircraft band, and all of the public-safety and military-aircraft frequencies from 76–999 MHz for the VX-1R and 30–999 MHz for the Q7A. Both units have cellular blocked.

These little micros hold a minimum of 200-plus channels, with Yaesu showing alphanumerics. Frequencies are selected by knob rotation, and both units have several buttons (Yaesu backlit) to get up and down the bands. Both micros feature an SMA antenna connector for an external antenna. The VX-1R will also run on 12 volts DC, plus Yaesu includes

This micro dual-band HT from Alinco, the DJ-C5T, weighs only a couple of ounces, is less than a half inch in depth, and is priced at around $150. Alinco products are distributed by ATOC Amateur Distributing.

digital DCS tone as well. Yaesu also includes a lithium-ion battery to give this micro dual-band handheld the latest in long-lasting portability. Both units can take headset systems, too.

If you can spend a bit more money (around $150) for your little micro dual-band handheld, Alinco offers a credit-card-size dual-band HT, Model DJ-C5T, which is so thin and concealable that it could even slip into a big wallet or a micro purse. The Alinco unit also steps up to modern lithium-ion battery technology. There is no other handheld that weighs only a couple of ounces and is *less* than a half inch in depth!

Before we step up to the next price category, check out the ICOM IC-V8 (seen selling for under $139), which comes out of the company's marine-radio mold and offers 5.5 watts output, 5-character alphanumeric display, 100 memory channels, and 16-button backlit keypad. It's a big, low-cost handheld ideal for nighttime operation. The ICOM V8 is both computer-programmable and cloneable, and its relatively large size with encode/decode CTCSS capabilities make it a "he-man" radio in the low-cost field.

Singles from ADI and Alinco

Priced around $175 are single-band transceivers that may get you onto some of those "other" bands, such as 6 meters or 222 MHz. ADI calls their units "Pryme," and these tough, solid HTs are heavy weights in single-band performance on 6 meters and 222 FM. In addition, the PR-460 is a land-mobile-designed UHF radio that might do triple duty as GMRS, UHF FM, and ham 70 cm radios.

The AT-401 is one of several single-band handhelds offered by ADI/Pryme. The 401 is good for working FM satellites, as the transmit range is 430–450 MHz. Receiver covers 420–470 MHz.

Alinco offers single-banders for 2 meters, 222 MHz, and 440 MHz styled identically to the very popular dual-band DJ-596T. The Alinco handheld transceivers offer a minimum of 41 memories per band, with the 222 MHz unit offering 160 memories, alphanumerics, backlit keypad, CTCSS encode/decode, DCS, and a hefty "feel." The newly designed Alinco single-band and dual-band HTs can take all of the Alinco accessories, including nickel metal-hydride battery systems, filtered DC accessory-plug cable kits, base fast chargers, headset with VOX or PTT, speaker mics, soft cases, and a variety of earphone options.

Cherokee's AH-50 is another quality 6 meter single-band handheld with some admirable capabilities, and it has been seen selling for around $150.

Both Kenwood and ICOM also offer single-band handhelds in the below-$199 price range. The Kenwood TH-22 and the ICOM T-22 have been around for several years, and ICOM recently has repackaged the T-22 with the BP-180 battery pack, which is interchangeable for those of us with the older ICOM Z1A or the popular IC-W32 and IC-T7H. The T-22 now has 80 memory channels as compared to Kenwood's 40 on the TH-22, but quite frankly, 30 memory channels is about enough for most 2 meter repeater operation! Anything more, and without alphanumerics you need a little black book to tell you what frequency goes with what repeater system. The ICOM T-22A *does* have alphanumerics, making it easier to spot what channel you have dialed into. Both the T-22A and the TH-22 take the common BNC antenna for those of us with SO-239 to BNC adapters.

Dual-Bander Priced at $200

As we approach the $200 mark, the bigger HTs now offer 2 meters and 440 MHz with high-power performance. Although for $100 less you can find dual-band handhelds, it takes $200 to get into higher power output—around 5 watts for VHF and 4 watts for UHF. We

Handhelds for More Serious Hams

	Kenwood G71	ADI Pryme 222	ADI Pryme 52	ADI 401	ADI 201	ICOM T7H	ICOM 2GXAT	ICOM W32A	ICOM T22A	ICOM IC-90	Alinco DJ-V5	Alinco DJ-596	RadioShack HTX-420
Ham Bands	2m/440	222	6m	440	2m	2m/440	2m/440	2m/440	2m	6&2m/70cm	2m/440	2m/440	2m/440
Output Power	6W	5W	5W	5W	5W	6W	7W	5W	5W	5W	5W	4.5W	4W
RX Coverage (MHz)	118-174	216-229	40-54	400-480	130-179	118-174	136-174	118-174	136-174	.5-999	76/999	136-174	108-174
(cellular blocked)	400-480					400-470		400-470				400-512	420-512
Air Receive	Yes	No	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Memories	200	41	41	40	40	70	40	200	80	500	200	100	100
Alphanumerics	Yes	No	No	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Dual RX	No	No	No	No	No	No	No	Yes	No	—	No	No	No
Dual Knobs	No	No	No	No	No	No	No	Yes	No	—	No	No	No
Auto Rptr Shift	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No
Tone Scan	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Backlit Keypad	Yes	Partial	Partial	—	—	—	No	Yes	No	Yes (3 colors)	Yes	Yes	—
Cloning	Yes	Yes	Yes	—	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Computer Prog.	No	Yes	Yes	—	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Ant. Connector	SMA	BNC	BNC	BNC	BNC	BNC	BNC	BNC	BNC	SMA	SMA	BNC	SMA
12 VDC Operation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS Encode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS Decode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DCS Tone	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No
Power Levels	3	2	2	2	2	2	3	2	3	2	3	2	2
Audio Output	3/4W	3/4W	3/4W	1/3W	1/2W	1/2W	1/2W	1/2W	1/2W	1/4W	1/2W	1/2W	1/2W
Power Saver	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DTMF Slots	10	—	—	—	—	9	5	9	5	10	8	10	10
Seen Selling $$	$259	$169	$159	$179	$189	$199	$249	$279	$199	$269	$209	$209	$249

find this in the ICOM IC-T7H seen selling for around $190. The T7H offers 70 memory channels, one band at a time on the display, 6 watts out on VHF and a little less for UHF, plus wideband receive, including AM aircraft reception. Less expensive 2 meter single-banders normally don't include air receive.

The ICOM T7 has almost become a "cult radio," because there are so many out there which can easily be cloned in the field for memory channels and are relatively simple to modify for U.S. Coast Guard Auxiliary, CAP, or MARS authorized band-edge-out transceive. The T7H has been around for several years and continues to be a good, solid performer.

At around $209 we find the relatively new Alinco DJ-596 2 meter/400 MHz heavy-duty handheld, which will take that talked-about digital voice communications add-on board, the EJ-43U. This changes your FM voice into an FM datastream that fully complies with rules and regulations as an approved way of sending data over the air. It is not a scrambler, and anyone with the right computer program can decode what is going out over the air. Alinco dedicates one page on its website to frequently asked questions about the digital voice option. The one-band-at-a-time display can also hold alphanumeric channel labels. Keypads are illuminated for nighttime use, and the Alinco DJ-596T probably has its greatest following because of the plug-in digital board which might give jammer-hunters a definite edge in tracking down the illusive signal. During our recent testing we found that most repeaters won't pass the digital transmission, so plan that your digital communications between a similar DJ-596 Alinco radio will be on simplex. (The digital voice format used in the EJ-43U is compatible with similar units on some other Alinco radios.)

At $200, Yaesu continues to offer the FT-50R. This was the first dual-band HT to include digital-coded squelch (DCS) and extremely loud audio for those of us who use our handhelds in emergency preparedness situations. The FT-50R offers super-wideband receive from 72–200, 300–540, and 590–999 MHz. Up to 48 characters are available for use in naming or identifying channels, using 4-character numbers or letters, or a combination, to distinguish each name or frequency identification. Of course, cloning and PC programming are part of the Yaesu 50R. Also, I have even seen this unit working on commercial radio ham repeater systems in Chicago, the home of Motorola.

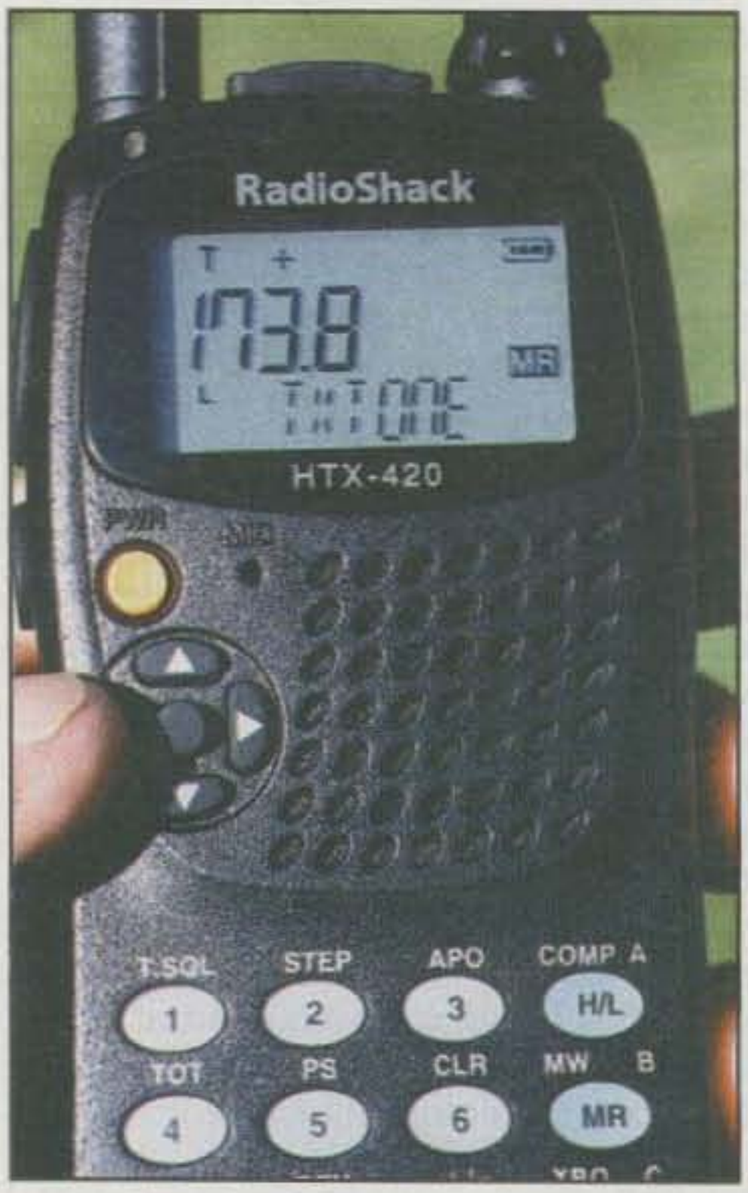
Top-of-the-Line HTs

	Kenwood D7A	Kenwood F6	Kenwood 42AT	Yaesu VX5R	Yaesu 50	Yaesu VX7R
Ham Bands	2m/440	2m, 222, 440	440	2m, 6m, 440	2m/440	2m, 6m, 222, 440
Output Power	5W	5W	5W	5W	5W	5W (.3 222 MHz)
RX Coverage (MHz)	118-136, 136-174	.1-1300	Ham	.5-16, 48-999	76-200	.5-999
(cellular blocked)	400-480	multi-mode		+ wide FM	300-999	
Air Receive	Yes	Yes	—	Yes	Yes	Yes
Memories	200	435	40	220	112	901
Alphanumerics	Yes	Yes	No	Yes	Yes	Yes
Dual RX	Yes	Dual	No	No	No	Yes
Dual Knobs	No	No	No	No	No	No
Auto Rptr Shift	Yes (2m)	Yes	Yes	Yes	Yes	Yes
Tone Scan	Yes	Yes	Yes	Yes	Yes	Yes
Backlit Keypad	No	Yes	Glows	Yes	No	Yes
Cloning	Yes	Yes	No	Yes	Yes	Yes
Computer Prog.	Yes	Yes	No	Yes	Yes	Yes
Ant. Connector	SMA	SMA	BNC	SMA	SMA	SMA
12 VDC Operation	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS Encode	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS Decode	Yes	Yes	Yes	Yes	Yes	Yes
DCS Tone	No	Yes	No	Yes	Yes	Yes
Power Levels	3	3	3	3	3	4
Audio Output	1/2W	1/2W	1/4W	3/4W	1/2W	1/2W
Power Saver	Yes	Yes	Yes	Yes	Yes	Yes
DTMF Slots	10	10	—	9	—	9
Seen Selling $$	$429	$349	$319	$235	$209	$350

The optional digital voice recording system can store the tone up-code sequence, and it behaves much like a commercial radio on those UHF repeaters working mostly commercial Motorola converted-to-ham equipment! The Yaesu 50R is also water-resistant and carries many submersible ratings like companion Vertex Standard marine equipment.

Just above the $200 mark is the Alinco DJ-V5TH dual-band HT, which has 200 memories, an alphanumeric display, direct frequency input, and a receiver that covers from 76 to 999 MHz, cellular blocked. The design follows the Yaesu-inspired look of a distinctive display with a keypad on the bottom.

Several other manufacturers followed Yaesu's lead on that aspect of HT design, but took a deep breath when they saw the new Yaesu VX-5R with triple-band capabilities, one band at a time. The VX-5R is water-resistant and offers full transmit and receive capabilities on 6 meters, 2 meters, and 70 cm. The VX-5R *also* gives you AM shortwave reception from the bottom of the AM broadcast band to 16 MHz, and then full FM scanner reception from 48 MHz to 999 MHz! The VX-5R comes with a high-capacity lithium-ion battery, built-in tone encode and decode, 220 memories, an 8-digit alphanumeric memory-tag capability, and all sorts of Yaesu search and seek and find scanning capabilities. It's a smart radio, too; it will even reduce its own power if it detects that an incoming signal is nearby. The VX-5R has been seen selling for a little over $235, making it the least expensive one-band-at-a-time, triple-band handheld.



At the $250 price level, RadioShack offers the new HTX-420, a dual-band handheld, one band at a time.

At the $250 price level ICOM offers the IC-2GXAT, RadioShack offers a brand new HTX-420, and Kenwood continues with its popular TH-G71—all dual-band handheld transceivers, one band at a time. The ICOM IC-2GXAT is advertised as the world's only 7 watt handheld. You get 7 watts if you use ICOM's BP-132A battery or an external 13.5 volt DC power source. This kind of power makes the unit mighty warm, but

an added 1 or 2 watts output *might* help if you are marginal into a distant repeater with a fixed antenna system. The ICOM 7 watt HT has been around for several years and will continue in the line for those who love this unit and recommend it to their pals.

The RadioShack dual-band HT, the HTX-420, was a welcome addition to a ham radio line that hadn't seen a newcomer for several years. This dual-band radio does one band at a time, even though you may see the second band shown in the display. It holds 100 memory channels, a simple step for CTCSS encode/decode, offers S.A.M.E. (Specific Area Message Encoding) weather alert and 16 backlit keypad with 6 autopatch dial speed locations, and even includes a built-in fluxgate compass just in case you get lost out on the trail. The new RadioShack HT also offers AM air-band reception and partial VHF reception. Although the unit *does* include weather reception at 162 MHz, general VHF reception only goes from 142 to just *below* the marine band at 156 MHz. On UHF, however, out-of-band transmit keystrokes allow it to open from 420 to 470 MHz! Sorry, there are no alphanumerics. The RadioShack HTX-420 is one solid performer, though.

At just over $259, Kenwood comes in with the well-respected TH-G71 dual-band handheld for 2 meters and 440 MHz, one band at a time. It holds 200 memory channels with the optional PG-4P programming cable, and offers relatively good wide-frequency coverage, including the AM aircraft band. The keypad is back-lit, and it pumps out a hefty 6 watts at 13.8 volts DC on VHF, and just about 6 watts on UHF, too. It is easy to program and is just a good plain workhorse radio.

Brand new from ICOM America is the IC-T90A tri-band handheld, seen selling for around $259. The three bands are 6 meters, 2 meters, and 70 cm, along with a huge, wide-open receiver that covers the bottom of the AM broadcast band continuously up through 999 MHz (with cellular blocked, of course). This would give AM reception of shortwave, WWV, and aeronautical, and all of these could be stored in any one of the 500 memory channels. Yes, each memory channel will hold alphanumerics. The backlit keypad can illuminate with three different colors, something new for ICOM handhelds. The T90 features weather alert, a lithium-ion battery, preprogrammed television channels, a "weatherproof" water-rating patterned after ICOM submersible marine VHF handheld radios, plus

receive modes of FM, narrow FM, wideband FM, and AM. I like the idea of those preprogrammed TV channels!

The new ICOM T90 has that distinctive look with a keypad on the bottom, and a very rugged feel when you press any of the up/down buttons or keypad numbers. ICOM has gotten away from that rocker button to the more conventional up and down buttons, and those of us with big fingers will enjoy this new feature! The T90 is brand new, so expect to hear more and more glowing (in three colors) reports about it on the air!

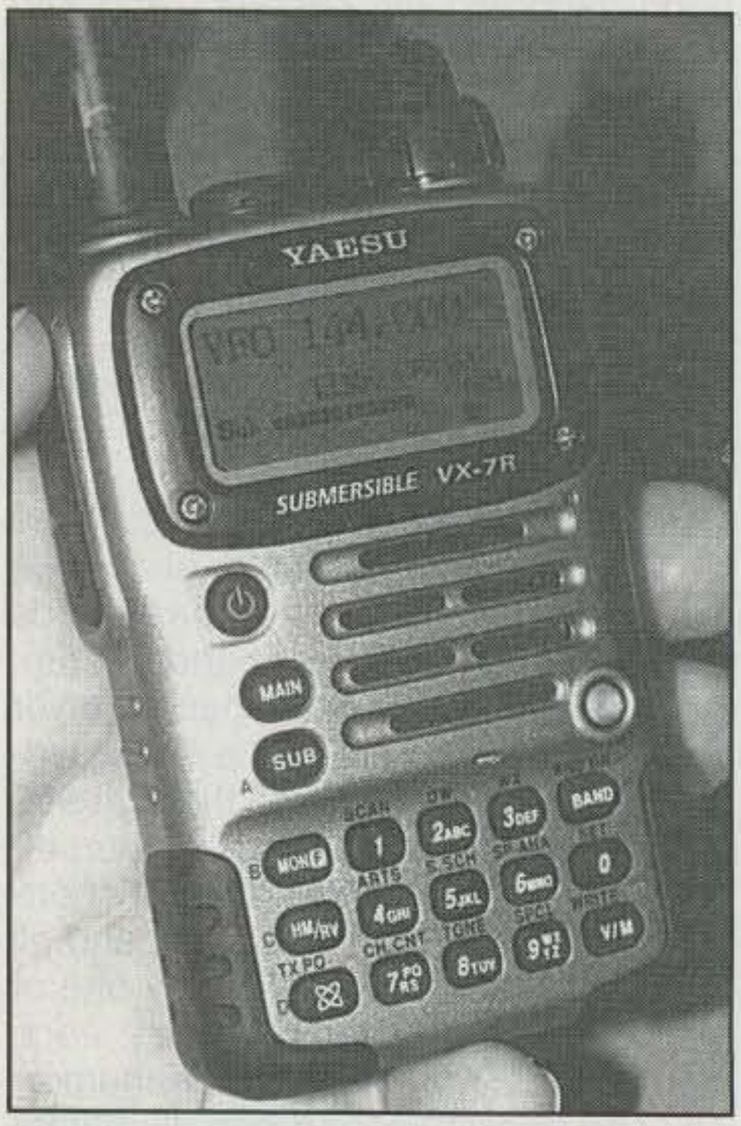
The IC-T90A, brand new from ICOM and seen selling for around $259, covers 6 meters, 2 meters, and 70 cm, and also has a huge, wide-open receiver that covers the bottom of the AM broadcast band continuously up through 999 MHz (cellular blocked).

At $279, ICOM offers the lowest priced full-featured, double-band, simultaneous-receive HT with the IC-W32A. Both bands at the same time are often a necessity for emergency communicators. The IC-W32A has been around for many years and continues to offer good, solid performance with 200 memory channels, double-band receive (either VHF/UHF, VHF/VHF, or UHF/UHF), wideband reception (including air), alphanumerics, automatic repeater shift, back-lit keypad, cloning, and the common BNC antenna jack. It's easy to modify with a single "diodectomy," so the IC-W32A continues to live even though there were a few months when dealers were claiming all stock had run out.

Above $300

Kenwood and Yaesu both have launched new handhelds with bunch-of-bands capabilities. Yaesu calls its new 6 meter, 2 meter, 222 MHz, and 440 MHz submersible handheld a tri-bander, even though it has 4-band capabilities. The VX-7R offers 5 watts on 6 meters, 2 meters, and 70 cm, and a little over a quarter watt output on the 222 MHz band. It also has double simultaneous band receive on any two bands of choice.

The VX-7R is also a sensitive shortwave receiver, covering from the bottom of the AM broadcast band all the way up to 999 MHz with AM reception plus wide and narrow FM. Weather channels are stored in special memory slots, and it even includes weather alert plus capabilities to stay working after 30 minutes of submersion in 3 feet of rainwater. The Yaesu VX-7R comes with a 1300 milliamp/hour lithium-ion battery, and it supports Yaesu's proprietary internet access system called "WIRES."



The new Yaesu VX-7R offers 5 watts on 6 meters, 2 meters, and 70 cm, and a little over a quarter watt output on 222 MHz. It also has double simultaneous band receive on any two bands of choice. The VX-7R is in the above-$300 price range.

In fact, it has a special key just to access "WIRES" systems.

Of course, what ham would be seen with an HT without a built-in clock, timers, spectrum-scope display, and emergency strobe/beep feature in case your voice gives out but you need to have someone spot you at a distance lying on the deck? I was very surprised to see how *functional* the bright strobe is at a distance!

Of course, everything is laid out in the usual Yaesu keys-at-the-bottom display, a design that many others are trying to duplicate! However, Yaesu has it right with its 4-band submersible handheld, reasonably priced at $350. The built-in barometer is extra!

Kenwood's brand-new unit is a tribander, Model TH-F6A, working on 2 meters, full power out on 222 MHz, and 70 cm. It is *also* a double simultaneous band receiver giving you audio out on two bands at a time, plus single-band dual-frequency (VV/UU) capability. The Kenwood TH-F6A features 435 memory channels and shortwave reception from 500 kHz to 1,300 MHz. *However, catch this:* Only Kenwood offers shortwave reception with SSB and CW modes as well as AM! No other handheld offers SSB shortwave receive. When we played with the unit on the 20 meter ham band for shortwave reception, it did very well, but it really needs an external antenna for SW receive.

The F6 ships with a 7.4 volt, 1550 milliamp hour, lithium-ion battery, and the rocker switch does a good job of selecting up and down, as well as left and right even with big fingers. It also sells at the $350 mark.

Keep in mind that Kenwood continues with the TH-D7A dual-band, double simultaneous reception, including the 1200/9600 built-in terminal node controller. Its display shows information each time a correct APRS data is received—no computer needed. It is the only handheld with this built-in capability, and with all this handheld can do with an external GPS, I wonder when Kenwood will go with an updated D7A with *built-in* GPS capabilities. After all, they can do it with an FRS radio, so why not build GPS into a ham radio HT?

Kenwood's TH-F6A is a tribander that works on 2 meters, full power out on 222 MHz, and 70 cm. It is also a double simultaneous band receiver giving audio out on two bands at a time, plus single-band dual-frequency capability. An added feature is shortwave reception with SSB and CW, as well as AM. The TH-F6A is priced at the $350 mark.

Conclusions

Manufacturers of ham radio handheld equipment continue to dazzle us with more bands, more features, lithium-ion capability in the battery system, and even some radios that can take a plunge under water for 30 minutes and still survive. Weather alert is becoming built in. Six meters and 222 MHz are no longer "forgotten bands." If anything was left out in this year's new models, it was the 1270 MHz band that is a personal favorite of mine here in southern California. Keep in mind, however, that 6 meters is really going to take a lot more than the little rubber-duck antenna that comes with the handheld!

Research your handheld purchase based on which radio will be best *for your specific needs and budget,* and get any important accessories at the same time as you buy the HT. Buy from a dealer who may do a little preprogramming and give you more than just an uncharged and unprogrammed handheld straight out of the box—that is, unless you have a pal with the same handheld and you plan to clone. Cloning is good. Dealers might offer that as an incentive to buy from them. Handheld pricing can't get much lower, and the typical dealer mark-up is less than 2 percent, so don't even try to fish for a better deal.

Enjoy all that these new handhelds can do for you! I hope the accompanying data charts will help, too. ■

He's baaaaccckk! Just in time for those chilly winter nights when you want to snuggle up next to a warm soldering iron, "Mr. Heathkit," WB8VGE, moves us up to 2 meters with his step-by-step program for restoring an early FM classic.

Keeping the Green Flame Burning

Part III—Restoring the Heathkit HW-202

BY MIKE BRYCE,* WB8VGE

Today you can plop down less than $150 and walk away with one of the newest microprocessor-controlled 2 meter FM radios made. It scans and it has tone encoding, tone decoding, digital readout, 70 watts of RF, and a zillion memories. That's today. Thirty years ago, however, things were very different. Anything above 50 MHz was considered the final frontier! The 2 meter band was largely unexplored. There were no set rules and no band plan was in place. *(There still is no uniform national band plan—ed.)*

Heathkit knew there was money to be made by producing equipment for this wide-open band. Its first attempt was a warmed-over idea coming from the new CB boom in the mid '60s. The HW-30 "Twoer" was born. It was one of the many "Benton Harbor Lunchbox" transceivers. Introduced in 1960, the HW-30 sold all the way until 1971, when production ended. The Twoer was a simple, inexpensive way to explore the then little used 2 meter band. The Twoer Lunchbox provided a lot of fun with its AM transmitter and regenerative receiver. Fun it was; practical it was not.

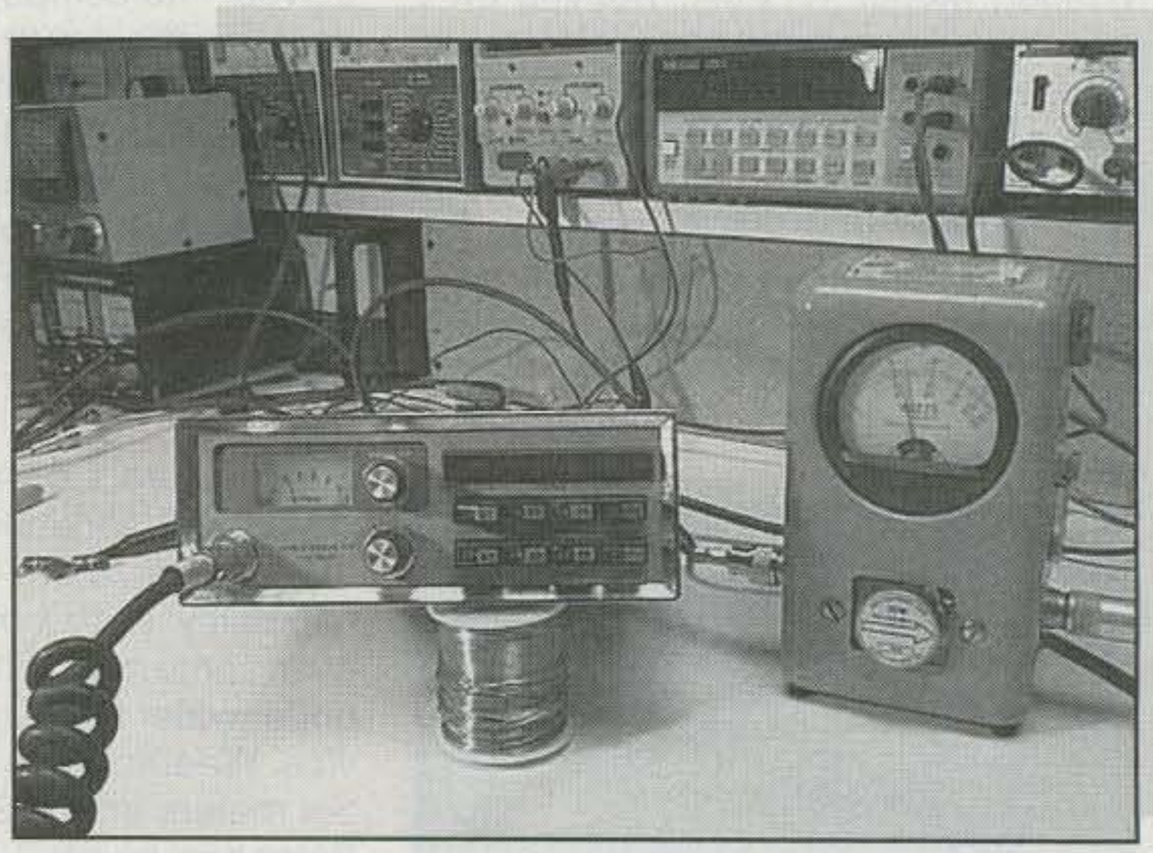
At about the same time, in 1968, Heathkit introduced the HW-17. The HW-17 remained in the Heathkit catalog only a very short time. It was discontinued in 1969. Heath reintroduced an improved model, the HW-17A, late in 1969. Production lasted only another year, and the HW-17A was discontinued in 1970.

Operating on the 2 meter band, the HW-17 was really a trans-receiver. The transmitter was crystal controlled, while the receiver had variable tuning. Amplitude modulation was used in the HW-17's transmitter. Later on an FM adapter was available, but the adapter never did seem to work well and very few hams got it to work correctly. The HW-17 was plagued with all sorts of little problems, many of which the engineers were never able to resolve.

Today, because of the short time both units were in production, the HW-17 and 17A are quite hard to come by. They sell for more now than they did when they were new. They are only useful as collector's pieces, and I have never heard one on the air. All in all, Heathkit learned a great deal between the Twoer and the HW-17.

**955 Manchester Avenue SW, North Lawrence, OH 44666*
e-mail: <Prosolar@sssnet.com>

***Note:** Parts I and II of this series dealt with restoring the HW-16 (December 2000 issue) and HW-101 (November 2001), respectively.*



Here's an HW-202 sitting on my workbench. If you can make out the reading on the wattmeter, you'll see that the HW-202 can send up to 15 watts of RF to the antenna. (Photos by the author)

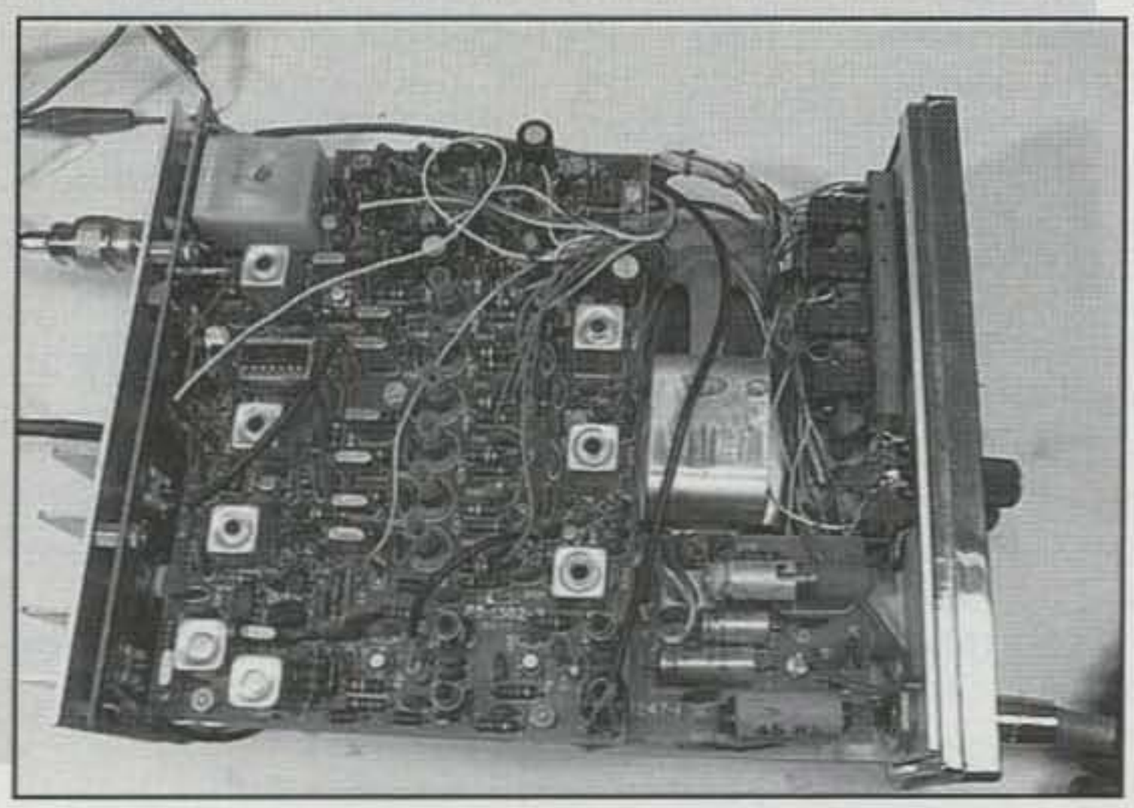
The 2 meter band was changing during this time, too. With the influx of wide-band FM commercial equipment, amplitude modulation was put to rest on the VHF bands. Channelized operation on set frequencies meant you did not need a tunable receiver. Crystal control was required for both the receiver and transmitter. (*No one in ham radio had even heard of a frequency synthesizer at this point.—ed.*)

The HW-202

Heathkit went back to the drawing board and set out to design a truly usable 2 meter transceiver. When the smoked cleared, in 1973 Heathkit introduced the HW-202, a rig that stayed on the market until 1977. Although the exact number may never be known, most guess Heathkit sold tens of thousands of the HW-202. At one time the kits were flying out of Benton Harbor so fast that there was a waiting list to buy one.

The HW-202 is a crystal-controlled 2 meter FM transceiver. It will produce up to 15 watts on any of six transmit frequencies. The receiver claims a respectable .2 µV usable sensitivity.

There is a front-mounted meter which serves as a relative power output meter as well as an S-meter on receive.



The HW-202 undergoing repairs.

Transmit and receive frequencies were selected by a series of push buttons. Heath was less than up front in its ad copy about the HW-202's crystal capacity. Although you only had six different "channels," the push buttons allowed you to separately select your transmit and receive frequencies for a total of up to 36 different frequency combinations. For example, you could transmit on 146.94 and receive on 146.52, or transmit on 146.52 and receive on 147.23. It was more ad hype than something you could really do, since even in the early days of repeaters you couldn't get far by transmitting on the input of one machine while listening to the output of another! For the majority of hams, the HW-202 remained a six-channel 2 meter FM transceiver, and it was up to the end user to supply the crystals.

All in all, the HW-202 was quite a buy at only $189. You could add the optional tone-burst board and the AC-operated power supply, the HWA-202.

Today the HW-202 makes a great transceiver for packet, especially if you monitor a DX spotting cluster or have a radio-linked weather station using APRS. You also can stick one in the shack to keep in touch with your friends on the local repeater. Best of all, it's very easy to operate—no microprocessor mumbo-jumbo here. Off-on, volume, and squelch are the only controls you need to mess with.

The HW-202 is a low-cost workhorse. It can be had on the used market for less than $50, and sometimes a lot less. I've paid as little as $10 for one in perfect operating condition. Get the manual, because you will need it. Also, because the HW-202 is crystal controlled, take into account that more than likely you will need to "recrystal" the radio to suit your needs. The radio originally came with a 146.34/94 crystal set. At the time, Heathkit said those crystals would provide coverage to 80 percent of the country. The 34/94 pair was the "national" repeater set at the time.

Inside the HW-202

When you compare the HW-202 with one of today's 2 meter radios, the HW-202 is a real monster. It's huge! The radio's size is also an advantage, though. It makes the radio much easier to work on.

There are four fiberglass PC boards inside the HW-202. The power-supply-regulator and hash-filter board is located directly under the meter. This board also holds the meter's lamp. Next, the receiver board is right on top. There is a row of crystals nearly in the center of this board.

The front edge of this PC board holds the receiver oscillator and the various doublers. Along the left edge are the front end and the mixers. The signal path wraps around the board and ends at the bottom of the board, with the IF IC chip located in its socket. The speaker of the HW-202 is located between the front panel and the rest of the circuit boards.

Flipping the HW-202 over on its back, you see the transmitter board. The transmit crystals are hidden under a small aluminum cover. On this board, while looking into the face of the radio, the series of coils on the very right are the transmitter doubler, tripler, and low-power output stage. You can see a small coax cable running from this board to the PA (power amplifier) PC board located on the very rear of the radio.

In the center of the transmit board you find the microphone audio circuits. As you move toward the left, the Variac diode that is used to frequency-modulate the carrier is located in the lower left of the PC board. The rest of the PC board holds the transmitter oscillator.

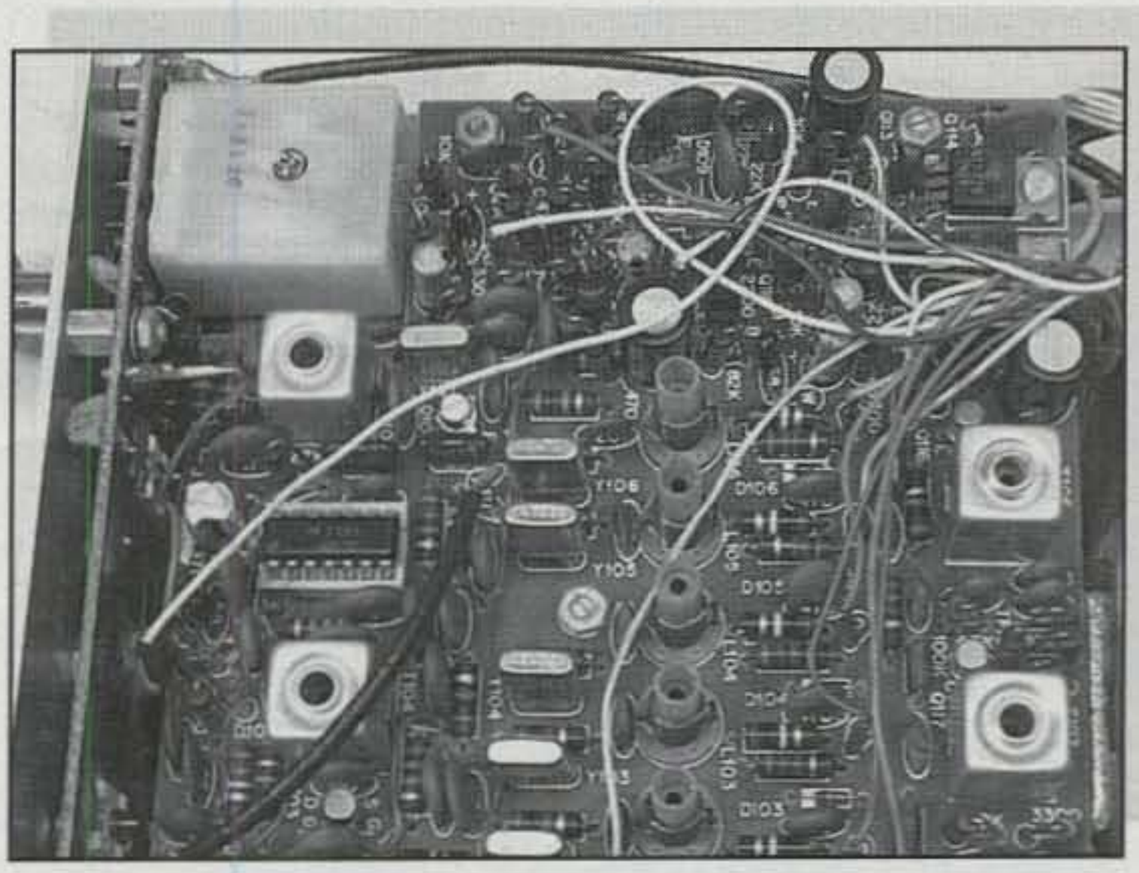
The PA board is mounted on the rear of the radio. You can see the studs of the RF power transistors poking through. Also mounted on the PA board is the T/R switching relay. Also, there is a large plug that mates with the matching socket that completes the control circuits between the four boards.

The many wires used to connect the various PC boards are long enough to allow removing a PC board without damage to the wiring harness. This makes it easy to get voltage readings on the bottom of the boards. Only the rear-mounted PA board is hard to get at.

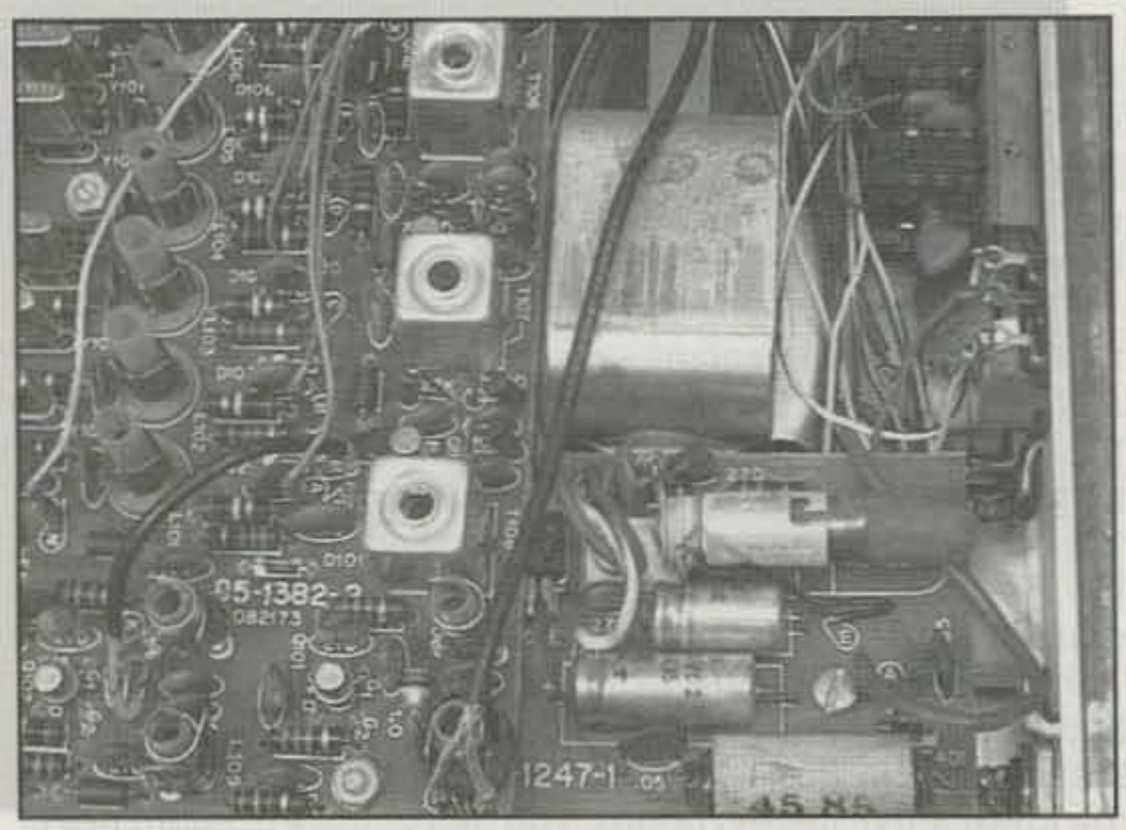
What Goes Wrong With the HW-202?

Looking back at all the HW-202s I have worked on, there is no pattern of failure. Some will transmit but won't receive. Other times the problem is reversed, with a working receiver and a dead transmitter. I've yet to find one with a bad RF power transistor in the PA, although I am sure there are plenty of them out there.

If you pick up an HW-202 that seems to have both receiver and transmitter problems, it's a sure bet the radio has been hooked up backwards to a power source. Although the HW-202 has an internal reverse-polarity-protection diode, it's pos-



The receiver section of the HW-202. The coils down the center of the PC board are used to "net" the crystals on frequency. This is a fine-tuning adjustment necessary in the days of crystal control.



Another look at the receiver PC board. The small board on the right is the DC filter and holds the reverse-polarity-protection diode.

sible that someone toasted this diode by repeated reversed connections. If this is the case, then you're off to a real intensive troubleshooting trip through the radio. Just about all the transistors and ICs will be toast. Therefore, make sure you observe the correct polarity of the power source before applying power to the HW-202.

A Few Quick Tests

Take a look at the rear of the radio. Make sure you have the speaker switch switched to the internal speaker. You will need to supply 13.8 volts to the radio via its power leads. Turn on the power and you should see the meter lamp glow. If not, don't worry. It may just be a burned out lamp. I've seen this a lot. Most people don't seem to worry about replacing the meter lamp, so don't worry immediately if you don't see the lamp come on.

Open the squelch control and adjust the volume to a comfortable level. Try operating the squelch. If the squelch closes properly, good. If not, you will need to dig a bit deeper, but for now let's say that the squelch is working.

A quick way to tell if the receiver is working is to use an HT and transmit on the HW-202's receive frequency. If you can't hear the HT, then try this tip: Adjust the volume control to a comfortable level. Select a frequency that has a crystal installed. While listening to the audio, remove the crystal from its holder. You should hear a noticeable drop in receiver noise. The crystal oscillator will stop when the crystal is pulled. With the crystal out of the circuit, there's no mixer action in the receiver and that makes for a noticeable drop in receiver noise.

If you can't hear any difference, be sure you pulled the correct crystal. Since the HW-202 uses diode switching to select the correct crystal, it's possible to have either a broken wire from the frequency selector buttons or an open diode that controls that crystal. Verify this by moving the crystal to another location and trying again. Make sure you have the correct button pushed in (or out) to select the crystal you want to use.

Over time, many of the component values are subject to change. Sometimes these changes are enough to stop the mixer oscillator dead in its tracks. The fix? Adjust T-106 in the oscillator tank circuit with the *correct* alignment tool.

First, connect your VTVM to the test point used to monitor oscillator activity. This is test point 101. This test point is the tip of a resistor standing upright. When the oscillator is running, you should see at least one-half to a full volt on the meter.

Place a piece of tape on the alignment tool to serve as a turns counter. This tape flag will make it much easier to count the turns. While monitoring the test point on the VTVM, slowly turn the slug one turn counterclockwise. If the oscillator does not fire, return the slug back to its original position and then one turn counterclockwise. If component values have changed just a bit, one turn either way should do the trick. Don't move the slug in T-106 more than two turns in either direction.

If you can't get the receiver oscillator to fire, try this: Lift the board from the chassis and reheat the solder pads on the oscillator components. Solder fractures also can shut down the oscillator.

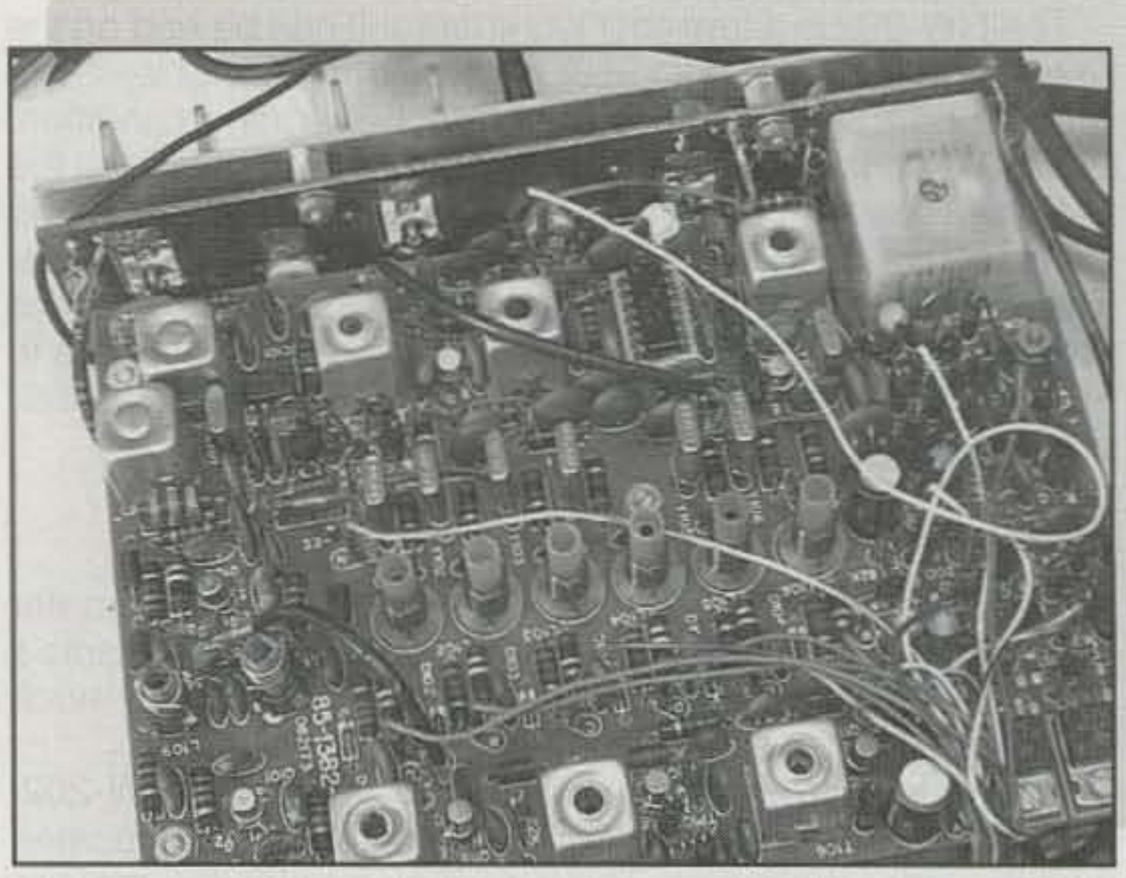
If the receiver is working but is kind of deaf, then check the first RF amplifier, Q101, on the receiver PC board. This dual-gate MOSFET is easily zapped by nearby high-RF fields and even lightning discharges during a thunderstorm. Lucky for us, an NTE222 is an exact replacement for this MOSFET.

Squelch problems usually require a scope to see the "noise" coming out of the receiver IF. No noise, no squelch. The noise is rectified and applied first to an amplifier and then to voltage-doubling diodes D108 and D109. The output of this doubler goes to an emitter follower and then to the squelch gate transistor, Q108. This transistor is used to turn on or off the audio between the IF amplifier and detector IC, IC102, and the audio-amplifier chain. Normally, as a rule of thumb, no squelch usually means no noise detection or rectification. A squelch that won't open up usually is associated with a shorted transistor switch in the audio chain.

S-meter problems usually are linked to diode D107 or C167. Capacitor C167 taps a small amount of signal from T104. Diode D107 rectifies the signal, and the resultant DC is applied to the S-meter.

Transmit Problems

If your HW-202 suffers from low transmit power, suspect low-power driver transistor Q210, a 2N3866. Transistor Q210 is used to drive the PA transistors to full power. Most of the time you'll find the driver transistor to be open. What power you may see is coming from the last doubler stage. A quick check of the problem is easy. Monitor the transmitter's current when the PTT button is pushed. A healthy HW-202 should draw about 3 amps at 13.8 volts for about 12 watts of output into



Yet another close-up of the receiver section. The audio-output transistors are on the very bottom right of the photograph.

a 50 ohm load. If you see very little current, then either there is not enough drive or one or more of the RF power transistors have opened.

Just as in the receiver, the components that make up the tuned circuits for the transmit crystal oscillators may have drifted out of spec. This time monitor transmit crystal oscillator Q201 at test point TP201. Move the oscillator coil's slug in one direction, then another. Usually one turn either way will start the oscillator running once more.

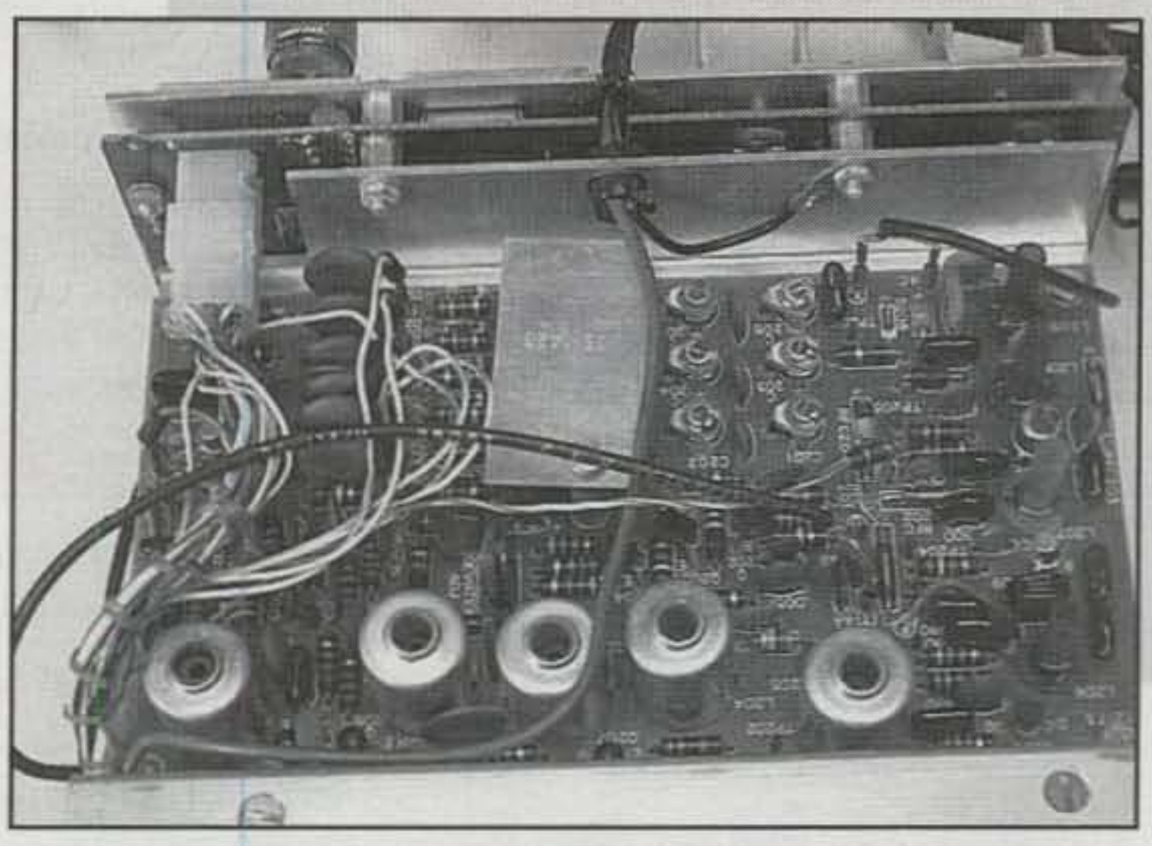
I've run across several HW-202s that won't transmit. Finding nothing wrong with the circuit, the fix has been to add a small-value fixed capacitor—i.e., 20 pF—between the base of the transmit oscillator transistor, Q201, and ground.

