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COMMUNICATIONS & TECHNOLOGY

JUNE 2004

CQ

Proposed FCC Rule Changes Pages 6, 86

1945 Our 60th Year 2004

Phoenix Transceiver: Rising from the Ashes, p.11

Results: 2003 CQ WW VHF Contest, p. 20

CQ Reviews: AOR ARD-9800 Digital Voice Modem, p. 24

Long-Delayed Echo Mystery, p. 32

Cover: The all-ham Johnson family ...idji, Minnesota...WØPJ, NØMJ, K1MJ, ... (with Boo, the cat), WOGJ and KL7YL. Details on page 102.

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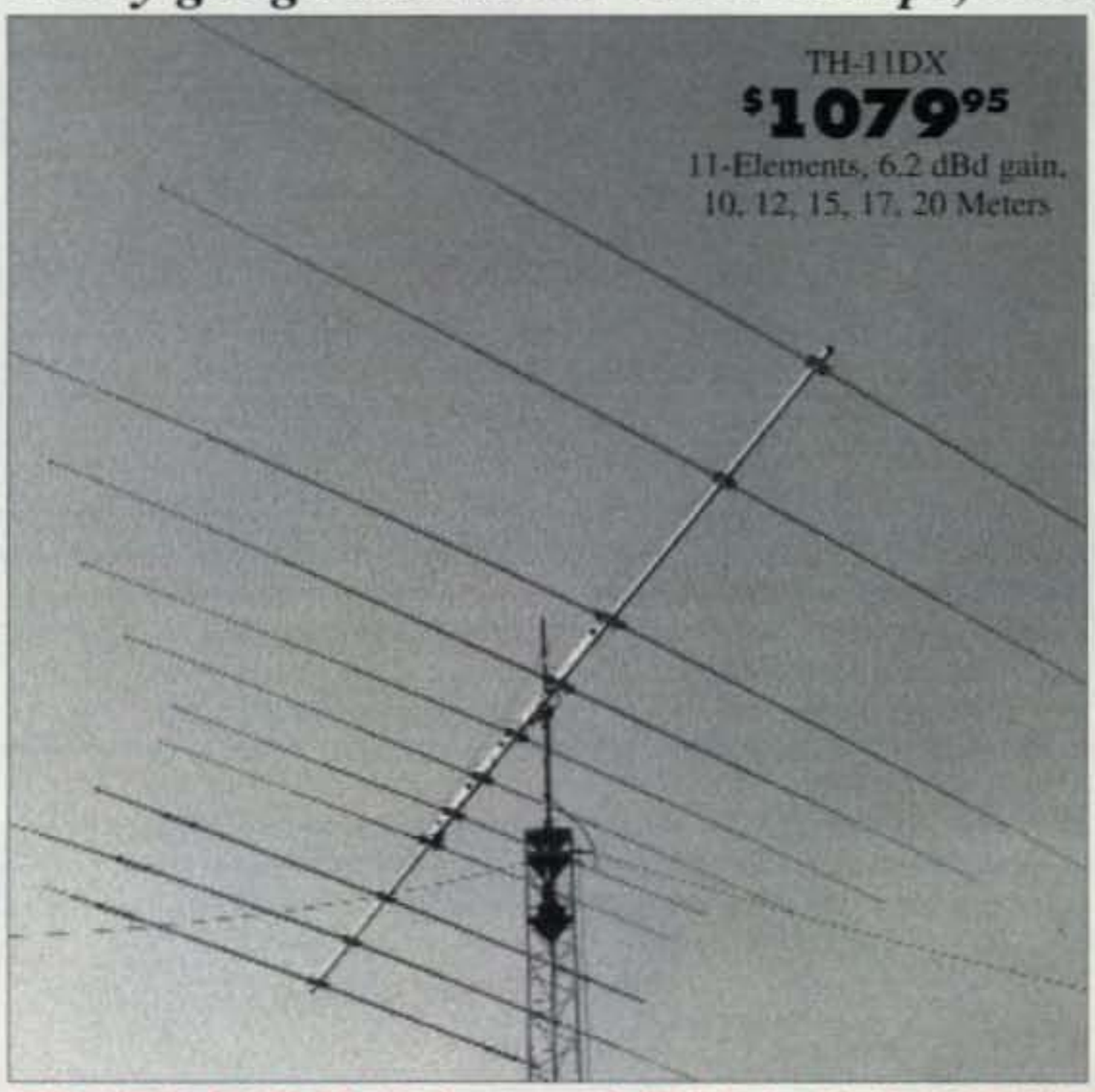