If you see excessive transmit current during key down, with very little RF at the output, then one of the RF power transistors on the PA board has a collector-to-emitter short. What I do is key the rig for several seconds and then find the hottest transistor with my fingertip. If the transistor is shorted, it will get hot! Getting to the power transistors is not an easy job. Most of the time they are in good shape and never need to be messed with.

Audio Problems

There are several transistors that make up the microphone audio chain. Basically, they amplify the audio to a usable level and then run the results through a pre-emphasis network. From there, the resultant voltage is applied to Variac diode D207. This is where the audio "FMs" the carrier.

A good way to start is by injecting a 1000 Hz tone into the microphone input and following it first through the audio predriver circuit and then the pre-emphasis circuit. You can monitor the voltage applied to the Variac diode with your VTVM. No voltage, no FM!



Here is the low-level transmit board. The frequency-netting capacitors are about in the middle.

If the receiver is working, but you can't hear anything from the speaker, check the position of the speaker selector switch located on the rear apron. If it is in the external position, guess what? You won't hear anything from the internal speaker.

Provided the switch is in the correct position, use an external audio amplifier and work from the low-level audio drivers up to the speaker. If you find you have audio to the speaker, but still no audio output, suspect the plug and socket that connects the rear apron to the rest of the circuit boards. Sometimes I've seen bad solder joints and cracked/broken PC board traces going to and from this plug. You might have

Crystal Sources

The following are well-known and long-established sources of radio crystals. You may find others on the web, but we can't vouch for the quality of the their crystals.

Bomar Crystal Co., 201 Blackford Avenue, Middlesex, NJ 08846; phone: 800-526-3935/732-356-7787; fax: 800-777-2197; web: <http://www.bomarcrystal.com>.

International Crystal Mfg Co., 10 N. Lee Street, Oklahoma City, OK 73102; phone: 800-725-1426/405-236-3741; web: <http://www.icmfg.com/>.

JAN Crystals, 2341 Crystal Drive, Ft. Myers, FL 33906-6017; phone: 800-526-9825; fax: 941-936-3750; e-mail: <sales@jancrystals.com>; web: <http://www.jancrystals.com/>.

to remove the PA board to gain access to all the PC-board solder pads.

Some More Tips

For reasons known only to the engineers at Heath, the antenna connection for the HW-202 is one of those nasty RCA connectors. Although the ceramic-insulated RCA connector is a very good RF connector; the one used on the HW-202 is a cheap chassis-mounted affair. To add insult to injury, the RCA connector has a crappy friction fit. If you place the HW-202 into mobile service, the antenna will fall off the connector. What to do? I've seen a lot of HW-202s with the RCA connector replaced with a BNC connector. It's a messy job. I prefer to use a simpler method. A short piece of coax is terminated into a PL-259. The other end is an RCA plug. This short pigtail is held in place by removing one of the back cabinet screws and a nylon cable clamp. This way, the clamp holds the plug into the RCA connector on the radio's rear apron, and the PL-259 makes it easy to connect your mobile antenna via an inline barrel connector. This is my preferred method of mating an antenna to the HW-202. It preserves the original look of the radio.

If you're really lucky, you might find a HW-202 that is filled with all the crystals you need for your local repeaters. Most of us are not that lucky, though. You can order new transmit and/or receive crystals from Jan Crystals or a few other sources (see box).

If you need only receive crystals, a much cheaper way is to order them through RadioShack. Yup! The Heathkit engineers decided to use the 10.7 MHz standard as the IF frequency of the receiver. That's great for us, because it's a very common IF used by a great deal of FM receivers. Everyone seemed to use 10.7 MHz as an IF, including RadioShack for its scanners. Therefore, order any crystal frequency you like from your local RadioShack for about five bucks a pop. (Heathkit *scanners* also use the same 10.7 MHz IF, so you can order crystals for your GR-1132 scanner from RadioShack, too!)

Here's another tip: Don't tell the guy behind the counter at RadioShack you need crystals for a Heathkit HW-202. Just tell him you need a few crystals for an old Realistic scanner. When it comes to ham gear, especially old ham gear, the slogan at most RadioShack stores usually ends up to be "You have questions; we have blank stares."

Also, don't get too carried away with the diddle stick (*technical term for an alignment tool—ed.*). It's possible to tweak the front end of the HW-202 so tightly that it is almost stone deaf if you move 600 kHz away. The same thing can happen to the transmitter. It's best to tune the radio in the segment you will be operating the most. If you want to use the HW-202 on packet, then tweak it for the 145 MHz band.

The HW-202

It's hard to find a 2 meter transceiver better than the HW-202. Sure, its quartz-locked technology pretty much holds you to a half-dozen repeaters. On the other hand, though, most of us usually "hang around" on one or two repeaters anyway. The only 2 meter radio in my shack is an HW-202 feeding a homebrew J-pole antenna. It monitors the local ragchew repeater, and I also have it crystalled for the Skywarn repeater and a few simplex frequencies.

The HW-202 will produce more than enough RF to the antenna to make working simplex interesting. And you know what? They sound great! There's room-filling volume even from the internal speaker. The transmit audio is full and robust. I've gotten many compliments about my transmit audio when I am using my HW-202.

If that's not enough, they are built like tanks. They should last for a very, very long time.

The HW-202 is a hard act to follow. However, Heathkit did the 202 one better with the introduction of the HW-2026. It was the world's first fully synthesized 2 meter radio in kit form—and Heathkit's first and only product recall!

Next time we meet on the pages of *CQ*, I'll take on the HW-2036, the radio that replaced the ill-fated HW-2026 two meter FM transceiver. ■

Reader Survey
February 2003

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*.

Our articles this month cover a broad spectrum of amateur spectrum, from antennas for 160 meters to handhelds for 70 centimeters, so we'd like to find out which bands are your favorites.

Please indicate which choice(s) best describe your activity on each band:

Band Meters (Freq.)	Equipped to Operate (Radio & Antenna)	Occasionally Operate	Frequently Operate	Favorite Band (Select only one)
160 (1.8 MHz)	1	16	31	46
80/75 (3.5 MHz)	2	17	32	47
40 (7 MHz)	3	18	33	48
30 (10 MHz)	4	19	34	49
20 (14 MHz)	5	20	35	50
17 (18 MHz)	6	21	36	51
15 (21 MHz)	7	22	37	52
12 (24 MHz)	8	23	38	53
10 (28 MHz)	9	24	39	54
6 (50 MHz)	10	25	40	55
4 (70 MHz/Europe)	11	26	41	56
2 (144 MHz)	12	27	42	57
1.35 (222 MHz)	13	28	43	58
.70 (430 MHz)	14	29	44	59
.33 & Lower (902 MHz & Higher)	15	30	45	60

Thank you for your responses. We'll be back with more questions next month.

What You've Told Us...

Oops... we accidentally ran October's survey results last month before giving you September's responses. So, to get things straight again, here are the results of our September survey on emergency preparedness:

A surprisingly high 17% of you said you had participated in amateur radio communications directly connected to the attacks on America of September 11, 2001. In addition, 37% of you said you had participated in emergency or disaster communications within the past year, and 44% had taken part in amateur radio public-service events. Considering that our survey demographics over the past year and a half show that, on average, 31% of you say you're active in public-service communications, that's pretty impressive (on this survey, 43% said they're active in public service).

Regardless of actual activity in public- service communications within the past year, two thirds of you consider yourselves prepared to respond (14% report an "excellent" level of emergency preparedness; 52% say "good"); and more than one-third of you (36%) say you're better prepared to respond in an emergency today than you were a year ago. Added to the 38% who said they were well-prepared a year ago and still are, that's 74% of you who have maintained or improved your skills!

Finally, we asked how your feelings have changed in the past year about the continued importance of amateur radio. Overall, 93% of you believe amateur radio *is* still important in our post-9/11 world, with 38% feeling much more positive about it, 25% feeling somewhat more positive, and 30% feeling about the same but with a positive view. Only 4% had a negative view of amateur radio's continued importance, and *no one* had a "much more negative" view.

This month's free subscription winner is Harry Johnson, KC8IXA, of Coloma, Michigan.

KØGRM says he enjoyed WB8VGE's "Confessions of a Heathkit Collector" in our January 2002 issue so much that he felt he needed to provide some balance in the form of what he termed a confession "on the darker side of amateur radio, those who have no respect for purity and mint condition!" However, it's really the true spirit of amateur radio in action (and when better to provide this "balance" than in the same issue as another WB8VGE restoration article?).

Confessions of a Radio Modifier (Butcher)

BY DENNIS R. MURPHY,* KØGRM

I really appreciate *CQ* having articles about early radio pioneers, the old stuff, collectors, and collections, from a time when radios glowed in the dark. Gee, when I got my license in 1956, I was delighted that my homebrew 6AG7-807 transmitter worked with my Windom antenna. It didn't take long after that, though, for the dark side of the homebrewing art to surface in my workshop!

My National NC-57 was the first to suffer. I changed some knobs. Then I got my Conditional license† and when a Heath DX-100 kit arrived, man, was I rolling! I built it and got on the air. I had an open-wire, center-fed Zepp and no antenna tuner, so I tied the feedlines together and ran it ungrounded. It wasn't too long before the transmit toggle switch was paralleled with a relay and I had a foot switch on the floor. Then someone smarter than me came up with the 10 meter neutralizing wire over the driver shield— right down my alley. Oh yeah . . . I changed the knobs, too!

The NC-57 was traded for a National HRO-7. The HRO went untouched for quite a while until I purchased a new four-section main-tuning-capacitor assembly on New York's Radio Row (fond memories). The HRO was traded for a Hammarlund HQ-160. (You out there have one of those? I still have mine!) It had an oscillation problem when in the double-conversion mode, and after looking at KØCMX's Hammarlund manual, the choke on my second converter plate shorted out and that fixed it. Then it drifted some, so a 6.3 volt filament transformer was installed inside and the oscillator tubes stayed on 24 hours a day, no drift. The Hi-Z headphones I had didn't work too well, as Hammarlund was one of the first manufacturers to put the headphone jack in the 4 ohm speaker circuit. The addition of a 4 ohm to 2K ohm transformer on the headphone jack made the phones work great!

Finally, I joined the SSB crowd when I purchased a Drake T-4X transmitter and R-4 receiver. Well, it wasn't long before I could see that the tune-up on the T-4X function switch was going to eat my finals in nothing flat. What to do? HA! I removed the microphone jack and installed it on the back (along with another jack for RTTY and a No. 10 ground bolt). After some wiring changes, I could put the function switch in "tune" and nothing happened until I pressed and held the new SPST push-button switch in the old mic jack hole. I still have the original finals!

The R-4 didn't miss out either. It got the same headphone treatment as the Hammarlund. The audio output tube was changed to a 6AQ5, so I rewired the filament string for that. An internal speaker was added, and I installed Millen spinner cranks on the frequency tuning knobs. (The rest of the knobs were cool and stayed.)

Next, 2 meter FM arrived in the area, and boy, was there a lot of modifying to be done on that stuff, as we were getting commercial gear such as the Motorola T33GGV, GE Progress Line, and 24 volt DC government-surplus rigs with sub-miniature tubes. Then 2 meter rigs appeared from WRL, Regency, Genave, and others. I got a Genave GTX-200. It wasn't long before I added heat-sink fins on the back, and toggle switches replaced the slide switches. Then I needed a DTMF mic, so I built a Heath Micoder with the Genave mic cartridge inside and put a big 4-pin Amphenol mic connector on the side of the GTX-200. There was no provision for an external speaker, so I mounted a three-circuit (now called stereo) jack in the back with audio and PTT available, then modified the car radio so keying the Genave muted the car radio. It worked great!

Time passed and the Drake TR-7 line was on closeout, so I purchased a TR-7A, the matching PS-7 power supply, the R-7A, the board extension kit, *and* all the service manuals. Right away the mic control was a problem. It was just barely off the minimum stop for adequate modulation, so I pulled the transmitter exciter board, cut a trace, and installed a 10K resistor in series with the mic gain wiper, after which it adjusted very nicely. The TR-7A was also scheduled for the PIN-diode switching system (slightly modified, of course), extra filters, diode-switched preamp, and a few other goodies. There was a mod list for the R-7A as well.

This malady for modification continued, even at work in electronics for 37 years. I must admit, even strategic plans couldn't cure me. I am simply a mods addict! I look around and I don't think I have anything—transceivers, receivers, RF amps, antenna tuners, TNCs, test equipment, stereo set, tape recorders, drills, house (extensive)—that I haven't laid hands on and . . . Wait! The refrigerator—no mods! I apologize, fellas, for the holes, wiring changes, etc., but it always seems I have an "improvement" up my sleeve, and now that I'm retired, I'm having fun, fun, fun! The newer stuff is harder to tinker with, but I manage to get in a few licks from time to time. Maybe, then, the callsign I have is the proper one for me. I've had it for almost 50 years, and the phonetics are just right: **K**ilo **Z**ero **G**reat **R**adio **M**odifier! Want to hear what I've come up with for a Collins 51J4 with no mechanical filters?

*111 W. Arikara Avenue, Bismarck, ND 58501

†*A Conditional license was the equivalent of a General, with the exam given by volunteers (before the days of Volunteer Examiners) to an amateur who lived more than a certain distance from the nearest FCC office. It was discontinued when the Volunteer Examiner program was started.—ed.*

Jupiter + Studio One

800-833-7373
www.tentec.com

$1189

MADE IN USA

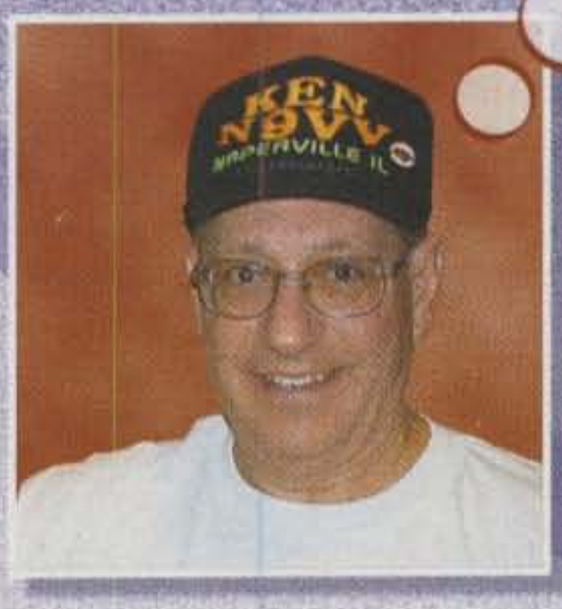
$129.95*

Thousands of Jupiter owners already know that they have the best priced, best sounding HF rig available today.

The best just got even better with the new STUDIO ONE microphone, manufactured to exacting standards for Ten-Tec by Heil Sound. STUDIO ONE features a brand new exclusive Heil element, sleek black casing, and is only available direct from Ten-Tec. Let's have audio guru Bob Heil tell it in his own words:

"This new STUDIO ONE microphone definitely has smoother sound over the Heil GOLDLINE element."

On-air results have been nothing but spectacular. While designed specifically for superior audio response from the Jupiter and the upcoming Orion HF transceiver, STUDIO ONE is also suitable for other HF transceiver brands. Visit our web site at www.tentec.com or call (800) 833-7373 for more info.



Illinois ham N9VV knows it's no dream. He sounds great with STUDIO ONE and his Jupiter!

Other Jupiter Accessories

Model 307C External Speaker $98.00

302J Remote Encoder/Keypad $139.00

705 Desk Microphone $99.95

963 Switching Power Supply $169.00

Also available: 701 Hand Mic ($28) and 538AT Internal Automatic Antenna Tuner (299) (not shown)

TEN-TEC
1185 Dolly Parton Parkway
Sevierville, TN 37862
Sales Dept: 800-833-7373
Sales Dept: sales@tentec.com
Monday - Friday 8:00 - 5:30 EST
We accept VISA, Mastercard, Discover, and American Express

Office: (865) 453-7172 • FAX: (865) 428-4483
Repair Dept.: (865) 428-0364 (8 - 5 EST)

*Connecting cable and table stand additional.
S&H cost for Jupiter in 48 states is $16. With Power Supply, $21.

In 2001 CQ sponsored a one-time, full-year operating award to welcome the new millennium. Here's our wrap-up report.

Wrap-up:

The CQ Millennium Award

BY RICH MOSESON,* W2VU

The idea behind the CQ Millennium Award goes back to 1947 and the CQ DX Marathon, a year-long activity designed to encourage DXing as most of the world was finally getting back on the air after the virtually worldwide shut-down of amateur radio during World War II. The CQ World-Wide DX Contest grew out of the 1947 DX Marathon, and from it, all of our other contests and operating awards.[1]

One element of the original DX Marathon has been lost over the years, however, and that is the full-year timeframe. Our contests pack their activity into a few weekends each year, and our awards are open-ended; if it takes 30 years to make the necessary contacts and collect the QSLs, then it takes 30 years. When we started planning our Millennium Award, we wanted something a little different—an activity with a beginning and an end, but not the pressure of a 48-hour weekend contest. So we went back to the original concept of the DX Marathon and settled on a full year in which to qualify for the award.

The CQ Millennium Award

For those of you who missed the original award announcement (or forgot the details), amateurs or short-wave listeners could qualify for the CQ Millennium Award by meeting the basic requirements (minus QSL cards) for any one of our regular operating awards during calendar year 2001—the *real* first year of the 21st century/third millennium. In other words, if you could work or monitor 100 countries (CQ DX Award), 40 zones (WAZ Award), 300/400 prefixes (single-mode/mixed-mode WPX Award), or 500 US counties (USA-CA Award) between 0000 UTC January 1, 2001, and 2359 UTC December 31, 2001, you were in.

The Envelopes, Please

We figured it would be at least a month before the first applications arrived. We were wrong. The first completed application, from Don Christensen, W8WOJ, landed on my desk before the second week in January was out, postmarked January 8th. Don had worked the required 100 countries for the DX portion of the award in just eight days! Overall, we had six applications mailed in January, including the first two of four separate filings by John Miller, WA2MUA. John eventually ended up qualifying for all four award segments, but did it six different ways, working the DX and WPX Award contacts on *both* SSB and CW, along with mixed-mode efforts for USA-CA and WAZ. Wow!

John was one of 24 applicants from six countries who qualified for all four award segments, out of a total of 178 valid applications from hams and SWLs in 25 countries. The top five countries were the US, Canada, Japan, Germany, and Belgium. The DX Award segment was the most popular, with 158 applicants, followed by WPX (68), WAZ (44), and USA-CA (30). This adds up to more than 178, because about one-third of the applicants qualified for multiple endorsements. The first ham to qualify for all four segments was Lou Hodges, W9IL, on March 12th. The first SWL to meet the requirements for all four endorsements was Dave Glow of Townsend, Massachusetts, just a few days later. Actually, Dave took longer to compile his logs than to monitor the required numbers of stations. He finished *that* task in just three weeks, logging his 500th county on January 21st.

The first DX station to qualify for all four award components was June Sim, VK4SJ, of Queensland, Australia, who finished on April 16th. June reports, "I spent a lot of hours in the shack, 'glued' to my rig, to get all four parts and jumped for joy when I got the last zone."

Highlights

First of all, being on the receiving end of the logs gave me a much greater appreciation for the tremendous amount of work put in by our volunteer award managers, month after month, year after year. Here, I was dealing with fewer than 200 total applications over the course of 15 months and I still had trouble keeping current. In fact, I often fell behind (as any award recipient will tell you) and am at least six months late with this report. My apologies to all who had to wait, and

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

MFJ *Speech Intelligibility* Enhancer

. . . makes barely understandable speech highly understandable!

MFJ-616
$169.95

"What did you say?" Can you hear but . . . just can't always understand everything people are saying?

As we get older, high frequency hearing loss reduces our ability to understand speech. Here's why . . .

Research shows that nearly *half* the speech intelligibility is contained in 1000 to 4000 Hz range, but contains a miniscule 4% of total speech energy.

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.

Second, drastically reduce speech energy below 500 Hz where only 4% of speech intelligibility lies.

The MFJ-616 splits the audio speech band into four overlapping octave ranges centered at 300, 600, 1200 and 2400 Hz. You can boost or cut each range by nearly 20 dB.

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.

MFJ-1316, $19.95. For 110 VAC operation. Provides 12 VDC/1.5 Amps.

MFJ-72, $58.80. *All-in-one MFJ-616 Accessory Pack.* Includes MFJ-392 headphones, two MFJ-281 speakers and MFJ-1316 power supply. ***Save $7!***

Try it for 30 Days

Order from MFJ and try it -- No obligation. If not delighted, return it within 30 days for refund less shipping.

MFJ Contest Voice Keyer

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.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312D, $14.95. 6½x1½x6¼ in.

MFJ-1025, $159.95. Like MFJ-1026 less built-in active antenna, use external noise antenna.

MFJ *tunable* Super DSP filter

MFJ-784B
$249.95

Only MFJ gives you *tunable* and *programmable* "brick wall" DSP filters.

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

Only MFJ gives you 5 factory pre-set and 10 programmable pre-set filters you can customize. **Automatic** notch filter searches for and eliminates multiple heterodynes. Advanced adaptive noise reduction silences background noise and QRM.

Free MFJ Catalog
Visit: http://www.mfjenterprises.com or call toll-free 800-647-1800

• 1 Year *No Matter What*™ warranty • 30 day money back guarantee (less s/h) on orders direct from MFJ

MFJ ENTERPRISES, INC.
300 Industrial Pk Rd, Starkville, MS 39759 **PH:** (662) 323-5869
Tech Help: (662) 323-0549
FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

http://www.mfjenterprises.com for instruction manuals, catalog, info

Four-Star Winner Profiles

In our initial award announcement, we said we would provide special recognition to those participants who qualified in all four award categories. We are going to do that in two ways, first with a listing of their names and callsigns elsewhere in this article, and second, with brief profiles of the operators and their stories of chasing and catching the contacts they needed. We'll start this month with our mobile 4-star operator, Ace Jansen, N3AHA, of Leesburg, Virginia. —W2VU

Ace Jansen, N3AHA
Ace Mobile Operator

Here's my story about achieving the Millennium Award:

I think it was mid-February when I saw an announcement about the award in the 425 DX e-mail newsletter. When I first read about it, I thought, "Wouldn't it be a tremendous accomplishment if I could qualify for the Millennium Award by all four ways while operating mobile?" When I found the information on the *CQ* magazine website, it said "special recognition if you qualify on the basis of more than one award program's requirements, and particularly if you achieve the nearly impossible feat of "qualifying all four ways." Now I felt challenged and I was pretty confident no one else would try to accomplish this from the mobile.

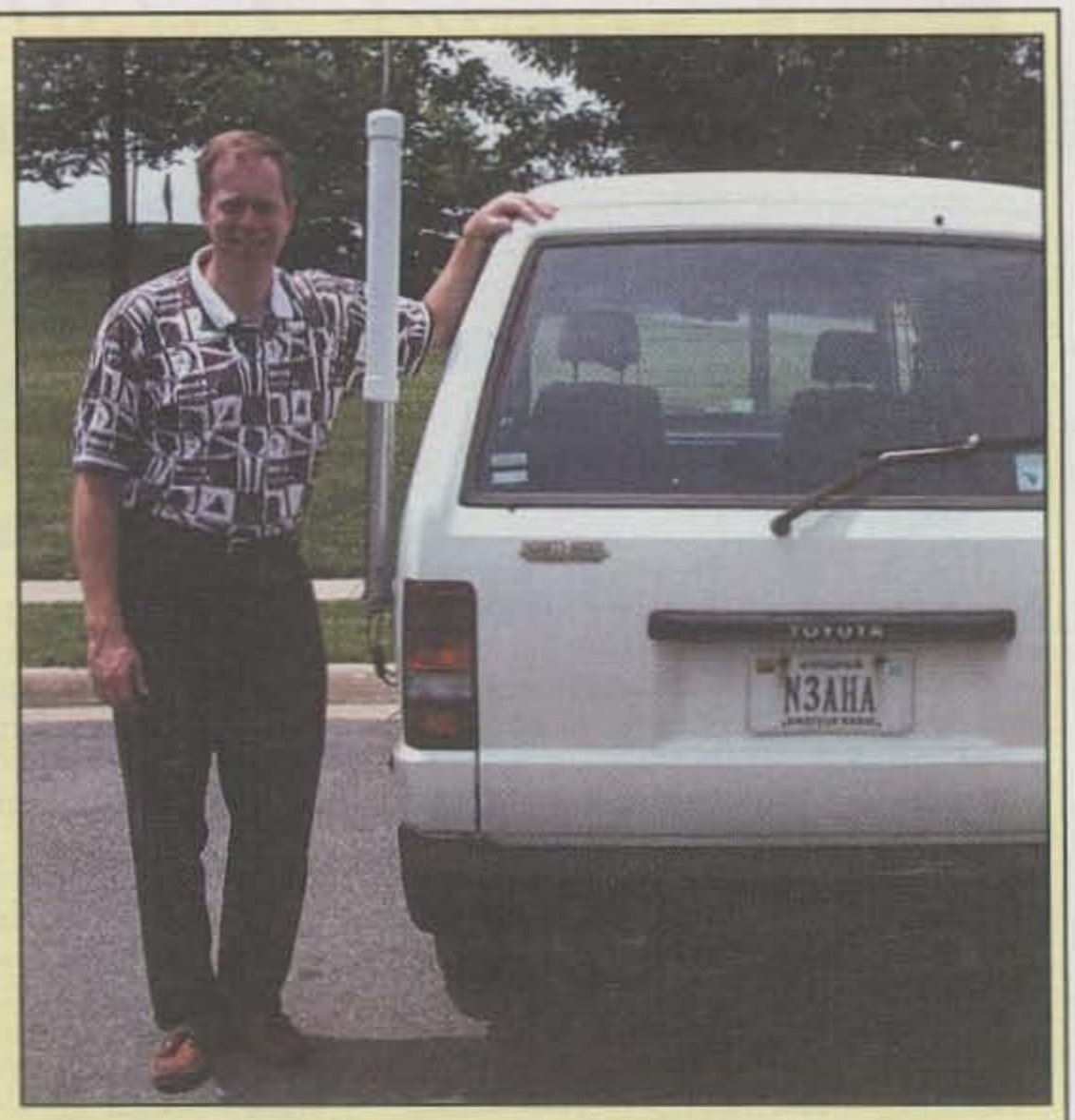
I have operated mobile for many years. My latest accomplishment was contacting all 3076 US counties (my second time) mobile-to-mobile. It took me 13 years to accomplish that feat. I had contacted 100 countries while operating mobile for the ARRL's Millennium award in 2000. Before hearing about *CQ*'s award, I had contacted D68C on seven bands while operating mobile. So I felt pretty confident with the county and DX parts of the award, but wasn't sure about WPX or WAZ. I was particularly concerned about contacting all 40 zones from the mobile. I determined early on that the most difficult zones from northern Virginia would be zones 22, 23, 24, 26, and 37. As it turned out, zones 22 and 24 were #38 and #39, but it was zone 27 that would be #40.

Here are the details of my mobile achievement:

USA-CA: I contacted 500 counties on 6 September. I continued to log 50 counties (10%) for margin. Of the 500 contacts, 254 (51%) were on CW.

CQ DX: I contacted 100 countries on 7 April. I continued to log all new countries. I had contacted 138 as of 11 December. Of the 100 country contacts, 73% were on CW.

WAZ: I contacted zone #40 on 25 November. I had contacted zone #37 on 24 May, and didn't get #38 and #39 until 31 August and 2 September. It took me almost three more months to finish WAZ. Of the 40 contacts, 29 (72%) were on CW.



Ace Jansen, N3AHA, posing next to his van, from which he made mobile contacts with over 500 US counties, more than 100 countries, over 400 prefixes, and all 40 CQ zones—about half on CW—during 2001 to qualify for all four components of the CQ Millennium Award. Congratulations, Ace!

WPX: I contacted 400 (mixed) prefixes on 31 July. I continued to log an additional 24 prefixes for margin. Of the 400 prefix contacts, 198 were on CW (50%).

I feel very good about the mobile achievement and that more than 50% of the contacts were on CW. All of the contacts were made in Virginia (most in northern Virginia) with a Yaesu FT-900 (100 watts) and a Nott Screwdriver antenna.

I've been a ham since 1978 (23 years) and I'm 38 years old. So far, I have contacted 275 DXCC countries while operating mobile. I've been writing a bi-monthly column on county hunting for *Worldradio* for the past 10 years. Thanks for the challenge!

73, Ace, N3AHA/mobile

my undying admiration for N4UF, K5RT, WN5N, and K1BV, who keep their award programs running smoothly despite having to keep track of a lot more paperwork.

The second highlight from my perspective was the extent to which so many of the participants "got into" the program—from people such as W8WOJ who finished up in barely a week to Ace Jansen, N3AHA, who qualified for all four award segments *while operating mobile*, and the several people, such as WA2MUA, who made all contacts for a particular endorsement using only SSB—and then went and *did it again* using CW! Many of the applicants completed their requirements using a single mode or a single band, and even though the rules never specified anything about mode endorsements, we added a note to that effect to certificates whenever it was requested or we could tell from the log that only one mode or band was used. Likewise, we noted all-QRP efforts when that was requested.

Finally, I was tremendously impressed by the lengths to which many hams, especially county hunters, were willing to go to help their fellow hams qualify for this award. Time after time, as I went through logs—again, especially those qualifying for the USA-CA portion—I saw the same callsigns over and over. Often they were mobile, suggesting that these people had gone out on special trips to remote locations just for the purpose of helping someone else collect another county for the Millennium Award and presumably, for the USA-CA Award as well. Thanks, everyone. This is the true ham spirit in action.

The final certificates were mailed out in June 2002, less than three months after the deadline for submitting logs on March 31. Our thanks to all who participated and to all who helped them in their quest.

Note

1. CQ's current contests and awards include:

Contests: CQ World-Wide DX Contest, CQ World-Wide WPX Contest, CQ World-Wide 160 Meter Contest, CQ World-Wide VHF Contest, CQ/RJ World-Wide RTTY DX Contest, CQ/RJ World-Wide RTTY WPX Contest, CQ National Foxhunting Weekend.

Awards: CQ DX Awards, CQ Worked All Zones Awards, CQ WPX Awards, USA-CA Award.

CQ Millennium Award 4-Star Winners

The following 24 people—listed in the order in which their logs were received at *CQ*—qualified for all four categories of the CQ Millennium Award, contacting or monitoring at least 100 countries, 300 prefixes, 40 zones, and 500 US counties:

Call	Name	QTH	Date
W9IL	Louis Hodges	IL USA	3-12-01
SWL	Dave Glow	MA USA	1-21-01 (log submitted 3-17)
W4VQ	Robert Beatty, III	FL USA	3-19-01
K4XI	Kermit Gay	FL USA	3-20-01
WA2MUA	John Miller	NY USA	3-27-01
N4MM	John Kanode	VA USA	3-30-01
W4HR	Bob Hudson	SC USA	2-10-01 (log sent 4-5)
VK4SJ	June Sim	Australia	4-16-01
LU2NI	Carlos Ribas	Argentina	5-21-01
W4YDY	David Langley	NC USA	5-26-01
K7INA	Russell Fish	WA USA	5-26-01
K8MW	Richard Larsen	MI USA	7-28-01
AD1C	James Reisert	MA USA	9-8-01
W1TW	Joseph Agins	MA USA	10-21-01
YBØDNK	William Tanujaya	Indonesia	10-26-01
K7ZA	Jon Zabel	WA USA	10-28-01
WA3GNW	Bruce Gibson	SC USA	11-11-01
N3AHA/Mobile	Ace Jansen	VA USA	11-25-01
W4GP	Mark Behrens	VA USA	12-1-01
G3LZQ	John Dunnington	UK	12-16-01
NØYYO	Donald Unruh	KS USA	12-15-01
SWL	Steve Carter	BC Canada	12-17-01
WA5VGI	William McFarlen	CA USA	12-25-01
AI6Z	Richard Thompson	CA USA	Unclear (log sent 3-24-02)

Three-Category Winners

The following 13 people, listed alphabetically by callsign, qualified for three of the four categories of the CQ Millennium Award. Congratulations on your achievements as well!

Call	Name	QTH	Categories Achieved
GW3JSV	Derek A. S. Holmes	Wales	CQDX, WPX, WAZ
K9UQN	Don Backys	IL USA	CQDX, WPX (All CW & All SSB), WAZ
KC2AFK	David Ruth	NY USA	CQDX (CW/QRP), WPX (QRP), USA-CA
KC8HWV	Lorraine Peerenboom	OH USA	CQDX, WPX, USA-CA
LZ1CY	Angel Gugov	Bulgaria	CQDX, WPX, WAZ
N4OT	Andy Harris	VA USA	CQDX (CW), WPX (CW), WAZ (CW)
VE3CFK	Chet Latawiec	ON Canada	CQDX, WPX (All SSB), WAZ (All SSB)
VE6ZT	Don Carlgren	AB Canada	CQDX (All CW & All SSB), WPX (All CW & All SSB), WAZ
9A4KA	Mladen Katic	Croatia	CQDX, WPX, WAZ
SWLs:			
DEØGFM	Gunter Franke	Germany	CQDX (All CW), WPX (All CW), USA-CA (All CW)
DEØTMD	Thomas Mlotzek	Germany	CQDX (All CW), WPX (All CW), WAZ
WO-20276	Gary Szucs	MI USA	CQDX, WPX, WAZ

mobiling

BY JEFF REINHARDT,* AA6JR

Ham Radio in the Fast Lane

Shortly after radio was invented, experimenters began developing mobile operations. What could be more natural? Maritime applications were the first widespread use of "mobiles," wheeled vehicles next, and then aircraft. Taking radio to where it was needed and the prospect of operating while "on the road" posed significant challenges to the mobileers of nearly a century ago. We've come a long way, baby. From radio-dispatched police cruisers (They still call all police cruisers "radio cars" in southern California.) through wartime uses and the dispatch of taxis, mobile operations have proven their worth beyond any doubt.

Ham radio was at the forefront of mobile development, and the establishment of repeaters was another major advancement that added utility. We now take mobile operations for granted, as something easily done with a 2 meter FM rig or one of the newer HF+VHF+UHF mobile units that make mobile ops basically "plug and play."

Mobile operations serve another purpose: With many residential areas now subject to deed restrictions that prohibit amateur radio antennas, going mobile provides many hams with their only opportunity to enjoy the hobby. Your "shack on wheels" circumvents restrictions and opens a world of adventure in radio.

Photo 1– N6CDJ of Burbank, California did this neat installation of a Kenwood tri-band in a Ford Explorer. The control head is just below the heater controls, and the microphone stores in the center console.

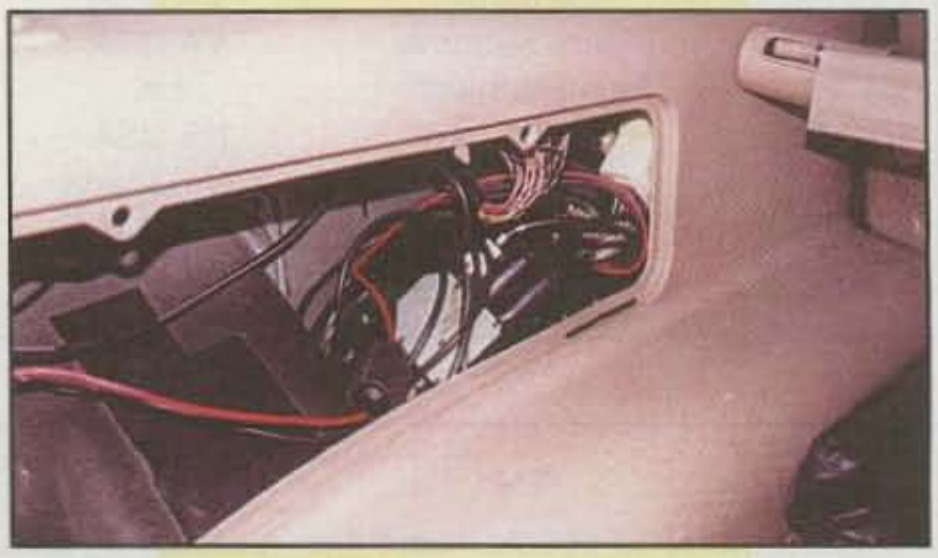


Photo 2– N6CDJ "buried" the transceiver and antenna triplexer in the left rear fender well of his SUV. Radio is securely mounted with air circulation clearance for the fan.

Good Mobile Practice

Nevertheless, mobile operations are not without their challenges. A good mobile installation is one that is convenient to the operator, technically well done, achieves the purpose of communicating while mobile, and is safe, both electrically and mechanically. Recently there has developed another challenge to the prospective mobile operator, and that is the legality of the practice. This column will explore many different aspects of mobile operations and you can help!

Today's cars are more fuel efficient, space efficient, and safer than ever. Those advancements come at a price for hobbyists. Gone are the days of "shade-tree mechanics," "souping up" your car's performance, or doing much of anything under the hood. The "tinker friendly" cars of the last generation have given way to computer-managed fuel-injection and ignition systems and a plethora of obstacles to the "do it yourselfer," and that includes installing radios. We now must contend with airbag systems in the steering wheel, dash, and in many cars, the side doors. Computer systems control the car's engine, automatic transmission, and other sub-systems, including increasingly complex in-car entertainment units. Your vehicle may already be transmitting data if it has On-Star® or some similar communications system. Most vehicles already receive broadcast AM and FM. A growing number also receive GPS, TV, and satellite entertainment.

Where Do I Put It?

Then there's the challenge of where to locate a transceiver. Most new cars have no under-dash space. Mounting one of the remotable-head mobiles is one potential solution, but even they are difficult to place in mini-vans, SUVs, and hatchbacks. Today's cars call for ingenuity, planning, and care. There's one other element we all need to be mindful of: Cars are now more expensive than ever. There's less room for error, and when problems occur, mistakes can be costly! Drilling a hole through a firewall can penetrate a computer or possibly set off airbags. Doing your homework is a must.

A Mutual "How To" Clinic

Together we will explore mobile operations in the 21st century. I welcome your photos, tips, and dia-

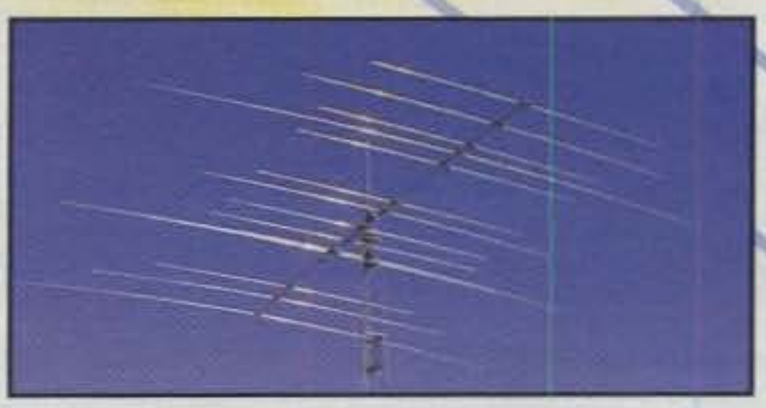
*904 Lake Lindero Drive, Agoura Hills, CA 91301
e-mail: <aa6jr@cq-amateur-radio.com>

Step up to the performance leader.
...Step up to Force 12

4 World Records In One Weekend 2001 CQWW CW!

HF and VHF Antennas and Towers
High Performance Yagis and Verticals

The XR-5©
20-17-15-12-10 mtrs, one feed line
10 full size elements, full coverage
no traps, no log cells
18' boom, 100 mph
54 pounds, 8.5 sqft



The Gold Standard of Tribanders
C-31XR
20-15-10 mtrs for those who want the best.
31' Boom, 100 mph, 5KW

C-19XR
Dollar for dollar the best buy in a
20-15-10 mtr tribander.
19' Boom, 100 mph, 5KW

Sigma-5©
20-17-15-12-10 mtrs, no radials
no tools, 9' tall + base, 7 lbs, 2' pieces
1200w PEP, pre-tuned, >91% efficient
(optional X-base)

C-3SS
World's Most Popular
Non-trapped
20-10 mtr Yagi, 12' boom
100 mph, 30 pounds, 5KW

Check our website for the NEW Sigma-40XK

Sigma-SV5©
CC&R Friendly© falling within the OTARD Rule
20-17-15-12-10 mtrs
no radials, 11'11" tall including 4' base.
12 lbs, 4' sections.
Can receive local TV broadcast and has cosmetic TV elements for concerned neighbors
1200w PEP, pre-tuned
>91% efficient
(optional X-base)

Sigma-80©
36' true vertical
dipole, no radials

Sigma-40©
24' true vertical
dipole, no radials

Force 12 ➔ Anything Else is Just an Antenna!

Complete line HF and VHF Antennas, Amateur and Commercial, Aluminum Manual and Hydraulic Towers
Available direct, through Texas Towers, Antennas Plus, Ham Radio Outlet and Dealers Worldwide

For FREE brochure - down-loadable, viewed on line, product info, tech tips: Debugging an Antenna, Antenna Specs, DXpeditions, Customer's Antennas, Antenna Tests and Tuning and more: www.force12inc.com
E-mail to: force12e@lightlink.com Join the Force 12 Reflector – see the web site for details

Force 12, Inc. PO Box 1349 Paso Robles, CA 93447
Order Line 1.800.248.1985 Tech Line 1.805.227.1680 FAX 1.805.227.1684

Photo 3– KC1NA works HF from his big rig all across the U.S. Listen for Bob on 14.336 MHz or on 40 and 80 meter WAS nets.

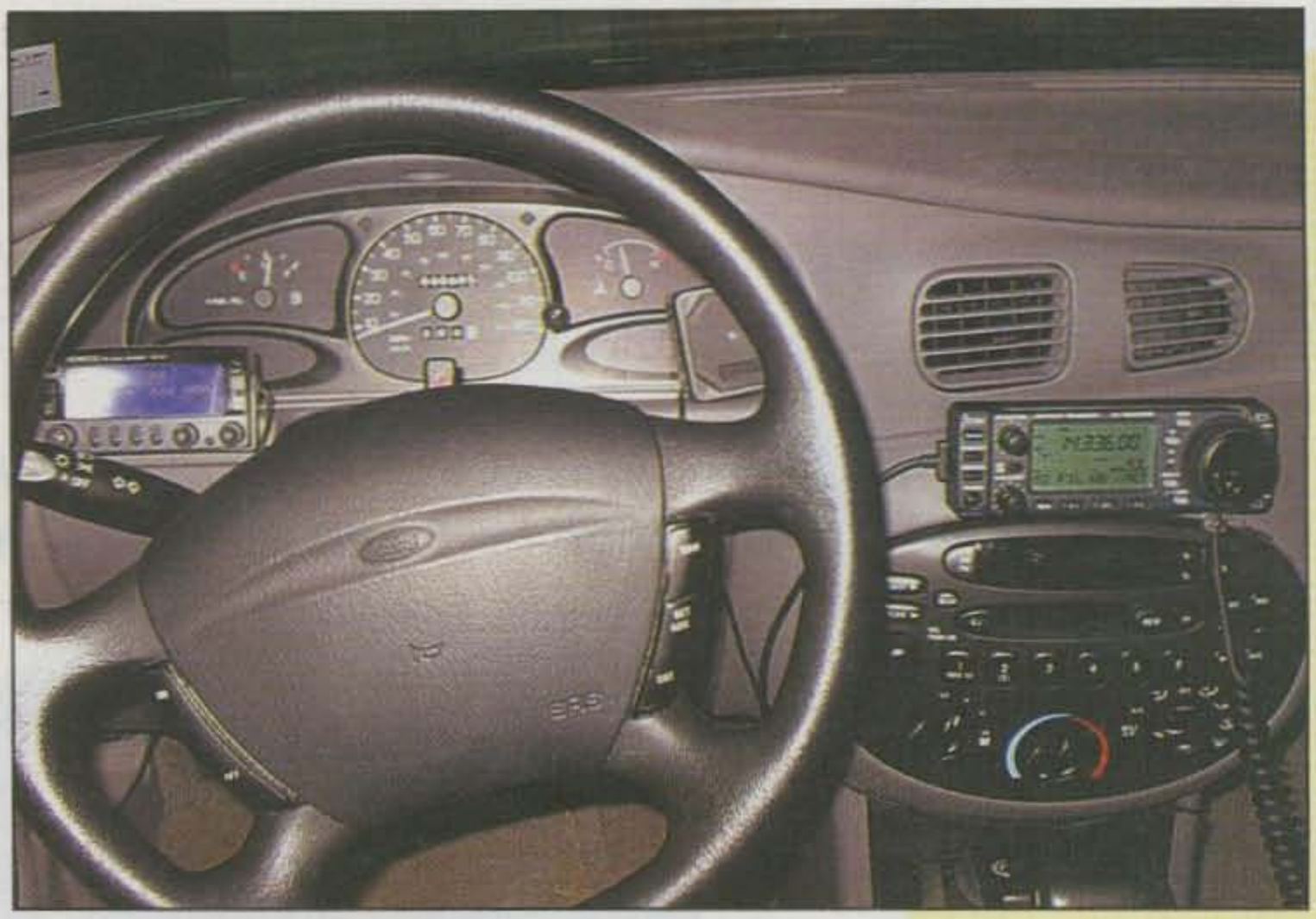


Photo 4– W4YDY shows that small cars and HF can get along! The control head of his ICOM is at his fingertips.

Photo 5– The W4YDY antenna system is small but effective.

grams that show others "how you did it." In future installments we will share some pointers from the "pros" on how to do a good mobile installation that enhances your enjoyment of driving and ham radio. We also can pass along developments in the automotive field, such as "memory seat" sensors that preclude using the underseat area for radio mounting or the proposed 42 volt electrical systems manufacturers are exploring. They are also looking at "drive by wire" systems that will eliminate mechanical steering linkage, and we've already seen multiplex systems used in cars where one wire operates various accessories, each of which has a unique "address." How will ham radio co-exist with these developments?

The good news is you shouldn't be discouraged by all the obstacles, as there are thousands of hams successfully engaging in mobile operations each day. You can join these road warriors and participate in what I consider to be the best "talk show" in the world—ham radio. I'm given to understand every manufacturer has an RF section that tests cars under a variety of RF-exposure conditions. Some manufacturers have issued cautions against using transmitters above a certain power-output level. Cars cannot be susceptible to shutdown when driving by a radio or TV transmitter, microwave relay station, and the like. Police and fire vehicles and taxis require an accommodation of on-board transceivers over a wide range of frequencies. Also, a "drive by wire system" cannot be prone to anomalies when exposed to a transmitter. I don't want to begin to think of the potential consequences. I'll also ask for guidance from the major auto manufacturers on installing and using radios. We'll be sure to pass along their tips in future columns.

Legal Obstacles?

Pioneered by New York, several states are considering the prohibition of handheld cell-phone operation by drivers. Harvard University recently published a study citing cell phones as a significant contributing factor in accidents. So far, the cell phone industry has kept several states from adopting laws similar to New York's, but the handwriting is on the wall *(New York's law applies only to wireless telephones, specifically defined as "the device used by subscribers and other users of wireless telephone service to access such service."—ed.)*.

Even if phone operation is legal, it's probably not long before your use of a cell phone, or mobile radio, could be a rating factor for liability insurance. We may have to make an overt effort to keep ham radio distinctly omitted from legislation that limits the use of mobile communications devices. Nevertheless, safety while operating your vehicle must always come first.

A Role for Radio Manufacturers

It also may be time for transceiver designers to rethink mobile operations. In another column I "brainstormed" (okay, advocated) that radio manufacturers start thinking about integrating their products into modern vehicle design, specifically with DIN-size units that also contain AM-FM reception and perhaps even a CD player. Such a design could solve the "where to put it" problem while maintaining peace with the non-ham members of the family. Such a transceiver would be the ultimate "plug and play" solution, ensuring ham radio a place in the many cars that support DIN units.

Connections

As mentioned, power-source connections are an increasing challenge, along with routing an antenna cable. Passing power cables to the battery is anything but easy. Some cars have taken to placing the battery under the rear seat or in the trunk. Getting fat wires through the firewall, away from hot engine components, is an ordeal calling for skill, ingenuity, and patience.

Antennas are another challenge, but there are many possible solutions, from "drilling the hole" to trunk lid and hatch mounts, magnetic mounts, and through-the-glass options. However, nearly every vehicle has a "quirk" to consider, such as fiberglass, aluminum, or composite body panels, or perhaps metallic components in glass (used for shading) that block RF. Again, you are encouraged to share your experiences and solutions to these problems.

On the Air

Ahhhhh, the reward for an installation well done. While others are listening to the same AM talk radio prattle from one end of the dial to the other, you might enjoy a QSO with a ham across town or across the ocean. I had a most enjoyable 20 meter chat with a Japanese station while driving north through California's Central Valley one evening. It was a great QSO, and he couldn't believe I was mobile. As I arrived at a club meeting one night, I eavesdropped on a friend concluding his conversation with an Australian; both were using only 10 watts! Getting mobile requires a little work up front for a lot of reward when the task is done. So let's get going with those mobiles and be sure to share your success stories!

How You Can Help

Please share your tips with me by sending e-mails to: <aa6jr@cq-amateur-radio.com>. Be sure to send e-photos that are high resolution. Please include some text with your tips and we'll pass along the info. 73, Jeff, AA6JR

BY IRWIN MATH,* WA2NDM

A Dummy Load for Just Pennies

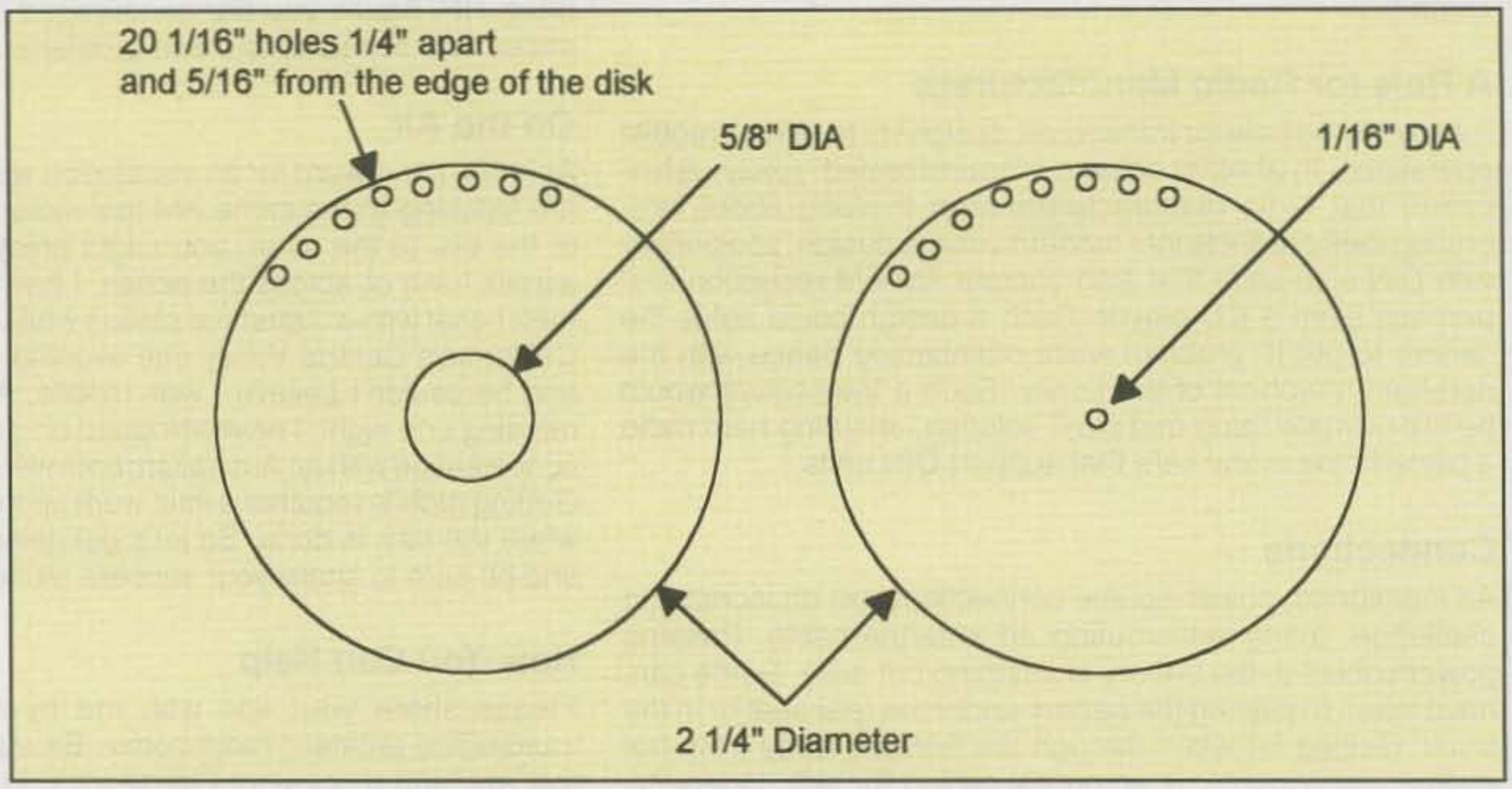


Fig. 1– Construction details for the two copper disks.

While cleaning up the lab (at the strong suggestion of my YL) we came across a bunch of 1K, 2 watt, 5% carbon resistors that we were saving (for I don't know how many years) to eventually build a dummy load. Well, it was either throw them out or finally build the thing. We chose the latter, and it worked so well that we are happy to pass the details on to you.

First start by cutting and drilling two disks of copper flashing (readily available from a local building supply yard) as shown in fig. 1. A pair of tin-snips is perfect for this job. Cut the disks carefully and be sure there are no sharp ends. When you are done, trim both so they are as close as possible in diameter to one another and so that they are indeed 2 1/4 inches across. Now drill or punch twenty 1/16 inch diameter holes 1/4 inch apart around each disk 5/16 inch from the edge. It helps to stack the two disks and hold them together with masking tape while you drill. It is important that the holes in both disks line up as closely as possible. Next punch a 5/8 inch hole in the exact center of one disk and drill a 1/16 inch hole in the center of the other disk. This completes the metal work.

Now obtain twenty 1K, 2 watt, 5% carbon resistors of the old Ohmite or Allen Bradley style. Place all resistors between the top and bottom disks so that you wind up with a sandwich (fig. 2). Be sure that the disks are resting directly on the top of the resistors. Lead length should be zero. Next, with a heavy soldering iron carefully solder all resistors between the two disks. When you are done, cut off all protruding leads. Using an ohmmeter, you should measure 50 ohms ± 5% between the two disks. If you do, congratulations; you have just made a 50 ohm, 40 watt, non-inductive resistor. If you use old resistors, be aware that although they may be marked 1K, age usually will cause their resistance to increase somewhat. The fact

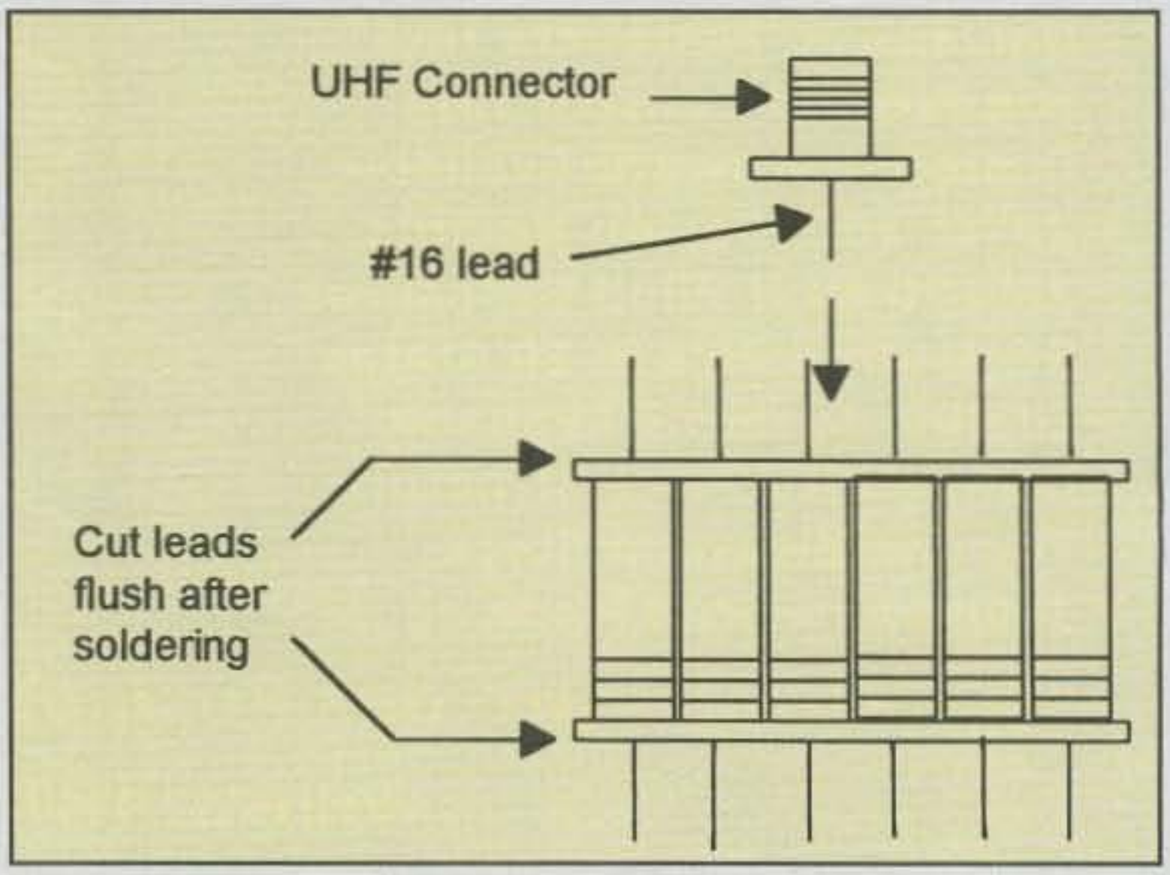


Fig. 2– Details of the resistor "sandwich."

*c/o CQ magazine

that you have 20 resistors will help, since the tolerances of some will be high and others will be low, so this may not be a major problem. Of three separate resistor assemblies that we were directly involved with, the final values were 50.5, 51, and 52 ohms, all well within the acceptable range for a dummy load.

Next obtain a UHF-style (SO-239) connector and solder a 6 inch length of #16 solid wire to the center pin. Rest the connector on the surface of the disk with the larger hole and thread the wire through the 1/16 inch hole in the other disk. Using a heavy soldering iron, carefully solder the body of the UHF connector to the top disk by heating around the rim, using plenty of rosin flux. Be careful not to melt the center insulator of the UHF connector. Finally, solder the #16 wire to the other disk and cut off the protruding lead. Once again, check that the assembly reads 50 ohms (or so) between the center conductor of the UHF connector and the shell.

The result of this effort is a 40 watt, non-inductive, 50 ohm resistor that will operate from DC into the VHF region. (It works at 6 meters with an SWR of less than 1.1:1, but I haven't tried it on 2 meters.) The resistor assembly will dissipate 40 watts continuously and can be used for brief tune-ups in the 100 to 150 watt range, although it will get hot quickly at these power levels. We use it to tune up a 150 watt SSB transceiver (in the CW mode for 30 seconds) with no additional cooling, and it works very well. In any event, make sure you put it on a heat-tolerant surface and keep it out of reach of little hands and/or paws. Although I have not tried it, you might be able to immerse the entire package in a container of non-conductive mineral oil for higher power dissipation. If you do try this, *be careful,* as hot oil on your skin really hurts! As an option, you can obtain a UHF "T" connector, connect it to the dummy load, and connect the free connector to your oscilloscope through a resistive divider. The resistor range you use will depend on the level of RF voltage present across the load and the maximum attenuation of the scope's input attenuator. This arrangement will allow you to tune up your rig and directly observe the signal while you make the various adjustments.

Since the cost for all of this is really pennies, and the resulting dummy load is quite rugged and useful, it is a project well worth the effort.

73, Irwin, WA2NDM

Amateur Radio License Exams . . . and Exam Credit

BY FREDERICK O. MAIA,* W5YI

We get tons of questions concerning the various amateur radio license examinations, the changes that were made effective April 15, 2000, and particularly inquiries concerning examination credit towards a higher class license. Admittedly, it can be very confusing, especially the rules covering the Technician Class, because over the years there have been four different versions of the Technician Class license, each with different examination requirements, exam credit, and operating privileges. Basically, the examination credit conferred for holding this license depends on when you first held it and if you are currently licensed.

Your author has been on the Question Pool Committee (QPC) since its inception during the mid-1980s, and even I have had a difficult time keeping up with the Technician Class. It is the QPC that is responsible for developing and revising all of the test questions that are on the various amateur radio license examinations.

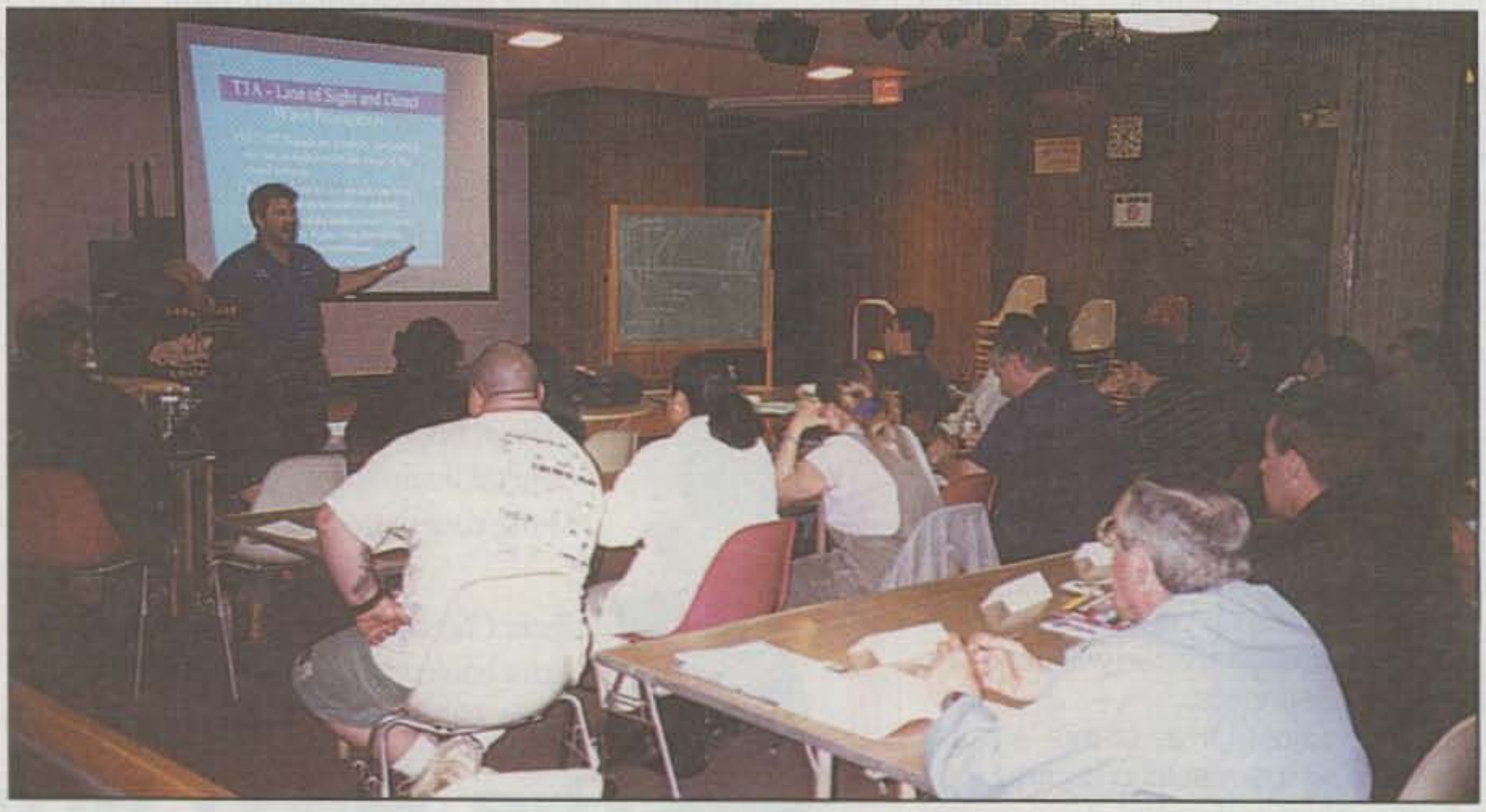
Without a doubt, the Technician operator license has received the most changes of any license in history. Prior to March 21, 1987 all Technician holders had to pass Element 3, which was the same written test given for the General Class license (along with the Element 1A five-word-per-minute Morse code exam). That changed with the FCC's "Novice Enhancement" proceeding in 1987, and Element 3 was split into two elements, with 3A becoming the Technician written exam and 3B the General exam. As a general rule, the Element 3 VHF/UHF questions went to Element 3A and the HF questions to 3B.

February 14, 1991 is another memorable day for the Technician license, as on that day passing a Morse code exam was no longer required for holding a Technician Class license. From that date on, any Technician license holder who had passed a Morse code exam automatically received all Novice Class HF (high frequency) privileges. Later the FCC made this an official license by issuing a Tech Plus license to those operators. The next (and most recent) change was on April 15, 2000, when the FCC dropped that special designation as part of its overall restructuring of amateur licensing. All of these changes have had an impact on the examination credit one receives.

Up until April 15, 2000 there were eight different license examinations (five written and three telegraphy) and six license classes—the most of any country in the world! On that date the FCC agreed to only continue with three new licenses: Technician—the VHF/UHF entry level; General—the HF entry level, and Extra—a technically-oriented senior license which could be obtained by passing only four examinations (see Table I).

Currently licensed Novice and Advanced Class operators would be "grandfathered"—that is, they

*National Volunteer Examiner Coordinator
P.O. Box 565101, Dallas, TX 75356-5101
(telephone 817-461-6443)
e-mail: <w5yi@cq-amateur-radio.com>



The Long Island (NY) Mobile Amateur Radio Club (LIMARC), among others, gives courses to prepare one for the various amateur radio license exams. Here George Tranos, N2GA, is shown teaching one subject area of the Technician class exam. (Photo via Diane Ortiz, K2DO)

would be allowed to renew and modify their licenses indefinitely, but no new Novice or Advanced Class licenses would be issued. The Technician Plus license was discontinued and simply replaced with a Technician license which also carried HF privileges if you passed a code exam.

At the request of the National Coference of VECs (Volunteer Examiner Coordinators), the FCC authorized the VECs' Question Pool Committee to determine the appropriate mix of written examination topics and individual question content that appear in the three (Element 2, 3, and 4) question pools. This means that the previously FCC-mandated ten topics in prior Section §97.503(c) have been eliminated and the QPC now has the authority to place the written examination emphasis where it believes appropriate (see Table II).

The new §97.503(c) Rules now specify only that the questions must relate to the privileges of the particular license class for which the exam is being taken. However, §97.523, which requires that "Each question pool must contain at least ten times the number of questions required for a single examination" still applies. The new Element 2 (Technician) and Element 3 (General) examinations each contain 35 questions (26 correct needed to pass); Element 4 (Extra) contains 50 questions (with a passing minimum of 37 correct).

Credit for Exams Previously Passed

You can find the FCC rules that cover amateur radio license examinations in Subpart "F" of the Part 97 Rules. Exam credit is covered in Section 97.505. As a general rule, they take into consideration previous exams already passed. All credit is conferred by the Volunteer Examiners (VEs) at a local examination session and cannot be obtained in any other way. VECs are not permitted to upgrade an amateur's license class without the application first being approved by three VEs.

Here is a complete rundown of the various examinations for which you may receive credit at a future test session, based on changes that took effect on April 15, 2000:

1. Currently licensed Novice operators and those with *expired* Novice licenses—even beyond the two-year grace period—receive credit for the telegraphy Element 1 (Morse code). In a nutshell, if you ever held a Novice ham ticket, you never have to take another code test again. You must, of course, provide the

License and Examination Changes

License Class	Prior to April 15, 2000	After April 15, 2000
Novice	Element 2	Eliminated
Technician	Element 2 & 3A	Element 2
Tech Plus	Element 1A, 2, & 3A	Eliminated
General	Element 1B, 2, 3A, & 3B	Element 1, 2, & 3
Advanced	Element 1B, 2, 3A, 3B, & 4A	Eliminated
Extra	Element 1C, 2, 3A, 3B, 4A, & 4B	Element 1, 2, 3, &4
Written elements (5):	2, 3A, 3B, 4A, & 4B	(3) Element 2, 3, & 4
Telegraphy Elements (3):	1A (5 wpm) 1B (13 wpm) 1C (20 wpm)	(1) Element 1 (5 wpm)

Table I– The number of new license classes and examinations has been drastically reduced. Prior to April 15, 2000 there were eight different license examinations (five written and three telegraphy) and six license classes. There are now only four exams and three new license classes—Technician, General, and Extra. Novice and Advanced Class radio amateurs may renew and modify their licenses indefinitely, but no new licenses are issued by the FCC. Tech Plus operators have their license renewed as Technician, but they retain the code credit.

VE team with some sort of evidence of having held a Novice ticket. A current or former Novice operator does not receive any written exam element credit towards a higher class license.

Because of the way the rules were written, General, Advanced, and Extra Class operators with expired licenses beyond the two-year grace period, and who never held a Novice or Technician Class license, do *not* receive credit for the code or any written exam.

2. A current FCC-licensed commercial radiotelegraph operator (or if the license expired less than 5 years ago) receives credit for the amateur code exam. No written examination credit is allowed, however, for holding any other commercial radio operator license, including the General Radiotelephone Operator license.

3. Currently licensed Technician Class operators (including those with expired licenses *within* the two-year grace period) receive credit for the Technician Class (Element 2) written exam when applying to upgrade to a higher class license.

4. Currently licensed Technician Class operators (including those with expired licenses *within* the two year grace period) who possess evidence of having passed a code test while a Novice or Technician receive credit for the Element 1 code *and* the Element 2 written exam. This evidence may be any expired Novice or "Technician Plus" license or, if a Technician, a Certificate of Successful Completion of Examination (CSCE) issued within the last 365 days.

5. A currently unlicensed (the key word is *unlicensed*) examinee who held

Technician Class Examination Topics

Subelement	Previous (Effective April 15, 2000)	New (Effective July 1, 2003)
1.	FCC Rules (9 Questions)	FCC Rules (5 Questions)
2.	Operating Procedures (5)	Methods of Communication (2)
3.	Radio Wave Propagation (3)	Radio Phenomena (2)
4.	Amateur Radio Practices (4)	Station Licensee Duties (3)
5.	Electrical Principles (3)	Control Operator Duties (3)
6.	Circuit Components (2)	Good Operating Practices (3)
7.	Practical Circuits (2)	Basic Communications Electronics (3)
8.	Signals and Emissions (2)	Good Engineering Practices (6)
9.	Antennas and Feedines (2)	Special Operations (2)
10.	RF Safety Practices (3)	Safety Practices (6)
Total Questions:	**35**	**35**

Table II– There has been a major change in the Technician Class syllabus (outline) and the number of questions asked from each topic. The new Technician Class question pool was released by the VEC's Question Pool Committee on December 1, 2002. It must be used in all Technician Class examinations administered on or after July 1, 2003. The new pool is available on the ARRL website at <http://www.arrl.org/arrlvec/pools.html>.

books calendars videos

video special!

~~$19.95~~ NOW ONLY **$12.95ea.**

Buy all 7 for your Club for only $69.95

Ham Radio Horizons: The Video .....*Order No. VHOR*
Getting Started in VHF .....*Order No. VVHF*
Getting Started in Ham Radio.....*Order No. VHR*
Getting Started in DXing .....*Order No. VDX*
Getting Started in Packet Radio.....*Order No. VPAC*
Getting Started in Amateur Satellites..*Order No. VSAT*
Getting Started in Contesting.....*Order No. VCON*

The Mobile DXer

by Dave Mangels, AC6WO

An in-depth look at Mobile DXing- includes its language; versatility; selecting and installing mobile HF radios; mobile HF antennas and tuners; tuning HF antennas; utilizing tools, tactics, and techniques; and more!

Order No. DXER ***$12.95***

Keys, Keys, Keys

by Dave Ingram, K4TWJ

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

Order No. KEYS ***$9.95***

33 Simple Weekend Projects

by Dave Ingram, K4TWJ

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

Order No. 33PROJ ~~$15.95~~

NOW ONLY ***$9.95***

The NEW Shortwave Propagation Handbook

by W3ASK, N4XX & K6GKU

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

Order No. SWP ***$19.95***

Ham Radio Magazine on CD

Brought to you by CQ & ARRL

Hot Item!

Here's what you've been waiting for! Enjoy quick and easy access to every issue of this popular magazine, broken down by years!

Three sets, each containing 4 CDs -

1968-1976 Order No. HRCD1 **$59.95**
1977-1983 Order No. HRCD2 **$59.95**
1984-1990 Order No. HRCD3 **$59.95**

Buy All 3 Sets and Save $29.90!

Order No. HRCD Set ***$149.95***

W6SAI HF Antenna Handbook

by Bill Orr, W6SAI

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

Order No. HFANT ***$19.95***

Building and Using Baluns and Ununs

by Jerry Sevick, W2FMI

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

Order No. BALUN ***$19.95***

2003/04 calendars

$10.95ea.

Fifteen month calendars
January 2003 through March 2004
(Specify Amateur Radio or Classic Keys)

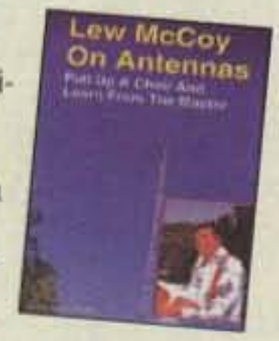
Classic Keys Calendar features 15 magnificent photos of some of the memory-jogging keys that so many of us treasure or used years ago!

Amateur Radio Calendar brings you 15 spectacular images of some of the biggest, most photogenic shacks, antennas, scenics and personalities.

McCoy on Antennas

by Lew McCoy, W1ICP

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



Order No.MCCOY ***$15.95***

The Vertical Antenna Handbook

by Paul Lee, N6PL

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

Order No. VAH

~~$9.95~~

NOW ONLY ***$6.95***

Visit Our Web Site www.cq-amateur-radio.com

Name _____ Callsign _____

Street Address _____

City _____ State _____ Zip _____

Qty	Item #	Description	Price	Total Price
U.S. and possessions - add $4 shipping/handling; $2 shipping/handling for single calendar. Foreign - shipping/handling charges are calculated by order weight & destination.			Shipping/Handling	
			Total	

Method of payment ☐ Check ☐ Money Order ☐ Visa ☐ MasterCard ☐ Discover ☐ American Express

Credit Card No. _____ **Expiration date** _____

CQ Communications Inc., 25 Newbridge Rd., Hicksville, NY 11801/516-681-2922; Fax 516-681-2926

Order Toll-Free 800-853-9797

a Technician Class license before March 21, 1987 receives credit for the code exam (Element 1) and the General Class (Element 3) written exam, but not the Technician Class (Element 2). This is because there is no requirement that the amateur be continuously licensed to obtain Element 1 and 3 exam credit. You must hold a current Technician Class license (or be within the two-year grace period), however, to receive credit for the Element 2 written exam. For example, an unlicensed person whose Technician Class license expired in 1986 need only take Element 2 to become a General Class operator.

6. A currently *unlicensed* Technician Class operator who held a Technician Class license between March 21, 1987 and February 14, 1991 receives credit only for the code exam (Element 1).

7. A currently *licensed* Technician Class operator who held a license prior to February 14, 1991 receives credit for the code exam (Element 1) and the Technician written exam (Element 2).

8. A currently licensed Technician Class operator (including those with an expired license within the two-year grace period) and who first held a Technician Class license prior to March 21, 1987 receives credit for the Element 1 (code), Element 2 (Technician written), and Element 3 (General written) exams and is immediately qualified for the General Class without further examination. You must present to a local VE team evidence of having first held your Technician license prior to March 21, 1987; the VE team will authorize your General Class ticket. All you will have to do is fill out a NCVEC Application form 605, which the VEs will have at their exam session. This evidence may be a copy of your old Technician Class license or a photocopy of a page from an old *Radio Amateur Callbook*. You may call the W5YI Group at (toll free) 1-800-669-9594 if you need help in obtaining the needed proof. (There is a $5.00 research fee.)

Another wrinkle to consider! The FCC rules specify February 14, 1991 (the date that the no-code license went into effect) and March 21, 1987 (when Element 3 was split into 3A and 3B) as the key dates on which exam credit is based. However, back then there was a considerable lag between when an examinee passed his/her exam and when the license was dated and issued by the FCC. For example, a person who passed the new "no code" Technician Class license on February 14, 1991—the first day it was available—did not have the application processed by the FCC until March 12, 1991. This means that all Technician Class licenses dated March 11 and earlier did indeed require passing a code test and receiving Element 1 credit.

The same holds true for the March 21, 1987 date. Most VE teams and VECs will authorize Element 1, 2, and 3 exam credit and a General Class license if your Technician Class license is dated on or before July 15, 1987.

9. A currently unlicensed Technician Class operator whose license expired more than two years ago and after February 14, 1991 receives no examination credit whatsoever.

10. A General or Advanced Class operator with a current license (or an expired license but within the grace period for renewal) receives examination credit for the Element 1 (code), 2 (Technician written), and 3 (General Class written) exams. This person only needs to pass Element 4 (Extra Class written exam) to upgrade.

11. Although Canadian-licensed amateurs may indefinitely operate their amateur radio equipment in the United States under their Canadian license, no examination credit is allowed for holding a Canadian license, or any other foreign amateur radio license for that matter (see Section 97.107[a]).

12. The comment that once you pass a 5 words-per-minute code test you will never have to pass another one is not necessarily true! A Certificate of Successful Completion of Examination (CSCE) for the telegraphy exam carries *permanent* HF operating authority, but gives you *examination credit* for only 365 days. If you are planning to upgrade to General, you must pass the written exam (Element 3) *within 365 days* or you will lose *examination credit* for your code test, even though you may operate indefinitely on the Technician HF bands with your Technician Class license and CSEC for code. If you wait longer than a year to upgrade, you will have to take the code test again.

Another thing to remember. A Tech Plus license yields code credit. A Technician Class license does not. Tech Plus operators who renew receive a Technician Class license. It therefore is important that you retain a copy of your old Tech Plus license or the original CSCE showing you passed the Morse code exam to validate the permanent code exam credit.

There you have it—all of the instances where examination credit is issued. Admittedly, it is very complex, and little wonder why even some VE teams are bewildered. 73, Fred, W5YI

A Cheap and Easy High-Speed Data Connection

BY DON ROTOLO,* N2IRZ

Welcome to the "Digital Connection"! In this new column my goal is to bring you a variety of topics related to radio, computers, and the internet, with an emphasis on practical how-to-do-it information. This is an expansion of my previous "Computers & Internet" column in *CQ*, adding radio into the mix. We've also upgraded from quarterly to semi-monthly, appearing in every even-numbered month.

In my opinion, there's nothing more exciting about amateur radio than trying new operating modes and methods. This column will introduce new tools and techniques, and sometimes re-examine old ones, to give you everything you need to get into something different. If there's some topic you'd like to see covered here, drop me a note and let me know.

Building a Fast Data Link

For this first column we'll be looking at some practical information on using modified commercial wireless networking gear for amateur radio. We've all been hearing about wireless networking equipment for creating a wireless Local Area Network (LAN) in your home. This uses a standard known as 802.11b. It should come as no surprise that adapting this equipment to amateur use is fairly easy, and it works well, too.

The advantage over traditional packet radio technology is huge. Not only can you get data rates in the megabits-per-second range, but the equipment is laughably inexpensive. This makes for some very inexpensive, high-performance links. The disadvantages include the extremely low transmitter power and the need for a computer of some kind.

*545 Baylor Avenue, River Vale, NJ 07675
e-mail: <n2irz@cq-amateur-radio.com>

Uncle Charlie and the Law

Before we get started, there's the small matter of FCC Rules & Regulations. 802.11b networking transceivers are sold with the understanding that the user shall not modify them in any way, including using any antenna not specifically designed for that equipment. Doing so invalidates their Part 15 type acceptance, making it illegal to use them. However, we will be operating our equipment under **Part 97** of the FCC rules, so using modified 802.11b transceivers appears to be legal, as long as all Part 97 rules are followed, including station identification, encryption, and others.

The bottom line here is, although I think the use of these modified devices is legal, I'm not a lawyer or legal expert. Since it will be *your* license on the line if anything is amiss, if you're uncomfortable with my interpretation, then I strongly advise you to seek an expert for an opinion *before* you start transmitting. *(But please don't ask the FCC to give you a ruling. Some questions are best left unasked—ed.)*

802.11b

The design goal was to create a radio-based data link to span a distance of about one-half mile, with data rates in the Megabit per second range. The RF path is essentially line of sight, but with some trees and buildings in the way. The idea was to gain enough experience in building this relatively

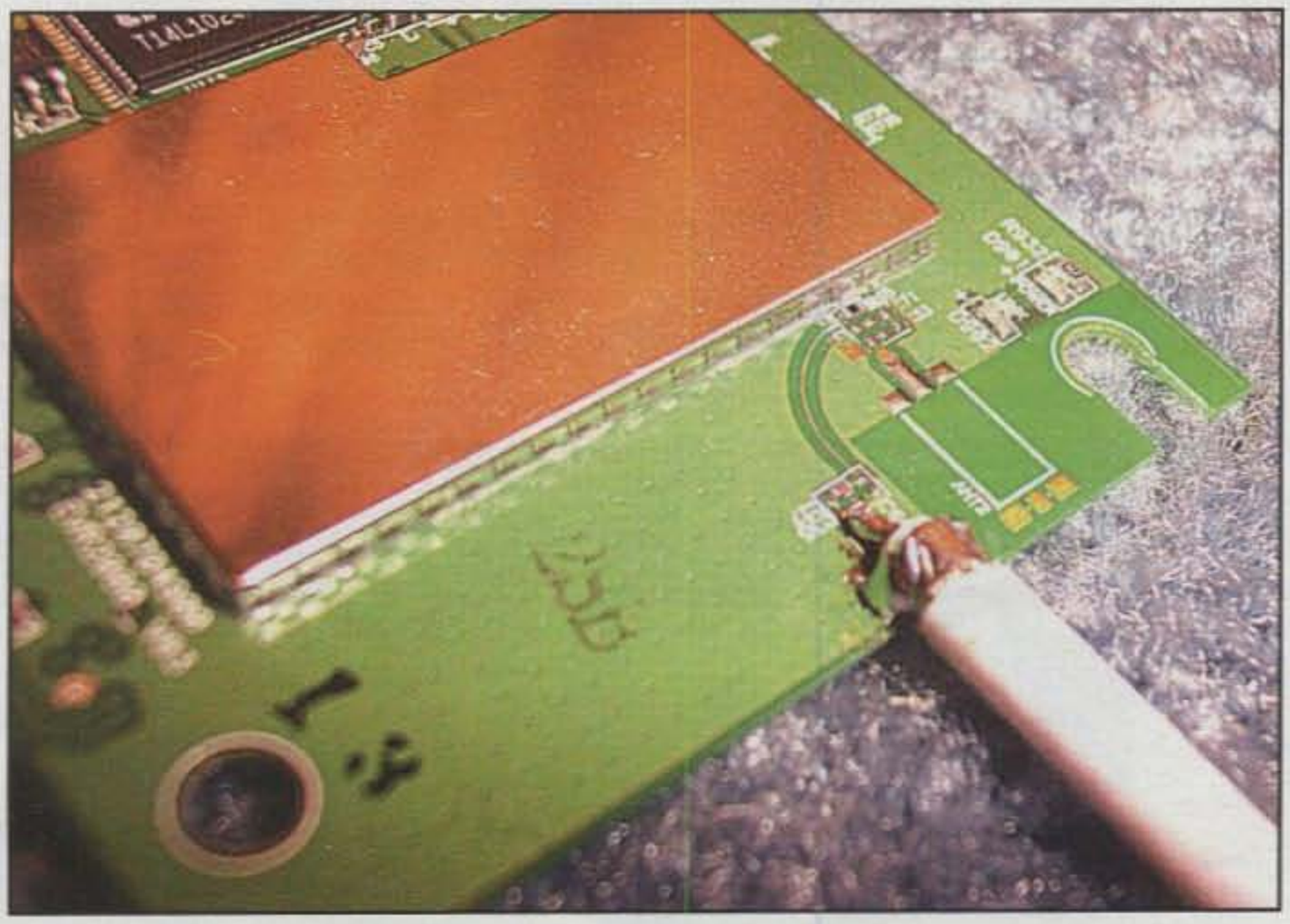


Fig. 1– A close-up view of the Linksys network card's antenna-connection point. Here you see the RG-58 cable that I soldered onto the board after unsoldering the original internal antenna connection.

short-hop link to be able to build longer links some time in the future using 802.11b networking gear. I learned a lot during this process, and that is what I will share with you here.

802.11b equipment is named after the IEEE standard describing the protocol and frequency standards for these 2.4 GHz wireless network adapters. You might see 802.11**a** equipment, which is for the 5.7 GHz band. Much like 802.11b, only some of the channels fall within the amateur 13 cm allocation. Note that a new standard is just about to enter the market, 802.11**g**, which uses the modulation techniques of 802.11a on the 2.4 GHz frequency band. For now, my advice is to stick with the 2.4 GHz 802.11b equipment; it's less expensive and a little easier to work with.

At first I was trying to accomplish all this without having to buy anything at all. For some reason that didn't work, so I went to Best Buy and bought the cheapest 802.11b networking card I could find. Instead of getting an internal card, I decided on a USB interface. I bought a Linksys Wireless USB Network Adapter, Model WUSB11, version 2.6, for about $90. Note that there are choices other than USB for the computer interface; just select the one which works best for you.

Configuration

Installation and configuration are simple. Just pop in the CD-ROM and install the software, then connect the adapter to the USB port, and in a few minutes you're nearly ready. For peer-to-peer networking (direct computer-to-computer communication), as opposed to a central hub or router, you should use the "Ad-Hoc" mode. If you use the "Infrastructure" mode, you must have a wireless hub or router at the other end, which might be an option for some sites. In this case, I wanted to communicate directly with another network card, so I went with the Ad-Hoc mode.

Next select a channel from 1 to 6 only, because only these lie entirely within the amateur 2.4 GHz band. Channels 7 and above have at least a portion outside the amateur allocation and should not be used under Part 97. Be sure to set the Encryption mode to Off or Disabled. Finally, set your station Identifier or SSID to your callsign, which I believe should be sufficient for FCC ID purposes.

My partner in all this was a neighbor who runs a medium-size communications technology company and has lots of toys, such as 802.11b-equipped laptops, to play with. He helped me test and debug our short-hop link.

After configuring both ends, we tried to establish a link with both computers in the same room. It worked perfectly the first time, and I was amazed at how easy it was. Informal testing showed that we had a range of only a hundred feet or so before the link quality (as shown by the configuration utility) started to degrade. Our next task was to get some high-gain antennas.

Antenna Connection

Before we discuss the antennas, we need to look at the modifications I had to make to the network adapter so I could connect an external antenna. Note that some 802.11b network adapters are equipped with connectors for an external antenna, but most—like the one I bought—are not. After ruminating on the topic for a few days, I worked up my courage and opened up my brand-new network adapter, breaking the "warranty void if broken" label in the process.

A single screw (in a recess under one of the rubber feet) and a few clips held the adapter together. I went slowly and carefully, using my trusty Swiss Army knife, and nothing broke in the process. The PC board came out easily, but the antenna was still encased in its housing. A few moments with the knife and some broken plastic later (it was glued), the antenna revealed itself as well. It turns out the antenna is a folded 1/2 wave, constructed from 1/32 inch FR4, and there's a 1/2-wave "ground plane" strip on the other side. For a sense of scale, the whole antenna board is 52 mm long.

Anyway, the best part was that the antenna was connected to the main board with a tiny piece of coax! I carefully unsoldered the coax from the board, making sure I didn't also desolder the very tiny SMT (surface mount technology) capacitor, about the size of a grain of salt. I connected a slightly longer length of Teflon® RG-58 coax (fig. 1) which terminated in a mini-UHF connector. I used a mini-UHF because it was handy, and I had the matching female end as well. I suppose there would be better choices for 2.4 GHz. Something small, such as an MCX, or even a BNC, would probably be better. Thus, with a careful touch of a soldering iron my Part 15 device was converted to Part 97 operation.

Antennas

Now let's talk about antennas. Based on our experiments, I guessed that I would need about 100 times the gain, which is 20 dB, to span a half mile. It was just a guess, not a calculation, and helped me limit my antenna search to ones with at least 10 dBi gain. (Two 10 dBi antennas—one at each end—provide a "system gain" of 20 dBi.) At least it was a place to start.

On the internet I searched Google for "802.11b antenna," and the first site that came up was the wireless networking site run by Greg Rehm, KD7RCG, at <http://www.turnpoint.net/wireless/index.html>. There are links to a few homebuilt 2.4 GHz antennas, one even designed by Greg himself. My favorites are the "Pringle's potato chip" Yagi and Greg's "Nalley Beef Stew" horn. I felt that either should provide the gain I was looking for, and the beef stew horn seemed to be the better of the two, both in terms of performance and ease of assembly. I also visited two commercial sites, Down East Microwave <http://www.downeastmicrowave.com/>, which sells a 17.5 dBi loop Yagi for $99 assembled, and Resources Unlimited <http://www.resunltd4u.com>, which has a 24 dBi parabolic grid for $129. Both sites sell other antennas as well.

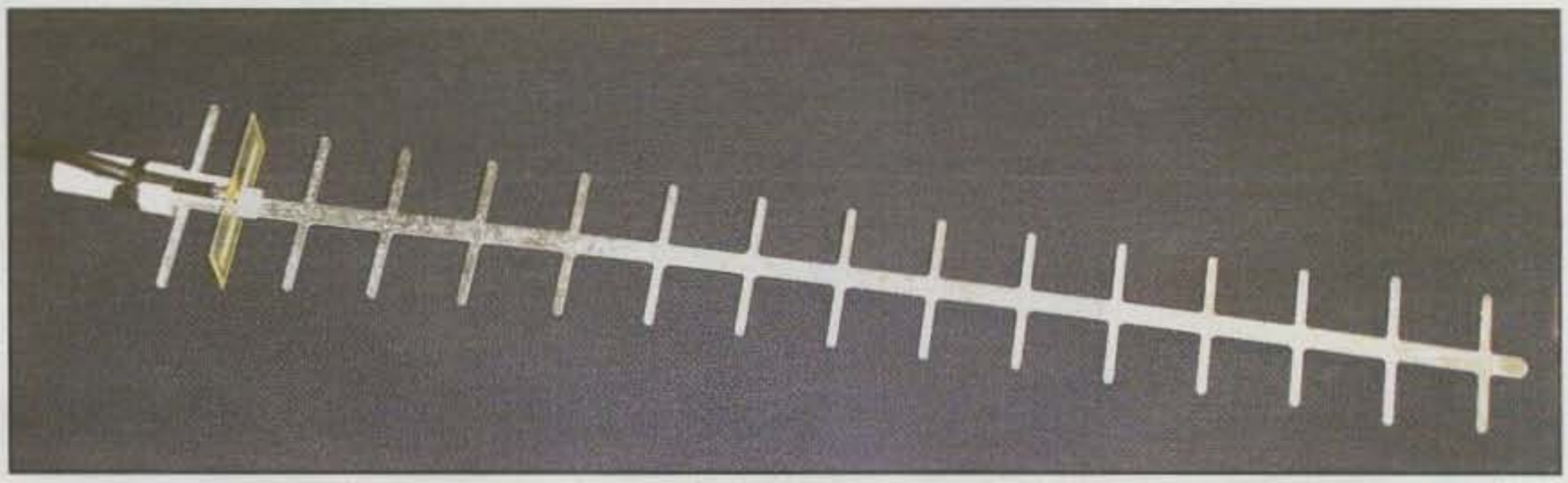


Fig. 2– The Aironet WLAN antenna. This is a simple 16-element Yagi with a PC-board driven element, sporting 13.5 dBi gain. It is stamped from a single piece of 1/16 inch aluminum sheet. Refer to the text and Table I for construction details.

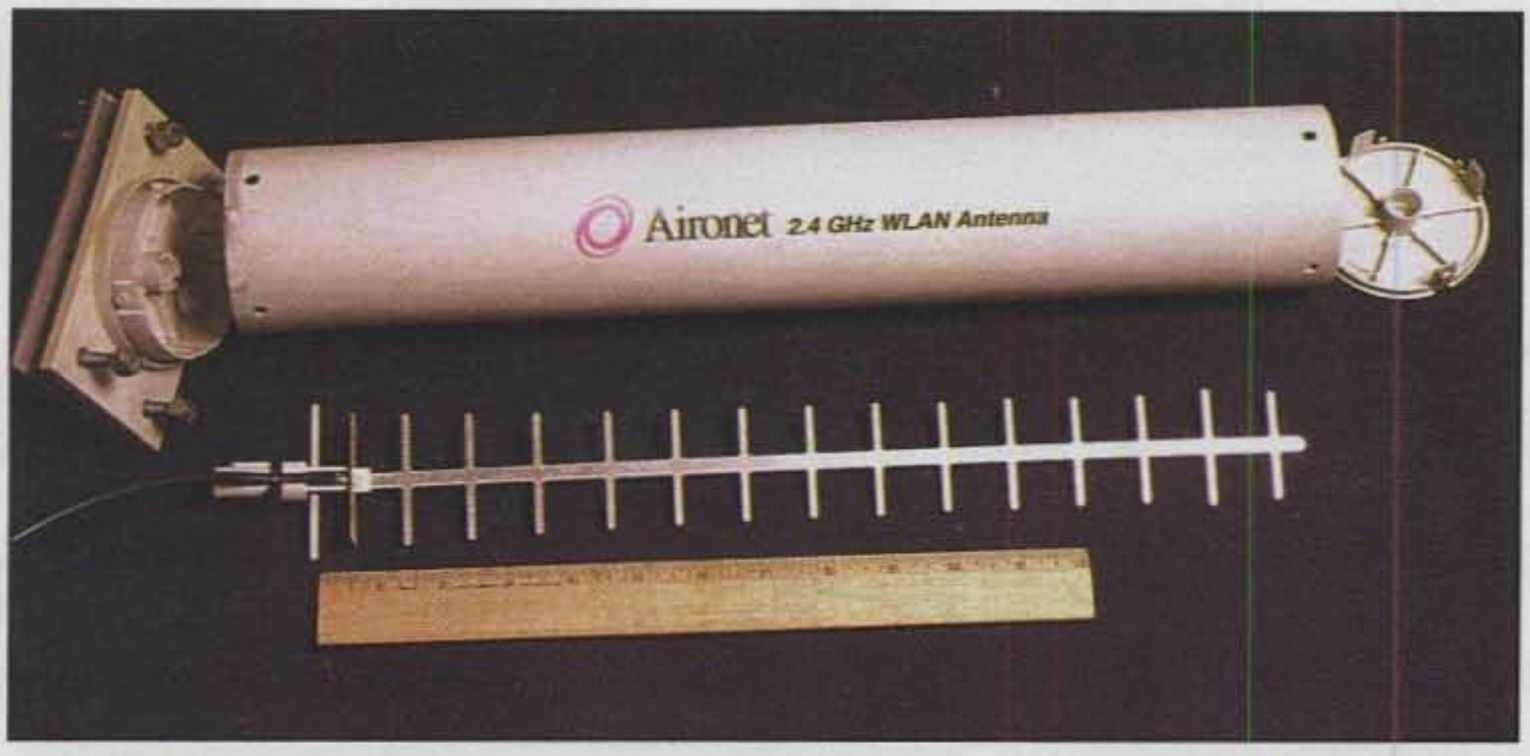


Fig. 3– The Aironet antenna and its plastic-tube radome. If you build one at home, you can use regular plastic pipe instead. A mounting plate is at the rear.

Director	Width overall	Distance
1	2 1/8	3/4
2	2 1/16	1 3/4
3	1 31/32	2 13/16
4	1 15/16	3 15/16
5	1 7/8	5
6	1 7/8	6 1/16
7	1 27/32	7 1/8
8	1 27/32	8 3/16
9	1 25/32	9 1/4
10	1 13/16	10 5/16
11	1 25/32	11 3/8
12	1 25/32	12 7/16
13	1 15/16	13 1/2
14	1 25/32	14 9/16

Table I– Director dimensions and positioning (all dimensions in inches). See text for driven element (DE) and reflector dimensions. The distances are measured from the front of the DE to the rear of the element. Director 1 is closest to the DE; director 14 is farthest.

In retrospect, I at least should have built one of the homebrew antennas. Maybe I will someday. I was spared the need, however: Out of the blue, a friend of a friend contacted me, having bought some gear from me last year at a hamfest. I had some more stuff I knew he would find useful for a project, and it turned out that he happened to have a nice 2.4 GHz Yagi he was willing to trade. After a few days I was the proud owner of a used commercial 2.4 GHz Yagi designed just for 802.11b gear and rated at a healthy 13.5 dBi.

Of course, I then did what every good ham does with a new piece of equipment, before even testing it to see if it would work: I took it apart. What came out is shown in fig. 2. Since those homebrew antennas are well documented on the web, I'll document the commercial antenna here, and readers can then make or buy the antenna they prefer.

The Aironet Antenna

The Aironet WLAN antenna, model AIR-ANT1949, is designed for use with Cisco equipment. Details on the antenna can be found at <http://www.cisco.com/>; search on Aironet Antenna. It is a compact unit housed in a plastic radome. It comes equipped with about three feet of RG-58U, terminated with a reverse-polarity TNC connector.

The reverse-polarity connector—a male TNC connector body with a female contact pin inside—is the opposite of what you would normally be able to buy. Manufacturers use these uncommon connectors to help ensure the antenna is not connected to equipment for which it is not intended, as specified by the FCC's Part 15 rules. However, you can buy these reverse-polarity connectors from many on-line connector vendors, such as The RF Connection <http://www.therfc.com> or Cable Experts <http://www.cablexperts.com>. Also remember that modifying an antenna invalidates your permission to use it with any 802.11b equipment under Part 15. If you buy or build one and use it *exclusively* under Part 97, as I did, then there shouldn't be a problem.

Opening up the radome revealed a very simple 16-element Yagi antenna made from a single piece of 1/16 inch aluminum sheet and a small piece of PC board. There are 14 directors, each 1/8 inch wide from front to back, on a 1/4 inch wide boom. See Table I for the director dimensions. The reflector is also 1/8 inch wide from front to back, 2 1/2 inch wide, and positioned 9/16 inch from the front of the driven element. Overall, the antenna is about 16 inches long and 2.5 inches wide at its widest. It was originally mounted inside a plastic tube, as shown in fig. 3, but you can also use a piece of 3 inch plastic pipe. On the original, slots in the end caps kept the antenna centered, which you can also do, or use plastic disks instead. End caps are still a good idea, to keep insects out.

If you were manufacturing thousands of these antennas, then creating a tool to stamp them out would be worth it. For the rest of us, a few hours with a nibbling

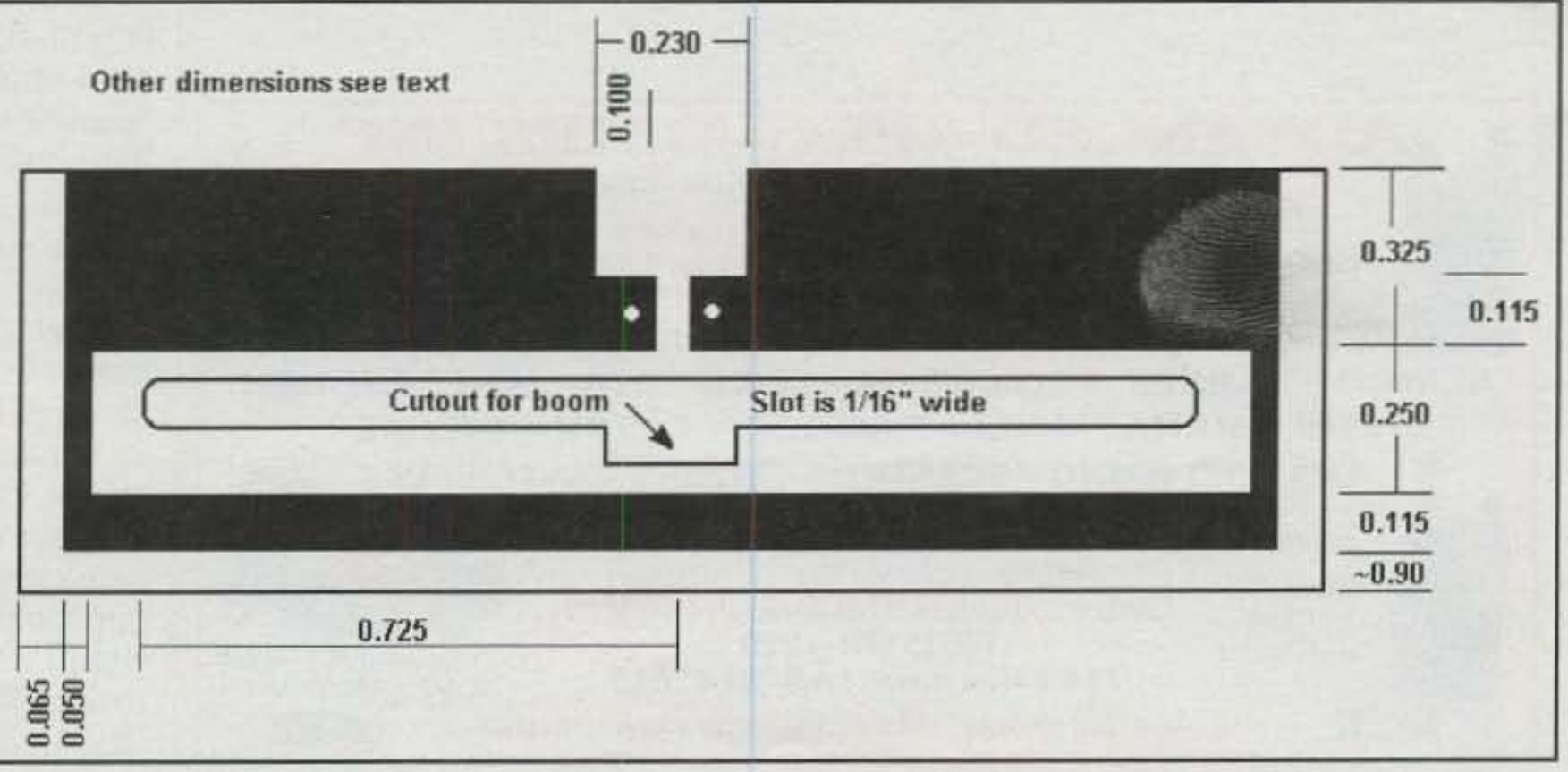


Fig. 4– Etching dimensions of the driven element. This is fabricated from single-sided 1/32 inch thick ceramic PC-board material. The coaxial feedline center conductor is soldered into one of the holes near the center, the shield into the other hole.

tool should take care of it. If you have access to a larger arbor press, you might make a punch and die set for cutting out the space between elements, sort of like a giant nibbling tool. Using copper instead of aluminum would allow an antenna to be soldered together out of individual strips. You could also use a band saw or similar to cut one out of sheet aluminum. If you made a full-size pattern on the computer and cut the antenna out by hand, I'd guess it would take an evening's work. Add another evening etching the PC board driven element and assembling it into an antenna. Two evenings' work seems like a reasonable investment for such an antenna. Note that the Pringle's and Beef Stew antennas might take half that time.

Fig. 4 shows the etching dimensions of the driven element (DE) as best I can measure with a micrometer and magnifying glass. The DE is made from a piece of cream-colored ceramic-like PC board material (perhaps Rogers RT/duroid®) 1/32 inch thick. It is exactly 2 inches wide and 0.780 inch high. There is a long 1/16 inch slot machined into the element, used to allow the DE to be slid into position past the reflector and onto the solid boom, between the reflector and first director. Once in position, there is another slot, 1/4" × 1/16", in which the boom rests. A 1/16 inch thick piece of plastic helps position and lock in the DE relative to the reflector, and also serves to support the coaxial feedline. It seems to me that one could use ordinary glass-epoxy material, or perhaps some microwave-type Teflon®, but this probably will affect the gain and performance somewhat. I imagine that the ceramic material would be difficult to cut, especially for the slot in the middle.

The feedline is soldered into the driven element as shown in fig. 5. It should not matter which point is used for the center conductor and which is used for the shield. In the photo you can also see the piece of plastic used for positioning, and imagine how the metal boom fits into the slot behind the plastic piece.

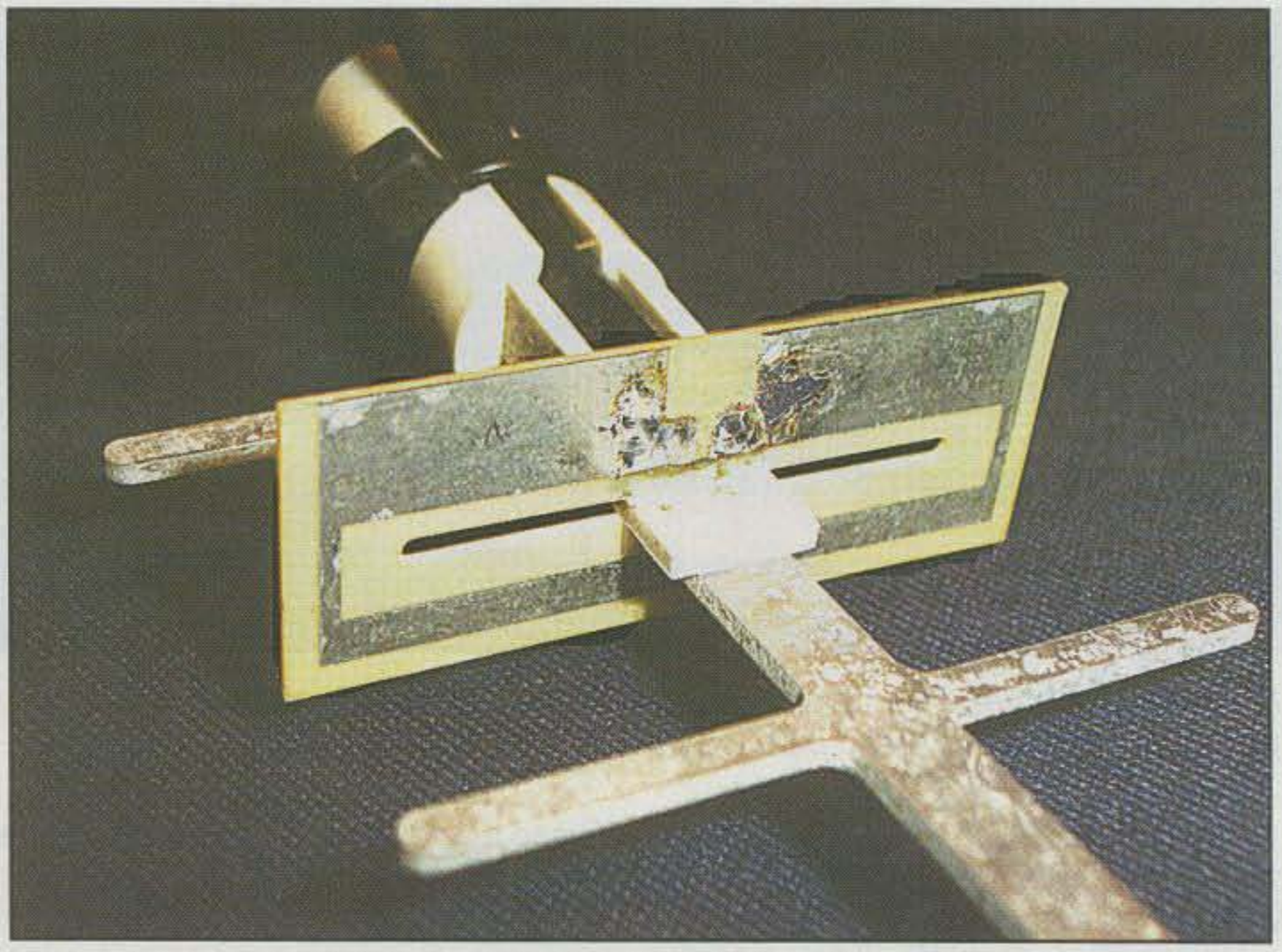


Fig. 5– Close-up of the driven element (DE). Note the soldered feedline connections, and the small plastic wedge which helps position the DE relative to the boom.

The Results

To sum up, after buying the least expensive wireless LAN adapter I could find, I configured it and got the link working at a short distance. Some simple experiments told me what kind of distance to expect, and I modified the LAN adapter to accommodate an external antenna by soldering a new piece of coax to the RF output point (Remember, this makes the adapter illegal for Part 15 use.). After lucking into an antenna that should work, I changed the connector to match our LAN adapters. Antenna aiming took some time and coordination, but the link ended up working just fine. If I had had to buy everything new, it still wouldn't have cost $500 for both ends.

I hope that this information will help you when you assemble your own high-speed data link. You might want to set up something to remotely operate your HF or VHF digital station from a laptop; multi-op contest stations might use these links for their logging networks; or you might want to actually communicate with a fellow ham keyboard-to-keyboard. The network adapters are very inexpensive, antennas can be built or bought, and distances of a dozen miles line of sight shouldn't pose any significant challenges. Just remember that feedline losses at 2.4 GHz can be huge, high-gain antennas have narrow beamwidths, and don't be tempted to use these techniques outside of amateur radio.

Next time, we'll review some the many ways we can send data over radio, with an emphasis on HF modes. In the months that follow, we'll take a closer look at some of these modes, with some practical advice on how you can start using them. If you have any questions, comments, or thoughts on what I should cover in future columns, please write. I'd love to hear from you.

73, Don, N2IRZ

Getting the Word Out!

BY BOB JOSUWEIT,* WA3PZO

"Amateur Radio—When Normal Communications Fail." How many times have you seen that phrase in an e-mail or on a website dealing with amateur radio public-service activity? If you are active in public service, you probably see it at least once a week. The sentence is appropriate among the amateur radio ranks, but often the message doesn't get to the general public.

In recent months there have been several examples of the news media covering the public-service activity of amateur radio. However, it seems that the message of ham radio's true value still is not really getting across, either to the public or to government officials.

Last August, Leslie Lenkowsky, Chief Executive Officer of the Corporation for National & Community Service (CNCS), spoke to the National Press Club in Washington, D.C. At the time he spoke about the $10.3 million in grants that were given to 43 private groups and public agencies in 26 states and the District of Columbia. He said, "The grantees included the venerable American Radio Relay League, based in Connecticut, which will create a national communications network of amateur radio enthusiasts prepared to respond in disasters when those new-fangled cell phones and PDAs become inoperative."

Leslie Lenkowsky, CEO of the Corporation for National & Community Service. (Photo courtesy CNCS)

Those who have been involved with the National Traffic System (NTS), the Amateur Radio Emergency Service (ARES), the Radio Amateur Civil Emergency Service (RACES), or other amateur radio public-service groups certainly would challenge the need to create a national communications network. It's already there. Most would say there is a need to improve and enhance the skills of those operators providing emergency communications.

In November the ARRL Emergency Communication Courses were noted in several publications carrying an article by Jonathan Rauch entitled "America's Secret Weapon in the War on Terror: Americans." The article appeared in *The National Journal*, a weekly publication on politics and government, and in the *Atlantic*. In a story *about* the article posted on the ARRL's web page, the writer says Rauch writes, "radio amateurs stand ready to rush to the scene of a forest fire, flood or hurricane with a 'jump bag' full of portable radio equipment."

The ARRL story left out some key quotes that present additional information and show the comments of Rauch and Lenkowsky in a different light. Rauch quotes Lenkowsky's statements about various groups that received grant money, and in Rauch's version, Lenkowsky concluded his comments about the ARRL grant by saying, "Then there are the hams. If you had told me we'd be giving a grant to a ham radio group. I wouldn't have believed it."

Rauch says the "League has embarked on an effort to increase the country's supply of emergency-ready hams from 1,500 today to at least 6,500 in three years." While the numbers reflect those trained via the ARRL Emergency Communications courses, it does not include those amateurs trained in yearly training exercises such as the Simulated Emergency Test or Field Day. It does not include those who participate in various emergency, public-service, and traffic nets, or others who take courses offered by various agencies such as the Red Cross, National Weather Service, or Federal Emergency Management Agency.

The article asks an important question: "On 9/11, of course, all commercial air travel halted. If that happened again, how could hams, and other urgently needed personnel, be rushed to the site of an attack?" While a good question, the answer is that following 9/11, hams responded to New York and the other sites by *driving* across country to help, often at their own expense.

One Ham's Cry

Every once in a while a ham will say the news media didn't report in a timely manner on the work local ham radio operators did during an emergency. Ham radio operators supplied communications for several weeks following the 9/11 attacks, yet the initial coverage said nothing of the important service hams provided. Ham radio was not the story. The attack on America was! The story of the service hams provided began to be reported several weeks after the initial attack. When there is a loss of normal communications among rescue crews, police, fire, and ambulance first responders, however, and amateur radio operators provide much-needed communications, then ham radio is the story.

This was the case in mid-November last year when tornadoes hit east Tennessee and Ohio. Cable news station CNN reported that "amateur radio operators played the role of hero after the tornadoes hit." An interesting angle to the story is that all of the amateur radio communications were coordinated from the upstairs bedroom of Tennessee ARRL Section Emergency Coordinator Sheila Tallent, KB4G.

Another story written for the Associated Press news service briefly mentioned that ham radio provided an important service following the tornadoes. While it was only a brief mention, the article appeared in over 95 newspaper and broadcast media outlets by 10 AM the day after the tornado. Just how important was ham radio to this story?

*c/o CQ magazine
e-mail: <wa3pzo@cq-amateur-radio.com>

There was no mention of police or fire communications, just ham radio. That's important!

Skywarn Recognition Day

This past December the National Weather Service and the ARRL sponsored Skywarn Recognition Day. Did your Skywarn group contact the local news media and tell them about the event and the work that goes on? The Amarillo (TX) Globe-News carried a story about it. The lead sentence was "Hams are the eyes and the ears." The story went on to tell how the National Weather Service relies on ham radio operators to watch for conditions and relay information. Additional information was provided on the day's event. With approximately 100 Skywarn stations participating from various weather-service offices, there were at least that many opportunities to promote amateur radio.

Most weather-service offices cover many cities and/or several states. Each city has a local newspaper; there is at least one television and radio station in each area, plus a local cable company. Does your employer produce a company newsletter with stories about its employees? Do you belong to another organization that has a newsletter about its members?

Another possibility would be to send information on Skywarn and Skywarn Recognition Day to a local high school where students study the weather. Let them know that during severe weather Skywarn members collect data and report it to the National Weather Service office.

Publicity Each Month

Amateur Radio Public Service can be publicized each month in your community. Let's see what topics might work:

- Severe winter weather snaps telephone poles. Amateur radio fills in.
- Weekly training net prepares local amateurs for emergency response.
- Ham radio club prepares for the marathon season; helps with local run and walk-a-thons.
- Club members complete a FEMA/ Red Cross/ARRL Emergency/Skywarn training course.
- Field Day tests local amateur radio club preparedness for communication emergency.
- Hurricane season (wildfires, etc.) begins. Hams are ready to respond.
- Hams participate in county disaster exercise.
- Severe weather strikes another state. Local hams are ready to respond if a similar problem occurs.
- Hams remember our veterans and help relay messages to those who served.
- Hams help coordinate community event (parade, marathon, etc.).
- Local ham tunes in on disaster far away (another country).
- Skywarn Recognition Day.

Hams Help During Ice Storm

A severe winter storm in early December caused widespread power outages in the Carolinas, the worst since Hurricane Hugo in 1989. According to ARRL North Carolina Section Public Information Coordinator Gary Pearce, KN4AQ, over 1.5 million people in North and South Carolina were still without power some 48 hours after the storm began. A half inch of ice covered nearly everything in the central part of the state. Pearce said, "Telephone service had fewer outright failures, but both wire and cellular service were sluggish due to the high volume of calls."

Early Wednesday afternoon Skywarn spotters began tracking the storm for the National Weather Service. As night fell and power failed, the Red Cross and county emergency management agencies began opening shelters to give people a warm place to stay. Hams in several dozen North Carolina counties staffed EOCs, shelters, and Red Cross offices to ensure continued communications. There was no statewide communications emergency, but ARES operators kept watch on the statewide ARES HF nets (3923 and 7232 kHz), and the state EOC in Raleigh remained on the air. The State EOC is also the home of the Wake County EOC.

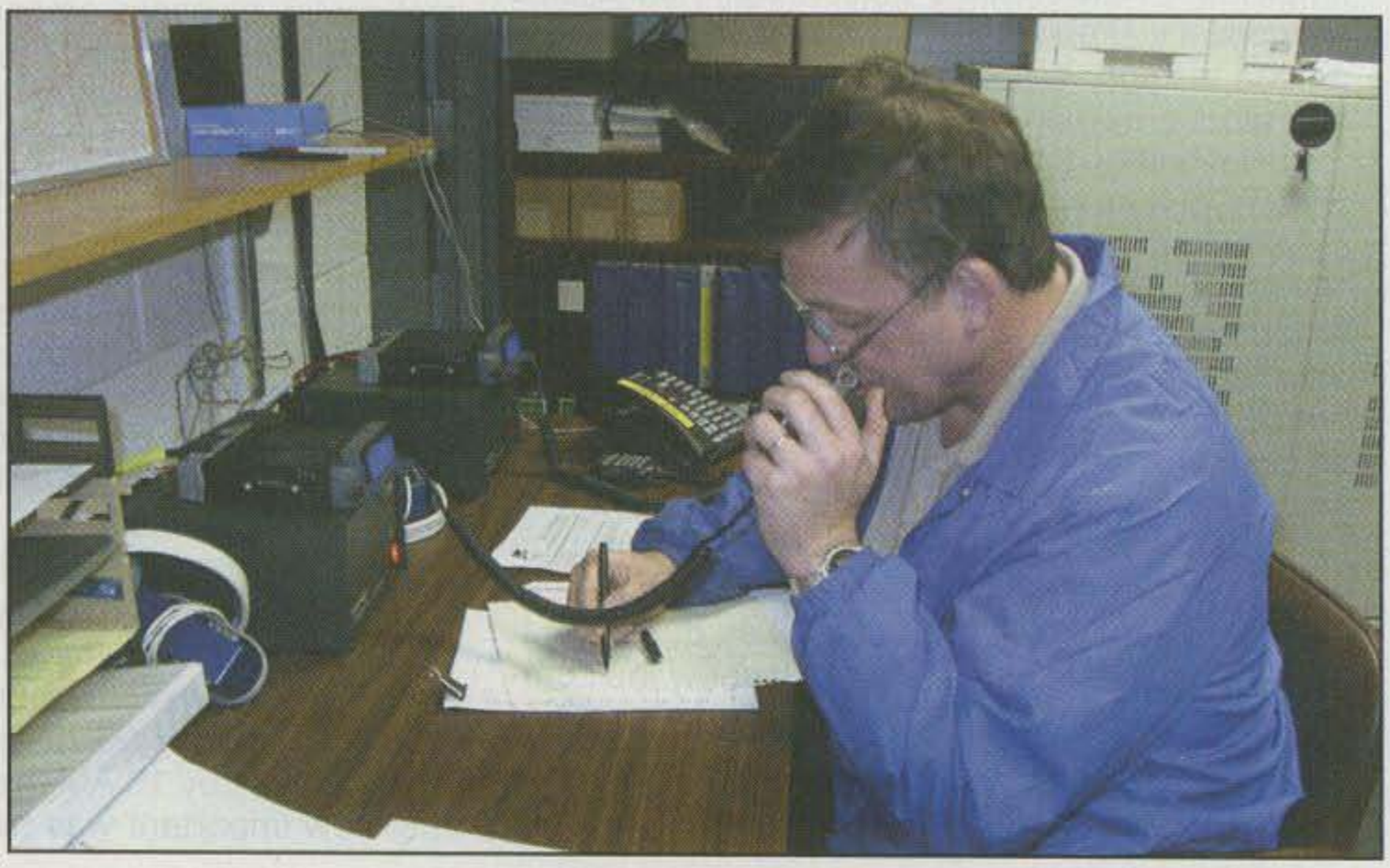
Members of the Guilford County Amateur Radio Emergency Service assisted with communications between four shelters in the county. Amateurs in at least five other counties also provided communications between shelters and teams doing damage assessment. Pearce told the ARRL that amateurs in Nash County provided almost all communications from the town of Rocky Mount.

Marilyn Braun, coordinator of the Greensboro-Guilford County Emergency Management Agency, told the *High Point Enterprise,* "We saw how hard it was to communicate over the telephones during and after the storm, so we have a network of radio operators."

Many areas of the country have experienced severe ice damage over the years. In those areas, amateur radio operators have taken steps to make sure they are prepared to operate using emergency power. Here is a great opportunity to tell your community that your group trains and is prepared should a severe ice storm strike the community. Let's take a look at a sample press release.

Amateur Radio In Case the Phone Doesn't Work

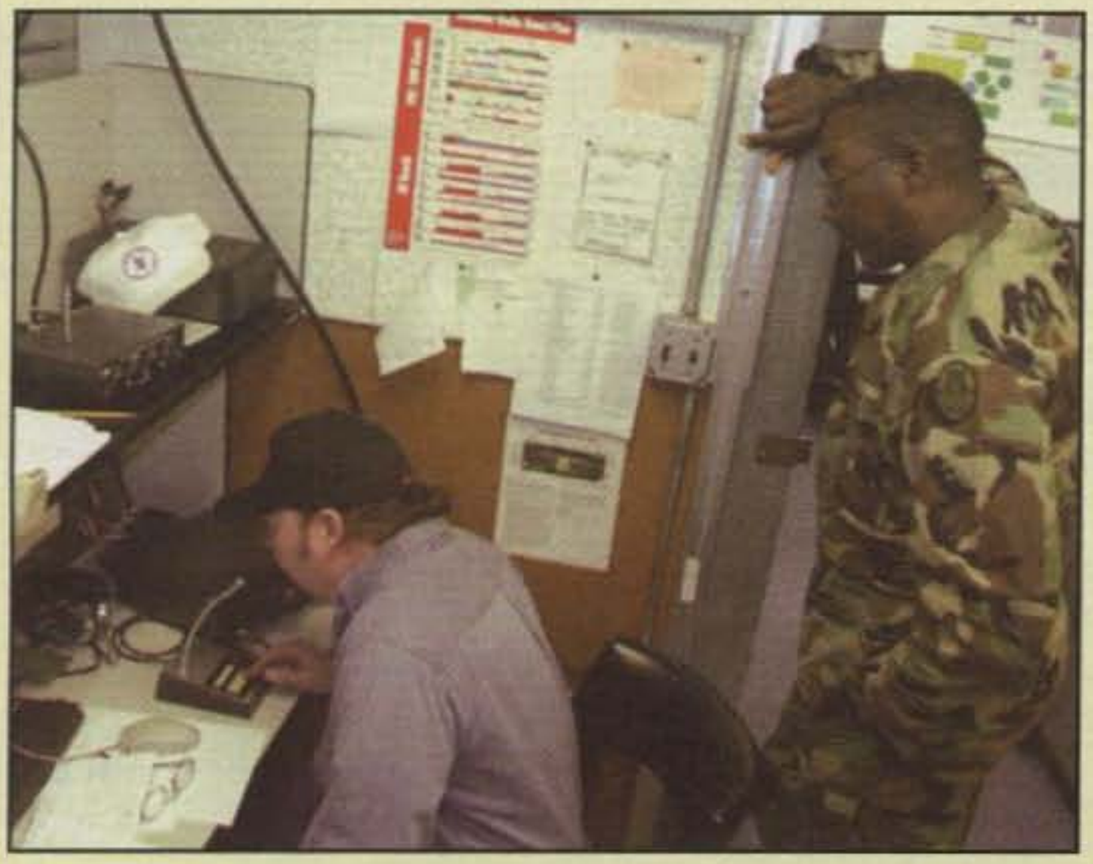
Local amateur radio operators drill year round just in case a severe ice storm or other disaster hits this county. John Smith, Amateur Radio Emergency Coordinator, says that amateur radio operators in North Carolina are providing emergency communication links between several shelters and county and state emergency management agencies. Locally, members of the Amateur Radio



Mark Gibson, N4MQU, operating the amateur radio position at the North Carolina State/Wake County EOC. (KN4AQ photo) →

Hams Stand By to Help National Guard in North Carolina

On Saturday, December 7, North Carolina Governor Mike Easley sent National Guard troops to 22 counties to go house to house to make sure residents knew that shelters were available. This was after the second night of no power for hundreds of thousands of homes in the aftermath of an early-season ice storm (see main article). The first night was relatively mild, with temperatures hovering around freezing. The second night, however, temperatures dropped below 20°, unusually cold for this southern state.



At the State EOC in Raleigh, KG4HDT demonstrated HF and VHF amateur radio communication to National Guard Sgt. Major Booth, who was coordinating the Guard activity. (Photo by KN4AQ)

The National Guard does not have its own statewide communications system. Its plan was to report back to the State EOC in Raleigh using cell phones. State Emergency Management officials asked if amateur radio could fill in where cell-phone coverage failed. John Guerriero, KG4HDT, ARRL EC for the State EOC, worked with Section Emergency Coordinator David Fleming, KE4JHJ, to run an all-day session of the "Tarheel Net" (North Carolina's statewide ARES/RACES net), with amateurs standing by from many of the affected counties.

In Alamance County amateurs already staffing the EOC for communications to shelters took on the additional task of providing dispatch service for the Guard. (Amateurs were not permitted to accompany the Guard troops.) The troops used VHF public-service radios left over after the county's move to an 800 MHz communications system. Ultimately, the call for backup communications never came. —*Thanks, KN4AQ*

Emergency Service work closely with the County Emergency Management Agency, the American Red Cross, and the National Weather Service.

County Emergency Coordinator John Doe says amateur radio operators throughout the county keep alternative sources of power—such as generators, batteries, and solar power—ready in case their services are ever needed. Each year local radio operators train with state and local officials to make sure they are ready if their services are ever needed. Each June local club members set up several stations in the field to make sure they keep in practice should they have to provide communications without the benefit of commercial power.

You could continue to explain more about your group's emergency communication capabilities, such as the club/EOC ham station, repeaters on emergency power, communications vans, etc. Note that no callsigns, acronyms, or other examples of "Hamspeak" are used.

Here's another example of a Skywarn related story:

Hams Ready if Disaster Strikes

Amateur radio operators provided valuable communications following severe storms that ripped through Tennessee and other states killing at least 30 people. About 45 miles west of Knoxville, emergency crews had to rely on ham radio communications when telephone lines were knocked down.

Members of the local amateur radio club work closely with the National Weather Service and county emergency management officials to provide communication support should severe weather strike this area. A spokesman for the club said they had just completed an emergency-preparedness drill with local emergency management officials to test their communications capabilities. Club members provided radio links among the simulated disaster site, the county emergency operations center, and several evacuation shelters. They also provided a communications link to the state capital.

Again the story could continue to tell more about your local organization.

Help! I'm Not a Writer!

Many hams are interested in telling their story but don't know how to get the word out. The ARRL is a helpful resource. Each ARRL section has a Public Information Coordinator and a staff of Public Information Officers. These people have an interest in spreading the word about amateur radio. Many work with the local news media in their own areas. All are willing to give you a hand. There is a new Public Relations manual on the ARRL website <www.arrl.org/pio> which has a lot of valuable tips. Finally, the ARRL sponsors a public-relations e-mail reflector.

If you still have any questions, drop me a note at <wa3pzo@cq-amateur-radio.com>.

In Other News...

A bit of mystery in Newington . . . Nearly a year ago, ARRL President Jim Haynie, W5JBP, spoke about a trip to Washington, D.C. After a round of meetings in March, Haynie said, "Since September 11th, people have begun thinking in greater depth about what role amateur radio can play." He said some congressional staffers talked about how telephone service was out or intermittent following the attack on the Pentagon.

During that trip the ARRL renewed its *Memorandum of Understanding* with the Federal Emergency Management Agency, which sponsors RACES, the Radio Amateur Civil Emergency Service. According to the ARRL, the *MOU* called on FEMA "to encourage state and local emergency management officials to establish cooperative relationships with ARRL field volunteers." The agreement says FEMA and the ARRL will "encourage the use of amateur radio resources in the development of state and local emergency operating plans and the use of those plans to support exercises."

Shortly after the announcement was made, however, a copy of the *MOU* was pulled off of the ARRL website and as of this writing, nearly a year later, it has not been reposted. No further information is available at this time.

With Thanks

We're now over the shock of 9/11. Many of us have been in transition for the past year. If you haven't participated in public-service activities, now is the time to get involved. This month I want to thank KN4AQ and the ARRL for their help in providing information.

Do you have a story to tell? Drop us a note. Until next time . . .

73, Bob, WA3PZO

BY KARL T. THURBER, JR.,* W8FX

The Argonaut V, RatTail Antenna Booster, Loop Antenna, and more

February is a cold and frosty month in most parts of the U.S., but this fact certainly won't keep us from getting right into our usual fare and fun. This month we'll focus on some noteworthy hamshack radio gear, portable and mobile goodies, antennas and accessories, software, net news, and books we believe will be of great interest to you, so let's begin!

Radio Gear

Ten-Tec Argonaut V Transceiver. The name "Argonaut" has been synonymous with low-power operation since Ten-Tec's original Model 505 QRP transceiver was released in 1971. The company's commitment to offering quality, low-power rigs to the radio-hobby community continues today with the return of a legend in the form of the new Argonaut V transceiver.

The Model 516 Argonaut V (photo A) is a full-function IF-DSP HF transceiver with adjustable 1– 20 watts output power on all bands from 10 to 160 meters, all-mode operation, and a high-performance general-coverage receiver. The radio's many cutting-edge features include quiet, dynamic, all-mode receiver performance; easy digital-mode operation, including PSK31; transparent QSK CW operation; an internal keyer for CW operation with adjustable sidetone; 35 built-in IF-DSP receive filters; dual VFOs with split mode; and much more.

Like other recent HF rigs from Ten-Tec, the Argonaut V is a software-defined radio. Thus, if new features for the rig become available, upgrading your transceiver is as simple as connecting it to your personal computer (PC) with a serial-port cable and downloading the latest version from Ten-Tec's firmware update website at <http://www.rfsquared.com>.

The Argonaut V's factory-direct price is $795; with TCXO high-stability oscillator installed, it's $849. For more information on the Argonaut V, contact Ten-Tec, Inc., 1185 Dolly Parton Parkway, Sevierville, TN 37862 (telephone 1-800-833-7373; e-mail: <sales@tentec.com>; web: <http://www.tentec.com>).

Portable/Mobile Device

RatTail Antenna Booster. Ian Soutar, VE7DJI, tells us of his innovative, patented new product to enhance handheld radio operation. It's the RatTail Antenna Booster (photos B and C), a small device that dangles from your 2 meter handheld (or marine- or aircraft-band radios). The booster is said to increase transmitted energy by 9 to 12 dB (800 to 1600 percent), seen when measured at a distance of 2 km (1.2 miles) or more, according to the manufacturer. Received sensitivity also is said to be increased similarly.

The new device, which sports a counterpoise-like "rattail" (just Velcro®), connects to the back of the handheld radio. The device rolls up for carrying in your pocket, although you can always leave the rattail attached to the radio if you like.

How the RatTail works is simple: The LED in the eye of the rat glows red when you find the right place to mount it on your radio. It then effectively turns your quarter-wave vertical into one element of a more efficient half-wave dipole. You can mount the instantly removable device anywhere that is convenient, as long as the light glows brightly when you transmit. Velcro® can be used for secure mounting after doing the initial testing, or you can slip the RatTail under your radio's belt clip.

The RatTail Antenna Booster is $24.95 USD, or $39 CDN, postpaid; check the RatTail website for the most current pricing information. For more information contact Microsec Research and Development, 1226 Lyall Street, Victoria, BC, Canada V9A 5G9 (e-mail: <rattail@Rattailantenna.com>; web: <http://www.rattailantenna.com>). On the

*289 Poplar Drive, Millbrook, AL 35054-1674
e-mail: <w8fx@cq-amateur-radio.com>

Photo A– The Ten-Tec Model 516 Argonaut V is a full-function IF-DSP HF transceiver with up to 20 watts output power on all bands from 10 to 160 meters, all-mode operation, and a high-performance general-overage receiver. (Photo courtesy Ten-Tec)

Photo B– The new RatTail Antenna Booster, offered by Microsec Research and Development, is a small device that dangles from your 2 meter handheld. The booster is claimed to increase transmitted energy by 9 to 12 dB (800 to 1600 percent) when measured at a distance of 2 km (1.2 miles) or more. Received sensitivity is also said to be increased by the same amount. (Photo courtesy Microsec Research and Development)

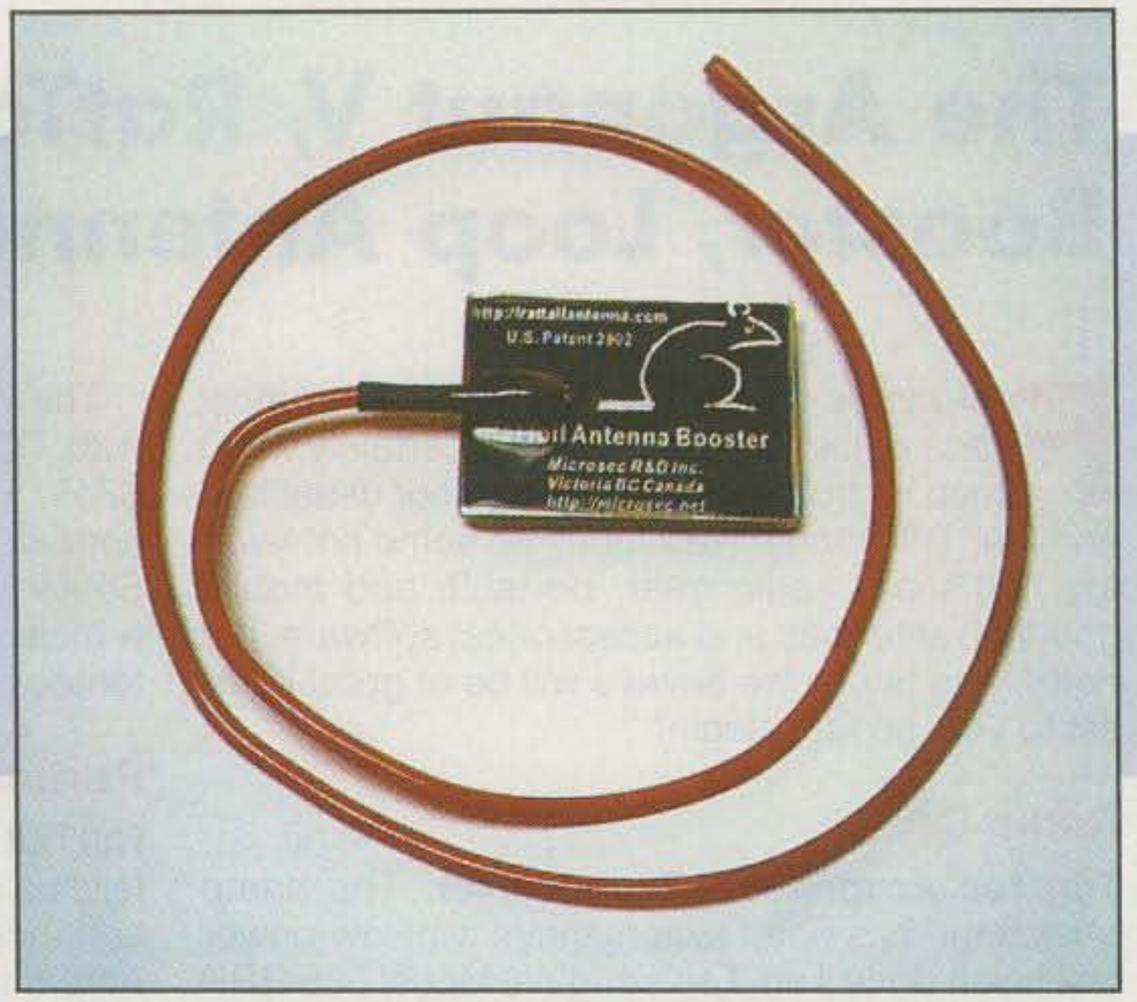


Photo C– The RatTail Antenna Booster sports a counterpoise-like "rattail" (just Velcro®), which connects to the back of the handheld radio. It rolls up for carrying in your pocket, although you can leave the rattail attached to the radio. (Photo courtesy Microsec Research and Development)

website you'll find both illustrated details of how the RatTail is mounted and technical information showing how the antenna works.

Antennas and Accessories

Improved Loop Antenna from Palomar Engineers. For nearly 25 years we have highlighted the amateur radio and listener equipment and accessories offered by California-based Palomar Engineers. Under Jack Althouse, K6NY, the firm has offered an assortment of accessories of interest to the readers of *CQ*.

One popular antenna that has been absent from the Palomar lineup for several years is the famous receiving Loop Antenna system. I'm happy to say that recently Palomar Engineers reintroduced the Loop Antenna (photo D). The present version is a "new and improved" model that has over 10 dB additional gain and sensitivity and features both rotation and tilt to match the received signal's incoming wave angle. These features provide deep nulls on local noise and received signals.

The system consists of a loop amplifier and plug-in loops. Loops are available for the LF band, 150– 550 kHz; the AM broadcast band (BCB), 530–1700 kHz; and the amateur and shortwave bands, 1700–6000 kHz. The loop amplifier has a rear panel clip to hold a 9 volt battery and a SO-239 UHF-type coax connector for connection to the receiver.

Especially of interest to the AM BCB DXer, the loop covers the entire band, including the new expanded band to 1700 kHz, and the tilt feature can eliminate local noise and interfering stations. On shortwave and the amateur 160 and 80 meter bands, the loop is particularly useful in noisy locations. It has less noise pickup than many other antennas and can null out local noise while still providing reception of DX stations in all directions.

The new loop system components are available from stock. List prices for the amplifier and the plug-in loops are $135 each; note that the loops do not work without the loop amplifier.

Contact Palomar Engineers, P.O. Box 462222, Escondido, CA 92046 (760-747-3343; e-mail: <palomar@compuserve.com>; web: <http://www.Palomar-Engineers.com>).

80/75-Meter Vertical from Array Solutions. Jay Terleski, WXØB, president of Array Solutions, offers a wide selection of phased arrays, RF switches, antennas, towers, and more. Now the firm has added a full-size, 1/4-wavelength 80/75 meter vertical antenna to its product lines.

The Model AS80-FS 80/75-Meter Vertical Antenna (photo E) consists of a freestanding aluminum radiating element that's about 70 ft. tall, attached to a plated-steel fold-over base. (A removable winch is available as an option.) The bottom portion of the antenna is a 4 in. diameter aluminum tube.

A predrilled radial plate—for connecting up to 120 radials—is included. The base assembly can be mounted in as little as one cubic yard of concrete. The antenna's weight, including the base assembly and optional winch, is around 200 lbs. Wind rating of the erected antenna is specified at 110 mph.

The manufacturer claims that the antenna's power-handling capability exceeds 15 KW carrier, and operation on 160 meters is possible with an antenna tuner. The Model AS80-FS antenna is priced at $1340, and the optional winch is $250.

For more information, contact Array Solutions, 350 Gloria Rd., Sunnyvale, TX 75182 (telephone 972-203-2008; e-mail: <wx0b@arraysolutions.com>; web: <http://www.arraysolutions.com>).

Software and Computers

Alinco DJ-596T Clone Utility Software. The popular Alinco DJ-596T Dual Band HT is a compact handheld that can transmit up to 5 watts output on the 2 meter and 70 cm bands, working in wide or narrow FM modes (as well as digital voice when talking with a similarly equipped radio). With the appropriate software, which is now available, you can manage all the settings from your PC. The radio programming software makes setting up the DJ-596T a breeze using a PC running Windows® 95, 98, ME, NT4, 2000, or XP.

It's very convenient to manage all the DJ-596T settings from the PC, maintaining multiple settings for different needs and different areas, and keeping them neatly organized. The software provides a nice backup for the DJ-596T settings on the PC, and also prints out concise reports for easy filing. Users can also set the Channel Indication Mode features not shown in the instruction manual, as well as clone the DJ-596T

Photo D– Palomar Engineers has reintroduced its famous Loop Antenna, a "new and improved" model that has over 10 dB additional gain and sensitivity. The system consists of a loop amplifier and plug-in loops. Loops are available for the LF band, 150–550 kHz; the AM broadcast band, 530–1700 kHz; and the amateur and shortwave bands, 1700–6000 kHz. (Photo courtesy Palomar Engineers)

around the block or around the world by sharing settings from the software package with other DJ-596T owners.

Also included on each CD-ROM are copies of the DJ-X2000, DJ-X3, and DJ-X2 receivers' free software, which currently can be downloaded from the Alinco website. The SW596 software described is available at all Alinco dealers at a manufacturer's suggested retail price (MSRP) of $29.95.

Contact Alinco through its North American distributor, ATOC Amateur Distributing, LLC, 23 S. High Street, Covington, OH 45318 (telephone 937-473-2840; e-mail: <alinco@alinco.com>; on the web: <http://www.alinco.com>).

Ham Intelligent Calculator (HAMIC). SweetScape, a Canadian firm, has announced HAMIC, the Ham Intelligent Calculator. According to the company's Graeme Sweet, many radio amateurs just love to spend hours building circuits or antennas. However, he notes, few of them will admit that their circuits fail because of simple calculation errors. Graeme holds that you can easily get rid of these annoying mistakes by using HAMIC.

HAMIC is a powerful, yet easy-to-use calculator that can solve simple resistor/capacitor/inductance/impedance circuits in series or parallel, or solve more complex L-, Pi-, or T-network circuits. HAMIC works well as a design tool and can perform SWR and reactance conversions.

The program's interface takes the form of a graphical circuit (see fig. 1). You select the calculation type (i.e., resistor, capacitor, inductor, or impedance), enter two variables, and HAMIC will solve for the remaining variable. With a click of your mouse, the program's display is changed from series to parallel.

HAMIC can work with advanced network circuits. The program calculates impedance for two types of L networks and both Pi and T networks. HAMIC can solve L networks for two variables, so you can use it to design Omega matching networks for antennas.

Results are displayed in the proper units (Ohms, Henrys, Farads, or Hertz) and can be converted to different orders

of magnitude (mega, milli, kilo, micro, or pico) with the click of a button. Other features include specifying the output precision and significant digits, as well as saving your work to a worksheet for later retrieval.

The program, which runs under Windows® 98/NT/2000/XP is available now, and it may be downloaded online. The downloaded program will run for 30 days; after that you need to register the program online. The registration price is $20 USD.

To obtain more information on HAMIC, contact Graeme Sweet online (e-mail: <gsweet@sweetscape.com>; web: <http://www.sweetscape.com>). You can download the program by going to <http://www.sweetscape.com/download>.

New on the Net

HamTestOnline. J. Cunningham & Assoc. has announced the launch of a new website, HamTestOnline <www. hamtestonline.com>, which helps both new and experienced amateur radio enthusiasts prepare for the U.S. amateur radio written exams. This site is said to be the first website to bring computer-based training (CBT) technology online for the amateur radio tests.

Unlike other test preparation websites, HamTestOnline takes on the role of your personal trainer. It keeps track in its database of which questions you have seen, which ones you have learned, and which ones you get right or wrong. It asks you questions based on your own personal needs, concentrating on the areas where you are weak. Even if it has been weeks since your last session, HamTest Online's database retains your history and continues where you left off.

HamTestOnline does not try to simulate a test. According to the publisher, in a simulated test you spend 15 minutes

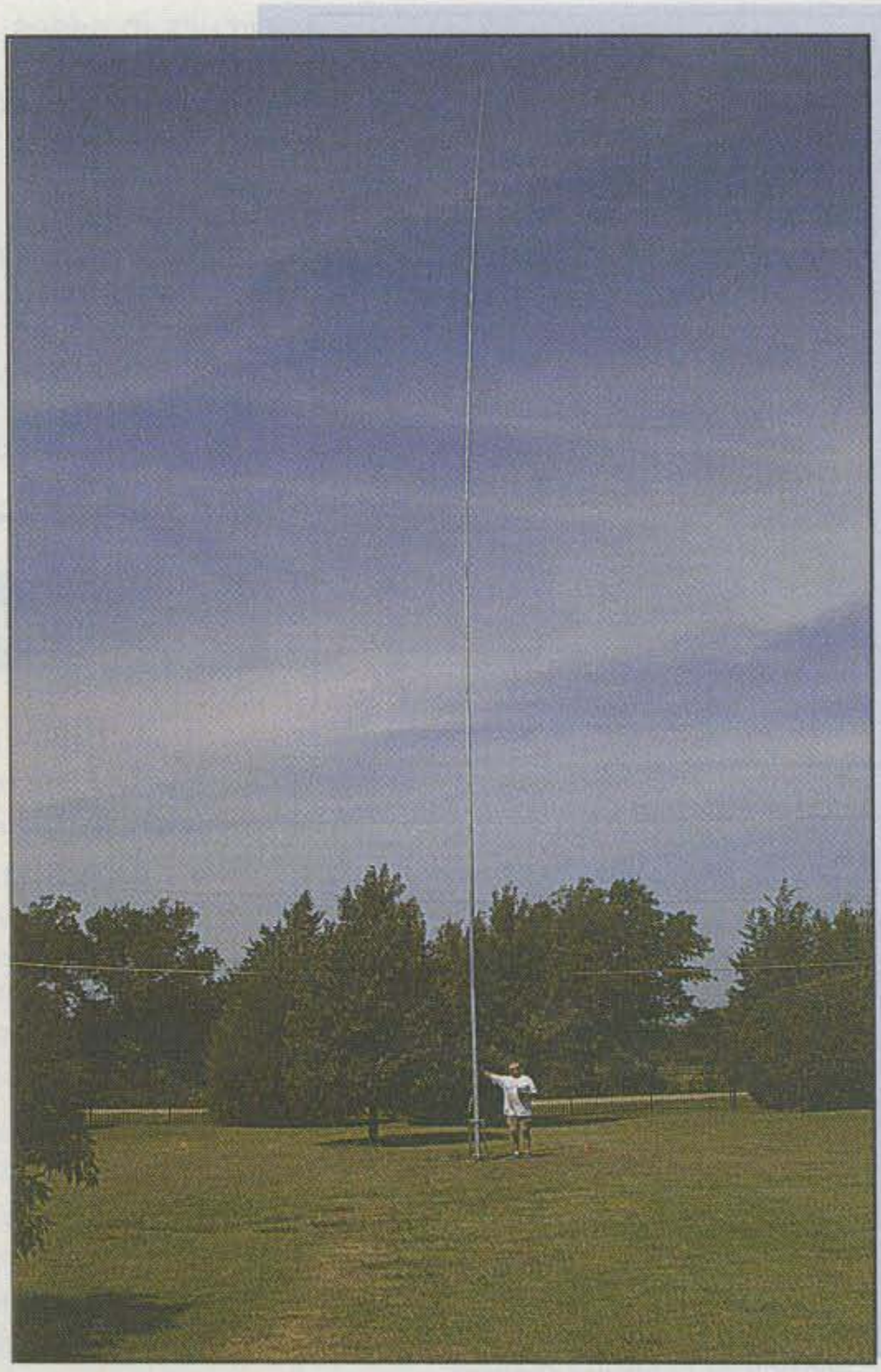


Photo E– Array Solutions offers a full-size, 1/4-wavelength 80/75 meter vertical antenna. The Model AS80-FS consists of a freestanding aluminum radiating element that's about 70 ft. tall, attached to a plated-steel fold-over base. The bottom portion of the antenna is a 4 in. diameter aluminum tube. (Photo courtesy Array Solutions)

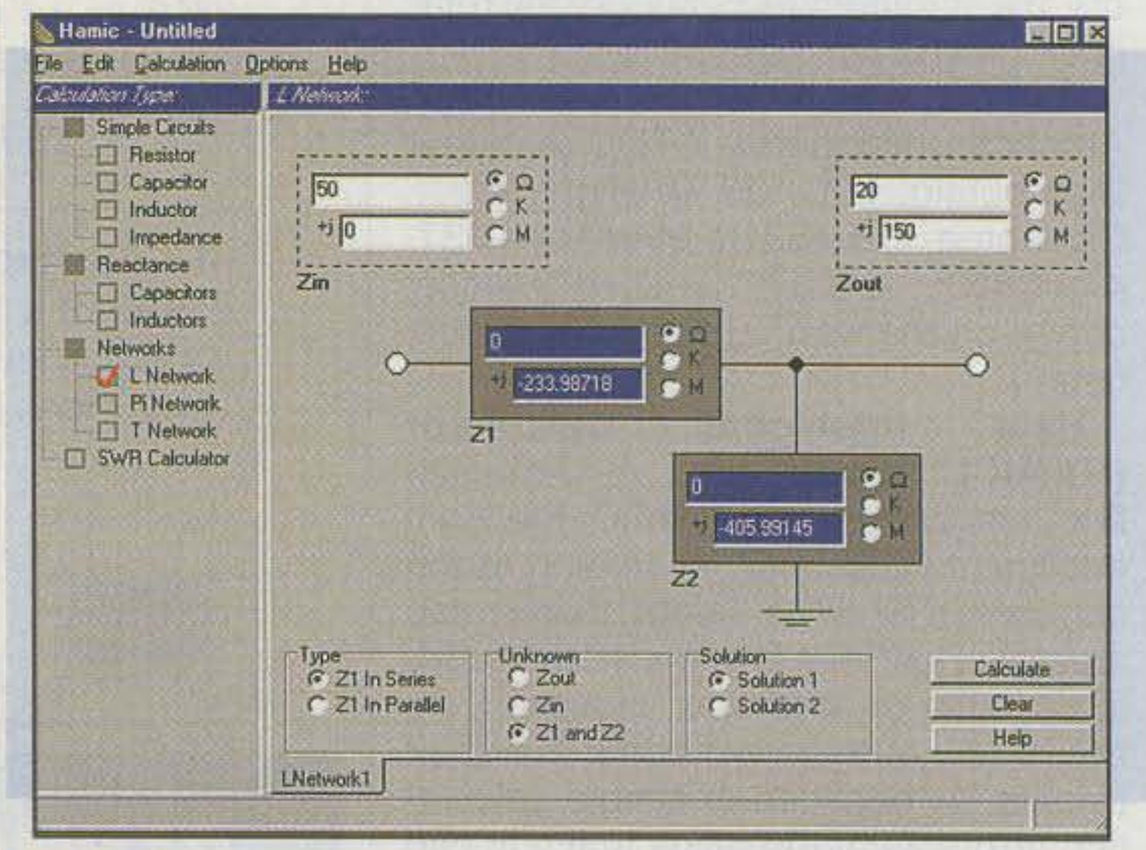


Fig. 1– HAMIC, the Ham Intelligent Calculator, is a powerful, yet easy-to-use calculator; the interface takes the form of a graphical circuit. HAMIC works well as a design tool and can perform SWR and reactance conversions. (Graphic from the SweetScape website)

guessing at the answers and learning nothing, and then 2 minutes reviewing your answers and actually learning. Thus, only a small fraction of your time is spent learning. With HamTestOnline your entire study session is devoted to learning. With 1572 questions in the question pools, you can take 100 randomly generated, simulated tests and still not see all the questions!

HamTestOnline operates entirely online; there is no software to download or install. It's easy to use: One click records your answer, provides feedback, and presents the next question. The website includes all questions from the latest Technician, General, and Amateur Extra class question pools. The website (fig. 2) offers a free trial, which includes 20% of the questions from each question pool. A paid subscription of $19.95 provides access to all questions in all three question pools for a period of two years. There is also a money-back guarantee if you are dissatisfied for any reason.

For more info on HamTestOnline, contact J. Cunningham & Assoc. (e-mail: <webmaster@hamtestonline.com>; web: <http://www.hamtestonline.com>).

From the Bookshelf

AM RADIO LOG. I'm rather surprised at the number of licensed radio amateurs (including myself) who also listen to medium-wave (MW) and shortwave broadcasts. The nonprofit National Radio Club (NRC), since 1933 an association of MW listeners and radio hobbyists, offers an interesting catalog of MW-related products and publications that's yours for a first-class stamp. While most of their publications relate to MW and not amateur radio, many are still of considerable interest to radio amateurs.

One of NRC's premier publications is the AM RADIO LOG, now in its 23rd edition. The log, which is published each September, contains AM broadcast-band (BCB) radio-station listings from the United States and Canada, including up-to-the-minute information on new stations in the expanded band (1605–1705 kHz).

Each station listing consists of its location, frequency, call letters, format, network affiliation, station address, station slogan, and day and night transmitter powers. There also are cross references by city and call letter. This annual edition consists of 325 three-hole-punched, looseleaf-format pages. The book is 8 1/2" × 11".

For NRC or IRCA (International Radio Club of America) members the AM

RADIO LOG is $19.95 in the U.S. and $23.00 in Canada. For others in the U.S. the price is $25.95 and in Canada $29.00. All prices listed are postage paid to your location. Send orders for the AM RADIO LOG to the National Radio Club Publications Center, P.O. Box 164, Dept. W, Mannsville, NY 13661-0164. Make checks payable to the National Radio Club, Inc., and include a first-class stamp for catalog requests.

The catalog and online ordering, as well as extensive information on the BCB DX hobby and membership in the NRC, are available on the web at <http://www.nrcdxas.org>.

New Pasternack Enterprises Catalog. Recently, we received a copy of this company's latest catalog, which at over 200 pages is the largest Pasternack Coaxial and Fiber Optics catalog we've seen yet. The new catalog includes thousands of different coax-related products, along with associated technical data, making it a great reference as well as a comprehensive purchasing resource.

The 8" × 10 1/2" hardcopy catalog shows a large selection of adapters, attenuators, coax and coax assemblies, in-line amplifiers, connectors, switches, patch cords, power dividers, switches, terminations, tools, twinax, directional couplers, DC blocks, and many other related items. It's quite easy to use the Pasternack catalog in that it has both a comprehensive table of contents and an index arranged by model number.

The company also has upgraded its website, most notably bringing the paper catalog online. The well-designed website assists you in finding any part in the inventory without the need to know any part numbers. The website also lets you look up any part if you know the Pasternack number.

For a free printed copy of the company's catalog, contact Pasternack Enterprises, LLC, P.O. Box 16759, Irvine, CA 92623-6759 (phone 949-261-1920; e-mail: <sales@pasternack. com>; web: <http://pasternack.com>). You also can download an electronic (PDF file) version of the catalog from the website.

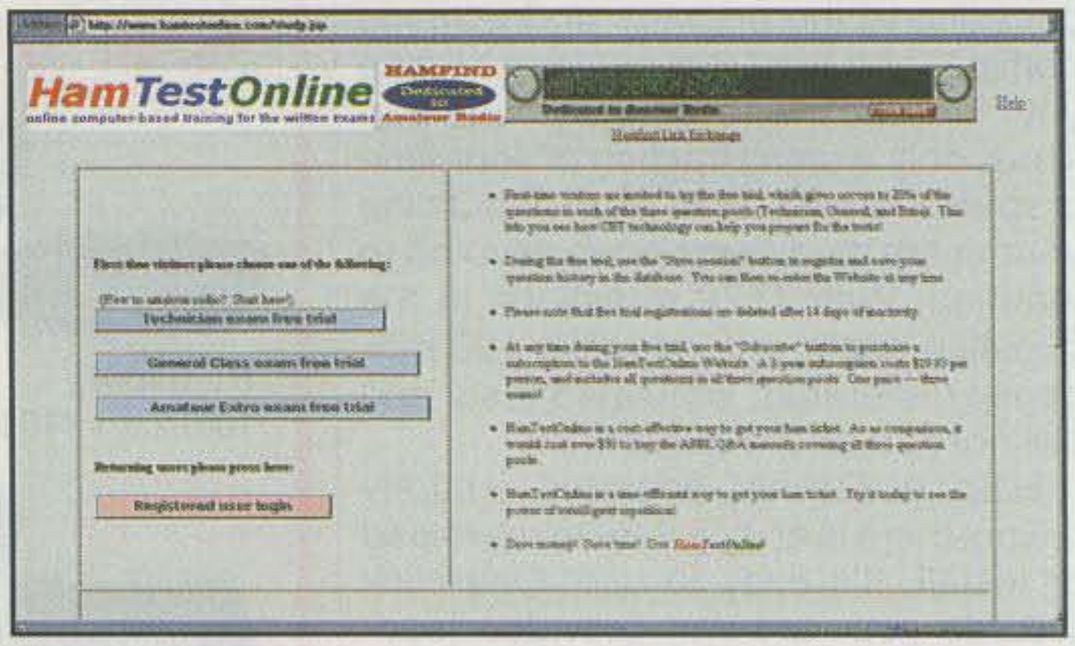


Fig. 2– J. Cunningham & Assoc. has launched a new website, HamTestOnline <www.hamtestonline.com>, which helps both new and experienced hams prepare for each of the written exams. The site offers a free trial, which includes 20% of the questions from each question pool. (Graphic from the HamTestOnline website)

Wrap-Up

That's all for this time, gang. Next time more "What's New." See you then.

Overheard: Are you a chronic complainer? Well, don't let complaining give you more satisfaction than actually getting in there and taking action.

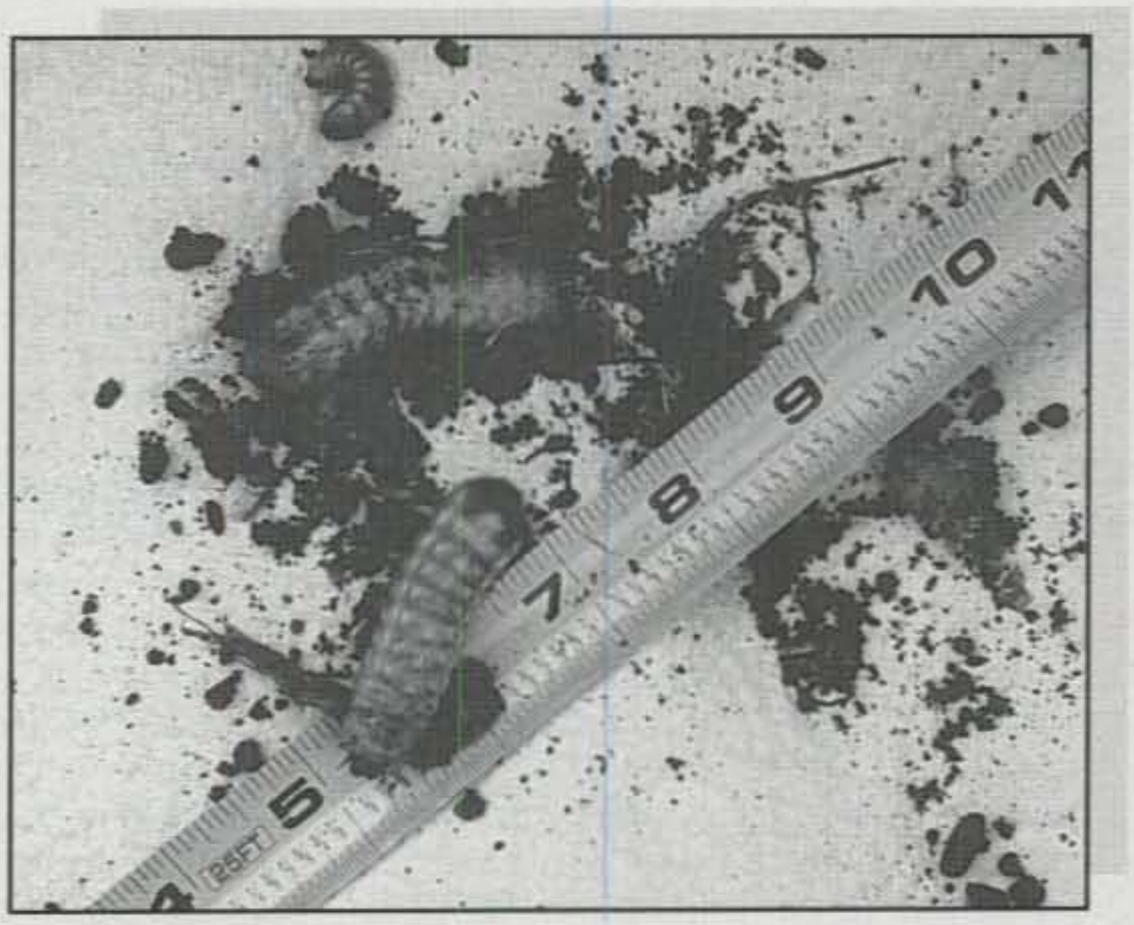
73, Karl, W8FX

"Self-Elmering," or Staying Curious

BY WAYNE YOSHIDA,* KH6WZ

There is a series of public television promotions that always end with the catch phrase "Stay curious." In one spot, a young girl wakes up before dawn, grabs a flashlight, and goes to the chicken coop. She sneaks up to the window and shines the light inside. The rooster wakes up, thinking it's a new day, and crows. In another spot, a different girl wonders about raising fish and goes to the pantry, picks up a jar of caviar, and then dumps it into a fish bowl.

Here's my wildly non-ham radio example of this curiosity idea. I wanted to know whether or not a bunch of really big, ugly worms in my compost pile were hazardous to garden plants or the compost. I typed "really ugly big worms in compost" into the Google search engine on the internet and found a link to describe what these things are (Happy D Ranch, <http://www.happydranch.com>). In case you are curious, the worms are soldier fly *(Insecta: Diptera: Stratiomyidae)* larva, and they are harmless to plants and animals and are aggressive composters, a good thing (see photo).



Curiosity made me check the internet to see whether or not these big, ugly worms in my compost pile are harmful to plants and animals (they're not). You can apply this sort of curiosity to your ham radio knowledge, too—but without the worms.

We should apply this idea of curiosity and fresh excitement to our ham radio hobby. By applying the many forms of learning to your ham radio activities, you will increase your knowledge and enjoyment of our hobby. As time goes on, you will "automatically" increase your expertise through hard-earned learning-by-doing.

Here are some points to consider as we begin our journey on the road of ham radio knowledge:

First, let's all remember this: All of our ham radio skills, as well as just about anything else we do, are a learned function. In other words, we are not born with the knowledge of how to properly solder a PL-259 connector to the end of a coax cable or how to make a contact on an FM repeater system. All of us were in the same condition of knowing nothing in the beginning.

Second, no matter how much you know, there is always someone out there who knows more than you do. By the same token, no matter how much you *don't* know, there's always someone who knows less than you do. Thus, let's all stay humble and help out each other.

Third, patience is the key to successful learning. There is no hurry to "get up to speed." The idea is to "just get there" at whatever level you want, since we are doing this primarily for fun. This is an important point. There are some folks who are satisfied with having as much knowledge as they have right now and have no need or desire to expand their knowledge. That's okay. However, I think most of us got into ham radio to have fun, and sometimes you can have more fun as you try new and different things.

Fourth, making mistakes is part of the learning process, so go easy on yourself when you goof. You may have to grow a "thick skin" to accommodate this, especially if you get criticism from others or participate in high-pressure events such as team contesting, nets, or emergency-communications drills. These events are sometimes a "sink or swim" situation, which is one type of learning, but it is not fatal or wrong. You must accept comments and negative feedback as constructive criticism, rather than a personal attack. Besides, making mistakes and learning from them builds character.

Just Doing It

Learning more about ham radio isn't hard, doesn't have to be expensive, and can be (hopefully *is*) a lot of fun. In fact, "just doing" ham radio is the first step. I can remember my first several dozen contacts made at W6YRA, the UCLA Amateur Radio Club. I was always nervous and self-conscious, and always felt uptight, since I thought everyone was listening to all the mistakes I made (they were). It was especially weird to say "CQ" on SSB to get a contact. On CW I had to send everything at least twice and had to ask for "fills" all the time.

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

It didn't take long for me to realize that if I were left alone, my feelings of embarrassment would go away. Even so, I still felt my ears turn red as I spoke the words (letters?) "CQ" into the mic.

Things got easier after a short while. Calling CQ and using the code became easier and more natural. Soon I wasn't making as many mistakes (Believe me, I still make mistakes, even now.) as before, and the "QSOs" just became "conversations" with strangers.

Join a Club

One sure way of learning more about hamming is to join a local radio club. Here you will find people just like you, and people you may want to become. Especially if you want to upgrade your license, the camaraderie of classmates will make learning a lot more enjoyable. Check the ARRL website for club listings in your area, or ask someone on your favorite repeater about clubs and meetings.

Listen, Listen, Listen

You can learn a lot of radio operating techniques just by listening. However, I must add this one very big caveat: You will have to listen very carefully to avoid picking up bad habits from poor operators along with the good habits from good operators. I have a saying at the office that I like to use all the time: "It's very important to be consistent, but it's more important to be consistently right than consistently wrong."

I suggest that you program several local public-service agencies into the scanner part of your FM rig (assuming you have out-of-ham-band coverage) and listen to their operations. Most VHF and VHF/UHF mobiles and HTs have extended receive capability, so you should not have much of a problem finding "good" frequencies to listen to. You can find specific frequency information for your local area with a scanning guide or ask the staff at your local radio and electronics emporium. Also, our sister publication, *Popular Communications*, is a great source for scanner radio and public-service communications information. Plus, you often can find useful frequency information on the internet. On the other hand, you can do what I do and just let the radio scan until it "finds something" all by itself and then input that frequency into memory.

The public-service-frequency bands include, but are not limited to, the following: 30–50, 148–174, 406–420, 450–470, 470–512, 806–824, 849–869, and 894–956 MHz. Personally, I like listening to the aircraft band (108–137 MHz). Those air traffic controllers and pilots really know how to communicate succinctly and accurately.

Again, however, be careful not to pick up any bad habits from others. Also, please don't imitate the movie and television view of radio communications, saying, for example, "Twenty-one-fifty to headquarters," as Broderick Crawford did in the TV series *Highway Patrol*. That sort of lingo won't be appreciated on just about any repeater system. (I must admit that those scenes on TV really looked exciting, though—the big man looking at something happening down the road, black-and-white patrol car door open, and stretching the microphone cord all the way out the door. . . .)

Some repeater groups have websites that provide a set of bylaws, rules, and suggested "repeater etiquette." Read the rules and obey them. Also, if you use a certain repeater regularly, think about contributing to the repeater system in some way, either through your checkbook or some other means of support. Owning and maintaining a repeater is a very expensive enterprise, and you are a "guest." Treat the "machine" and its sponsors with both respect and courtesy.

Learning by Teaching

This is an interesting one. Did you know that when you teach others something, it reinforces your knowledge of the topic? When I was a tutor for non-native English students, I really

On the Cover

Ask Paul Bittner, WØAIH, what he grows on his farm in Fall Creek, Wisconsin, and if you're from the government, he'll tell you he grows something called blue-stem grass, which grows to six feet and provides food and ground cover for a variety of wild animals. If you're a ham ... well, if you're a ham, you don't even have to ask. In between the stalks of blue-stem grass sprout no less than 66 towers, poles, and pole-towers, supporting (at current count) 52 different antennas for six HF bands from 160 to 10 meters.

"My hobby, I must say," says Paul, stating the obvious, "is towers and antennas ... and the CQ contests." His favorite contest, on his favorite band, is the CQ World Wide 160 Meter Contest, making his antenna farm a perfect fit for our February issue, since the SSB weekend of the 160 contest is at the end of the month.

Directly behind Paul in the cover photo is an elevated 1/4-wave vertical for 160 meters, rising 130 feet above the insulator that's 50 feet in the air! Total height: 180 feet, plus 48 elevated radials. You can also see the supports for one of his two full-wave 20 meter rhombics.

Paul says he began seriously collecting towers and antennas about 25 to 30 years ago, when he placed the high bid—about $200 total—on four fire towers that the US Forest Service no longer needed. Nowadays, he often "inherits" broadcast antennas that are being replaced for no cost except that of tearing them down and hauling them away.

Paul has been a ham since 1949 and a contester since 1950. He's a retired Lutheran minister and credits ham radio and on-air friendships with helping get the wheels moving for an ongoing church medical mission in Kyrgystan and Kazakhstan. He adds that people often ask how a minister got involved with all this metal, and he answers, "Some ministers golf; some ministers put up towers." To which we say, Hallelujah! *(Cover photo by Larry Mulvehill, WB2ZPI)*

References

Here's a quick listing of some of my favorite ham radio books. You might find them useful, too.

The ARRL Handbook for Radio Communications (ISBN: 0-87259-192-1)
The ARRL Operating Manual (ISBN: 0-87259-793-8)
The ARRL Antenna Book (ISBN: 0-87259-804-7)
The ARRL's FCC Rule Book (ISBN: 0-87259-785-7)
The ARRL Repeater Directory (ISBN: 0-87259-864-0)

Don't forget the award-winning CQ "Getting Started" video series, available from the CQ Store. Titles include:

"Getting Started in Ham Radio"
"Getting Started in VHF"
"Getting Started in DXing"
"Getting Started in Contesting"
"Getting Started in Amateur Satellites"
"Getting Started in Packet Radio"

For more information or to order, see the ad in this issue of *CQ* or visit the CQ website, <http://www.cq-amateur-radio.com>, and click on "The CQ Store" button.

had to twist my way of thinking to understand what they were asking. Their questions made me think about various topics in a completely different way, and I had to use my knowledge of the subjects at hand to answer their questions.

Remember that second point about others knowing less and more than you? When you have the power of knowledge, you can teach others something new, too. Their questions will make you think about the topic or topics from new angles, reinforcing your knowledge even more. Sometimes, though, a question can "stump" you, which is okay. This just means that you'll have to search for another expert to lend you a hand, and the teacher (you) becomes a student again.

Reading and Research

This method isn't as exciting as the previous ways to learn more about our hobby, but it certainly is valid. In fact, with internet access, there is almost no limit to what you can find. However, like a lot of things in life, there is nothing like old-fashioned, hands-on experience and learning by doing. Some of my favorite reference books are listed at the end of this column, and don't forget about the video tapes available from the CQ Store.

Making Mistakes and Learning from Them

As mentioned earlier, making mistakes is one of the aspects of learning. I always say, "I know what *not* to do in this case. . . ," since I make mistakes all the time. However, the only way to turn mistakes into useful knowledge is to learn the proper way of doing the task. In other words, if we goof, we have to find out why we goofed, fix the goof, and remember the correct way of doing something to prevent another goof in the future.

A Team Effort

You can also learn new things by helping others. This is especially true with bigger projects, such as antenna work. I have learned a lot about antennas and tower systems over the years (especially the "knowing what not to do" sort of stuff) by helping others. If you're willing to help at an antenna party, the folks in charge will tell you what to do and what not to do. Your job is to safely do what the boss tells you to do, but for future reference, you should also be making mental notes so that when the time comes to install your own antenna system, you will be able to make knowledgeable decisions.

The Concept of Continuous Improvement

This idea isn't new. It comes from many quality programs. Continuous improvement is the search for excellence and perfection. Since nothing is "perfect," we should always be improving our skills and knowledge. Whenever you use your radio for something, you should strive to improve your signal, or your operating technique, or station layout. You can also sit back, relax, and take pride in your station if you are satisfied with its operation and efficiency. This would be a great time to take on a new challenge, whether it's a new operating mode such as SSTV, or a new operating activity such as a contesting or traffic handling. Who knows? Maybe you can share some of your curiosity by teaching someone something new about hamming.

73, Wayne, KH6WZ

world of ideas

BY DAVE INGRAM,* K4TWJ

More Spider Webs and Dinking Fun

As you will recall, last month's column featured a neat two-tube trans-receiver with genuine spider-web coils, an easy-brew mini-rig you could assemble as is or modify to your heart's content. Basic details of the little gem overflowed available column space, so we are continuing this month with more notes and information applicable to both this rig and numerous other homebrew projects. Think of it as a newcomer's guide to dinking, experimenting, substituting parts, and coming up with your own circuit ideas, and you will be right on track.

In addition, this time we highlight another homebrew project with widespread appeal—an eye-catching antenna tuner also designed by our guest, Peter Demmer, KH6CTQ, and also using spider-web coils. Even if you do not elect to build either of our fun projects right now, you should acquire some good, basic electronic knowledge that never goes out of date, information more and more folks are failing to learn in today's digitally oriented era. On that note, let's get started!

Photo A– Need a simple and convenient way to check resonance of a hand-wound coil and junk-box-obtained capacitor? An MFJ-259 Antenna Analyzer and accessory MFJ-66 Dipper Coil are the ideal solution.

Receiver Notes

In looking back at the receiver section of last month's mini-rig (fig. 1) and comparing it with the classic KnightKit regenerative receiver in fig. 2, we find some quite interesting variations. First, the Knight uses regular plug-in coils rather than spider-web coils, and its antenna input is coupled to the main/grid coil by a variable capacitor rather than a swinging link/coil. What is the difference? The three-turn/antenna-to-ten-turn/grid-coil arrangement offers a slight voltage step-up and a possible improvement in sensitivity, but the concepts are otherwise interchangeable. If I was not mechanically inclined, I would opt for capacitor coupling. Could the regen/plate coil also be modified for stationary rather than movable operation? Sure. Just add a potentiometer in series with the plate's 2.5 mHy choke and (40 VDC) B+ connection and leave its "far end" (point "A" on KnightKit) disconnected. A variable capacitor (50 or 100 pFd) wired in parallel with the plate coil would also work, as it would shunt some of the feedback around the coil. Are the ideas starting to make sense, friends?

Next notice small-value capacitors (such as 50 pF, 100 pF, etc.) are used in signal- or RF-related applications, while larger value capacitors (such as .047, .01, and 2.2 mF) are used in the audio stage. Why? Capacitors act like "AC resistors," with small values passing RF but attenuating AF while large values pass both AF and RF. In many respects, different-value capacitors may be compared to electronic "traffic cops," ensuring that RF and AF (and DC) follow specific circuit paths in receivers and transmitters.

Notice the KnightKit employs multi-grid tubes while our spider-web treat utilizes triodes. Why? Multi-grid tubes usually exhibit more gain, but again, both concepts have their good points. An input signal is usually applied to a tube's "first grid," so it controls the flow of electrons from cathode to plate and detects, amplifies, etc. An "almost as positive as the plate" voltage is applied to a tube's "second grid," and it accelerates electrons so they really "wallop" the tube's plate. This punch knocks secondary electrons off the plate and generates noise, so negative voltage (ground) is connected to a third grid to prevent secondary electrons from degrading current flow or amplification. By thus applying near B+ to grid 2 and ground to grid 3, a multi-grid tube can usually be substituted for a triode—or vice-versa for low-power transmitter circuits.

Transmitter Notes

Now look at the transmitter section of our spider-web-coil-equipped rig (fig. 1) and compare it with the push-pull transmitter from Frank Jones's 1936 *Radio Handbook* (fig. 3). The circuits are almost identical, except Jones used a No. 53 or 6A6 tube, which was popular in receivers prior to the heyday of the 12SN7. Jones also limited current through the tube or input power with a 500 ohm cathode resistor, while KH6CTQ only used a 270 ohm resistor to step up power. An even lower value resistor might further increase power, but the tube could get abnormally hot and implode—especially with

*4941 Scenic View Drive, Birmingham, AL 35210
e-mail: <k4twj@cq-amateur-radio.com>

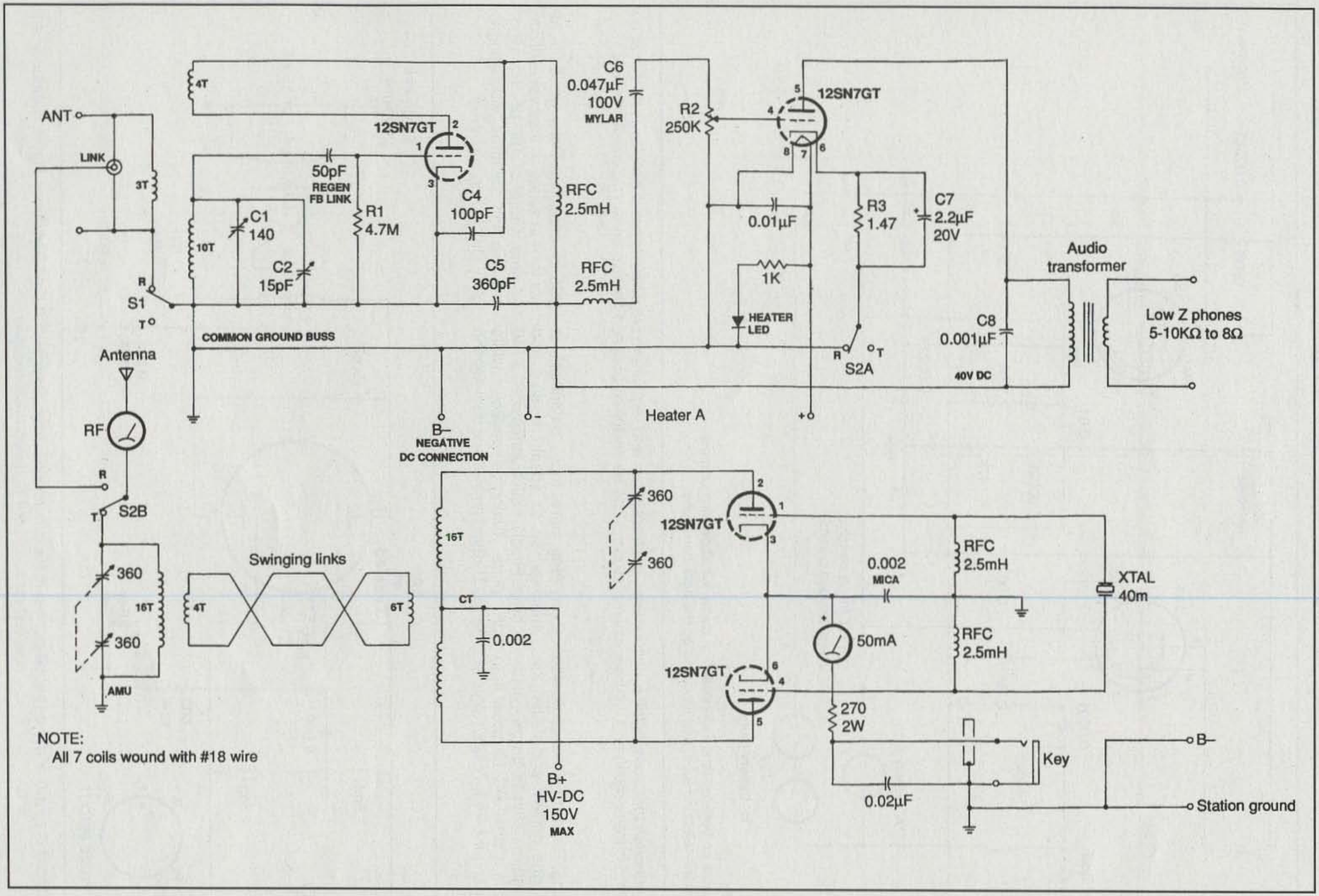


Fig. 1- Circuit diagram of the KH6CTQ trans-receiver with spider-web coils. Main details on this mini-rig were included in last month's column. Additional notes and ideas for circuit modifications are given this month.

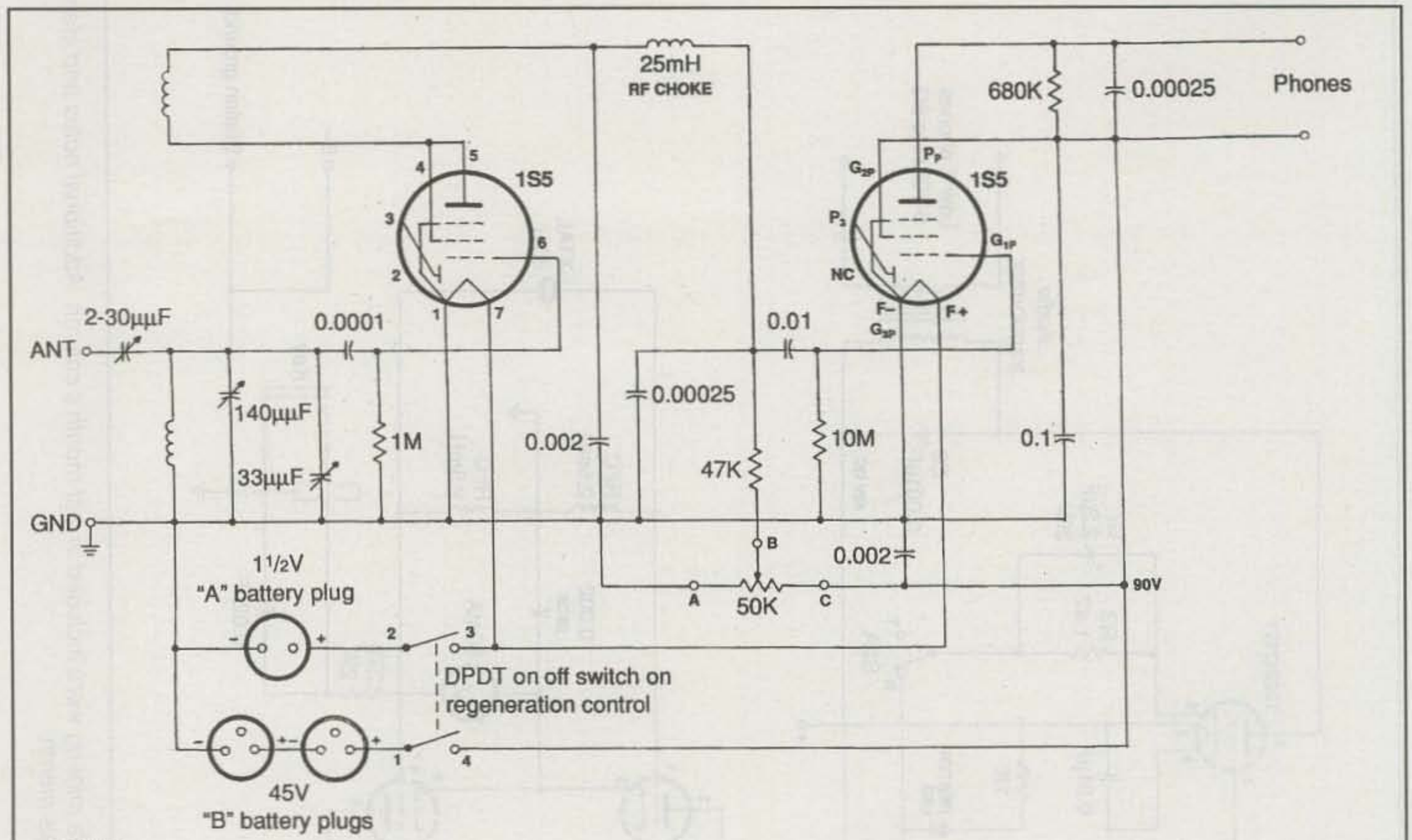


Fig. 2– Although this classic little KnightKit uses different tubes and regular plug-in coils, its basic circuitry is similar to our featured trans-receiver. Likewise, several designs can be swapped between the two units. (Discussion in text.)

slow keying. The extra power could also increase grid current and cause the crystal's quartz slab to break—especially if it is a small HC-18 rather than the larger FT-243 case crystal. Everything here thus "balances" or matches, so to speak, in size and power. Finally, notice Jones used a 140 pF plate tuning capacitor, while KH6CTQ used an on-hand dual-section 365 pF capacitor. Peter wired the two sections in series so their value divided to yield a total of 180 pF. By experimenting with coil turns, resonating the plate circuit then was easy.

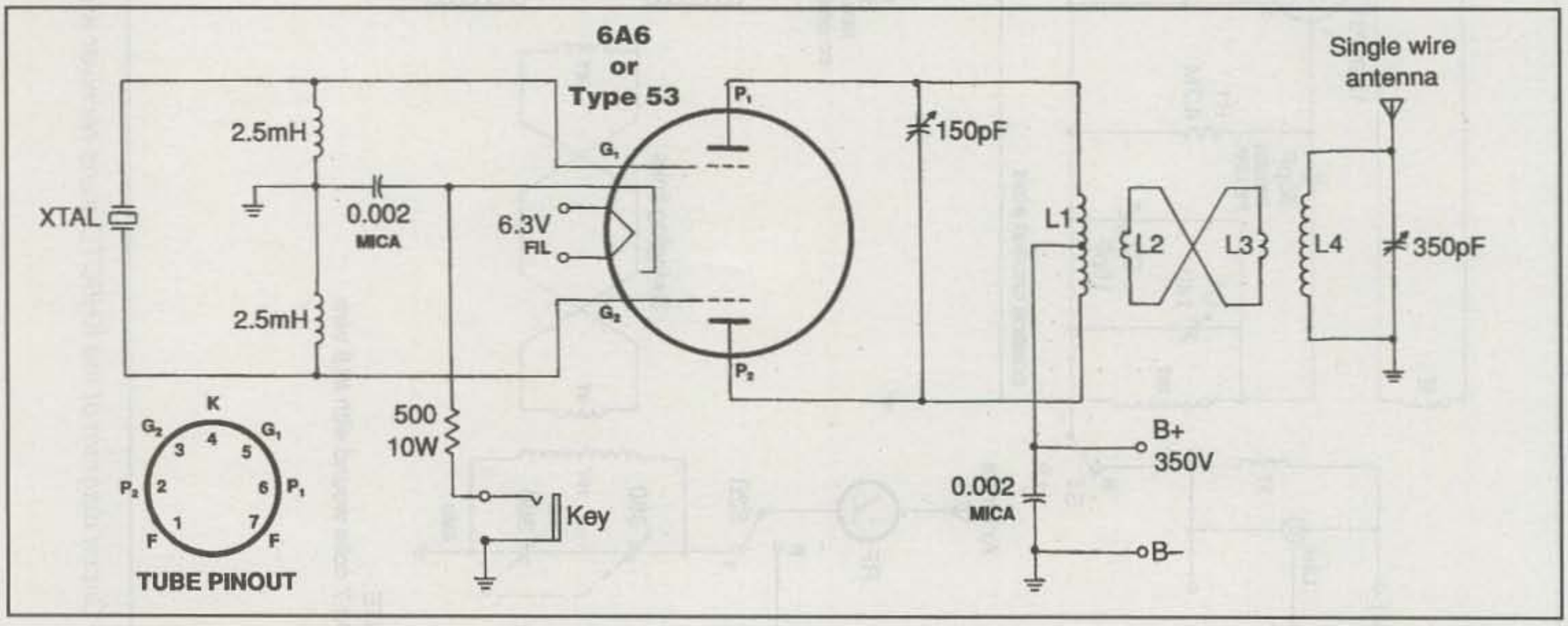


Fig. 3– Circuit diagram of the one-tube push-pull transmitter originally described in the 1936 Jones Radio Handbook *and adapted for use in our featured trans-receiver.*

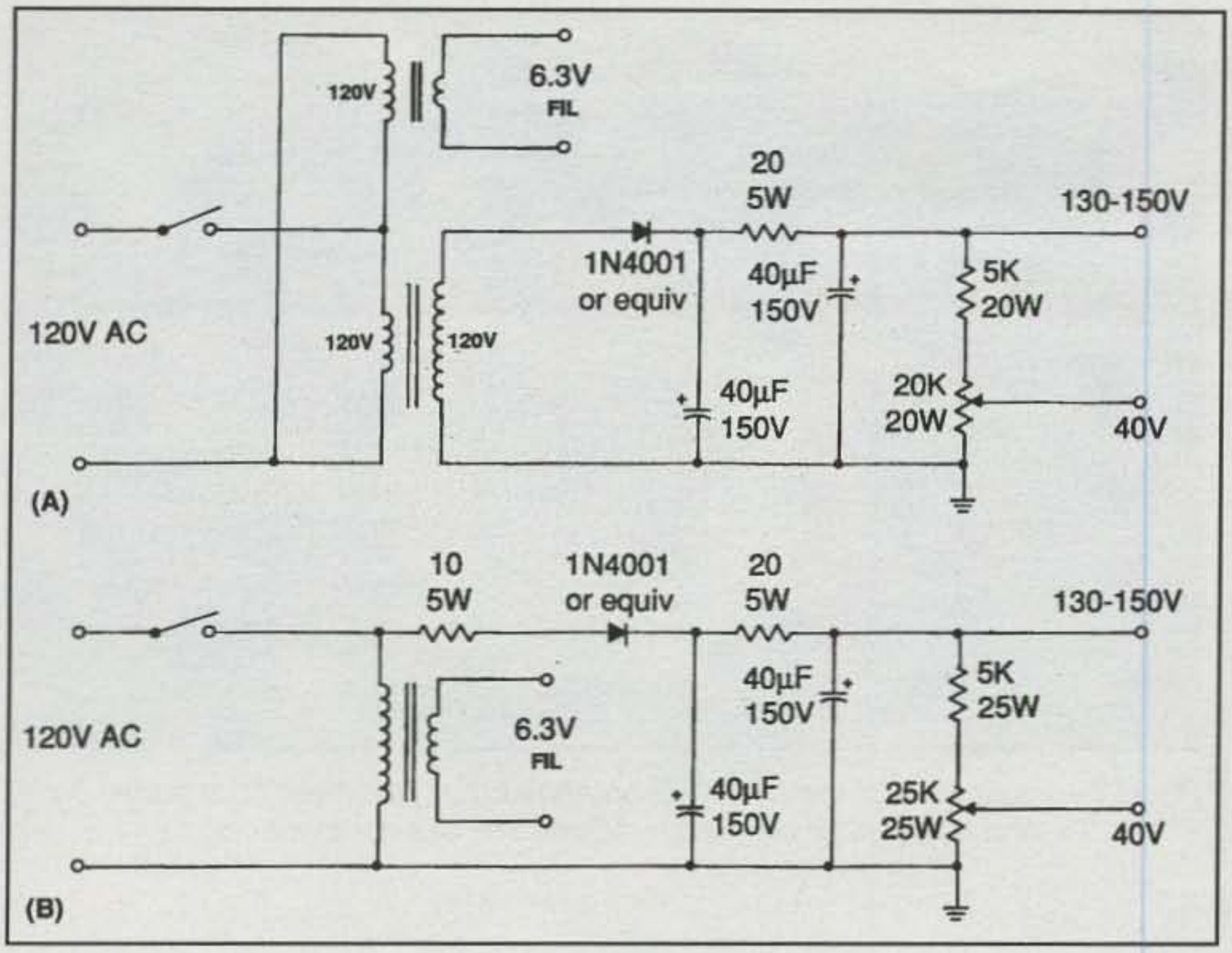


Fig. 4– Circuit diagram of a regular half-wave power supply (A) and a transformerless power supply suitable for use with our featured trans-receiver (B). Shocking idea? Not if it is isolated from ground, as discussed in the text.

Next focus on the swinging links and antenna-matching unit used for coupling the transmitter's output to a random-length longwire. If you prefer to use a dipole and avoid swinging mechanisms, just position the six-turn pickup coil close to the plate coil, connect the dipole to its two output wires, and place a 150 pF variable capacitor "across" those "link" wires for tuning/loading in a "pi net" fashion. It is a simple trick, but it works fine. Seasoned radio amateurs may consider the above notes common knowledge, but remember newer amateurs also read this column, and one of the best ways to learn basic facts is by reading about them. Hopefully, our views help that cause.

Resonating Coils and Tuned Circuits

Probably the most challenging question both new and experienced amateurs ask about homebrewing rigs is how to determine tuned circuit coil and capacitor values without complex math calculations. This calls for some real radio dinking, but we can offer a few shortcuts to simplify the process—and they can be applied to cylindrical and spiderweb coils alike.

First, look through a stack of old magazines to get an idea of what similar homebrew rigs used as coils. Using a grid dip meter to determine the resonant frequency and tuning range of a mated coil and capacitor and then adding or deleting coil turns until resonance appears within a desired frequency range is also a good idea. Genuine tube-type grid dippers are becoming scarce. Two alternatives work well here, however: Treating the circuit like an antenna and checking its resonant frequency with an MFJ-259 Antenna Analyzer, or using an MFJ-259 with its optional dip-meter coupling coils (photo A). Either approach gives you essential data on the circuit's resonant frequency, bandwidth, and Q, and stray capacitance is even factored into the measurements. Then you simply add a couple of coil turns to lower the frequency range or remove/delete two or three coil turns to raise the frequency range.

An Interesting Thought

Some readers may be asking for suggestions to use with this KH6CTQ mini-rig, so the circuit of a traditional half-wave DC supply is shown in fig. 4(A). If a suitable "tube type" transformer is not available, consider using a pair of 115 to 12 volt transformers wired back to back. With a capacitor input circuit, output voltage will be around 150 VAC. A 5000 or 7500 ohm, 10 or 20 watt "slider type" resistor should work fine for reducing the voltage down to 40 volts for the receiver.

Now consider this point, friends. If this mini-rig is built on a wood baseboard, its common ground-bus connection is isolated from the antenna link, and a

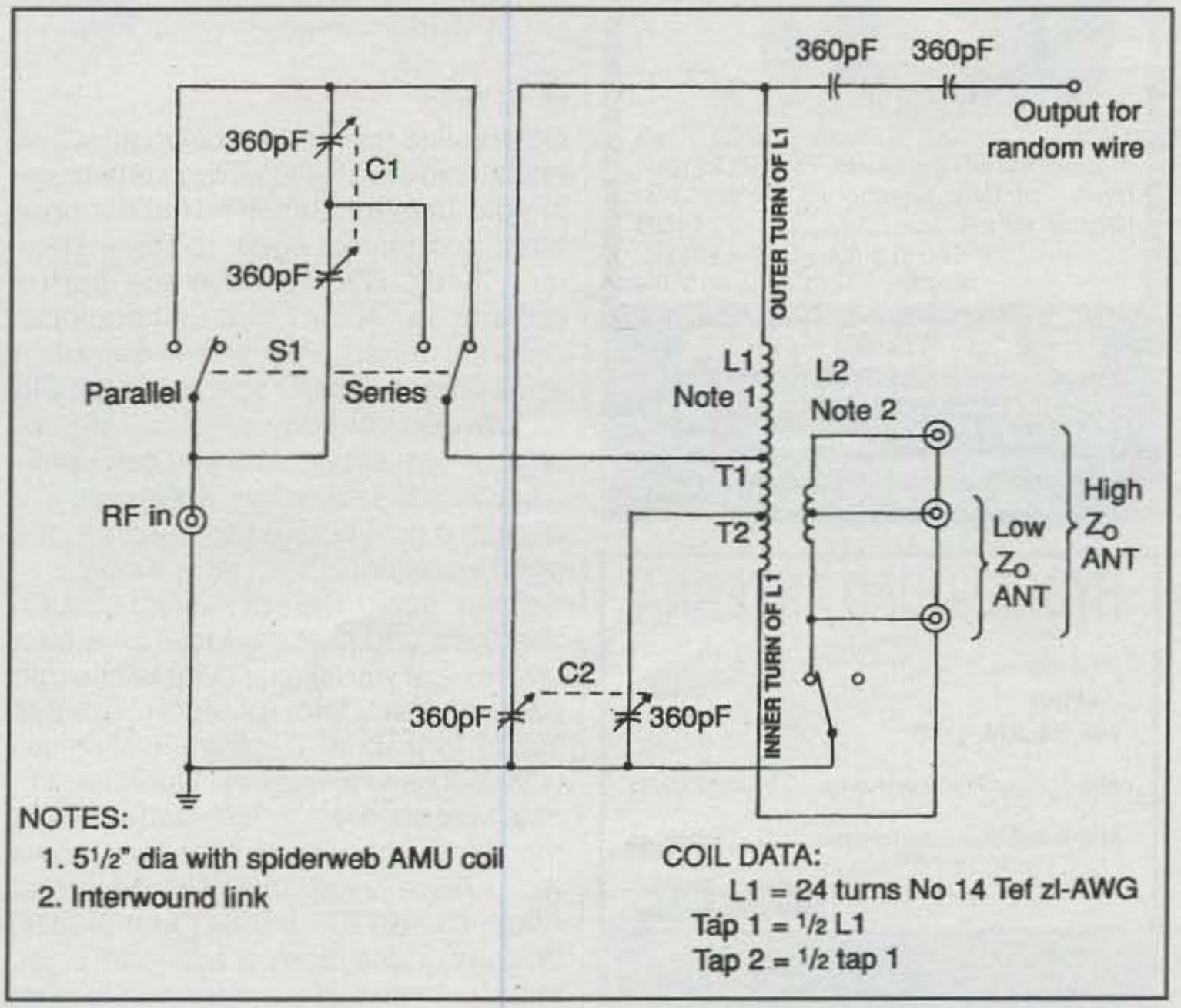


Fig. 5– Circuit diagram of the unique web-equipped antenna tuner designed and built by Peter Demmer, KH6CTQ.

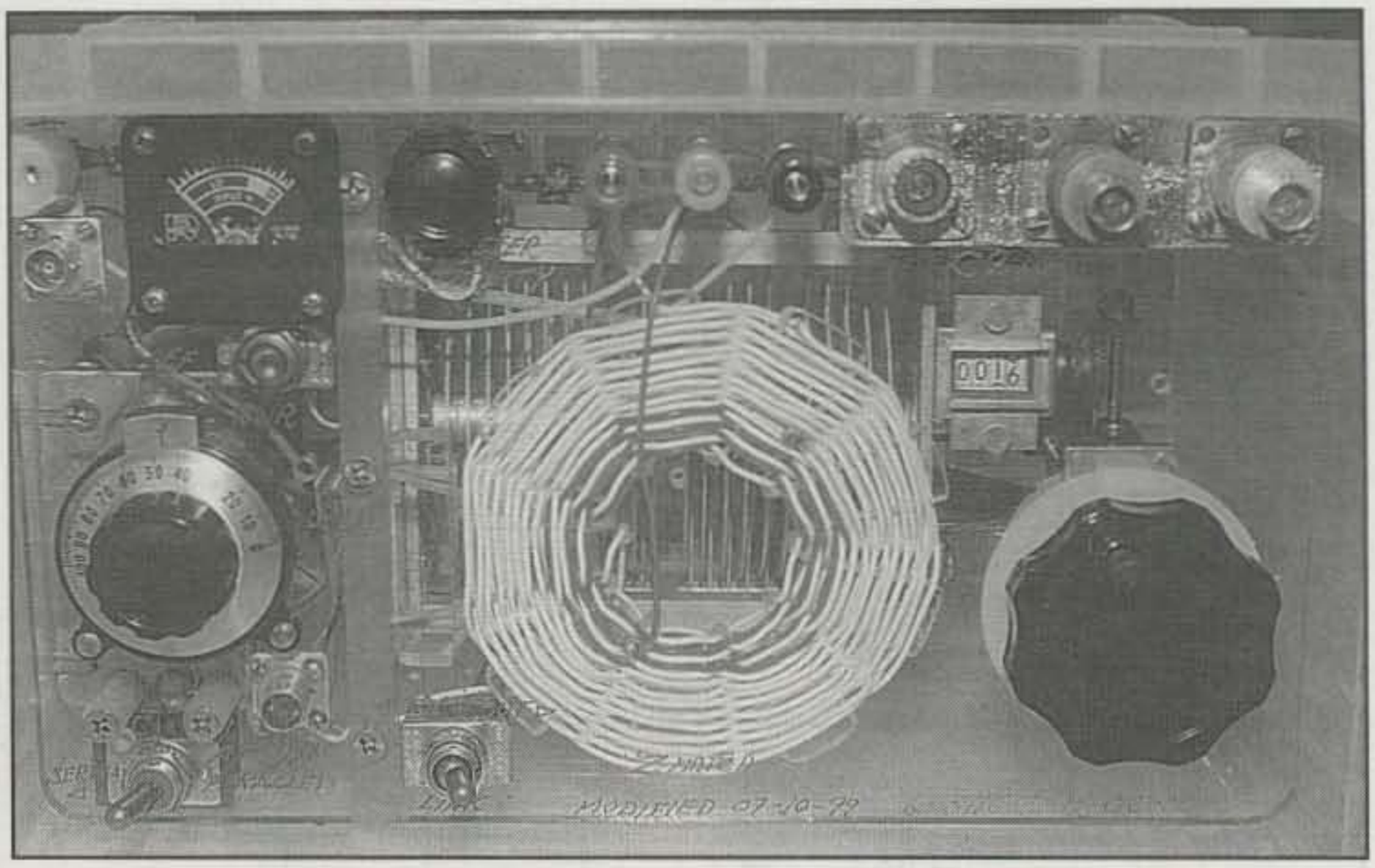


Photo B– Front view of the KH6CTQ antenna tuner with clear front panel, base, and spider-web coil forms. All you see are components!

plastic-encased bug is used for keying, would not an AC/DC high-voltage supply hold merit? A sample circuit is shown in fig. 4(B). "Transformerless" supplies are generally considered unsafe because one "side" of an AC line is hot to ground, but a transformer isolates that direction connection. If reverse isolation is applied (insulating the key, earphone, and antenna connections), however, safety is maintained.

A Spider-Web Tuner

Do you find spider-web coils attractive, and would you like to include one or two in your present station? That's a great idea, and thanks again to Peter Demmer, KH6CTQ, we have the perfect answer—a spider-web-coil-equipped antenna tuner. You can assemble it according to Peter's special circuit (fig. 5), my general-purpose circuit (fig. 6), or your own circuit, and you can opt for 5 or 3 inch diameter forms. Any way you decide to go, you are set for some jolly-good webbing!

Peter took the maximum-visibility approach and built his tuner on a clear Lucite base with similar clear Lucite front panel and web form (photo B). This particular form is 5 1/2 inches in diameter with double windings near its center. You can "size up" the 3 1/2 inch pattern in last month's column to make this form, check with KH6CTQ (98-1559 Akaaka Street, Alea, HI 96701, e-mail: <ampruss@lava.net>) for a ready-made form, or just make your own 3 1/2 inch form. Since the form does not move or swing like those in our previously featured mini-rig, it can be permanently mounted from the center or any way you prefer.

The coil is wound with No. 14 insulated wire. Peter went first class and used Teflon®-insulated wire. Plastic-coated wire can be substituted, provided you hold applied power to below 300 or 400 watts. The main coil, L1, consists of 24 turns with taps at 6 and 12 turns, and the interwound output link, L2, consists of 12 turns with a low-impedance tap at 6 turns. Wind the coils starting near the form's inside area with wires for both L1 and L2 on your finger(s). Weave the wire between the form's spokes until you complete L2, then continue winding and weaving outward until you complete L1. I have found the best way for making taps on web coils is by winding the first turns, then cutting and scraping/soldering the wire to a "take-off wire" plus remaining coil wire, then winding more turns, etc. When you are finished, you just wire the coil ends and taps to the circuit and a switch or jumper wire—simple and effective.

The variable capacitors used in Peter's tuner are dual-section 360 pF types with common stators to minimize "scratchy" or erratic tuning. Switch SW1 configures the sections for series or parallel operation, producing a quite wide capacitance and impedance matching range. As you will notice, a random wire can connect to the "top" of L1, a high-impedance antenna can connect "across" L2, or a low-impedance antenna can connect between the center tap and "bottom" of L2. Overall, Peter's design is both elaborate and impressive.

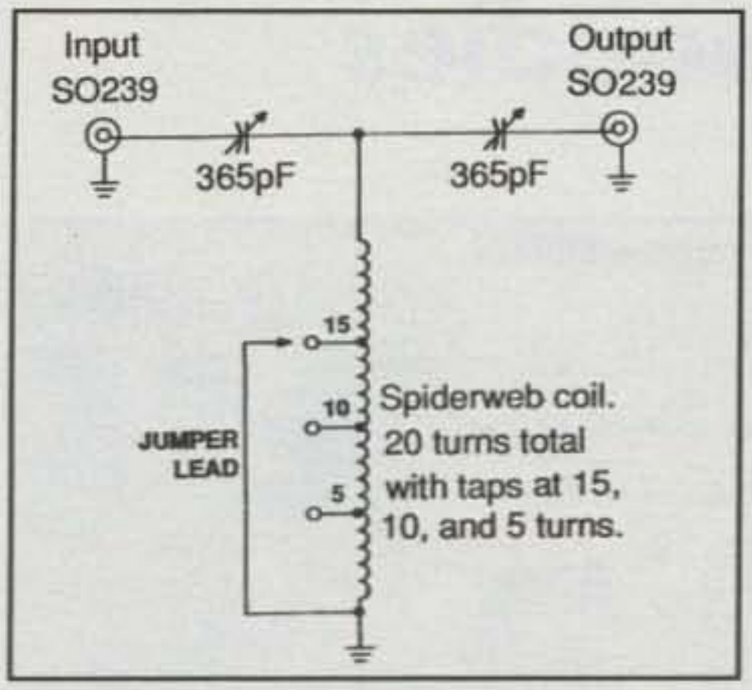


Fig. 6– Circuit diagram of my own quick and easy antenna tuner using a spider-web coil. (Discussion in text.)

Since my own homebrewing time is extremely limited, I took the quick and easy approach and assembled my tuner in the classic "T" circuit configuration as shown in fig. 6. I just wound a single winding of 20 turns and included taps at 15, 10, and 5 turns. A clip lead rather than a switch is used to select turns (I am not cheap, just pushed for time—really!). The tuning capacitors are 365 pF types I had on hand, with a fair but not wide plate spacing. A pair of SO-239 connectors round out this quick-brew gem. Thus far, I have only used the tuner from 10 to 40 meters. (I seldom operate 80 meters, and 160 meter work is eclectic.) It works fine with a 100 watt transceiver, and it feels as if it could handle 400 or 500 watts if the SWR is not excessive.

After dinking with the tuner and looking back at spider-web forms (right around Halloween 2002, no less!), I started visualizing a huge 10 or 15 foot form made with a small center hub and thin, round spokes. I then visualized a few widely spaced turns of wire woven between the spokes to produce a miniature or disguised antenna. Hmm . . . painted black and orange then hung slightly above roof level. This "dinktenna" could have merit. Would any of our readers like to expand on the idea?

Conclusion

Well, gang, we became lost in a web paradise and again pushed available column space. I therefore will close with a quick and friendly thanks to our guest, Peter Demmer, KH6CTQ, for sharing his views, and also a reminder to all that this is a fun project for your dinking pleasure. Have fun and stay active on the air.

73, Dave, K4TWJ

Cool Clubs and Hot Goodies

BY DAVE INGRAM,* K4TWJ

One need not look very far to realize that interest in QRP is growing by leaps and bounds. Indeed, the numerous QRP clubs, projects, on-the-air activities, and ever-expanding array of hot new goodies you can enjoy on a limited budget is incredible! Looking from that "maximum enjoyment at minimum cost" standpoint, this month's column highlights the top clubs of the day, plus some exciting new accessories for QRP fun. If you have been thinking about spicing up your usual ham activities—being a big fish in a little pond rather than vice-versa—QRP is the answer and this column is your guide. Let's begin with details about the major QRP clubs.

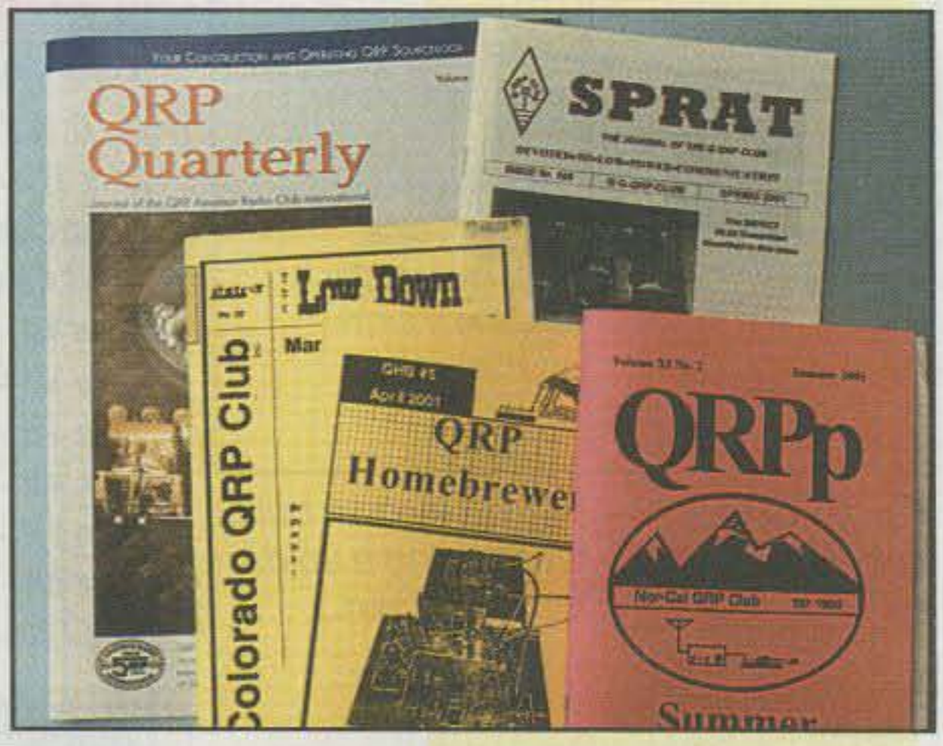


Photo 1– Nothing brings home the camaraderie of QRP like membership in three or four QRP clubs. Their quarterly magazines are filled with thought-whetting circuits and homebrew projects attractive to amateurs of all backgrounds and ages.

Photo 2– The very popular and widely acclaimed LDG Electronics Z11 Automatic Antenna Tuner. Unit measures 1.5"H × 5"W × 7"D, matches impedances of 6 to 800 ohms, and operates from 13 volts DC or a pair of 9 volt batteries for stand-alone activities. Note SWR-indicating LEDs on front panel. Nice!

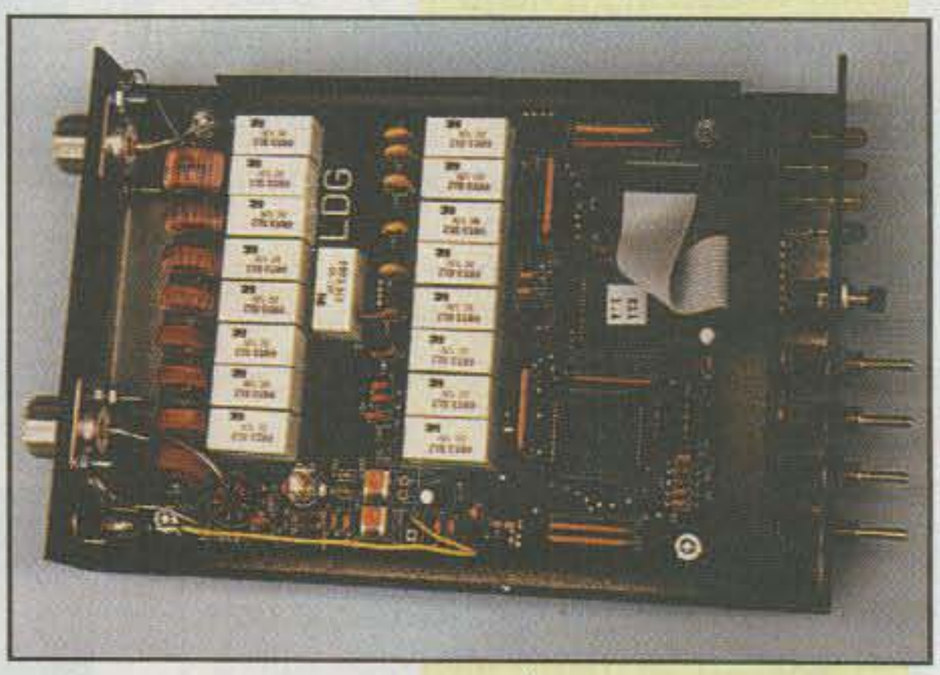


Photo 3– Inside view of the LDG Z11 reveals multiple capacitors and inductors that are switched into its "L"-type tuning circuit by latching relays which retain their settings even after power is removed. Updated (MARK II?) specs reveal all Z11s can operate from two 9 volt batteries and handle up to 60 watts of power.

Clubs for QRPers

Traditionally, QRPers thrive on building kits, sharing ideas, and experimenting with circuits, and our leading QRP clubs support that interest with some terrific quarterly magazines (photo 1). Indeed, every issue of these QRP-dedicated publications is filled with "build 'em" details on neat mini-rigs, accessories, and antennas. Between building gear and operating in some of the contests also outlined in the magazines, club members stay enthusiastic, bond together, and have a ball. If you want to really enjoy life in the QRP lane, join one or two clubs and share the fun. Which one(s)? They all are winners!

The **G QRP Club** of Great Britain is well known and endorsed by low-power enthusiasts worldwide. In fact, many of the homebrew projects described in the club's quarterly magazine, *Sprat,* have become commercially produced kits of good performance. A membership/subscription is well worth the investment, and it is available in the U.S. through Bill Kelsey, N8ET, of Kanga U.S. for $15 a year. Kanga UK and Kanga U.S., incidentally, produce some cool little kits (such as the FOXX III mini-transceiver discussed in the June 2002 "QRP" column, plus other items we hope to review here in the future). You can reach Bill at Kanga U.S., 3521 Spring Lake Dr., Findlay, OH 45840; telephone 419-423-4604; on the web: <www.bright. net/~kanga/kanga/kanga@bright.net>.

Another big-time QRP club that has been around for many years and continues to grow like crazy is the **QRP ARCI** (QRP Amateur Radio Club International). This club sponsors several on-the-air contests plus an outstanding awards program, such the famed 1000 mile-per-watt award you can get after making only one good cross-country QSO at the 1 or 2 watt level. The club's magazine, *QRP Quarterly,* is balanced sort of like *QST,* with projects, circuits, contests, member activities, milliwatting news, etc. Membership is $15 per year (U.S.), and goes to QRP ARCI, Mark Millburn, KQØI, 117 E. Philip St., Des Moines, IA 50315-4114, or <www.qrparci.org/us2signup>.

**4941 Scenic View Drive, Birmingham, AL 35210*
e-mail: <k4twj@cq-amateur-radio.com>

If you enjoy homebrewing to any reasonable (or unreasonable!) degree, you simply must join **NorCaL**, the North California QRP Club, and check out its quarterly magazine, *QRPp*. Every issue is loaded with details on hot kits and homebrew projects, plus member-initiated expansions and modifications galore. This magazine is dink heaven, and NorCaL kits are top notch. Subscriptions are $15 a year for U.S., $20 DX, and go to Jim Cates, 3241 Eastwood Road, Sacramento, CA 95821.

Next in line is the **New Jersey QRP Club**, a newer club that is coming up strong. The club launched its own magazine, *QRP Homebrewer,* a couple of years ago. Like NorCaL, the NJQRP Club is heavy into building goodies and kits. Membership/subscriptions are $15 per year U.S., $20 DX, and go to George Heron, N2APB, 2419 Feather Mae Court, Forest Hill, MD 21050, or e-mail: <n2apb@amsat.org>.

Do you like contests and mainly enjoy the operating side of QRP? Take a close look at the **Colorado QRP Club** and its magazine, *The Low Down*. It is quite interesting and includes short articles from some sharp QRP DXers to boot. Subscriptions are $12 a year and go to CQC, P.O. Box 371883, Denver, CO 80237-1883. The club's website is <www.cqc.org>.

Several smaller yet equally active clubs that focus more on local-area activities (and may expand or "go nationwide") also warrant mention now so that you will recognize their names at a later date. These include the Arizona ScQRPions, The St. Louis (MO) Club, and The North Georgia (NoGA) Club. Finally, our vote for the most up-and-coming and promising QRP-affiliated group of the day goes to Bonnie Crystal's HF Pack Troops. Details on these energetic, creative, and *very* active low-power portable operators was included in our October and November 2002 "World of Ideas" columns. (You do save back issues, don't you?) You can also check out this group at <www.hfpack.com>.

Now let's shift gears and peek preview some blowout new goodies for QRP—and more!

LDG-Z11—MARK II?

You probably have heard of the LDG-Z11 (the most popular accessory going for Yaesu's FT-817), but no, an official MARK II version has not been added to the line. The LDG-Z11 does, however, represent LDG's second generation of low-power automatic antenna tuners, and it also sports some recent performance upgrades worthy of special recognition. Before delving into the upgrades, however, let's take a brief memory-refreshing tour of this little marvel (photos 2 and 3).

Basically, the Z11 is a microprocessor-controlled "auto tuner" similar to the type used in many modern transceivers, except it has a wider impedance matching range and uses latching relays to select various L-C values. Specifically, it will match loads of 6 to 800 ohms or SWRs up to 10:1! The Z11 can be used as a fully automatic, semi-automatic, or manual antenna tuner; it has unbalanced/SO-239-type inputs and outputs; and works with coax-fed dipoles, beams, verticals, etc. An optional 4:1 LDG balun can be added for tuning a balanced or ladderline-fed antenna like a multiband doublet.

When used in its fully automatic mode, the unit senses SWR and selects one of its 130,000 L-C combinations any time an antenna's SWR is 3.0:1 or higher. In semi-automatic mode, the Z11 tunes for a low SWR (1.5:1 or less) when you press its front panel's "tune" button. In manual mode, you watch the Z11's SWR-indicating LEDs and tap its momentary "Cap" and "Ind" toggle switches to yield an optimum (near 1.0:1) SWR.

Photo 4– The W4RT Electronics One Touch Tune mod interconnecting a Z11 and FT-817. Mod is ideal for walk-and-talk HF'n where SWR changes as you move. Additional One Touch Tune modules for interfacing LDG's AT-11MP and RT-11 tuners with an FT-897 or TS-50 are also being developed by W4RT Electronics.

The big attraction of this little auto tuner has to be its use of latching relays to "switch in" different capacitors and coils to achieve a low SWR. That's because once tuned, the Z11 does not require "keep alive" or "maintenance voltage" like regular automatic tuners (latching relays hold their position until reset). This means you can even switch off or unplug the Z11's DC power cable and it will still hold its tune setting (until you reset or retune it). Combine that fact with the Z11's recently upgraded ability to operate from an 11 to 20 volt source (two regular 9 volt batteries wired in series), and this tuner's go-anywhere portability really shines. This is big news for campers and pedestrian mobileers, as the tuner can oper-

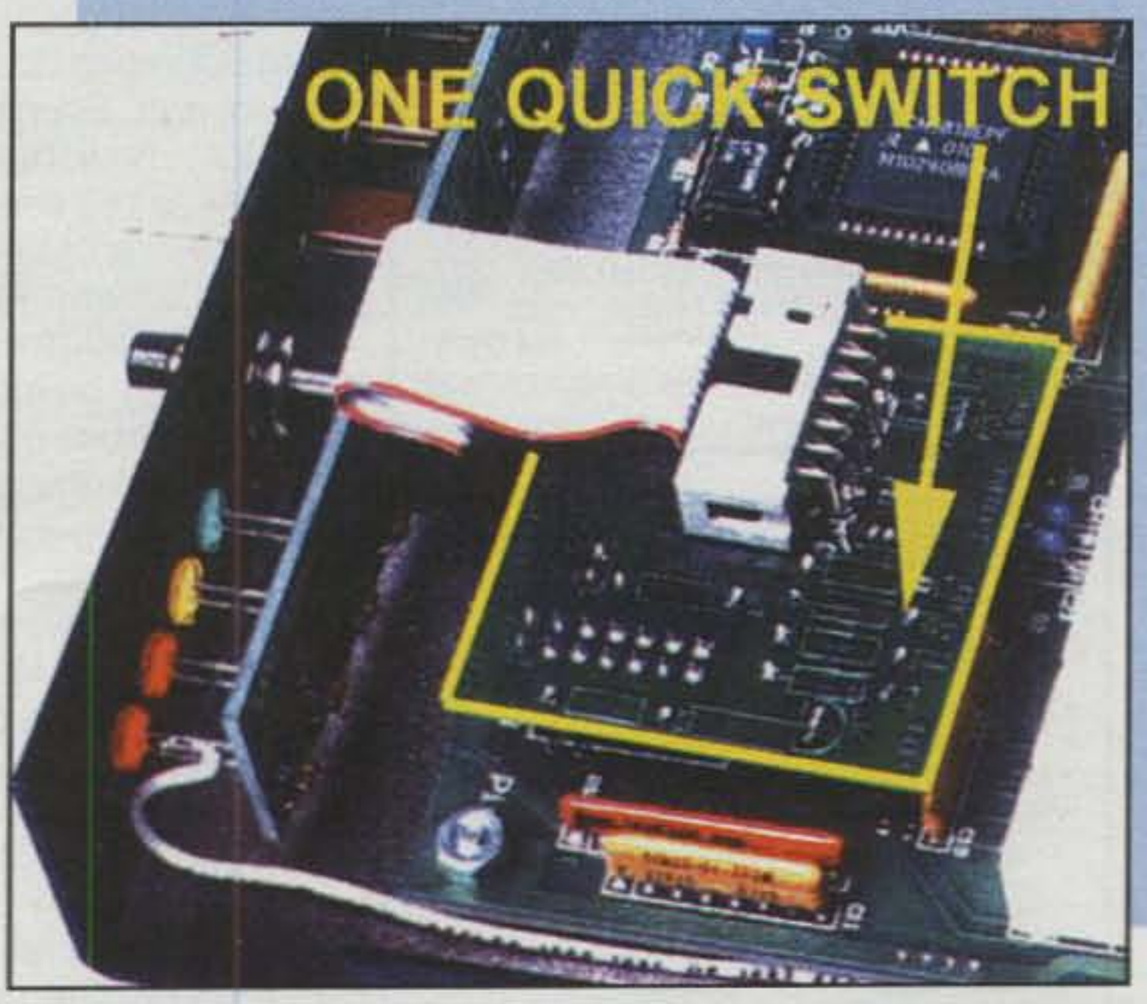


Photo 5– The W4RT One Quick Switch mod installed in a Z11. Unit allows the Z11 to stay in the "off" mode, yet briefly awaken anytime a remote Tune command is sensed. Mod is handy when backpacking and reaching gear is inconvenient.

Photo 6– Want a super-sounding SSB signal for portable QRP work? Need an extra hand for HF pack'n? Heil Sound's new Traveler headset with boom mic fills the bill in high style, and optional plug-in cables let it work with the FT-817, FT-897, or IC-706. Rock 'n Roll Radio Supreme!

ate stand-alone style for "walk and talk HF'n," plus two 9 volt batteries will power it for more than 500 tune cycles.

After extensive field tests and study, LDG also upgraded the Z11's maximum intermittent (SSB or CW) power rating from 30 to 60 watts. It thus qualifies as a handy auto tuner for low- and medium-power applications alike. No production changes were involved here, so both upgrades apply to all Z11s regardless of age. Everyone wins! In addition, the Z11 now has two higher power cousins: a 150 watt desktop version AT-11MP with a cross-needle SWR meter, and a 125 watt remote-mount version RT-11. A mini-review of the RT-11, incidentally, will be included in my next column on mobile operation. Watch for it!

How does the Z11 stack up in "typical portable operations? I've used it with my FT-817 and a haphazardly adjusted "Buddipole" (described in my October 2002 "World of Ideas" column) to operate not two, but three bands without tweaking, and it worked great. I even wrangled some DX QSOs with the lash-up. I am also continuously impressed by the amazing flexibility this pocket-size auto tuner adds to any rig—not just an FT-817. I've used it with a NorCaL 38 Special and a Kenwood TS-50 (at 10 or 50 watts only), and with a multiband G5RV, and it makes operating from anywhere a cinch. Try one. You'll like it!

Z11 tuners and information are available from LDG Electronics, Inc., 1445 Parran Road, P.O. Box 48, St. Leonard, MD 20685; telephone 410-586-2177 (or 877-890-3003) for orders, or via <www. ldgelectronics.com>.

Before leaving our discussion of the Z11, I should also highlight two popular support items (one brand new) for this tuner from W4RT Electronics. First is the One Touch Tune module which interfaces an FT-817 and Z11 to give instant autotuning (regardless of mode) by pressing a remote button (photo 4). Second is the new One Quick Switch mod which can be installed in a Z11 (photo 5). The latter mod lets you leave the Z11's power switch off for zero battery drain, yet briefly "wakes up" the Z11 for autotuning when you tap its Tune button. Both mods are ideal for battery-powered pedestrian mobile pursuits, and more details on them are available at <www.w4rt.com>.

New Heil Microphone

Bob Heil, K9EID, has also been quite busy pumping out some fantastic audio-enhancing goodies for the FT-817 and other QRP/battery-friendly transceivers. Leading that list is his new Traveler headset shown in photos 6 and 7. This

Photo 7– As Rhonda, KG4FVL, demonstrates here, Heil Sound's new Traveler makes a dandy chest mic for walking or mobiling when worn around the neck with its mic swiveled up to lip level. Its full-bodied audio response sounds great on FM, too!

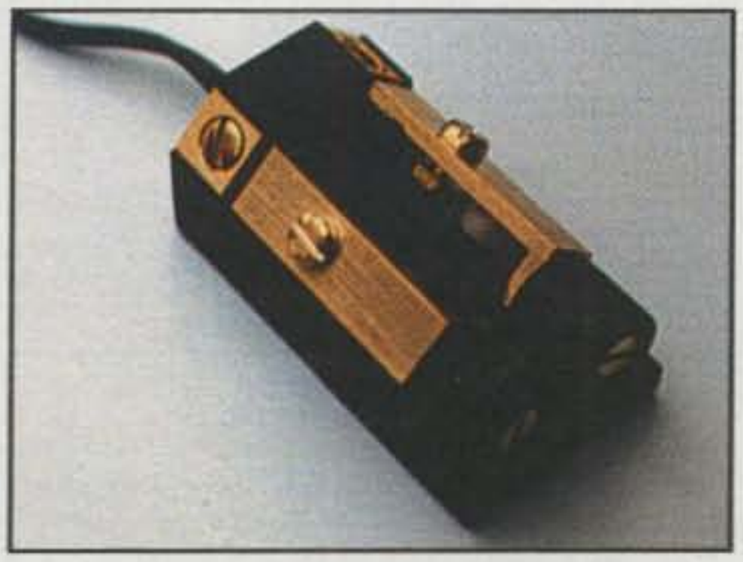


Photo 8– This unique new Squeeky key is handmade by Englmar Wenk, DK1WE, in Germany and is only 1 inch wide by 3 inches long. It sports angled levers, round fingerpieces, and works great with horizontal, vertical, or lateral finger movements. Paddle is rugged with a self-protecting design and is well suited to handheld or off-desk use.

little treat is a single earphone with a swivel boom mic and an in-line push-to-talk switch with up/ down tuning buttons. The Traveler's cable terminates in an 8-pin ICOM plug which mates with sockets on optional cables to fit an FT-817, IC-706, or other Kenwood, Alinco, or ICOM rigs. After studying the headset, I asked Bob if he named it the Traveler because it could move around for portable work or because it could travel between rigs. Bob cheerfully replied "Yes!" Enough said.

In checking out the Traveler we found it has a new wide-range electret mic element that delivers exceptionally full-bodied audio with enough output to drive even the most finicky mic input. Use this headset with an "HF plus VHF" rig such as the FT-817 or IC-706, and you can have awesome transmit audio on both 20 meter SSB and 2 meter FM. It rocks! With a slight adaptation, the Traveler also makes a dandy mobile mic. Just wear it like a chest mic with its headband around your neck and the mic swiveled up to your lips. You can clip the Traveler's PTT box to your shirt, or Bob even has an optional ergonomically designed footswitch with dual circuits and cables (one for rig, one for amplifier) you can place on the floor.

To order the Traveler and/or learn more about it and Heil Sound's other goodies, contact Heil Sound Ltd., 5800 North Illinois, Fairview Heights, IL 62208; telephone 618-257-3000 or <www.heilsound.com>.

DK1WE's "Squeeky" Key

Remember the little Squeeky key made by Englmar Wenk, DK1WE, and introduced in my December 2002 holiday gifts column? I recently put it to the test in a couple of QRP contests and while mobile, and found it to be terrific (photos 8 and 9). I even connected this "QRP Key" to my higher power big rig and it worked great there, too!

If this paddle looks confusing to you, the brass strips on each side are the levers and those round, black pieces at their ends are fingerpieces. Dot/dash contacts are set into Teflon® insulators below the levers, and adjacent screws (with heads near lever centers) set gap or travel. This unique, self-protecting design makes Squeeky ideal for carrying in a shirt pocket, using "handheld style," and going mobile. Squeekys are handmade and available direct from Englmar Wenk, DK1WE, Hubenring 4, D-88048 Friedrichshafen, Germany; or <www.morsekey.com>. Try one and spice up your CW life!

On that note, the curtain falls on another month's column (ouch!). Keep on hamming with low power, have fun, and may the force of good signals be with you! 73, Dave, K4TWJ

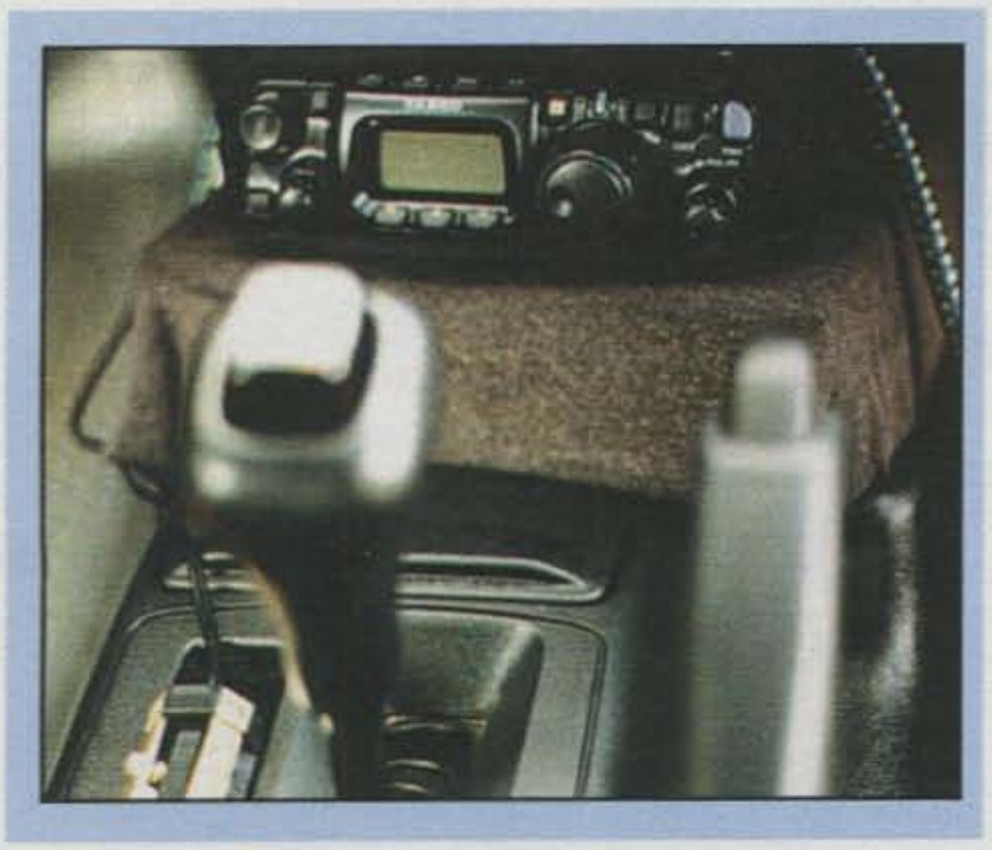


Photo 9– We often take Squeeky mobiling, as it fits perfectly into the gearshift position-display window on my Camaro, and probably many other vehicles. A thin piece of clear double-sided tape on the key's base also holds it solid to a rig case or other surface. Paddle is fitted with cable and 1/8 inch stereo plug for instant use.

vhf plus

BY JOE LYNCH,* N6CL

Leonids Storm Burst

The results of the *Leonids* meteor storm are still trickling in. However, from all observations to date, it was not the radio storm many had predicted and anticipated. Shelby Ennis, W8WN, commented that North Americans found the shower to be poor. However, Europeans found it good, although not as good as the past few years. Both peaks apparently reached storm levels.

The following came from the *Leonids* MAC preliminary report:

> The *Leonid* meteor storms occurred much as predicted. European observers saw the peak at 04:09 UT (ZHR = 2,300/hr, with the absolute scale still rather uncertain), while observers in the Americas witnessed a storm peaking at 10:50 UT (ZHR = > 2,600/hr). Both peaks were narrow, with a full-width-at-half-maximum of only 0.52 and 0.50 hours, respectively. Both peaks were also rich in faint meteors.
>
> The most important result may have been the high abundance of faint meteors. While predicted in some models, the distribution of meteoroid sizes in the trails is still poorly understood, and the new observations will help put constraints on this variable.
>
> A high background of activity persisted between the two storm peaks. That background may reflect the 1833 dust trail encounter (Lyytinen's prediction put the encounter time at 06:36 UT.), or it could be a manifestation of the *Leonid* filament.

Ennis added:

> The Europeans did rather well. I received a number of reports listing 50+ contacts, and one report close to 100. Nearly all contacts reported by everybody over there were on SSB. A couple of 1400+ mile contacts were reported, but none of an exceptional distance.
>
> Over here it was much poorer. Even though the ZHR was very high (and all visual reports put it slightly higher than the European rate), the meteors were generally very faint (thus, less ionization and less to reflect signals) and the peak was short. I received very few totals—mostly random comments on their disappointment. I know that a few fellows made a dozen or more contacts, but just don't have much information on their results. Several reported easy 222 contacts. Don't believe there were any 432 contacts reported. Many (maybe most, not sure) of the contacts reported were using FSK441. Either the peak wasn't good enough for SSB, or those making SSB contacts didn't post a report (probably the latter).
>
> In retrospect, it's surprising that we did so poorly over here, given the rate. True, the particles were generally small. Even so, the visual observers reported at least some fireballs. However, with this many meteors, and with the number using FSK441, there should have been more contacts.
>
> During the second peak, I was on FSK441 monitoring W1IPL, with whom I had just run a sked. Nil. Not a ping. He shouldn't be that difficult, but can't seem to work him. We have heard each other on past skeds, yet near the peak not a thing.

Andy Clarke, VA6SZ, reported the following 6 meter QSOs during the storm (all times UTC): W9JN, EN54, 0649; KL7NO, BP54, 0725; KØGUV, EN26, 1023; W7FSI, DN24, 1033; W7DHH, DM48, 1038; WA7GCS, CN85, 1044; NØAX, CN87, 1047; N7WT, DM08, 1052; K6UM, CM88, 1121; and VA5DX, DO62, 1138.

e-mail: <n6cl@fuller.edu>

VHF Plus Calendar

Feb. 1	New Moon
Feb. 2	Moderate EME conditions
Feb. 7	Moon apogee
Feb. 7–10	Second Annual Winter Six Club Contest (See text for details.)
Feb. 9	First quarter Moon. Poor EME conditions
Feb. 13	Highest Moon declination
Feb. 16	Full Moon. Excellent EME conditions
Feb. 19	Moon perigee
Feb. 23	Last quarter Moon; poor EME conditions
Feb. 26	Lowest Moon declination

• EME conditions courtesy W5LUU.

EME Conditions for 2003

The following is from Derwin King, W5LUU: "In 2003 the average degradation continues to increase as Moon perigee occurs at increasing right ascension and southern declinations where the sky noise (temperature) is generally higher. This trend will continue for the next two to three years as the position of perigee versus right ascension proceeds along its near 9-year cycle. Degradation will be very low again in 2007–2010 as perigee occurs within a few hours right ascension of cold sky. Meanwhile don't give up. There is one *very good* weekend monthly from January through May. In addition there are two good ARRL contest weekends: October 18–19 and November 15–16. We should quickly lay claim to these for the EME contest. In addition to these weekends, there are many *good* to *excellent* days during the week, especially in January through June 2003. Enjoy and good luck."

More information on EME predictions for the year, including Derwin's complete chart for the year, can be found in the Winter Issue of *CQ VHF* magazine. Also in that issue is a primer on getting started on 2 meter EME by Bob Kocisko, K6PF.

Transequatorial Propagation Feedback

I received the following comments from Ken Neubeck, WB2AMU, regarding my column on transequatorial (TEP) propagation in last December's "VHF Plus" column:

> I am not sure what you meant to say in the ninth paragraph of your December column in *CQ*, but it is not correct the way it is presented: "First, if you are located in the northern latitudes and are working well into the southern latitudes on 6 meters, you are working either normal *F2*

First Thailand EME QSOs Logged

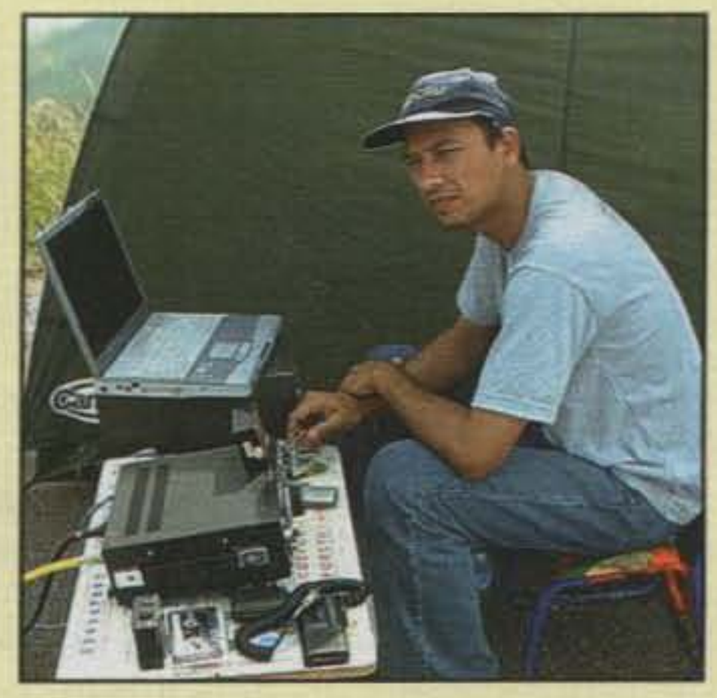
The first-ever Thailand EME QSOs took place on November 24, 2002 during the second weekend of the ARRL EME contest. Dave Blaschke, W5UN, reported the following via the Moon Net reflector:

"The highlight of the contest for me was working HS2JFW for a new country. This was the first-ever EME contact made from Thailand. My QSO was followed shortly by KB8RQ's. These were the only two QSOs made during the HS2JFW operation. They promised that they will do this again in the future. The operators were Joe, HS2JFW, and Long, HS2CRU. Their equipment consisted of a single 2M8WL Yagi and 180 watts. Their signal was surprisingly good. They operated from a remote site near HS2CRU's home. They put up a tent to shield them from the occasional rains, and did all antenna control by the 'arm-strong' method."

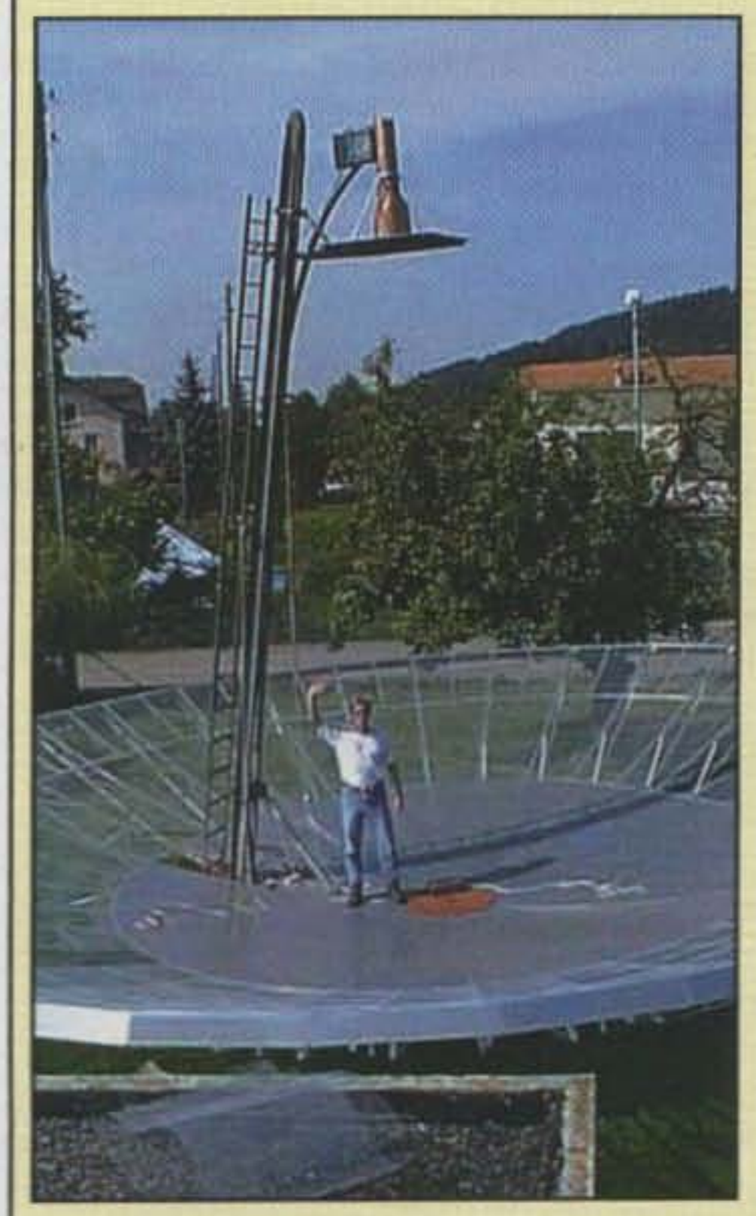
Dave also reported that the two Thai hams were attempting skeds in late December. Results of their efforts will appear in a future column.

Michel, HB9JAW, used this newly completed 11 meter dish in last fall's ARRL EME contest, during which the first Thailand EME QSOs took place. (Photo by HB9JAW)

Long, HS2CRU, poses underneath the 2M8WL Yagi. (Remaining photos via Dave, W5UN)



Joe, HS2JFW, waiting for the history-making Thai EME QSOs to take place.



Michel, HB9JAW, standing inside the 11 meter dish. (Photo by HB9JAW)

Determination and ingenuity are demonstrated in this photo of the first EME QSOs from Thailand. On the left in the rear of the photo the EME operation is underway. In the center can be seen the precarious position of the 2M8WL Yagi. On the right in the foreground an unknown Thai citizen walks along the road trimming the weeds, oblivious to the history being made.

propagation or multi-hop sporadic-*E* propagation." This simply is not true. Many of us in the northern latitudes work into the southern latitudes via sporadic-*E* plus TEP combination. The report by WA2FGK in the same column is of the October 6, 2002 TEP plus sporadic-*E* opening. The sporadic-*E* link was well defined from the northeast into Florida at the same time that they were working TEP into Argentina and Uruguay. I was lucky to catch this opening on that day when I got back into New York from California. The opening into LU-land lasted over 3 hours! Not *F2,* as it was after 3 PM local time.

Multi-hop sporadic-*E* southward can take you to YV and Central America. Single-hop *F2* can take you into the same area. Double-hop *F2* has happened on rare occasion into Argentina, but this [anomaly] is usually after an aurora event.

Also, I am not so sure that you can make that statement about *F2* on 70 MHz; there are not enough countries that allow operation on this band to know if this is true. I would wonder if the countries near the equatorial belt might be able to work via *F2* if they had privileges on this band. I would agree that conventional east-west *F2* might not be possible on this band for European stations. Again, there are not enough stations around the world on this band to make a definite conclusion. I would have deleted this paragraph altogether, as it takes away from your discussion.

Ken is correct to state that sporadic-*E* linked transequatorial propagation does take place on 6 meters—and theoretically is even possible on higher amateur frequencies, such as 2 meters—although to date no known QSOs have taken place. Regarding his statement "Not *F2,* as it was after 3 PM local time," I am not sure that he is correct in this assumption, as I believe *F2* propagation is possible after 3 PM local time.

Regarding the 70 MHz upper limit for *F2* propagation, at this point in propagation research no one really knows the upper limit of *F2* propagation, as no one except amateur radio operators (and perhaps the military) who operate in this lower to mid-VHF frequency range is seriously interested in this mode of propagation as a vehicle for two-way radio communications.

Most of the major users of this frequency range are only concerned with local propagation of their signals, and observe any reports of their signals being heard well beyond their anticipated range of reception as a novelty. Even so, there are many undocumented contemporary reports of DX reception on these lower VHF frequencies. For example, when I was in Vietnam we often had reports of guys hearing distant stations on their field radios which operated on FM on the lower VHF frequencies (below 60 MHz). Who knows what mode of propagation was the carrier of the signals? The answer to that question is lost to history.

Regarding the 70 MHz speculation on my part, when Ed Tilton, W1HDQ, was the editor of "The World Above 50 Mc" in *QST,* he occasionally received reports of operators working Europeans crossband between 50 MHz and 70 MHz. At the time, both Ed and the correspondents believed that the propagation mode was *F2.* Again, the answer to this question is lost to undocumented history.

Incidentally, for more information on TEP, see the Winter issue of *CQ VHF.* In it you will find Ken's article on TEP, along with Jim Kennedy, K6MIO/KH6's seminal article on TEP, which originally appeared in the 2000 Central States VHF Society's *Proceedings.*

South African Tropo Attempts

The following is from the South African Radio League website, <http://www.sarl.org.za/public/_news/NewsArticle2.asp>:

Exciting Tropo Season Ahead for VHF and UHF: Regular temperature inversions could occur from now on until autumn next year, producing optimum tropo conditions on VHF and UHF, thus making long distance contacts possible on both the analogue and digital modes.

From December this [past] year to February [this year], Pieter Jacobs, ZR1AEE, of Bellville attempted to establish a Trans-Atlantic contact with PY2ANE near Sao Paolo, Brazil on 144 MHz. Pieter is already testing a beacon, ZS1VHF, on 144.425 MHz FSK, which will eventually beam across the Atlantic. Distances of 4330 km have been recorded on VHF and UHF between the USA and Hawaii when tropospheric ducting occurred over the sea. But longer distances are expected, especially on the new DSP modes, when super high-pressure cells exist over the oceans, such as the St. Helena High and the Reunion High.

Countrywide contacts are also possible on both SSB and FM during tropo openings on VHF or UHF. So keep an eye on the barometer and weather reports or watch the VHF beacons and FM stations or repeaters within range. Tropo openings from Port Elizabeth can be detected by monitoring the ZS2VHF beacon on 144.415 MHz FSK. Its horizontally polarized signal has been heard in all six divisions of the Republic of South Africa via tropo propagation. This beacon can also indicate band openings on 432 and 1296 MHz.

SVHFS Conference

The following is excerpted from the announcement of the Southeastern VHF Society Conference by Greg Robinson, KB4NVD:

We invite you to join us in Huntsville, Alabama, April 25–26, 2003 for the 7th Annual Southeastern VHF Society Conference, which will be held at the Huntsville Marriott, 5 Tranquility Base, next door to the US Space and Rocket Center. Mention the SVHFS Conference when calling the Marriott Reservations Department, toll-free 888-299-5174 (local 256-830-2222; fax 256-895-0904) on or before the cut-off date of April 3, 2003 in order to receive the special rate of $75 per night single or double.

As in years past, we will have an exciting program with presentations from accomplished VHF+ amateur radio enthusiasts from around the country, plus antenna gain measurements (including the 1296 backscratcher competition), pre-amp gain and noise-figure measurements, Friday evening fleamarket with vendor displays, Saturday afternoon auction, Saturday evening banquet (open to everyone), and family programs. Drawings for door prizes will follow the banquet.

New for this year is a hands-on surface-mount technology (SMT) soldering workshop conducted by Tom Hadden, K5VH. Class size will be limited, so if you are interested, register for both the workshop and the conference early. Watch the society's website, <http://www.svhfs.org>, for updates on registration details.

We will also be having a 1296 homebrew antenna competition based on the Mouser Electronics backscratchers that were given out at the 2002 conference banquet. Gain will be confirmed on the 2003 Conference Antenna Range. Rules for the competition will be posted on our website.

Dick Hanson, K5AND, is the Program Chairperson. This is also the first call for technical papers for the SVHFS conference *(see the "Announcements" section in this issue of CQ—ed.).* Dick's e-mail address is <k5and@adelphia.net>. Contact him directly with questions about format, media, hardcopy, e-mail, etc.

For more information and updates see the SVHFS website: <http://www.svhfs.org>.

Six Club Winter 6 Meter Contest

The second annual Winter (6 meter) Contest begins at 2300 UTC February 7 and goes to 0300 UTC February 10. Each QSO is worth one point in own country and two points for every contact made outside own country. Hawaii and Alaska are each considered a separate country. Exchange is RST and grid square. QSO points: One point in the same country; DX (including KL7 and KH6), two points. For total score multiply total QSO points by the total number of grids worked. All entries must be received by March 15, 2003, either by e-mail or snail mail. Web page address: <http://6mt.com/contest.htm>. Snail-mail address: Six Club, P.O. Box 307,

Hatfield, AR 71945. Awards will be given out to the first-, second-, and third-place winners in each country.

And Finally . . .

Pay it Forward: It was in the late 1950s when I was a young street urchin selling the *San Diego Evening Tribune* on the street corners in Chula Vista, California. After I sold my allocated number of papers, I would go by the local newsstands and buy up their copies so that I could resell them. I can hear you now, wondering why I would buy papers to sell them for no profit. It was for the tip money. I worked the local eating establishments, asking the patrons if they wanted to buy a paper. Often they would give me a quarter for a paper that cost a dime.

It was at one of those stops at a local newsstand that I had a memorable event take place. Looking over the magazines and books in the racks, I noticed an *ARRL Handbook*. Knowing what amateur radio was, although I was not yet a ham, I knew the value of the book. I really wanted that copy but could not afford it—even with all of the tip money I had made.

Deep in my thoughts and oblivious to a woman coming up behind me, I was somewhat startled when she asked me which of the magazines I wanted to buy. I told her that I didn't want any of the magazines, but I was hoping to someday buy the *Handbook*.

Not knowing ham radio from lawn mowers, she didn't understand the contents, but she did understand my intent on having the book. She asked me if I was really serious, and I told her yes I was. Then she tested my sincerity by asking me to come by her home later in the week, when she would give me the money to buy the book.

You can bet that I did go by her home later that week, and true to her word, she gave me the money. After receiving her gift, bicycling as fast as I could, I went back to the newsstand and purchased the book.

I never did get the woman's name. She wanted to be anonymous. I did go back to her house to tell her thanks, but that was the last contact I had with her. Even so, I was profoundly affected by her simple act of generosity. Where am I going with this story? It is this:

Two years ago a movie that didn't get much national attention made its debut. Entitled *Pay it Forward*, it was based on a novel of the same name written by Catherine Ryan Hyde. The story is basically that of a school boy challenged by his teacher to do something kind for someone else. The boy takes the idea much further by deciding to do something kind for three people in the hopes that those three each would also do something kind to others. We don't need a calculator to figure out the math. Before too long the geometric proportion gets way out of our imagination's grasp.

W2VU wrote about "paying it forward" in amateur radio in his editorial a few months ago (November 2002 "Zero Bias"), and I'd like to expand on his ideas with a specific suggestion: What if clubs had a program that would encourage their members to "pay it forward" by allocating some funds to *make* it happen? Here is how it could work:

A club puts up some money, such as $1000, that would be made available to its members for the purpose of doing something good for someone else. This something good is limited only by one's imagination. Following the example of the woman who gave me the money to buy the *Handbook*, someone could take part of the club money and buy someone else a license study guide. Maybe someone could get a bunch of parts together and foster a project-building class. Someone else could pay the tuition for one of the League's classes on emergency communications or antenna modeling.

Here is the practical application: The person responsible for running the program in the club arranges for envelopes each containing a $50 bill to be put on a table for people to pick up at the end of a club meeting. The only stipulation is that the people who pick up the envelopes have to tell the story of what they did with the money at a future club meeting or in the club's newsletter, and they cannot benefit personally from the spending of the money. For instance, you cannot buy a radio for someone to become your captive rover in VHF contests. You can, however, buy a radio for someone to get on VHF and work you (as well as others) in a future contest.

Let me know what you think. If you pursue this idea, I will be more than happy to report on it in a future "VHF" column here in *CQ* or as a full-feature article in *CQ VHF*. For more inspiration, check the following website: <http://www.payitforwardfoundation.org/home.html>.

That's all the room we have this month. For additional reporting on VHF-plus activities, plus in-depth features, see *CQ*'s sister publication, *CQ VHF*. For more stories of your monthly activities, look again next month at this, your column. Until then... 73, Joe, N6CL

dx

BY CARL SMITH,* N4AA

The Most Wanted

By the time you read this Christmas will be a distant memory and the new year will be well under way. I trust the holidays were pleasant for all of you and that you have started off the New Year with all the usual resolutions—you know, the ones which won't be kept anyway....

The Most Wanted

DXing over the past year saw some of the really rare ones come on the air. Four of the Top Ten Most Wanted from *The DX Magazine*'s Most Wanted survey made enough "noise" to drop them out of the top spots. Most notable, I suppose, was the operation by Ed as P5/4L4FN from North Korea. Although the North Koreans asked Ed to cease his operation in December, he accounted for nearly 16,000 contacts. This was enough to drop North Korea from its number one ranking worldwide. The one mode Ed did not operate was CW, and that still makes North Korea the most wanted in the world for that mode. If you are interested in the survey results worldwide, the list is available on the web at <www.dxpub.com>. The Italian "425 DX News" also conducts a Most Wanted survey, and you can check its website at <www.425dxn.org>.

Last year saw a lot of activity from Afghanistan, but those responsible for YA5T are now gone and don't expect to be going back. Although there have been a few others active, it has not been enough to meet the continuing demand. As I mentioned above, North Korea is again silent and it may be a long time before anyone else manages to obtain permission to operate from there. Andaman (VU4) and Lakshadweep (VU7) have been silent for years, and with the political situation over there, it no doubt will be a while before we hear those prefixes on the air. Yemen (7O) continues to elude potential operation. Although OH2YY did manage a short operation last year, it didn't come close to fulfilling the huge demand for Yemen.

Government travel restrictions have prevented anyone from going to Navassa (KP1) or Desecheo (KP5) for several years now, and there doesn't appear to be any light at the end of that tunnel. Scarborough (BS7) remains high on the Most Wanted lists due to the political disagreement about who owns/controls that area. There have been some news reports that indicate a possible resolution to the problem, so it is possible we might see something happen over there in the foreseeable future—one possible bright spot for DXers. The French islands of Juan de Nova (FR/J), Kerguelen (FT8X), Glorioso (FR/G), and Crozet (FT8W) still sit high on the list, especially Juan de Nova. Perhaps our friends in France could mount a DXpedition to one or more of these Most Wanted islands sometime soon.

The ZL7C Chatham Island 2002 operating team. Left to right, front row: Al, K3VN; Bob, ZL3TY; Ken, ZL4HU; Paul, WF5T; Steve, G4EDG; and Hiro, JF1OCQ. Back row: Bill, N2WB; Reinhard, DF4TD; Stan, ZL2ST; Murray, ZL1CN; Dave, K4SV (ex-KW4DA); and Wilbert, ZL2BSJ. (Photo courtesy Dave, K4SV)

Peter I (3Y/P) is very high on the list, too, but being one of the Antarctic islands, it would be a very costly operation, to say nothing of the danger in going to those places. Still, there have been operations to these areas before, and one never knows when it might happen for Peter I.

I've been hearing rumors about some DXpeditions to some pretty rare spots. There is nothing on which I can comment at this point, but don't be surprised to learn of some really "good stuff" coming up this year. If some of this does come about, there will be a lot of very happy DXers.

QSLing—again

QSLing continues to be a topic of conversation almost every time more than two DXers get together. Why does it take six months or a year for a DXpedition to get cards printed and processed? We hear many stories as to why this happens—a sponsor is providing the cards at no charge and we have to wait for them; the mail is slow; etc.—and we wonder. I urge all DXpeditioners to put QSLing into their initial planning and follow through with the plan. Some have done so, and I encourage others to follow suit and help at least reduce the constant complaining we hear following a major operation.

Comments from Readers

Obviously, a lot of people who read this column aren't necessarily DXers. After talking about the Southern Appalachian Radio Museum project and

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

The WPX Program

SSB

2853 .....N5PU

CW

3100.....IK3UGX 3102.....OM7CA
3101 .....F5TDB

AWARD OF EXCELLENCE: KØKG

CW: 350 IK3UGX. 450 F5TDB. 600 KØKG. 1350 EA2BNU. 1400 F5YJ. 2500 KF2O.

SSB: 450 IZØBNR. 500 7N1NXF. 1300 ON6MX. 1500 AA1KS. 2300 I7PXV. 2900 KF2O. 5450 ZL3NS.

MIXED: 1350 EA2BNU. 1700 KØKG. 3500 KF2O.

15 meters: ON6MX
20 meters: 7N1NXF
80 meters: ON6MX

Africa: ON6MX
No. America: ON6MX

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, 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, WA8YM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2OD, ABØP, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1PO, K9LNJ, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, KZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, I7PXV, S57J, EA8BM, DL1EY, KØDEQ, KUØA, DJ1YH, OE6CLD, VR2UW, 9A9R, UAØFZ, DJ3JSW, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, W4GP, K4LQ.

160 Meter Endorsement: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF N4NX, SMØDJZ, DK3AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR1QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N8JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, WBØDD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA5CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, UAØFZ, CT4NH, W1CU, EA7TV, LY3BA, RW9SG, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, W4GP.

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.*

showing pictures of some of our collection in the December 2002 column, I received a number of e-mails and letters from readers. One said he normally wouldn't bother reading a DX column, but the pictures caught his eye. We exchanged a number of interesting e-mails. It was fun, and I thank him and others for their comments.

Equally interesting were the comments I received about my editorial on "Free Banding" which appeared in the November/December 2002 issue of *The DX Magazine* and also in my January "DX" column here in *CQ*. A great number of readers expressed shock that such things were going on, and they were completely unaware of it. I should stress again that there is a difference between CB and Free Banding.

The 8N1OGA Ogasawara team. Left to right, in front sitting: JA1LZR, 7K3EOP, JA1ELY, and JA1EY. Center sitting: JS1DLC, JA1WSX, WA1S, and XYL of JA1ELY. Left side, sitting: JR1AIB; standing: JE1CKA, JA1MRM, JQ1SUO, and JF1PJK. (Photo courtesy Ann, WA1S)

CQ DX Awards Program

SSB

2390.....NØYYO 2392 .....F5INJ
2391 .....IK8TMI

SSB Endorsements

320 .....4Z4DX/335 275.....WZ3E/314
320.....DJ9ZB/335 275.....XE2NLD/299
320.....VE7WJ/333 275.....IK8TMI/281
320 .....K9PP/333 275.....F5INJ/279
320.....W2CC/333 250.....KU4BP/254
320.....EA3BMT/332 200 .....NØYYO/216
320 .....K1EY/328 28 MHz.....NØYYO

CW Endorsements

320 .....W4OEL/334 310 .....F5OIU/317

RTTY Endorsement

320 .....W4EEU/299

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. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10, 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.

5 Band WAZ

As of December 15, 2002, 609 stations have attained the 200 zone level and 1301 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:

W6KR EA8ZS

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

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
WØPGI, 199 (26)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
KL7Y, 199 (34)
NN7X, 199 (34)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (1)
KC7V, 199 (34)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
K4UTE, 199 (18)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
K5MC, 199 (22)
W1JZ, 199 (24)
K2UU, 199 (26)
W1WAI, 199 (24)
W1FZ, 199 (26)
UT4UZ, 199 (6)
SM7BIP, 199 (31)
PY5EG, 199 (23)
SP5DVP, 199 (31 on 40)
KY7M, 199 (34)
W8AEF, 199 (40)
W9NGA, 199 (26)
K8RR, 199 (26)
UU5JR, 199 (4)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
KØSR, 198 (22, 23)
UA4PO, 198 (1, 2)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
LA7FD, 198 (3, 4)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
KF2O, 198 (24, 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)
N4XR, 198 (22, 27)
OE2BZL, 198 (1, 27)
N4PQX, 198 (24, 26)
RU3DX, 198 (1, 6)

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

DF3JO (153 zones)

Endorsements:

JT1CO (197 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $80 ($100 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, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. 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 Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.

The WAZ Program

12 Meter SSB

26.....VE3XO 27.....IK8CNT

17 Meter SSB

30.....IK8CNT

30 Meter CW

55.....VE3XO

6 Meters

57 .....N6KK (25 zones)

All Band WAZ SSB

4827 .....EA3JL
4828 .....EA4EED
4829 .....PY2DBU
4830.....UN7FN
4831.....DL2UH
4832.....IK6JAL
4833.....JG4OOU
4834.....HLØO
4835.....N8LAS

Mixed

8199.....K4BVN 8200 .....KQ4EE

All CW

341 .....PY2DBU
342.....JA2QXP
343.....IK8CNT

Satellite

018 ....N6KK (All 40 zones)

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, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. 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 Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.

DX "heavy weights" from Michigan (left to right): Don, W8WOJ; Bela, N8SHZ; and Ray, KB8ZYY. Don says he's been a reader of this column since the early 1950s and comments that he used to work Dick Spencely, KV4AA (SK), every morning many years ago. (Photo courtesy Don, W8WOJ)

Most countries have some sort of legalized CB and that's okay. The Free Banding thing is another story, where that operation is taking place on unauthorized frequencies for "casual" communications.

Unfortunately, even here in the U.S. there is illegal operation taking place on frequencies outside of the authorized Citizen's Band 40 channels. You say it should stop. I dare say that it would be virtually impossible to stop such operation. The FCC certainly doesn't have the manpower, or resources, to do much more than investigate interference to public-safety communications by such operations.

The FCC has been successful in many such cases, but not with the overall illegal frequency operation in general. Have you listened to the bottom end of 10 meters recently? Between 28.000 and 28.100 MHz there are more AM carriers than you can count. When the band is open, you hear literally dozens of them, making it difficult to work CW on 10 meters. That, my friends, is not acceptable. I like to work 10 meters on CW, and I don't like to have to fight S-9 AM signals from illegal operations to enjoy my hobby. I think it's our responsibility to make this activity known to those in positions of authority and power so they can look into it and come up with a satisfactory resolution. These are *our* frequencies, and we had better start fighting for them.

The GB2COS Scout Headquarters team, May 31 to June 1, 2002 (left to right): John, G3PXX; Peter, GW4IGF; Adam, M3JAL; Tony, G3TRL; David, G7GFC; Tony, G6FIT; Mike, G1CZU/M3CZU; Rod, GW7TKZ/MW3RDD; Arthur, G7BQY; and Patrick, GW4WSU. (Photo courtesy Arthur, G7BQY, and via John, KDØJL)

W2AGW Silent Key

December saw the passing of one of the top DXers in the world, Howie, W2AGW. Howie and two others had been at the "top of the top" for a long time. Now there are only two at the top. Urb, W2DEC, commented on Howie's passing, "It's the end of an era."

As the years go by more and more of the old timers who worked virtually all of those deleted countries leave us. Eventually I suppose we will see the "top of the top" get down to the current active list. There won't be anyone left who has worked those deleted countries. If you know any of these old timers, you might want to spend some time chatting with them about those long ago days before the memories are lost forever.

Work 'em Now; Worry Later

There has been a lot of talk about the sunspot cycle—when was the peak, what will the next cycle look like, what can we expect in the way of propagation, etc., etc. I've read a lot of the material, and then I turn on the radio and I still hear a lot of good, strong signals on 10 meters, along with the other bands, from all over the world. I don't remember past cycles being quite like this. Maybe my memory is failing, but I'm going to enjoy the conditions as long as they last and worry about declining sunspots later—when it really happens.

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

5062 9A2AA	3784 N6JV	3230 KF2O	2912 W2WC	2436 W7OM	2063 WB3DNA	1837 AA1KS	1472 OK1DWC	1130 PY1NEW
4492 W2FXA	3668 N4MM	3167 S53EO	2898 IK2ILH	2334 W6OUL	2018 HA9PP	1724 W7CB	1461 WT3W	1114 K6UXO
4154 F2YT	3633 YU1AB	3140 K9BG	2694 YU7GMN	2331 W8UMR	1999 I2EAY	1697 Z35M	1448 NG9L	1081 W4UW
4146 W1CU	3602 I2PJA	3139 WB2YQH	2655 WA1JMP	2288 K5UR	1983 W9OP	1674 YBØAI	1429 N1KC	742 K5IC
3971 EA2IA	3548 N9AF	3121 PAØSNG	2545 W9IL	2226 JN3SAC	1976 DJ1YH	1641 KØKG	1369 KW5USA	728 VE3NQK
3928 N4NO	3489 SM3EVR	3005 HAØIT	2456 9A4W	2121 PY2DBU	1958 CT1EEB	1573 VE9FX	1325 KX1A	697 KL7FAP
3827 9A2NA	3465 N5JR	2952 KØDEQ	2454 K2XF	2117 OZ1ACB	1949 VE6BF	1501 W2EZ	1226 EA2BNU	604 VE9FX
3823 VE3XN	3235 I2MQP	2944 IT9QDS						

SSB

4446 IØZV	3068 N4NO	2667 4X6DK	2270 IN3QCI	1954 CT1EEN	1730 I3ZSX	1520 DF7HX	1193 WT3W	990 HA9PP
4050 ZL3NS	3066 I2MQP	2594 I8KCI	2259 K5RPC	1950 K5UR	1721 DK5WQ	1485 W2FKF	1193 I2EAY	959 VE7SMP
4018 VE1YX	3049 F2VX	2570 LU8ESU	2180 OE2EGL	1937 I8LEL	1706 NQ3A	1415 KI7AO	1190 K4CN	842 K1BYE
3581 I2PJA	3030 9A2NA	2509 EA5AT	2061 W2WC	1864 K2XF	1704 IT9SVJ	1384 LU3HBO	1162 EA5DCL	822 K1BYE
3525 F6DZU	2885 I4CSP	2444 KF7RU	2002 LU5DV	1862 EA7TV	1658 W6OUL	1377 VE9FX	1089 N1KC	812 KU6J
3260 CT4NH	2885 N5JR	2386 EA1JG	1994 W4UW	1852 W7OM	1606 K8MDU	1368 NG9L	1078 EA3KB	786 KX1A
3234 N4MM	2824 CT1AHU	2337 W2WC	1978 N6FX	1821 W9IL	1562 W2ME	1254 JN3SAC	1062 AG4W	776 YBØAI
3180 OZ53V	2741 PAØSNG	2325 CX6BZ	1969 CT1EEB	1736 K3IXD	1540 SV3AQR	1238 LU4DA	1048 EA3EQT	702 KU4BP
3079 EA2IA	2719 KF2O	2301 HAØIT						

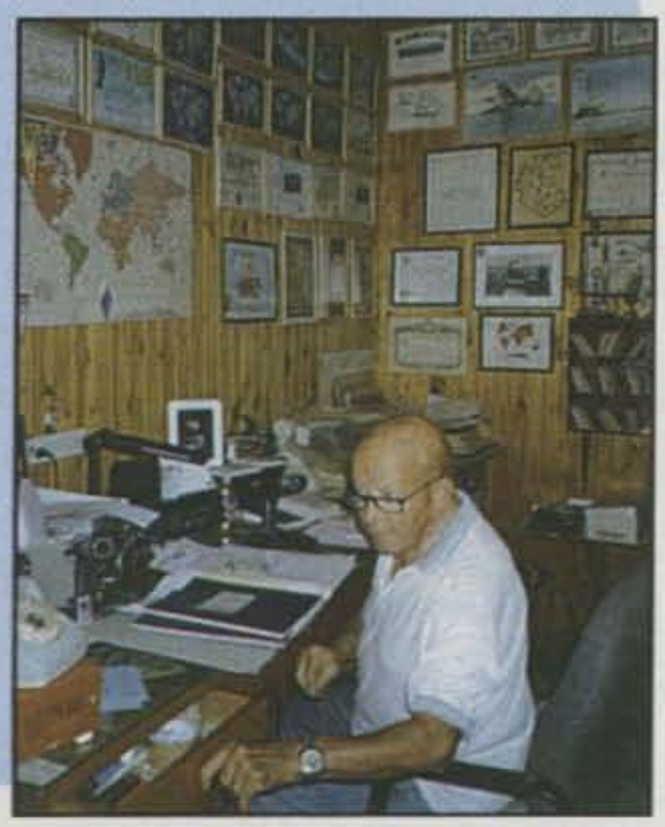
CW

5397 WA2HZR	2681 9A2NA	2312 JA9CWJ	2009 OZ5UR	1846 KS4S	1728 W9IL	1483 EA6AZ	1218 WO3Z	991 WA2VQV
3785 N6JV	2578 N5JR	2301 EA7AZA	1955 G4SSH	1832 VE6BF	1671 DJ1YH	1464 4X6DK	1118 EA2BNU	877 KX1A
3485 N4NO	2558 N4MM	2285 KA7T	1938 LU2YA	1798 W7OM	1668 I2EAY	1332 EA2CIN	1118 HB9DOT	871 WT3W
3217 K9QVB	2399 HAØIT	2203 W4UW	1919 K2XF	1789 W6OUL	1585 EA7AAW	1284 AC5K	1097 K6UXO	809 KU6J
3035 EA2IA	2375 W2WC	2147 I7PXV	1905 JN3SAC	1780 IK3GER	1571 I2MQP	1282 DF6SW	1096 YU1TR	729 N1KC
2822 LZ1XL	2325 KF2O	2102 N6FX	1854 K5UR					

Sometimes I think we get too carried away with worrying about what's going to happen next month, or six months from now. Just enjoy what you have, while you have it.

Keep listening for news of those Most Wanted countries being active. It could happen at any time for some of them. Until next month, enjoy the upcoming ARRL CW DX contest the 15–16 of this month and other DXing activities as well.

73, Carl, N4AA



Hellmut, LU1YU, is obviously an award collector. Look for him on 15 meters SSB. (Photo courtesy John, KDØJL)

QSL Information

EA8/HA6NL via HA6NL
EA8/HA6PS via HA6PS
EA8/HA6ZV via HA6ZV
EA8/HA7JJS via HA7JJS
EA8/OH2NC via OH2NC
EA8/OH2U via OH1JT
EA8/OZ5IPA via OZ5IPA
EA8ZS via OH1JT
EF2UNI via EA2URV
EJ4VBC via DF8AN
EK3AA via DK6CW
EK3SA via DK6CW
EK8WB via EK8WB
EK8WY via EK8WY
EL2TM via F6FNU
EP2MKO via RU6FZ
EP6KI via G4WFZ
ER3DX via ER3DX
ER4DX via UT7ND
ER60SB via ER1DA
EX8W via EX8W
EY1100 via DJ1MM
EY1HQ via DJ1MM
EY2Q via DJ1MM
EY7AF via RW6HS
EY8AW via EY8AW
EY8BW via DJ1MM
EY8DQ via DJ1MM
EY8MM via K1BV
EZ8CQ via DJ1MM
EZ8YL via DJ1MM
FG5FC via F6DZU
FG5XC via FD6HSI
FH/DL5CF via DL5CF
FK/W6YOO via W6YOO
FK8GJ via F6CXJ
FK8HW via VK4FW
FM/DL2GAN via DL2GAN
FO/W6YOO via W6YOO
FO/WA4OAB via WA4OAB
FO5RK via 3D2AG
FR1GZ via FR1GZ
FR5HA via F6FNU
FR5KH via F6FNU
FS/KM3T via K2PF
FS/W5KG via W5KG
FT1ZK via F5JCB
FW8FP via VK4FW
FY5FY via FY5FY
FY5GS via F6FNU
FY5KAC via FY5KAC
FY5YE via W5SVZ
G8D via G3LZQ
GB3RN via GØVIX
GI4FUM via GI4FUM
GJ2A via GJ3DVC
GS4AGG via GMØWRR
GU4VXE/P via G3SWH
GZ7V via MØCMK
H22H via 5B4MF
HA4/DL2JRM via DL2JRM
HBØ/DK3KD via DK3KD
HBØ/HA7JTU via HA7JTU
HBØ/HB9AON via DJ2YE
HB9/3A2MY via 3A2MY
HC1AKP via HC1AKP
HC2SL via HC2GT
HC4T via EA7FTR
HGØ3HNY via HG4I
HGØWGC via HAØNAR
HG41FC via HA1VQ
HG5A via HG5A
HH2/DL7CM via DL7CM
HH2/DM2AYO via DM2AYO
HH7PV via HH7PV
HI3HN via OE7NHT
HK8JEH via EA5KB
HLØCAC via HL4GRT
HLØKSJ via DS4CNB
HL8KSJ via RK1PWA
HP100RCP via HP1RCP
HP3XBH via W4WX
HP3XUG via HP3XUG
HR1HCP via HR1HCP
HR1RTF via HR1RTF
HSØ/OZ1HET via OZ1ACB
HSØZDZ via GM4FDM
HV5PUL via IWØDJB
HZ1MD via PA2VST
IH9/OK1DSZ via OK1DSZ
II2ARI via I2MQP
IR7TA via IK7AFM
ISØJ via ISØSDX
J3/K6MYC via K6MYC
J3/N1RJF via N1RJF
J3/W6JKV via W6JKV
J38AA via WA1S
J39AH via WA4WTG
J3A via WA1S
J45KLN via SMØCMH
J49Z via IK8UND
J75A via KU9C
J75PA via PA5ET
J79UF via VE5UF
JI3DST/6 via JI3DST
JT1FHD via RU3HD
JV5C via JT1KAA
JWØHU via SP3WVL
JY9QJ via DL5MBY

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," P.O. Box 3071, Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)

awards

BY TED MELINOSKY,* K1BV

Questions from New County Hunters

This month we start off with some interesting questions received via e-mail from new county hunters. Perhaps the answers will be of help to all county hunters.

Q: I have many old cards that don't show the county or zip code. Can these be used towards the USA-CA award?

A: Yes. There's no requirement that the county be shown on the card. Use a good map or atlas that shows county boundaries, and count the cards if they are new ones you need for the award. There's no sense wasting any contacts!

Q: I've heard that there is a county hunter's booklet. How do I get one and what is the cost?

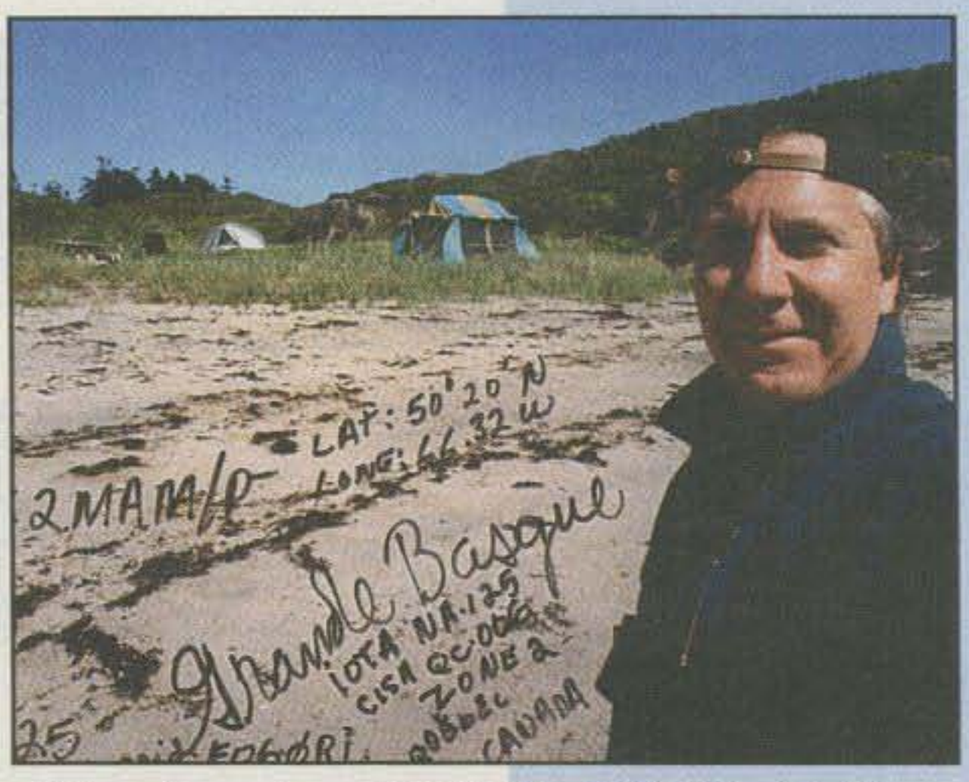
A: CQ publishes the *County Hunter's Record Book*, which you may use to keep track of the counties to apply for the USA-CA award. You can get one from CQ Communications or directly from me. The cost is $2.50 per booklet, and we suggest your getting two, one to send in as the application and one to keep for your records. Remember that the booklet is optional, and you may use any kind of computer program to print a list of contacts, as long as that list is in alphabetical order by state and by county, and includes columns for Call, City/Town/Mobile, Band, and Mode. Some county hunters have come up with some neat computer programs that can be used to keep track of your counties. You also will need the certification statement signed by yourself and two witnesses stating that the QSLs are in your possession and that they have been checked for their validity by General class or above licensees or officials of a national-level radio organization or affiliated club. (This widely accepted procedure is known as General Certification Rules, or GCR.) This form is in the booklet, and is also included in the rules for the USA-CA award, which are available for an SASE from CQ or on the CQ website, <www.cq-amateur-radio.com>.

Q: Do I have to send in the QSLs and MRCs (mobile reply cards) with each application or endorsement request?

A: No. The program requires that you find two witnesses who will sign a statement that they have examined the cards for the particular level you're applying for. It's only when you get all the way up to the top level that I require that you send to me a small number of cards of my choice. The USA-CA award is a program of honor and trust which has been remarkably well respected by the over 1000 county hunters who have completed the requirements.

Gilles Laroche, VE2MAM
USA-CA All Counties #1046

USA-CA All Counties recipient Gilles, VE2MAM, gained a great deal of knowledge about the geography and people of the U.S. in his ten-year journey toward achieving this award. Here is his story:



Gilles Laroche, VE2MAM, USA-CA All Counties #1046, June 22, 2002.

County hunting has been very good for me. I now have a better understanding of the geography of the United States and of its people. My English is also much better. It took me ten years to confirm all the counties! I chased counties by myself, mostly on 17 meters for the first six years. I often had no answers to my call if I was just calling "CQ." However, by calling "CQ stateside, this is VE2MAM chasing counties" I was sure that there would be many stations that would respond—and they did so generously. I've never seen so many people so eager and proud to offer their county!

My first rig was a Kenwood TS-820 with an R5 vertical antenna. I had a lot of fun at first, but the noise level at home was incredible. Some days it was just no use trying. Eventually the 820 was replaced by a TS-440 and beams took the place of the vertical. Because I worked the evening shift, my QSO period was morning until mid-afternoon. Still, the noise took its toll on the enjoyment of the hobby.

Then a miracle happened. My good friend and Elmer, Fern, VE2ZV, offered me a piece of land in his forest! Since 1996 my shack has been a 14 ft. trailer. My tower is 50 ft. high, and the antennas are just over the canopy of the forest. I run a small gasoline generator when I'm operating, and a wind generator feeds the three batteries the rest of the time. No hydro lines, no neighbors, a real sanctuary. Fern, I could not have done it without you. Many thanks, OM! *Merci beaucoup, mon ami!*

USA-CA Special Honor Roll

Jack Jacobs, WD4OIN
USA-CA All Counties #1055
November 4, 2002

Richard Sauneuf, W6XLR
USA-CA All Counties #1056
November 15, 2002

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Honor Roll

500		1500	
I1PES	3212	VE4NWP	1347
VE4NWP	3213	WD4OIN	1348
WD4OIN	3214	WQ7A	1349
JA3KZV	3215	W6XLR	1350
OZ1ACB	3216	**2000**	
WQ7A	3217	WD4OIN	1245
W6XLR	3218	WQ7A	1246
W0RSD	3219	W6XLR	1247
1000		**2500**	
VE4NWP	1611	WD4OIN	1166
WD4OIN	1612	W6XLR	1167
XQ5SM	1613	**3000**	
WQ7A	1614	WD4OIN	1075
W6XLR	1615	W6XLR	1076

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.

During the first few years of this quest I was often invited, by other county hunters, to join the net on 14.336 MHz. In May of 1998, after listening for a short while to understand the procedure, I started being a regular on the CHN. I felt very much a part of the gang. It was the start of a new era! The countdown of the counties continued at a faster pace. I had made over 8000 QSOs to get 1040 counties confirmed before joining the net. I had worked "popular" counties many times. Even with the help of all those mobiles, it took me another 3 1/2 years to go down to 50 counties. Now I really, *really* wanted to complete this endeavor. Before, I didn't think much about it. I was having fun ragchewing. To finish off all those counties was an abstract thought.

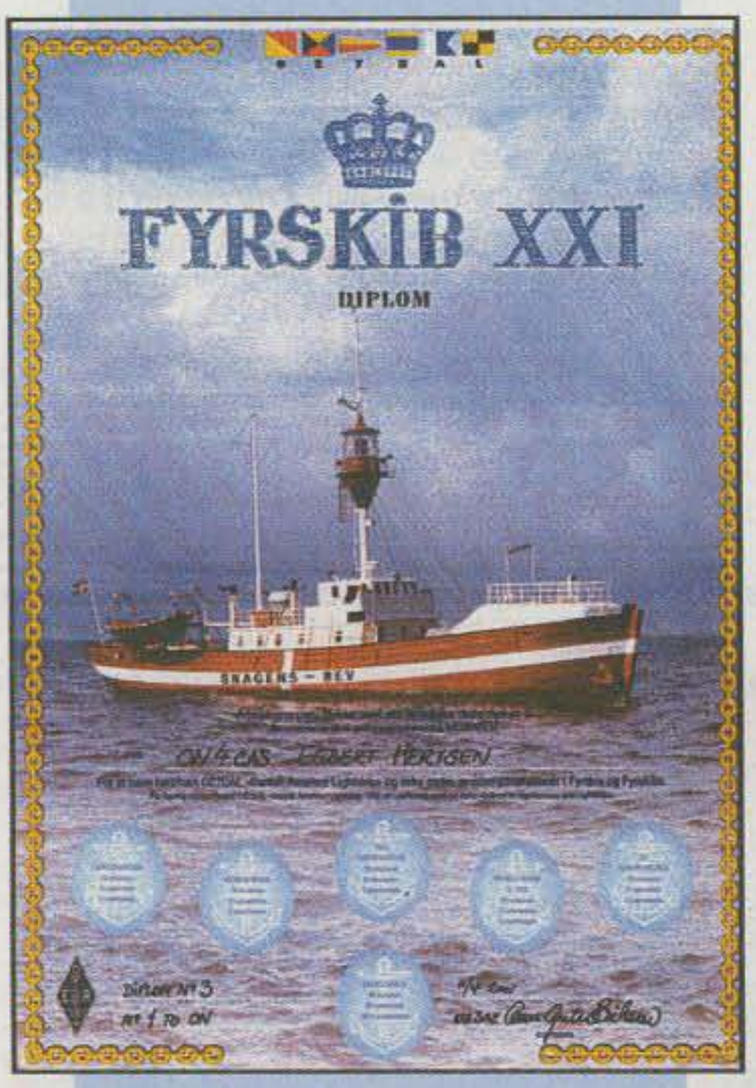
Since 1999 I have gone portable in zone 2 on different islands that are part of the IOTA (Islands On The Air) program. Of the thousands of QSOs, there were always a dozen new counties that made the trips even more enjoyable.

In April 2002, KL1V went to Montana and ran all the counties in about a week! He gave me five new ones to get the count down to three to finish USA-CA. Jim, KA9PZS, gave me Edmunds, SD. It was the 40th time that he gave me a new county. Greg, KK7GN, whose father (KL7GN) has completed all the counties, went to Skamania, WA for my next to last. Wow! One more to go, and I was so excited! Bill, KE5OG, made a valiant effort to give me Presidio, TX, but Mother Nature challenged our effort. That day 10 meters was completely dead. Still, Bill is a top-notch OM in my book. At this point there were at least five other mobile stations getting ready to go to Presidio to give the last one in June or July.

Jim, WA7SLD, sent me an e-mail telling me he would be in Presidio the first of June at around 1800Z. He was there at 1742Z. We exchanged a report and chatted for a short while because of QRM, and Jim drove back to Arizona, making a round trip of over 900 miles to get me "the last one for the whole ball of wax." Isn't that nice? It's much more than that. My hobby is one of the few reasons why I still believe in the human race! It's as simple as that.

As I write this, it's now been a week since I've completed all the counties and I'm still elated. What a rush! Will I try doing it a second time? Hey! Do you think I could have a QSO with a U.S. station without asking what county he or she is in?

I would like to go mobile myself and see some of the places that have been so important to me and give counties to people who need them. I live just an hour from the U.S. border, so everything is possible. I'll start like



The Danish Lightship award is given for contacting active or inactive lighthouses and lightships anywhere in the world.

I did ten years ago, slowly, ragchewing and picking up speed after a few years. "CQ CQ stateside, this is VE2MAM chasing counties and standing by for any calls."

Many thanks to everybody!

Oki (Gilles), VE2MAM

DX Awards

Danish Lightship Award. Over the past few years lighthouse and lightship awards have been issued by many countries for contacts with these special locations. Denmark's contribution provides for a basic award that's fairly easy to achieve, and then a number of endorsements that may be affixed to the basic award certificate. The annual lighthouse/ lightship activity weekend held each August is an excellent opportunity to work qualifying stations.

Contact amateur stations operating from active or inactive lighthouses or lightships anywhere in the world on or after 25 March 1994. SWL okay, and only a list of stations heard must be sent in. Direct contacts must have a minimum RS(T) 33(8) on any band or mode. Crossmode QSOs okay. QSLs must reflect QTH (photo QSL, official stamp on QSL, or similar). A list showing details of the contacts should be certified by the award manager of a national society. If this is not possible, then the cards must be sent to the sponsor with sufficient IRCs for their return. OX, OY, and OZ stations apply directly to OZ7DAL with QSLs and sufficient postage for their return. This award may be claimed only if the contacts are made/heard over a period of *more* than seven days.

The award is available as follows:

Basic Award, *National*—Seven (7) contacts anywhere in the world, with OZ7DAL mandatory.

Upgrades:

Continental—Additional 8 contacts, new total 15. Minimum 4 countries.

Bi-Continental—Additional 5 contacts, new total 20. Minimum 6 countries on two continents.

Tri-Continental—Additional 5 contacts, new total 25. Minimum 8 countries on three continents.

World Wide—Additional 5 contacts, new total 30. Minimum 10 countries on 4 continents.

World Wide Extra—Additional 5 contacts, new total 35. Minimum 15 countries on 3 continents.

Excellence—Additional 15 contacts, new total 50. Minimum 20 countries on all 6 continents.

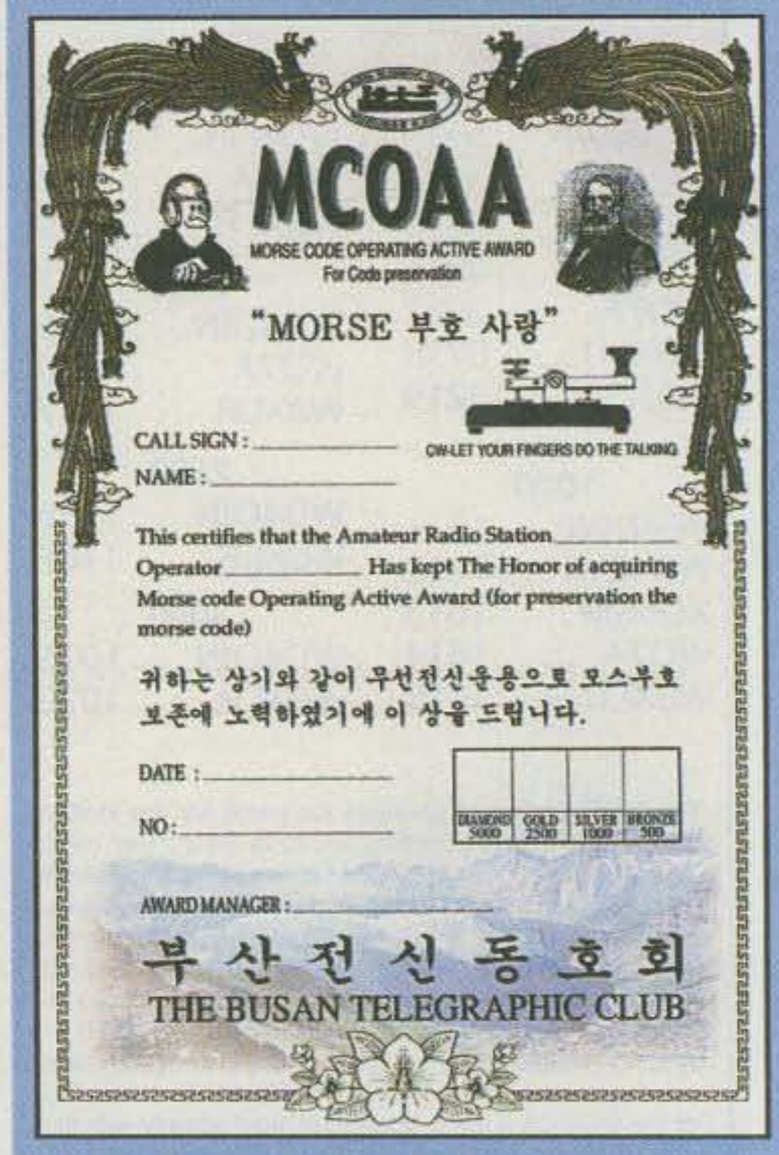
Fee is 12 IRCs, $US9, or 55 DKK. Upgrades SAE plus 3 IRCs, $US2, or 15 DKK per upgrade. Apply to OZ7DAL, Danish Amateur Lightship, Fyrskib 21, DK-8400 Ebeltoft, Denmark.

Busan Telegraphic Club Series. Byong-joo Cho, HL5AP, is one of the Korean old timers, active on HF for many years and a big CW enthusiast. He has organized the Busan Telegraphic Club, which offers the two CW awards described here. If your CQ WW CW DX Contest logs are in one of the many electronic formats available today, you probably have a good chance of earning the highest class of the first award, the Morse Code Operating Active Award. If your logs are on paper (like mine—blush), the effort of listing 5000 CW contacts will be somewhat of a grinding task.

Morse Code Operating Active Award (MCOAA). Issued in the following classes for working the specified number of stations: Diamond 5000, Gold 2500, Silver 1000, and Bronze 500.

Sparks Award: Issued for working members of the Busan Telegraphic Club. As of March 2002 there were 63 members. Award classes as follows:

Gold—HL/DS/6K stations work 50 club members; all others 30 members.

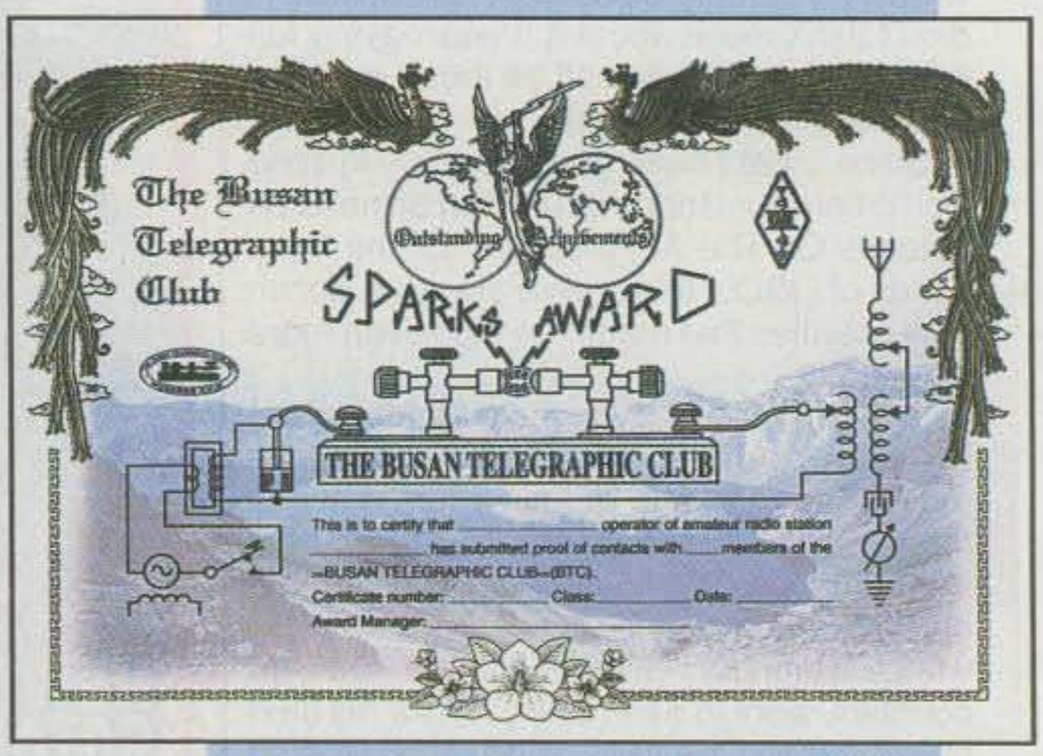


The Morse Code Operating Active Award is issued by the Busan (Korea) Telegraphic Club in various levels for contacting stations on CW only.

Silver—HL/DS/6K work 25 members; all others 15.

Bronze—HL/DS/6K work 10 members; all others 5.

General Requirements. All contacts must be CW and must have been made on or after 6 September 2001. GCR list accepted. Fee for each award is $US7, or 10 IRCs. Apply to award manager Byong-joo, HL5AP, P.O. Box 41, South Pusan, 613-600 Korea.



Also issued by the Busan Telegraphic Club, to earn the Sparks Award contact club members on CW.

The Amber Coast Award is sponsored by the Russian UA2 Radioclub in Kaliningrad for contacting UA2 stations. Thecertificate features a sprinkling of pieces of amber.

Kaliningrad Amber Coast Award. Amber is the petrified sap of conifer trees. One of the few places in the world where this beautiful fossilized sap can be found is on the Baltic Coast of Europe, including the vicinity of Kaliningrad. The award certificate is decorated with a generous sprinkling of genuine amber pieces and comes already framed (235 × 325 mm), thus the rather high cost for the award as listed below. Requirements for the award are modest, however, the necessary 5 points pretty much translating into making 5 contacts with UA2 stations.

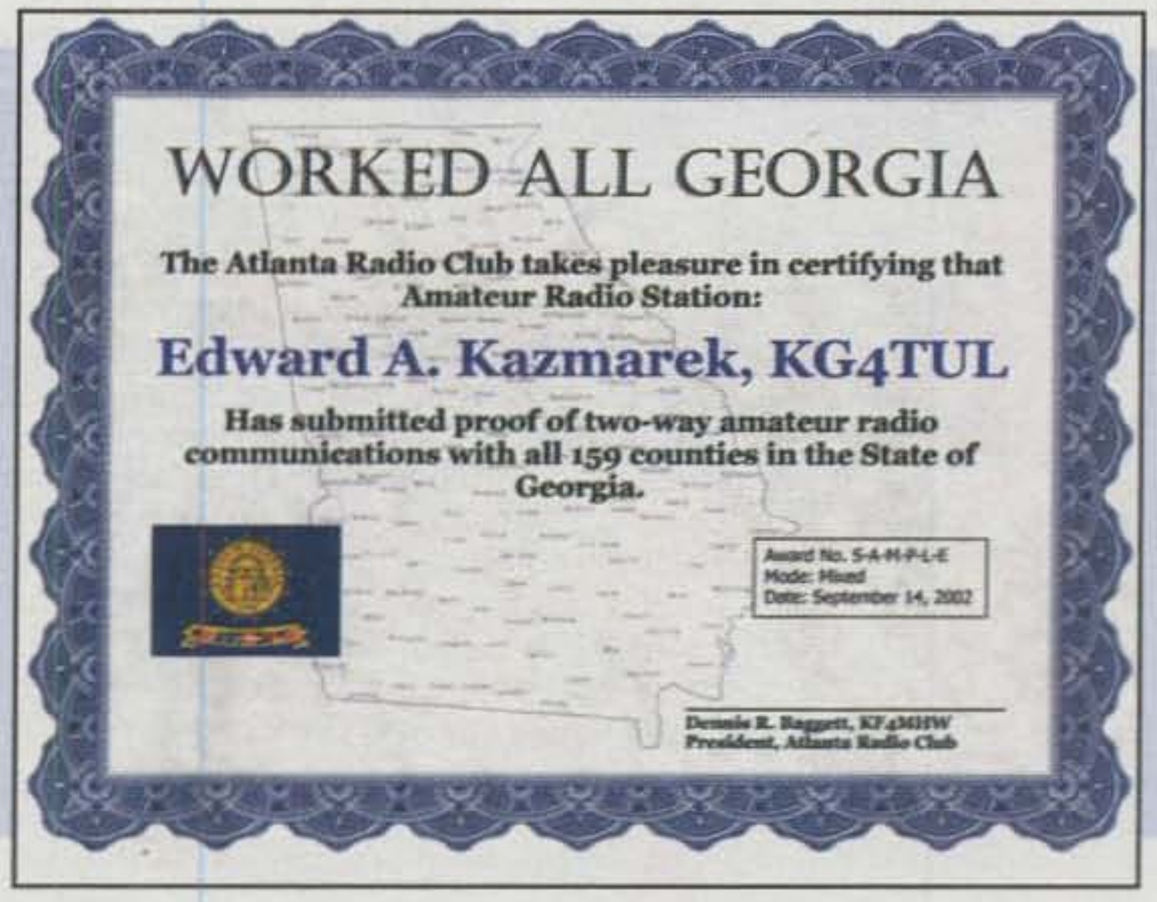
This award is sponsored by the Russian UA2 Radioclub in Kaliningrad. Each QSO with a UA2 station (city or region of Kaliningrad) counts 1 point; a 5-band QSO with the same UA2 station will give you 5 points. Europeans need to earn 10 points, and all others need 5.

All modes and bands (160–10 meters) are accepted. Award fee is $US15, 15 Euros, or 23 IRCs. Payment by bank money order may be done as follows: banking account number 787868, bank identifier code 23052750 (Kreissparkasse Herzogtum Lauenburg, Germany). If you use this method of payment, don't forget to include your name, callsign, and the catchwords "amber coast." If an e-mail address is given, the applicant will receive an acknowledgement of receipt (receipt of application and fee).

Send the application form (GCR list, confirmed and signed by two other amateur radio operators) to: Lutz Radloff, DL5KUA, Moellner Landstrasse 9, D-22946 Grande, Germany. The custodian is located in Germany because mailing problems are less likely to occur there. DL5KUA's e-mail address is <Lutz@Radloff.de>.

Worked All Georgia Award

By the time most county hunters work their way down to the last few dozen counties, almost invariably there are some from


WORKED ALL GEORGIA

The Atlanta Radio Club takes pleasure in certifying that Amateur Radio Station:

Edward A. Kazmarek, KG4TUL

Has submitted proof of two-way amateur radio communications with all 159 counties in the State of Georgia.

Award No. S-A-M-P-L-E
Mode: Mixed
Date: September 14, 2002

Dennis R. Baggett, KF4MHW
President, Atlanta Radio Club

Sponsored by the Atlanta Radio Club, the Worked All Georgia Award can be earned by contacting Georgia counties, the basic certificate being for 50 counties, with endorsements available for higher levels.

Georgia among that group. The state claims 159 counties. Outside of the major cities and counties with interstate routes running through them, Georgia is largely a rural state and there are many counties which have neither major cities nor interstate roads and are that much harder to work. The Atlanta Radio Club's award shown below starts at 50 counties and moves up in steps to all 159. There are special provisions for those who have achieved USA-CA All Counties status, which is a nice touch. Also somewhat unusual is the fact that the award is *free*.

The basic certificate is issued for 50 counties, then there are endorsements for 100 and all 159. The award complements the annual Georgia QSO Party, which is a good way to work many of the lightly populated counties. All bands except WARC may be used. All modes are accepted, although *all contacts must have been made using the same mode*. Endorsements are available for CW, Phone, Digital, Satellite, single band, and all five HF bands. No repeater or cross-mode contacts.

Applicants must use the sponsor's official application form, which is available for an SASE or may be downloaded from their website. GCR list is accepted, as are e-QSLs. The award manager reserves the right to request any cards to check for validity. Those who have completed USA-CA All Counties can receive the award just by sending a request and including their award number. Apply to: Edward A. "Skip" Kazmarek, KG4TUL, 1190 Byrnwyck Road, Atlanta, GA 30319; e-mail: <kg4tul@arrl.net>, <http://www.saf.com/arc/wagaward.htm> or <http://www.saf.com/arc/>.

URL of the Month

The Federacion de Radioaficionados de Cuba is the national amateur radio organization of Cuba. They sponsor an interesting awards series for contacting Cuban districts, Caribbean countries, and countries of the American continent. The URL is <http://frc.co.cu/diploing.htm>.

As always, awards samples and rules from your club or organization are welcomed. Until next month . . .

73, Ted, K1BV

contesting

BY JOHN DORR,* K1AR

Contesting for Newcomers—Part III

February's Contest Tip of the Month

Have you recently checked on the quality of your on-the-air signal? Most of us depend on what we hear in our receiver's monitor. However, often you don't hear the hum, buzzing, and other degrading effects that can significantly affect your signal's quality and intelligibility. Accessories such as voice keyers as well poor grounding are common contributors to this problem. It's not limited to voice, either. Do yourself a favor and check out the quality of your transmit with a local station. Be sure to do it on many, if not all, bands and modes. A clean signal can only mean more people will work you in the next contest!

As the final installment in this series, I wanted to conclude my introduction to contesting with a brief discussion of the subject of operating technique and style. Every ham has a unique approach to operating style. Frankly, some are better at it than others. The same is true for contesting. What are some of the major things you should be thinking about? Read on.

What's Different About Contest Operating?

If you're like most HF operators, one of the attractions that drew you into the hobby in the first place was the ability to work DX and tell your friends how you had that "conversation with a new friend in England this morning." The skill of casual HF operating is something that nearly everyone can obtain. In contrast, contest operating is a different animal. It is fast-paced (sometimes too fast for the newcomer) and demanding. The very nature of the sport is one where speed is king. With that being said, let me give you some tips to make your entry into this aspect of ham radio more enjoyable.

Not Everyone is a Superstar

It's easy to assume that as a newer contester you are the worst operator on the band and the spotlight is entirely on your inadequacies. The reality is that the vast majority of contest participants are casual operators. Only the craziest of the crazies take the sport of contesting seriously enough for it to affect their view of life in general. The rest simply get on the air to have a good time and work some cool stuff.

With that idea in mind, remember this is meant to be fun, not intimidating. Before you operate, study the basics of the contest's rules so that you know the exchange (i.e., 59 001) or the requirements for a valid QSO. The fact that you're faster or slower than the next guy is actually irrelevant to most contesters. As it turns out, common sense prevails. In a contest you simply communicate as efficiently as possible the information required for a valid QSO. For example, let's say you answer a station calling CQ. I'll play it out for you here:

K1AR: CQ Contest, K1 Alpha Radio, K1 Alpha Radio, Contest
KA7XXX: Kilo Alpha 7 Xray, Xray, Xray
K1AR: KA7XXX, 59 New Hampshire
KA7XXX: Thank you, 59 Arizona
K1AR: Thanks, K1 Alpha Radio, Contest

There are a couple of items about this contest interchange to point out. Did you notice KA7XXX didn't repeat my callsign when he called me? Thank you, I already knew it! When I answered him, I didn't ask him about his weather and career choice, did I? I passed along the absolute minimum amount of information required to make a good QSO. Thankfully, he did the same. Again, I already know my callsign and then I also knew his. Therefore, why repeat either of them?

The key is simply to provide the new and required information. I'll ask you again if I miss it, so there's no need to repeat it over and over again. See, isn't this easy? A little common sense will make you a contest pro in no time.

What Else Should I Be Doing?

One of the hardest decisions to make in a contest is whether you should be calling CQ or searching for other stations (called "search and pounce" [S&P]). For the most part, that decision should be based on the effectiveness of your station. If you are limited to 100 watts and a dipole, you're not going to have as much success CQing as you would with a kilowatt and a beam. However, don't underestimate your station's ability when conditions are at their peak. There is also something to be said about honing your operating skills by calling CQ and "running stations" even if you can work them faster by tuning up and down the bands.

A key point to learn here is that, especially for a new operator, score is not everything. Making an investment in skill development is important as

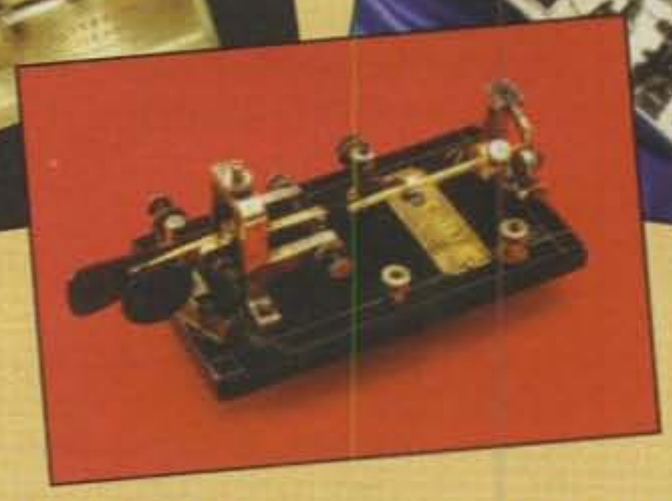
Calendar of Events

Jan. 24–26	**CQ WW 160M CW Contest**
Jan. 25–26	REF CW Contest
Jan. 25–26	BARTG RTTY Sprint Contest
Jan. 25–26	UBA SSB DX Contest
Feb. 1	Minnesota QSO Party
Feb. 1–2	Delaware QSO Party
Feb. 8–9	**CQ/NJ RTTY WPX Contest**
Feb. 8–9	PACC Contest
Feb. 8–9	RSGB 1.8 MHz Contest
Feb. 9	North American CW Sprint Contest
Feb. 15–16	ARRL CW DX Contest
Feb. 21–23	**CQ WW 160M SSB Contest**
Mar. 1–2	ARRL SSB DX Contest
Mar. 9	North American Sprint RTTY Contest
Mar. 9	UBA Spring Contest
Mar. 9–10	Wisconsin QSO Party
Mar. 15–16	Russian DX Contest
Mar. 15–17	BARTG Spring RTTY Contest
Mar. 29–30	**CQ WW WPX SSB Contest**

*2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

CQ 2003 calendars

10th Anniversary



Better than ever and still 15 months of value!

Yes, this year marks ten years of outstanding calendar photography with the release of the 2003/2004 CQ Amateur Radio Calendars. Buy a few for yourself, and solve some holiday shopping dilemmas by ordering a few for giving to your special ham friends.

Marking the 10th anniversary of the famous CQ calendars, we're pleased to introduce the new 2003/2004 CQ Classic Keys Calendar. Classic equipment photographer Joe Veras, N4QB, takes a different track this year by featuring 15 magnificent photographs of 15 extraordinary telegraph keys, both new and old. Fifteen magnificent photos of beautiful telegraph keys presented as an art form. You absolutely will not want to miss out on this one.

The 2003/2004 CQ Amateur Radio Calendar brings you fifteen spectacular digital images of some of the most interesting and photogenic Amateur Radio shacks, antennas, scenics, and personalities. These are the people you work, the shacks you admire, the antenna systems you dream about having, all digitally captured by the talented Larry Mulvehill, WB2ZPI, CQ's own roving photographer.

All calendars include dates of important Ham Radio events such as major contests and other operating events, meteor showers, phases of the moon, and other astronomical information, plus important and popular holidays. The CQ calendars are not only great to look at, but they're truly useful, too!

Order both versions of the highly acclaimed CQ Amateur Radio Calendars today. Keep your collection complete!

Save shipping by ordering more! On orders of more than one calendar, you pay just one shipping charge. Order a few for your shack. Order one for the office. Order several for your Ham friends as gifts, or just to share the fun.

Available directly from CQ and from your local dealer!

Calendars are $10.95 each plus only $2 shipping and handling no matter how many you order!

For Fastest Service call 1-800-853-9797 or FAX 516-681-2926
www.cq-amateur-radio.com

CQ Communications, Inc.
25 Newbridge Road, Hicksville, NY 11801

MasterCard VISA DISCOVER AMERICAN EXPRESS

My Return to Contesting

By Dave Jordan, KC1Q

Consistency in contest participation over the years varies from one operator to the next. In my case, I've never really taken a break despite the challenges of college, family, career, etc. One way or another, I've always managed to squeeze ham radio contesting into the mix. For others, the exact opposite has happened. Recently, while corresponding with fellow Yankee Clipper Contest Club member Dave Jordan, KC1Q, I received an interesting account of how much our sport has changed. Dave completely exited the hobby for nearly seven years. Read on and appreciate the perspective of a "new contester," or shall I say a "renewed" contester? —K1AR

It was about seven years ago when I last turned on an HF radio. No code, no contesting, no operating. The excuses—which include kids, moving, and the fact that I design antennas all day—seemed to be enough to keep me from putting up the station. There was always something to do instead of digging holes for towers. Summers were occupied chasing bass from my boat and working around the house.

Now, let's fast forward to the CQ WW DX CW 2002.

Several months ago I dug out my 2 meter rig and hooked it up in the truck to pass the time going to and from work. Several hams mentioned the upcoming DX contest and I got to thinking. Could I still operate? Did I still know the code? Why not try it? Even if I was rusty, I thought I could still help out and maybe it would even be fun. I contacted several old-time friends to see if they were operating. Fred, K1VR, was going to K1IR's to operate. I e-mailed Dick, KB1H, who gladly opened up a part-time operating spot for me. I didn't want to go to some unknown station just in case I was too rusty!

The sport has gone through tremendous changes, including computer-controlled radios, robust contest software that works, new radios with tons of buttons, and to my surprise a packet network that really helps out with the S&P.

I decided to arrive at KB1H's shack on Saturday afternoon and help out during the night. I planned to stay until about 10 AM on Sunday. I didn't want to shock my wife, since I had not disappeared for a whole weekend to go off and contest for quite some time. I would only attempt to operate bands where the rates were low. I had no idea if I could run again and needed the time to become familiar with the software, radios, and virtually everything else.

It was strange to send and copy code again. I was rusty, but after a few hours on the low bands my code speed came back to the mid-20s. When the packet spots started coming in telling us that 15 meters was open, Dick set me up on that band to do some S&P. I tried calling CQ, but for the first 30 minutes all I could do was chase loud Europeans and DX around the band, picking up about 20 QSOs.

The signals then began to improve, and we started to get through the pile-ups on the first call, so I decided to call CQ and see what would happen. As it turns out, 2.5 hours later I was still working EU's at a good clip, copying most callsigns on the first try. I was able to see that Jeff, K1AM, was flying on 10 meters. Jeff was really running, working about two times my rate. It's not that I couldn't go any faster, as much as what the band supported. Not knowing CT well enough and having the 10, 20, and 15 meter contacts flying across the screen, I had no idea how I was really doing. I just thought I was working stations at a reasonable clip. No one came to replace me, so I must have been doing reasonably well.

At around 9:30 AM I decided to give the key over to one of the main operators. It was time to go anyway. My result was an 89/hr. rate for over 2 hours with some 100 QSO/hr. peaks. Not bad considering the time off. Thanks to Dick for letting me use his station.

After the contest it was strange to see the scores. I remember the results of the CQ WW 1982 from W2PV when I was one of the ops there for that contest. That score held for about five years. In today's world, it seems like the scores have doubled. What hasn't changed is that it still takes good operators, good antennas, and good station design to be effective in contesting. The new radios help, but I wonder how many stations still keep a souped-up R4C or Collins S-line around so they can really hear. I know that's what I used to do regardless of what "new" box with fancy filters, DSP boards, and other gimmicks that cover up poor front ends and phase noise may be available. There's still no substitute for good input intercept and blocking dynamic range in a receiver.

Thus, my contest rebirth has started. I'm planning to put up my tower again. My town will allow 70 foot towers, and that should be decent for a part-time single-op or multi-single effort. I'll use all my old stuff, including my Drake TR7, SB-220 (with 160 meters), Classic 36, and some 10 and 15 meter monobanders that can rotate mounted halfway up the tower. Oh yeah—maybe a 4-square on 40 and 80 and a shunt-fed tower for 160. I'll add some computer logging and packet. I'll still have to manually dial my Drake TR7 VFO, but that should not be a huge problem because being able to hear is more important than being surrounded by KWs in southern New Hampshire. The bottom line is I'll add some more points for my club (Yankee Clipper Contest Club). So for now, I'll be at K1RX for the upcoming ARRL CW, and yes, I still hate phone!

73, Dave, KC1Q

well. As you'll see from Dave, KC1Q, later on in this column, developing these skills from a friend's station (preferably a bigger one) can be a major factor as well.

Most contests have an added element in the mix—the concept of multipliers. In addition to the requirement of working QSOs, your score can improve dramatically by working stations in as many different countries, zones, or states as possible, depending on the contest (see contest rules for specific details). As a contest operator you have to balance the trade-off between running and multiplier chasing. Again, common sense and intuition prevail here. If you have 200 QSOs in your log but only 5 multipliers (I'm being melodramatic here for effect.), you need to spend some time looking for new countries/multipliers. For the new contester, this actually can be enjoyable, as the thrill of working new "stuff" often can be the most exciting part of the contest, especially if you're interested in obtaining awards and other on-the-air achievements.

What About Those Pile-ups?

As with any on-the-air activity, popular/rare stations certainly can attract attention, resulting in large numbers of guys calling them. In fact, working stations through pile-ups is a skill in and of itself. The key is to make a judgment call based on your station's capabilities. For example, if you have a huge hill to the north and you are running 100 watts to a vertical, you probably don't want to spend much time calling XV3TAA on 15 meters.

There are some basic concepts to consider when trying to work a station in any pile-up, contest or otherwise. It begins by listening. A natural inclination is to hear someone you want to work and immediately start to call your brains out. A more productive approach, especially when brute-force calling rarely works, is to take a minute and listen to the operator's style and/or instructions. For example, he may not be inclined to work "tail-enders," and by listening you can adjust your approach to calling.

Although mostly a CW operating technique, one trick I often use is to call a station slightly off his operating frequency. To a large extent, the laws of physics apply to this problem, and finding yourself in a reasonable spot that places your signal in the clear affords a tremendous operating advantage (However, I do try to stay on the same band, hi!). Try calling stations using the frequency last used by the previous QSO as well. It's amazing how a slight adjustment of your XIT (yes, XIT) button can put a QSO in your log.

Finally, Just Dive In

The bottom line for any new contester is that operating skill can only be developed by participating. You can read about golfing, as an example, until the cows come home, but you'll never develop your skills until you pick up a club. The same is true for contest operating. If you are fortunate enough to find a "contesting Elmer," you'll only be that much better off. For the most part, experienced contesters want to help. If you want to be pointed in the right direction, drop me a line and I'll do my best to help. Good luck in the contest!

Final Comments

Well, that's it for this month's rendition. As some of you may have noticed, it's getting toward that time of the year to run another CQ Contest Survey. Keep an eye out for the 2003 edition over the next month or two. If you have a particular topic that you'd like me to cover, send me an e-mail and I'll try my best to incorporate your thoughts.

73, John, K1AR

BY TOMAS HOOD,* NW7US

CQ WW DX CW 2002 Overview

Conditions were a bit rocky during the week leading up to the CQ WW DX CW Contest weekend of November 23–24, 2002. The week started out with two M-class flares. Then, on November 19, a partial halo CME left the sun, followed by a faint full-halo CME on November 20. Solar wind speeds increased to about 700 kilometers per second during the night between November 21 and 22. The magnetic component of the Interplanetary Magnetic Field (IMF) stream turned negative (south), causing very high geomagnetic storminess by November 22 and early the 23, with a peak *K*-index reading of 7. Thankfully, things settled down later on the first day of the contest. The observed sunspot count was 133 over the weekend, with a 10.7 cm flux of 148 on November 23 and 146 on the 24. The background X-ray level was B5.9 on the first day and B4.1 on the second. A small *K*-index spike occurred again on the second day, but did not seem to degrade most mid- and low-latitude paths. Polar paths were generally fair.

I've received a number of comments from participants. Opinions were mixed, with the common observation that most of the expected openings did not occur or were marginal. The best conditions seem to have been noticed by stations located in the low latitudes, while those in the higher latitudes suffered most. Comments from Finland and Spain indicated a very disappointing contest. Others indicated reasonably good conditions. Here are some of the comments received:

"Wow, 10 meters was great in the CQ WW CW Contest. I always said the 10 meter God loves a good contest. Stayed open way past my bedtime. Made 201 contacts on 10, with 23 zones and 74 countries. It was possible to get DXCC on 10 this weekend."—*Edward, KN4Y*

"I ran 40 meter single op, low power. Right before the contest began on Friday evening, I was getting into Europe without any problems. I had contacts with several zone 20 stations and heard lots of Europeans in zones 14, 15, and 16. When the green flag dropped at 0Z, I had no trouble finding S&P *(search and pounce—ed.)* contacts—34 in the first hour (I even missed the first six minutes of the contest!) and it continued into the second hour. Suddenly at 0138Z my inverted Vees and vertical couldn't work anything else, whether Europe, the Caribbean, or Canada. Finally, in another half-hour I started putting zone 8 and 9's into the log. Some 33's came in as well. I think they were the most consistently strong signals the entire weekend. South Americans often seemed watery from my QTH near DC, and working Central America was a nightmare (I only put two in the log.). What I really noticed from analyzing my logs is that despite the bad conditions on 40 meters, both days the QSO totals peaked during European sunrise at around 0700Z."—*Jamie, NS3T*

*P.O. Box 213, Brinnon, WA 98320-0213
e-mail: <cq-prop-man@hfradio.org>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for February 2003

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 2-6	A	A	B	C
High Normal: 5, 7-8, 12, 20-21 23	A	B	C	C-D
Low Normal: 1, 7-9, 16, 18-19, 22-26, 28	B	C-B	C-D	D-E
Below Normal: 12, 17	C	C-D	D-E	E
Disturbed: 11 C-D	D	E	E	

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.

2. With the *propagation index,* use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be good (B) on feb. 1st, excellent (A) on the 2-6, good (B) on the 7-9, etc.

"My only observation was that 20 meters was never very good from here to Europe, of course our meat and potatoes area for contacts.... Reminds me a lot of the bottom of the cycle except for the fact that the volume of stations on 20 during the day wasn't as high as it is when the higher bands are not open or are only marginally open.... The (few so far) reports from other contest club members in the southeast USA show the same pattern.... Scores on 20 meters were way down.... The other bands seemed to be about average, with 10 meters closing earlier to Europe than in the past several years, which is to be expected as we get farther past the peak of the cycle."—*John, K4BAI*

"From the beginning of the contest at 0000Z on 23 November up to about 0600Z conditions on 80 meters were abnormally *good.* Loud signals even from as far east as Moscow and the Arabian Gulf. At the same time 40 meters was somewhat more difficult than usual into Europe, and German stations were complaining of 'aurora' conditions. Both days 20 meters closed down to eastern Europe the minute the sun went down over there, and at the same time signals from western Europe were not as robust as usual. Ten meters opened late both mornings, but once it opened wide (at about 1300Z), signals from Europe were *very* strong up until about 1600Z. Fifteen meters was the best band all around with good signals and longer openings than available on 10." —*Fred, K3ZO*

"At least here in NW (42,52N 8.31W) of Spain the high bands closed really early. Ten meter band closed abt 19.00Z, and 15 and 20 were clear

around 22.00Z, even though in the SSB section of the contest we were able to use them during the night with good results. Not vy good conditions to Pacific from here, nor to JA. Also lot of noise on 40 and 80 meters."—*Shawn, EA1CXH*

Sunspot Cycle 23 Progress

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 95 for November 2002. This is down three points from the 98 reported for October 2002. The low for the month was 49 on November 26. The high of 145 occurred on November 7. The mean value for November results in a 12-month running smoothed sunspot number of 109 centered on May 2002, just slightly down from the 110 of April 2002. This is exactly the same smoothed number as was for May 2001. Following the curve of the 13-month running smoothed values, a smoothed sunspot level of 73 is expected for February 2003, plus or minus 12 points.

Canada's Dominion Radio Astrophysical Observatory at Penticton, British Columbia reports a 10.7 cm observed monthly mean solar flux of 168 for November, slightly up from October's 167 (This was adjusted from 165 in the preliminary report.). The 12-month smoothed 10.7 cm flux centered on May 2002 is 188, down from April's 192. A smoothed 10.7 cm solar flux of about 130 is predicted for February 2003.

The observed monthly mean planetary *A*-index (*Ap*) for October 2002 is 23, which is the highest value for Cycle 23 so far. The *Ap* for November is 16, quite a bit down from October. The 12-month smoothed *Ap*-index centered on May 2002 is 13, remaining about the same as for March and April. Geomagnetic storming will be much the same as we had during October and November.

February Conditions

Beginning about the middle of February and continuing through March and early April, typical *equinoctial* propagation conditions can be expected on the HF bands. This usually means a noticeable improvement in conditions between the Northern and Southern Hemispheres. Look for improvements between the United States and South America, Africa, Australasia, Antarctica, and parts of Asia. Equinoctial propagation occurs during the spring and fall months, when the sun is most directly overhead at the equator, producing similar ionospheric characteristics over large areas of the

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 0 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. An ** indicates best time to check for 6 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 *standard* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 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.

February 15 - April 15, 2003
Time Zone: EST (24-Hour Time)
EASTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	09-11 (1) 11-13 (2) 13-14 (1)	07-08 (1) 08-09 (3) 09-12 (4) 12-13 (3) 13-15 (2) 15-16 (1)	04-07 (1) 07-09 (4) 09-12 (3) 12-15 (4) 15-17 (3) 17-19 (2) 19-21 (1)	17-19 (1) 19-20 (2) 20-01 (3) 01-02 (2) 02-03 (1) 19-21 (1)* 21-22 (2)* 22-23 (3)* 23-00 (2)* 00-01 (1)*
Northern Europe & European CIS	08-12 (1)	07-08 (1) 08-11 (2) 11-14 (1)	05-07 (1) 07-09 (3) 09-11 (2) 11-13 (3) 13-14 (2) 14-18 (1)	18-20 (1) 20-22 (2) 22-02 (1) 20-00 (1)*
Eastern Mediter-anean	09-13 (1)	08-09 (1) 09-11 (3) 11-13 (2) 13-15 (1)	07-09 (2) 09-12 (1) 12-14 (2) 14-16 (1) 16-18 (3) 18-22 (2) 22-23 (1) 04-07 (1)	19-20 (1) 20-22 (2) 22-23 (1) 20-22 (1)*
East Africa	10-13 (1) 13-15 (2) 15-16 (1)	07-08 (1) 08-13 (2) 13-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-18 (2) 18-21 (3) 21-23 (2) 23-01 (1)	19-00 (1) 21-23 (1)*
West & Central Africa	11-14 (1) 14-16 (2) 16-17 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-14 (4) 14-16 (3) 16-17 (2) 17-19 (1)	07-09 (2) 09-12 (1) 12-13 (2) 13-15 (3) 15-18 (4) 18-19 (3) 19-22 (2) 22-07 (1)	18-20 (1) 20-22 (2) 22-01 (1) 21-23 (1)*
South Africa	10-11 (1) 11-12 (2) 12-14 (1)	07-09 (1) 09-13 (2) 13-15 (3) 15-17 (2) 17-18 (1)	05-14 (1) 14-16 (2) 16-18 (3) 18-20 (2) 20-23 (1)	21-23 (1) 23-00 (2) 00-01 (1) 23-01 (1)*
Central & South Asia	*Nil*	07-09 (1) 18-20 (1)	23-01 (2) 01-03 (1) 07-10 (1) 19-22 (1)	05-07 (1) 19-21 (1)
Southeast Asia	*Nil*	07-09 (1) 18-20 (1)	06-07 (1) 07-09 (2) 09-10 (1) 19-21 (1)	06-08 (1) 17-20 (1)
Far East	17-19 (1)	07-09 (1) 16-17 (1) 17-19 (2) 19-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 17-20 (1) 20-22 (2) 22-00 (1)	05-08 (1) 06-07 (1)*
Guam & Pacific Islands	13-15 (1) 15-17 (2) 17-18 (1)	12-15 (1) 15-17 (2) 17-19 (3) 19-20 (2)	01-07 (1) 07-10 (2) 10-19 (1) 19-01 (2) 20-21 (1)	00-02 (1) 02-06 (3) 06-07 (2) 07-08 (1) 02-03 (1)* 03-05 (2)* 05-06 (1)*
Australia & New Zealand	16-18 (1)	08-12 (1) 15-17 (1) 17-20 (2) 20-22 (1)	00-03 (2) 03-07 (1) 07-09 (3) 09-10 (2) 10-13 (1) 13-15 (2) 15-19 (1) 19-22 (2) 22-00 (3)	03-05 (1) 05-07 (2) 07-09 (1) 04-05 (1)* 05-06 (2)* 06-07 (1)*
Northern & Central South America	08-10 (1) 10-12 (2) 12-15 (3) 15-16 (2) 16-18 (1)	07-08 (1) 08-11 (3) 11-14 (2) 14-15 (3) 15-17 (4) 17-19 (3) 19-20 (2) 20-21 (1)	00-03 (2) 03-06 (1) 06-07 (2) 07-09 (4) 09-11 (3) 11-15 (2) 15-17 (3) 17-22 (4) 22-00 (3)	18-19 (1) 19-20 (2) 20-03 (3) 03-05 (2) 05-07 (1) 19-21 (1)* 21-02 (2)* 02-06 (1)*
Southern Brazil, Argentina, Chile & Uruguay	09-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	07-08 (1) 08-10 (3) 10-15 (2) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	04-06 (1) 06-08 (2) 08-15 (1) 15-16 (2) 16-17 (3) 17-19 (4) 19-01 (3) 01-04 (2)	19-21 (1) 21-03 (2) 03-07 (1) 21-06 (1)*
McMurdo Sound, Antarctica	11-13 (1) 13-16 (2) 16-18 (1)	08-10 (1) 15-17 (1) 17-19 (2) 19-21 (1)	04-07 (1) 07-09 (2) 09-12 (1) 15-18 (1) 18-21 (2) 21-00 (3) 00-04 (2)	23-05 (1)

Time Zones: CST & MST
(24-Hour Time)
CENTRAL USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	09-12 (1)	07-08 (1) 08-09 (2) 09-12 (3) 12-14 (2) 14-15 (1)	05-07 (1) 07-09 (3) 09-11 (2) 11-14 (3) 14-17 (2) 17-20 (1)	17-19 (1) 19-22 (2) 22-02 (1) 20-21 (1)* 21-22 (2)* 22-00 (1)*
Northern Europe & European CIS	08-11 (1)	07-09 (1) 09-11 (2) 11-13 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-17 (1)	19-01 (1) 20-23 (1)*
Eastern Mediter-ranean	09-12 (1)	07-09 (1) 09-12 (2) 12-14 (1)	23-02 (1) 07-12 (1) 12-17 (2) 17-22 (1)	19-23 (1) 20-22 (1)*
East Africa	10-15 (1)	07-10 (1) 10-15 (2) 15-17 (1)	06-12 (1) 12-17 (2) 17-20 (3) 20-21 (2) 21-23 (1)	19-21 (1) 20-22 (1)*
West & Central Africa	11-13 (1) 13-15 (2) 15-16 (1)	07-08 (1) 08-10 (2) 10-12 (3) 12-14 (4) 14-15 (3) 15-16 (2) 16-18 (1)	07-12 (1) 12-13 (2) 13-15 (3) 15-17 (4) 17-20 (2) 20-00 (1)	18-19 (1) 19-21 (2) 21-00 (1) 20-22 (1)*
South Africa	10-13 (1)	07-09 (1) 09-13 (2) 13-14 (3)	05-14 (1) 14-16 (2) 16-18 (3)	23-00 (1) 23-00 (1)*

		14-16 (2) 16-17 (1)	18-19 (2) 19-21 (1) 00-02 (1)	
Central & South Asia	17-19 (1)	07-10 (1) 18-20 (1)	06-07 (1) 07-09 (2) 09-11 (1) 19-22 (1)	06-08 (1) 19-21 (1)
Southeast Asia	09-11 (1) 16-19 (1)	08-11 (1) 16-17 (1) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-12 (1) 17-18 (1) 18-10 (2) 20-22 (1)	06-08 (1) 17-19 (1)
Far East	15-18 (1)	07-09 (1) 14-16 (1) 16-19 (2) 19-21 (1)	07-09 (2) 09-11 (1) 17-20 (1) 20-00 (2) 00-07 (1)	02-05 (1) 05-07 (2) 07-09 (1) 05-07 (1)*
Guam & Pacific Islands	12-15 (1) 15-17 (2) 17-19 (1)	10-13 (1) 13-16 (2) 16-19 (3) 19-20 (2) 20-21 (1)	06-07 (2) 07-09 (3) 09-11 (2) 11-18 (1) 18-20 (2) 20-22 (3) 22-00 (2) 00-06 (1)	22-01 (1) 01-06 (3) 06-07 (2) 07-09 (1) 00-03 (1)* 03-06 (2)* 06-07 (1)*
Australia & New Zealand	15-17 (1)	09-12 (1) 12-17 (2) 17-19 (3) 19-20 (2) 20-22 (1)	07-09 (2) 09-17 (1) 17-20 (2) 20-00 (3) 00-03 (2) 03-07 (1)	02-04 (1) 04-07 (2) 07-09 (1) 04-05 (1)* 05-07 (2)* 07-08 (1)*
Northern & Central South America	09-11 (1) 11-13 (2) 13-14 (3) 14-15 (2) 15-17 (1)	06-07 (1) 07-08 (2) 08-14 (3) 14-16 (4) 16-18 (3) 18-19 (2) 19-20 (1)	06-07 (2) 07-11 (3) 11-14 (2) 14-16 (3) 16-20 (4) 20-22 (3) 22-02 (2) 02-06 (1)	18-19 (1) 19-20 (2) 20-02 (3) 02-04 (2) 04-06 (1) 20-21 (1)* 21-02 (2)* 02-06 (1)*
Southern Brazil, Argentina, Chile & Uruguay	08-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	07-08 (1) 08-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	06-08 (2) 08-15 (1) 15-16 (2) 16-18 (4) 18-22 (3) 22-04 (2) 04-06 (1)	19-22 (1) 21-03 (2) 03-06 (1) 21-05 (1)*
McMurdo Sound, Antarctica	11-13 (1) 13-15 (2) 15-18 (1)	13-16 (1) 16-18 (2) 18-20 (1)	07-09 (2) 09-12 (1) 15-18 (1) 18-20 (2) 20-23 (3) 23-03 (2) 03-07 (1)	00-06 (1)

Time Zone: PST (24-Hour Time)
WESTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	09-11 (1)	08-10 (1) 10-12 (2) 12-15 (1)	23-01 (1) 06-08 (1) 08-12 (2) 12-14 (3) 14-16 (2) 16-20 (1)	18-00 (1) 20-22 (1)*
Northern Europe & European CIS	*Nil*	08-12 (1)	23-01 (1) 06-07 (1) 07-09 (2) 09-13 (1)	19-23 (1) 20-22 (1)*
Eastern Mediterranean & East Africa	*Nil*	07-11 (1)	06-09 (1) 09-11 (2) 11-15 (1) 18-21 (1)	18-21 (1)
West & Central Africa	11-16 (1)	06-08 (1) 08-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	05-10 (1) 10-15 (2) 15-18 (3) 18-20 (2) 20-22 (1)	18-22 (1) 19-21 (1)*
South Africa	10-13 (1)	08-10 (1) 10-14 (2) 14-16 (1)	05-14 (1) 14-16 (2) 16-18 (3) 18-20 (1) 00-02 (1)	19-22 (1) 20-21 (1)*
Central Asia	17-19 (1)	07-09 (1) 16-17 (1) 17-19 (2) 19-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 17-19 (1) 19-20 (2) 20-22 (1)	05-08 (1)
Southeast Asia	16-19 (1) 09-11 (1)	08-09 (1) 09-10 (2) 10-14 (1) 14-17 (2) 17-18 (3) 18-19 (2) 19-21 (1)	07-08 (1) 08-10 (3) 10-11 (2) 11-21 (1) 21-00 (2) 00-02 (1)	00-02 (1) 02-06 (2) 06-08 (1) 02-06 (1)*
Far East	14-15 (1) 15-16 (2) 16-18 (1)	12-14 (1) 14-18 (2) 18-20 (3) 20-22 (1)	08-10 (2) 10-20 (1) 20-22 (2) 22-00 (3) 00-04 (2) 04-08 (1)	00-02 (1) 02-06 (2) 06-08 (1) 02-08 (1)*
Guam & Pacific Islands	12-15 (1) 15-17 (2) 17-19 (1)	08-12 (1) 12-16 (2) 16-17 (3) 17-18 (4) 18-20 (3) 20-21 (1)	09-10 (2) 10-12 (4) 12-16 (3) 16-19 (4) 19-20 (3) 20-00 (2) 00-09 (1)	19-20 (1) 20-22 (2) 22-06 (4) 06-08 (2) 08-09 (1) 21-23 (1)* 23-06 (2)* 06-07 (1)*
Australia & New Zealand	11-15 (1) 15-17 (2) 17-18 (1)	10-12 (1) 12-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-17 (1) 17-18 (2) 18-20 (3) 20-22 (4) 22-00 (3) 00-02 (2) 02-04 (1)	00-03 (1) 03-05 (3) 05-07 (2) 07-08 (1) 02-03 (1) 03-05 (2) 05-07 (1)
Northern & Central South America	10-12 (1) 12-14 (2) 14-16 (1)	06-07 (1) 07-08 (2) 08-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (2) 07-09 (3) 09-10 (2) 10-14 (1) 14-16 (2) 16-18 (4) 18-22 (3) 22-00 (2) 00-06 (1)	18-20 (1) 20-00 (3) 00-03 (2) 03-05 (1) 20-21 (1)* 21-01 (2)* 01-04 (1)*
Southern Brazil, Argentina, Chile & Uruguay	08-12 (1) 12-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	00-02 (1) 07-11 (1) 11-13 (2) 13-15 (3) 15-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	20-05 (2) 05-15 (1) 15-16 (2) 16-18 (4) 18-20 (3)	18-19 (1) 19-23 (2) 23-03 (1) 20-02 (1)*
McMurdo Sound, Antarctica	11-13 (1) 13-15 (2) 15-17 (1)	12-15 (1) 15-18 (2) 18-20 (1)	05-06 (1) 06-08 (2) 08-11 (1) 16-19 (1) 19-20 (2) 20-23 (3) 23-02 (2) 02-05 (1)	00-06 (1)

**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.*
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 40 and 20 meter openings.

Propagation charts prepared by George Jacobs, W3ASK.

world. It tends to maximize during sunrise and sunset periods and over both short- and long-path openings.

During the *daylight* hours, optimum DX propagation conditions are expected on 15 meters. The band is forecast to open to all areas of the world sometime during this period, often with strong, stable signals with little fading or noise. Openings will be a bit shorter than those of the last few years. Conditions on 10 and 12 meters should run a close second, but with fewer openings expected into Europe and the Far East. Excellent worldwide DX openings to most areas of the world are forecast for 17 and 20 meters during the *daylight* hours. Conditions are expected to optimize for an hour or two after *sunrise* and again during the *late afternoon.* With increasing hours of daylight during February, expect the 10, 12, 15, 17, and 20 meter bands to remain open for an hour or so longer into the early evening than during the winter months.

Although the solar cycle is declining, be sure to check the 6 meter band for possible DX openings, particularly when conditions are High or Above Normal. Openings are expected to be less numerous than in previous years of higher solar activity, but some openings may still be possible during the hours of *daylight.* The best bet is for openings towards Central and South America, but other openings may also be possible.

During the *early evening* hours and to as late as *midnight,* seven bands should be available for DX openings; 15, 17, 20, 30, 40, 80, and 160 meters. Fifteen and 17 meters should hold up for openings towards Central and South America and the Caribbean, the Pacific area, the Far East, and parts of Asia. Even better openings to many areas of the world should be possible on 20 meters during this period, with the strongest signals from southerly and westerly directions. Good DX conditions are also forecast for 30, 40, and 80 meters for openings towards the east and the south. Openings in the same direction, but with higher noise levels and weaker signals, should also be possible on 160 meters.

Between *midnight* and *sunrise* it should be a toss-up among 20, 30, and 40 meters for DX paths. These bands should open to many areas of the world, with conditions favoring openings towards the south and the west. Expect similar conditions on 80 meters, but with weaker signals and higher noise levels. Be sure to check 160 meters for some unusual DX openings toward the south and the west during this period. Conditions on the bands between 160 and 20 meters are expected to peak at local sunrise.

VHF Ionospheric Openings

As mentioned previously, check for 6 meter DX openings during the *daylight* hours. Some short-skip openings over distances of about 1200 to 2300 miles may also occur. Best times for such openings are during the *afternoon* hours.

Trans-equatorial (TE) scatter propagation tends to increase during the equinoctial period, and some 6 meter openings may be possible between 7 and 10 PM local time. The best bet for

such openings is between the southern tier states and South America for paths approximately at right angles to the equator. An occasional TE opening may also be possible on 2 meters. Unlike *F2*-layer or sporadic-*E* openings on 6 meters, TE openings are characterized by very weak signals with considerable flutter fading.

Auroral displays tend to occur somewhat more frequently during the equinoctial period. Unusual short-skip conditions often occur on the VHF bands during these displays. Openings, generally over distances of several hundred and up to about 1300 miles, may take place by means of reflection from the ionized region produced by an auroral display. Flutter fading and multi-path echoes characterize auroral-type openings. To take maximum advantage of such openings, rotatable antennas should be beamed towards the auroral display, if it is visible.

Large areas of sporadic-*E* ionization also accompany most auroral displays. Reflection of VHF signals from these regions can make possible short-skip openings between distances of 750 and 1300 miles. Signals reflected in this manner are usually strong and stable as compared to those reflected directly from an auroral display.

Auroral activity often occurs during periods of radio storminess on the HF bands. Check the Last-Minute Forecast on the first page of this column for those days that are expected to be Below Normal or Disturbed during February. These are the days on which VHF auroral-type openings are most likely to occur.

Next Month

Next month I will present my review of another propagation analysis program that is based on the VOACAP program. I will compare it to the ACE-HF program that I reviewed last month. There is not enough room in this month's column for all that I wish to share with you about these programs.

Please drop an e-mail or a letter to me, and share your observations about the current solar cycle, or ask questions that you would like me to explore in this column. Also, don't forget to visit my propagation center at <http://prop.hfradio.org/>, or using a WAP device (for example, a WAP cell phone), go to <http://wap.hfradio.org>. You might also wish to have my automated e-mail reports; you can sign up at <http://prop.hfradio.org/ealert/>.

Until next month, I wish you great DX. Look for me on the bands!

73, Tomas, NW7US

our readers say

Re: "Zero Bias," October 2002
("Nobody Goes There Anymore. It's Too Crowded")

Editor, *CQ:*

I'm a new ham operator, so excuse my lack of years of experience.

When I was a kid, SW radio was the first bug that I caught, and enjoyed it. Communications outside the local area was a blast. Then later on in life I became interested in Citizens Band radio. I guess I got into this in the mid-70's. I had interesting QSOs with all sorts of people. It helped a lot with travel directions, routes around traffic jams, etc.—probably today, one of the best services it offers. In case of emergency I knew I had Channel 9. With the interesting and diverse group of people, my first look at technical discussions came from CBers who had large base setups, but also with mobile radio installations and tuning antennas. Guess where I learned SWR from? Someone to keep me company on the roads, especially Interstate travel. Great late-night entertainment.

Unfortunately, there were the ugly sides of CB operation, the foul language, jammers, etc. So this prompted me to look for something different. Ham radio was the next stop, and as I investigated it I saw more emphasis towards technical aspects and this interested me. *But* there was this Morse code issue facing me, so I attempted and failed.

Life moves forward, and someone mentioned the Tech No-Code license, and although it was 20+ years from my last attempt to become a ham, I was thrilled. I got my license. I got on a repeater, installed a mobile, operated the satellites, all as no code. What surprised me was that 2 meter or 70 cm repeater operation was almost the same as CB radio. Hams call it "rag chewing." I would call it general "BSing." What I *expected* was more technical discussions, antennas, radio, propagation, etc. But *very* few ever talked technical. Most would talk mobile antennas, but realistically is was general conversation. In central Florida, where I was first licensed, I would say most repeaters had 75% Tech no-codes, and the other 25% where there, but rarely talked. When they did, it was HF, and the other 75% disappeared. Sad. Here in NC, it is at least 80% no-code and on some repeaters almost 100%. When I ask about HF or DX, they point me to other repeaters.

In Part 97, Section 97.113 Prohibited transmissions, (5) "Communications, on a regular basis, which could reasonably be furnished alternatively through other radio services."

Now isn't that interesting? CB radio provides for exactly what FM repeater operation does, reasonably, as described by your article. *Is this ham radio??* The drive-to-work 2 meters, 70 cm morning CB radio operations are no longer a shock to me, although a disappointment.

Once again there is a push to bring a diverse (interests) groups of people, primarily Tech no-code and HF people, together. Make friends. Yet we continue to ignore that they each have a differing interest in RF communications. True we can *all* talk about the weather, health, road conditions, and other general chit-chat. So can you with a mobile CB radio.

Thanks for the great magazine!

Stewart Dunaway

P.S.: By the way, I passed 13 wpm Morse code, at an older age and enjoyed it. 80/160 meters reminds me of CB raunchy conversations, even a group talking about diarrhea. All I wanted to do was get a signal check on a new 160 meter shunt-fed tower. So HF is *not* heaven, but when you really want to learn more technical RF communication items, the ionosphere is the limit!

Editor, *CQ:*

Just picked up the October issue of *CQ* on the newsstand and enjoyed your editorial. It's the same thing here in the Dallas, Texas area—dead repeaters except for the to-work and to-home group.I have sold all my 2 meter gear except for an old HT to listen to when bad WX hits.

I gave up on 2 meters because it got to the point where I could seldom find anyone on the band to talk to about my favorite ham stuff such as CW, QRP, DX, antennas, or HF. The guys around here are just seldom interested in that kind of stuff. They are no-coders interested in computers and working other no-coders through their computers. I really hate to say this, but I just don't have much in common with these new hams. Even the ones who have upgraded to the 5 wpm Extra don't have any interests in common with me. They are still on 2 meters and just don't do HF. All the good things you mentioned about 2 meters are true, but when I say something about CW or QRP, it's like dead silence—no response. For myself, I don't need 2 meters or any other UHF/VHF band and am quite happy to stay on HF and talk abt antennas, QRP. DX, CW, etc. with others with like interests.

Anyhow, I thought it was just me who noticed a lack of hams on 2 meters. Now I see its universal.

Wayne Brandon

Editor, *CQ:*

I'd like to comment on your October editorial concerning repeaters. Along with your own observations, you quoted Bill, WA6ITF, and his observations on 2 meters in Los Angeles. He wrote that "back in 1992...there was a QSO every 15 kHz..." Now the band is 'dead.'" I had the same experience this past summer. We drove back to Maine from Salt Lake City. I had a 2 meter radio with me and the only place I heard any conversations was in the Cleveland area eastbound and in Rock Springs, Wyoming westbound.

You ask, "Why?" Well, here's one fellow's opinion:

Personal background: I am 54; been a ham since 1961 (age 13); originally KN1TMK, then K1TMK in Bangor, ME; had to learn Morse code; early activity in NTS; chase DX; dabble in contests; work 2 meters (multi-mode); have hosted a PacketCluster; used to run 2 meter autostart teletype; operated from LU and PJ8... That said, here we go.

In the early days of 2 meter FM, even as recent as the early '90s, I'd guess that many, if not most, of the ops enjoyed at least General Class privileges and used 2 meters as just one more aspect of their operating interests. Many paid the price—in money, equipment, and time—to put repeaters on the air. I know some who are *still* the ones supporting local repeaters. Most of us paid the "total price" to get our tickets. But "we've" dumbed down ham radio. No more code (it's "archaic"), 5 wpm if you want all privileges, simple Technician and you're on the air. I suspect this was all motivated by money: Organizations need members and subscriptions, and manufacturers and dealers need buyers. Well, all these no-code hams passed that 35-question exam after a month of memorization, bought a 2 meter radio, got on the air ("Meet you on channel tonight?" "10-roger that."), chatted once or twice, and got bored. They came in through the back door and never made it into the house. You know who I hear on our local club repeater...when I listen? Mainly the "old timers."

A second repeater attraction was the autopatch. But with the ubiquitous cell phone, who needs autopatch?

Some who read this will respond "over simplification." But why does every explanation have to be "complex"? The bottom line is, if all you operate is 2 meter FM 'cuz you can't go below 6 meters and you didn't buy any other radio, then you're going to get bored real fast. Why don't those of us who operate the "low bands" get bored? I know some do,

but most of us don't because the bands are always changing: new countries, a better contest score, something new about band conditions, a different mode, whatever... None of that occurs if all you operate is 2 meter FM.

Obtaining a ham radio ticket is not all that demanding anymore, and activities that don't require much don't return much.

Curt, K7CU

Editor, *CQ:*

While one probably can't directly compare the situation concerning 2 meter FM repeaters in the USA and DL (Germany), Just the same, I'd like to add my two cents worth: No activity outside "drive time" seems to be perfectly in order to me. Repeaters are meant to be used by mobile or portable stations, who generally are at a disadvantage when it comes to antenna size and height above ground. Repeaters certainly aren't there for fixed station operation.

When I was still driving a car (These days I'm about twice as fast riding my bicycle), I quit using repeaters so long ago that I can't remember exactly when. Around 1972 I guess. By then I was tired to the bone of being "entertained" by burps, kerchunks, and abusive language. From one day to the other I traded my TR-7200 in for a TR-7010 and replaced the Lambda 5/8 whip with an "'ox horn" (angled dipole). Using CW and SSB from then on, I not only met much nicer people, it also dawned on me after I while that I had considerably increased coverage.

After a while the ox-horn had to make way for a Big Wheel, and then things really got lively! Imagine driving along a motorway talking on the air to another ham over 100 km away (divide by 1.6 to get miles). During tropo lifts my biggest problem was explaining to, say, stations from G-land that I was actually moving and not parking alongside some big Yagis! A sporadic-*E* opening even got me a contact with Ukraine, UB5 back then.

You mention "generally strong signals" as an advantage of repeaters. Not for me, though. When things get easy, boredom sets in. No challenge, no fun!

I consider myself a radio amateur, emphasis on "radio." Any communication that has more than Mother Nature between both stations doesn't constitute a QSO! Yes, here I do include not only all means of wire- or fibre-bound technology, but also repeaters and satellites.

Your solution to more activity is, of course, activity. Implementation may vary, though. While I'm mainly active on HF, I always monitor 144050 kHz and let my CQ-loop run there whenever I'm QRL in the shack (writing QSL cards, copying contest logs into the computer, etc.).

73, Eddi, DK3UZ

Forget "Little Pistol" Advice Remember the Rules!

Editor, *CQ:*

I think you did us a real disservice when you mentioned the "contesting advice from a little pistol" (October "Zero Bias"), item number one, "Give your call often, ideally every QSO."

In fact, unless the rules have recently changed, one is required to give the call with the end of each communication. I believe that means that when one does a contest report to another station, which basically consists of one transmission (communication) to the other station, they need to give their callsign. I agree with you about the sitting for 10 minutes waiting part. I wish the FCC would start cracking down on this.

Anyhow, my comment about the disservice is this: You had a golden opportunity to expound on the FCC rule, but you did not mention it at all. I was really disappointed. I hope one of these times when you get the podium again that you mention the call is needed with the end of each communication. Then there would be no ten minutes.

K9KR

Editor, *CQ:*

FCC Rule §97.119 Station identification states: (a) Each amateur station, except a space station or telecommand station, must transmit its assigned call sign on its transmitting channel AT THE END OF EACH COMMUNICATION [emphasis added] and at least every 10 minutes during a communication, for the purpose of clearly making the source of the transmissions from the station known to those receiving the transmissions. ..."

Hmmmm... In the contests, it is unlikely that the 10-minute requirement would come into play, but the identification at the end of each contact does (and is routinely ignored). So after giving out the 59 report and before the next "CQ contest," don't forget to identify after each contact. Contests promote good amateur practice, don't they?

Mark

(no last name or callsign provided)

Re: Musings" by W9KNI

Editor, *CQ:*

Just received my October *CQ*, and just finished reading Bob Locher's fine article ("Musings on an Experiment in QRP," p. 11). Man, that man can write! You should to get him as a columnist.

Nice issue.

Danny Richardson, K6MHE

A Problem on 10 Meters

Editor, *CQ:*

I am damn mad at the state of affairs of pirate unlicensed "CB" stations operating on the 10 meter amateur radio band. It is no longer just a few pirate stations, but many unlicensed operators. These unlicensed stations can be heard jamming other stations using foul offensive language.

On several occasions this past week I have tuned across the 10 meter amateur band and found unlicensed stations transmitting on AM, LSB, and USB. I have heard these pirate unlicensed stations operating phone modes from 28.000 (in the U.S. CW/Digital *only* portion of the band) to approximately 29.500 MHz. Transmissions from these unlicensed stations are in plain English and some are in Spanish.

Ten meter transceivers are being sold in truck stops/gas stations along interstate highways (and on the internet) across the United States. It is completely legal to sell and/or purchase amateur radio transmitting equipment. It is (as we are well aware) illegal to transmit on a 10 meter transceiver in the United States without a valid FCC amateur radio license.

We the people of the amateur radio community must unite and petition to our representatives in the United States Congress and Senate to create federal legislation making it illegal to sell and/or purchase equipment that is capable of transmitting on amateur radio frequencies to individuals who are not licensed amateur radio operators. The amateur radio community must also petition to our representatives in Congress and the United States Senate to provide adequate funding to the Federal Communications Commission to "police" the amateur radio bands and get rid of unlicensed pirate operators.

The situation of unlicensed pirate stations and their manner of operating on 10 meters and other HF frequencies is an International Disgrace to amateur radio in the United States of America.

David Humphries, KC7PFR

ham shop

Advertising Rates: Non-commercial ads are 20 cents per word including abbreviations and addresses. Commercial and organization ads are $1.00 per word. Boldface words are $1.50 each (specify which words). Minimum charge $2.00. No ad will be printed unless accompanied by full remittance. All ads must be typewritten double-spaced.
Closing Date: The 10th day in the third month preceding date of publication (example: Jan. 10th for the March issue). Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of *CQ* cannot vouch for the merchandise listed therein. The publisher reserves the right to reject any advertisement. Direct all correspondence and ad copy to: CQ Ham Shop, 25 Newbridge Road, Hicksville, NY 11801 (fax: 516-681-2926; e-mail: <hamshop @cq-amateur-radio.com>.

CB-TO-10M CONVERSIONS: Frequency modifications, FM, books, plans, kits, high-performance CB accessories. Catalog $3. CBCI, Box 30655CQ, Tucson, AZ 85751. <www.cbcintl.com>

FOREIGN AIRMAIL POSTAGE for successful QSLing! Plus **EUROPEAN NESTING AIRMAIL ENVELOPES, EYEBALL CARDS, QSL ALBUMS.** Bill Plum, 12 Glenn Road, Flemington, NJ 08822-3322 (e-mail: <plumdx@msn.com>).

QSLs FOR DX STATIONS: Our new "International Division" was established to handle QSL needs of DX hams. We understand the problems of packaging, shipping, and dealing with the customs problems. You can trust us to deliver a quality QSL, usually much cheaper than you can find locally. Write, call, or FAX for free samples and ordering information. "The QSL Man—W4MPY," 682 Mount Pleasant Road, Monetta, SC 29105 USA. Phone or FAX 803-685-7117.

NAME BADGES BY GENE: In full color, our artwork or yours. See our web page for samples and prices. **www.hampubs.com** Harlan Technologies 815-398-2683.

REAL HAMS DO CODE: Move up to CW with **CW Mental Block Buster III.** Succeed with hypnosis and NLP. Includes two (2) Tapes and Manual. Only $27.95 plus $5.00 s/h US. FL add $2.02 tax. Success Easy, 123 NW 13th Street, Ste 304-2, Boca Raton, FL 33432, 800-425-2552, <www.success-is-easy.com>.

"QRZ DX"—since 1979: Available as an **Adobe PDF file** each Wednesday or by regular mail. Your best source for weekly DX information. Send #10 SASE for sample/rates. **"The DX Magazine"—since 1989:** Bi-monthly – Full of DXpedition reports, QSL Information, Awards, DX news, technical articles, and more. Send $3.00 for sample/rates. DX Publishing, Inc., P.O. Box DX, Leicester, NC 28748-0249. Phone/Fax: 828-683-0709; e-mail: <DX@dxpub.com>; WEB PAGE: <http://www.dxpub.com>.

CERTIFICATE for proven contacts with all ten American districts. SASE to W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

CALLBOOK CD-ROM 2003 **FINAL** EDITION: $38.95 USA/VE. <aa6ee@amsat.org>; 760-789-3674. Duane Heise, AA6EE, 16832 Whirlwind, Ramona, CA 92065. <www.radiodan.com/aa6ee/>

TRYLON SELF-SUPPORTING TOWERS: Delivered **ANYWHERE** in the US for **ONLY** $261.00. This is the **BEST** tower value around – 96 feet for only $2451.00 **DELIVERED TO YOUR QTH!** Go to <www.championradio.com> or call 888-833-3104 for more information.

MAUI, HAWAII: vacation with a ham. Since 1990. <www.seaqmaui.com>, telephone 808-572-7914, or <kh6sq@seaqmaui.com>.

KK7TV COMMUNICATIONS: *See our display ad.*

ALUMINUM CHASSIS-CABINET KITS, UHF and VHF Antenna Parts. K3IWK, 5120 Harmony Grove Rd, Dover, PA 17315-3016; <www.flash.net/~k3iwk>.

HALLICRAFTERS Service Manuals. Amateur and SWL Write for prices. Specify Model Numbers desired. Ardco Electronics, P.O. Box 95, Dept. C, Berwyn, IL 60402.

KNOW FIRST! Ham radio fanatics—you need THE W5YI REPORT, a twice-monthly award-winning Hot Insider Newsletter Acclaimed best! Confidential facts, ideas, insights, nationwide news, technology, predictions, alerts. Quoted coast-to-coast! We print what you don't get elsewhere! $19.50 annually to new subscribers! Money-back guarantee! FREE sample for SASE (two stamps). W5YI, P.O. Box 565101, Dallas, Texas 75356.

Sound Card to Transceiver Interface for PSK31, SSTV, MFSK, MMTTY, and more! *No other manufacturer offers you this VALUE and Quality in a sound-card to transceiver interface! All Cables, Connectors, Components, Case, Custom-designed Printed Circuit board, PSK31 software, pictorial diagrams, large schematic, software disk, and setup instructions ARE INCLUDED with every* ***RASCAL®™ (Radio And Sound Card Adapter Link®™)*** *interface, Wired and Tested, or Kit.* There are no jumpers to joggle, no wall-wart or external power supplies required. This makes the ***RASCAL®™*** ideal for portable and field-day operation. The wired and tested ***RASCAL®™*** is ready to "Plug-N-Play" with more than 75 Sound Card software packages to choose from. Freeware, Shareware, and Commercial software (see software links at bottom of page at: <www.PacketRadio.com/psk.htm>) that enables you to enjoy the best of your PC sound card and our hobby. The ***RASCAL®™*** Sound Card Line in and Line out are isolated from the transceiver by special, audio-coupling transformers designed for this application. The LINE IN and LINE OUT (or Mic IN & Spkr OUT) cables are high-quality, shielded cables with high-permeability ferrite chokes molded into the cable. This ferrite choke provides an increased degree of immunity from potential RF feedback. ***RASCAL®™*** activates automatic PTT using an optical coupler, via the PC serial comport. ***RASCAL®™*** **Kit** is $24.95. ***RASCAL®™*** wired & tested is $44.95. ***RASCAL®™*** wired & tested with added FSK option is $54.95. *(Prices do not include s&h.)* SECURE, On-Line ordering, go to: <www.PacketRadio.com/PSK.htm>; or fax 434-525-7818; or U.S. mail: BUX CommCo, 115 Luenburg Drive, Evington, VA 24550. ALL ORDERS are shipped same day, except Sundays and holidays.

****

AMATEUR TV — 1250 & 2400 MHZ TX-RX MODULES: Compact, ATV 8 channel programmable, FM, PLL, Stereo and NTSC/PAL compatible. Great receiver sensitivity with 1 mile range w/rubber duck! 12 v/130 mA. Gain antennas extend range to over 30 miles. Fully assembled, tested, and complete with 1/4 wave antennas. **(1)** ATV-2400 (transmitter and receiver), **$159**; **(2)** ATV-1200, **$159**; **(3)** 3.0 GHz Wireless Freq Counter, **$129**; **(4)** 14 dbi Linear Patch 13" × 13" × 1" patch w/30 degree beam angle, **$179**; **(5)** SMA Low Loss Male-Male cables, **$10** & up. Contact our regional Dealers listed on website, or **ORDER DIRECT** ON-LINE at **www.4atv.com**, fax 847-619-0852; EzATv. Also, Seeking other Dealers and Distributors; e-mail us at **sales@4atv.com**

ARTHUR COLLINS, RADIO WIZARD, 394-page biography with photos of the man who built the S-Line, KWM-2, and other great Collins gear. $18.95 + $8.95 S&H. Order online at <http://www.artcollinsradiowiz.com/> or send check to Collins Book, P.O. Box 2782, Cedar Rapids, IA 52406-2782.

IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, 2755 Woodhull Ave., Bronx, NY 10469.

PHASED ARRAY NETWORKS by COMTEK SYSTEMS deliver gain and front to back. Call 704-542-4808; fax 704-542-9652. COMTEK SYSTEMS, P.O. Box 470565, Charlotte, NC 28247.

FREE HAM CLASSIFIEDS <http://hamgallery.com>

Antenna **MADE** for **AO-40** <http://www.n3iyr.com/>

Advertiser's Index

now including websites

Advanced Specialties, Inc.	64	www.advancedspecialties.net
Alinco	3	www.alinco.com
Alpha Delta Communications	71	www.alphadeltacomm.com
Aluma Towers	113	www.alumatower.com
Ameritron	27	www.ameritron.com
AN Wireless	53	www.anwireless.com
Antique Electronic Supply	89	www.tubesandmore.com
Antique Radio Classified	88	www.antiqueradio.com
Associated Radio	40	www.associatedradio.com
Astron Corp	21	www.astroncorp.com
Atomic Time, Inc.	85	www.atomictime.com
Batteries America/E.H.Yost	115	www.batteriesamerica.com
Bilal Co./Isotron Ants	88	www.rayfield.net/isotron
Buckmaster	60	www.hamcall.net
Burghardt Amateur Center	58	www.burghardt-amateur.com
Command Productions	40	www.LicenseTraining.com
Command Technologies	104	www.command1.com
Communications Concepts Inc	73	www.communication-concepts.com
CQ Calendars	103	www.cq-amateur-radio.com
CQ Merchandise	59	www.cq-amateur-radio.com
Cubex Quad Antennas	104	www.cubex.com
Cutting Edge Ent.	95,104,113	www.powerportstore.com
Datamatrix	113	www.prolog2k.com
Davis Instruments	35	www.davisnet.com
DX4WIN(Rapidan Data Systems)	58	www.dx4win.com
Elecraft	105	www.elecraft.com
EQF Software	84	www.eqf-software.com
Finger Lakes Radio	88	www.fingerlakesradio.com
Force 12 Antennas	51,88	www.force12inc.com
Gap Antennas	25	www.gapantenna.com
Glen Martin Engineering, Inc	26,99	www.glenmartin.com
Ham Radio CD Roms	68	www.cq-amateur-radio.com
Ham Radio Outlet	10	www.hamradio.com
Ham Station	73	www.hamstation.com
High Sierra Antennas	79	www.cq73.com
Hy-Gain	1,9	www.hy-gain.com
ICOM America, Inc	Cov.IV,31,33	www.icomamerica.com
International Radio	109	www.qth.com/INRAD
K2AW's "Silicon Alley"	95	
K-Y Filter Co.	104	www.ky-filters.com/cq.htm
Kanga US	89	www.bright.net/~kanga/kanga/
Kangaroo Tabor Software	58	www.taborsoft.com
Kenwood, USA	Cov. II	www.kenwood.net
KK7TV Communications	114	www.kk7tv.com

Oops...

Author John Karasz, WB2GMY, of "Build a Solid-State Power Supply for Vintage Transmitters" (December 2002 *CQ*) notes that one item is missing from his parts list: The heat sink is made by AAVID-THERMALLOY, part number 504222b00000. We apologize for the omission. In addition, there is an error in the schematic. We learned of it too close to press time to have the schematic redrawn correctly. We will correct it next month. Please stand by.

We got out of sequence last month on our survey results, publishing the summary of last October's responses before we'd given you September's responses. The September results are in this issue and we'll be back on track next month.

Looking Ahead in CQ

Here's a look at some of the articles we're working on for upcoming issues of *CQ:*

- CW Results: 2002 CQ WW WPX Contest
- "What Happened to 10 Meters During the WPX CW Contest?" by K9LA
- "Ham Radio in The Azores," by SMØJHF

Plus ...

- "The Nine-Minute QSO," by WB2UDC
- "Resonance," by K5YNR
- "Kitbashing the PD-8010 Antenna," by N3SNU

Do you have a ham radio story to tell? See our writers' guidelines on the CQ website: <http://www.cq-amateur-radio. com>.

Advertiser's Index

now including websites

LDG Electronics.....105	www.ldgelectronics.com
Lewallen, Roy, W7EL 95	http://eznec.com
M2 Antennas.....60	www.m2inc.com
MFJ Enterprises.....17,47	www.mfjenterprises.com
Nemal Electronics.....109	www.nemal.com
New Communications Solutions.....67	www.ncsradio.com
Paddlette Company 95	www.paddlette.com
Palomar Engineers 84	www.palomar-engineers.com
Personal Database Applications.....89	www.hosenose.com
Peter Dahl Co. 26	www.pwdahl.com
Popular Communications.....112	www.cq-amateur-radio.com
PowerPort.....95,104,113	www.powerportstore.com
Productivity Resources.....51,88	www.force12inc.com
Prolog 113	www.prolog2k.com
QSLs by W4MPY.....95	www.w4mpy.com
Radcomm Radio.....73	www.rad-comm.com
Radio Club of JHS 22 34	www.wb2jkj.org
Radio Daze.....104	www.radiodaze.com
Radio Works 55	www.radioworks.com
RF Connection.....113	www.therfc.com
RF Parts.....49	www.rfparts.com
Rotor EZ-Idiom Press 84	www.idiompress.com
SGC, Inc. 5	www.sgcworld.com
Surplus Sales of Nebraska 85	www.surplussales.com
Tarheel Antennas 60	www.tarheelantennas.com
Ten-Tec 45,89	www.tentec.com
T.G.M. Communications.....84	www3.sympatico.ca/tgmc/index.html
Traffie Technology.....111	www.hexbeam.com
Universal Radio, Inc. 32	www.universal-radio.com
VHF Magazine.....93	www.cq-amateur-radio.com
Vibroplex.....109	www.vibroplex.com
W & W Manufacturing Co. 39	www.ww-manufacturing.com
W3FF Antennas.....72	www.buddipole.com
W4RT Electronics.....35	www.W4RT.com
W5YI Marketing 32,55	www.w5yi.org
W9INN Antennas.....113	
West Mountain Radio 7	www.westmountainradio.com
Wireman, The 104	www.thewireman.com
WXOB Array Solutions 57	www.arraysolutions.com
Yaesu Electronics CovIII,14-15,116	www.vxstdusa.com

It's easy to advertise in CQ.
Let me know what I can do to help.
Arnie Sposato, N2IQO.
(516) 681-2922 or FAX (516) 681-2926
e-mail:arnie@cq-amateur-radio.com

NO COOLING FAN
COOL AND QUIET 65 W OPERATION

Yaesu's FT-2800M, the most ruggedly-built 2-meter amateur transceiver ever, provides 65 Watts of power along with Yaesu's renowned bullet-proof receiver front end. Direct keypad frequency entry, Alpha-Numeric Memory System, the high power output, and unsurpassed ergonomics make the FT-2800M an operator's dream come true!

New Ultra-High-Dissipation Heat Sink Design

The all-new heat sink of the FT-2800M provides more effective cooling than any other design, allowing long transmission periods without dangerous heat build-up or power reduction due to thermal protection.

High power output, a huge, easy-to-read display, and one-touch WIRES™ Internet Linking Access capability are yours with the exciting new FT-2800M.

On transmit, the 65 Watts of true FM power output provides you with excellent coverage and superb voice clarity. On receive, you get extended coverage of 134-174 MHz, with a special memory bank dedicated to the NOAA Weather Broadcast Channels (U.S. version only).

Built to the exacting requirements of both the commercial radio industry, as well as the U.S. military's MIL-STD 810, the FT-2800M is constructed using an aluminum diecast chassis/heatsink assembly, providing outstanding mechanical and thermal stability for the internal components.

With superb ergonomics to go along with its stout RF design, the FT-2800M is ready for action, at home or away!

HEAVY-DUTY VHF FM TRANSCEIVER

FT-2800M

ACTUAL SIZE

For the latest Yaesu news, visit us on the Internet:
http://www.vxstdusa.com

YAESU
Choice of the World's top DXers

Vertex Standard
US Headquarters
10900 Walker Street
Cypress, CA 90630 (714)827-7600

HF EXCITEMENT

INTRODUCING YAESU'S ALL NEW HF MOBILE

Blending leading-edge technologies developed on the FT-897 and MARK-V FT-1000MP transceivers, the FT-857 is the world's smallest HF/VHF/UHF Multimode Transceiver, and it's available now!

FT-857 DESIGN HIGHLIGHTS

The FT-857 is a high-performance, ultra-compact transceiver operating on the 160-10 meter HF bands, plus the 50, 144, and 430 MHz VHF/UHF bands. Providing 100 Watts of power on HF/6 meters, 50 Watts on 2 meters, and 20 Watts on 70 cm, the FT-857 is ideal for mobile, vacation, DX-pedition, or home use when space is at a premium.

Utilizing the renowned receiver performance of the FT-897 and MARK-V FT-1000MP, the FT-857 features wide dynamic range, Digital Signal Processing, and outstanding audio.

The wide array of convenience features includes a 32-color display; Spectrum Scope; built-in keyer with memory and beacon mode; U.S. Weather Band reception; 200 memories with Alpha-Numeric labels; AM Aircraft reception; detachable front panel (optional YSK-857 required); and much, much more.

You've asked for it, and it's here today: the FT-857 Mega-Mobile. . .from the engineers at Yaesu!

Actual Size

HF EXCITEMENT

FT-857

Ultra-Compact HF/VHF/UHF
100 W* All-Mode TRANSCEIVER
(HF/6 m 100 W, 2 m 50 W, 70 cm 20 W)

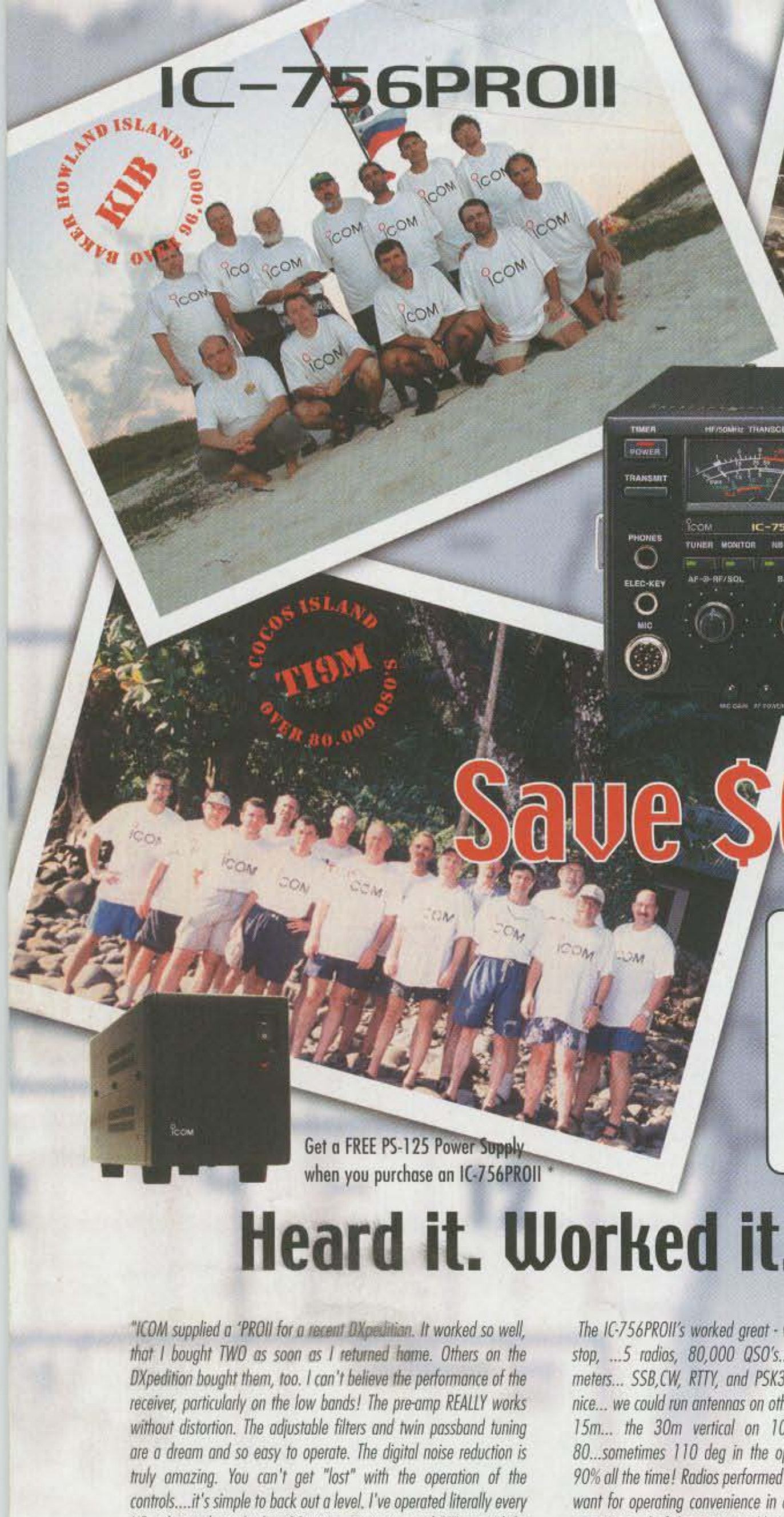
For the latest Yaesu news, visit us on the Internet:
http://www.vxstdusa.com

Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

YAESU
Choice of the World's top DX'ers

Vertex Standard
US Headquarters
10900 Walker Street
Cypress, CA 90630 (714)827-7600

IC-756PROII



Save $600!

Buy a IC-756PROII and get a PS-125 FREE! That's a total savings of $600!* An offer this good can't last forever, so see your participating authorized Icom dealer today for details!

Get a FREE PS-125 Power Supply when you purchase an IC-756PROII *

IC-756PROII. The best just got better.

HF/6M • 100W • All Mode • Enhanced Rx • Dual Watch • 32 Bit IF-DSP • Independently Selectable IF Filter Shapes For SSB & CW • Variable Level Noise Blanker • Auto & Manual Notch Filter • Twin Passband Tuning • Improved 5" TFT Color Display • CW Memory Keyer • VOX • Auto Antenna Tuner • SSB/CW Synchronous Tuning • External Control For Voice Memory & Memory Keyer • Adjustable RIT Clear • 1/4 Tuning Steps In Digital Mode

Heard it. Worked it. Logged it. Again!

"ICOM supplied a 'PROII for a recent DXpedition. It worked so well, that I bought TWO as soon as I returned home. Others on the DXpedition bought them, too. I can't believe the performance of the receiver, particularly on the low bands! The pre-amp REALLY works without distortion. The adjustable filters and twin passband tuning are a dream and so easy to operate. The digital noise reduction is truly amazing. You can't get "lost" with the operation of the controls....it's simple to back out a level. I've operated literally every HF radio made in the last 30 years, contesting and DXing, and the 'PROII is in a class all by itself! We have a six ham family and we all love our new PROII's!!! The "fun" is back into ham radio more than ever now."

-Glenn Johnson WØGJ , A50A WW SSB Contest

The IC-756PROII's worked great - we ran them for 11 days, non-stop, ...5 radios, 80,000 QSO's... all bands 160 through six meters... SSB,CW, RTTY, and PSK31! The built-in antenna tuners nice... we could run antennas on other bands... the 40m vertical on 15m... the 30m vertical on 10m... . Temps always above 80...sometimes 110 deg in the operating tents. Humidity above 90% all the time! Radios performed flawlessly. Everything you could want for operating convenience in one box. When you are on the receiving end of the entire world calling you in a pileup, it helps to have a top-notch rig to work them all! I liked the radio so much, I bought one and brought it home!

-Bob Voss N4CD, TI9M DXpedition

I was very impressed with the reliability of the IC-756PROII transceivers and IC-PW1 linear amplifiers, given that our environment on the island was challenging in some respects. At the CW site, there was so much talcum-powder fine volcanic ash blowing around that the radios, amplifiers, and everything else in the tent was covered with a thick layer of dust. I was especially concerned about the 'PW1s given that the fans were running almost continuously, pulling in this dust. We also had a troublesome generator which caused large fluctuations in voltage and frequency (we eventually replaced it). Even with these conditions, the ICOM equipment ran perfectly for 10 days, 24 hours per day. I'd feel confident taking your equipment to any location on the planet.

-Michael Mraz N6MZ, XRØX DXpedition

ICOM ADVANTAGE

*Limited time offer. See participating authorized dealer for details.

Find out more

www.icomamerica.com

ICOM®