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The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander!

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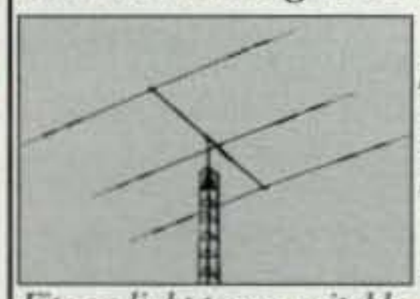

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Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius (ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
TH-11DX	11	6.2	22	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 (30/40 option)	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

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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

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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.

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CQ contents

JUNE 2004

features

Vol. 60 No. 6

departments

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Throughout the years, Kenwood has engineered many significant feature and hardware advancements that earned us the nickname "Pacesetter in Amateur Radio". Kenwood continues to show this leadership in advanced design and technology with the TH-D7A(G) handheld and the TM-D700A mobile dual-banders. Not only do our radios perform all the functions of any other radio, but you can also explore the exciting digital world of APRS™, which has become the fastest growing and most dynamic part of the hobby. Most Disaster Communication organizations use APRS™. Identifying someone's location with APRS™ can save a life.

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FCC Issues "Omnibus" Rule Proposal

In an effort to "clear the decks" for consideration of the 18 separate petitions filed with regard to changing code test requirements and other licensing matters, the FCC in mid-April issued a wide-ranging, 71-page Notice of Proposed Rulemaking on a variety of ham radio issues, including Novice band "refarming," amplifiers for 12 and 10 meters, and auxiliary operation on 2 meters. Major points are covered elsewhere in this issue ("Zero Bias" and "VHF-Plus"), and the proposal will be covered in detail in next month's "Washington Readout." Comment deadline on WT Docket 04-140 is June 15.

ARRL, NCVEC Propose New Entry-Level License

The American Radio Relay League (ARRL) and the National Council of Volunteer Examiner Coordinators (NCVEC) have each filed petitions with the FCC to continue the license restructuring process which began in 2000. While each differs in details, both propose creating a new code-free entry-level license offering significant operating privileges on HF. See this month's "Washington Readout" column for details.

FEMA Backpedaling on BPL Opposition

Last December, the Federal Emergency Management Agency (FEMA) filed comments with the FCC expressing "grave concerns" over the interference potential of BPL and saying that interference could "result in significant detriment to the operation of FEMA radio systems" and could "directly impair the safety of life and property." However, just a few weeks later, it was recently revealed, FEMA's top administrator sent a letter to FCC Chairman Michael Powell, attempting "to clarify the record" on where the agency stands. The Department of Homeland Security's Undersecretary for Emergency Preparedness and Response told Powell the agency is still studying the interference issue and that "(w)e expect that there may be ways to provide the public with the benefits of BPL without compromising the emergency communications capabilities available to FEMA." A FEMA spokeswoman told a reporter for KYW News Radio in Philadelphia that there was no material change in the agency's position, and that FEMA wants to see more studies on the interference issue.

ARRL Seeks Extension on BPL Comments

The ARRL has asked for a 45-day extension to the comment period on the FCC's Notice of Proposed Rulemaking (NPRM) on Broadband over Power Lines, or BPL, ET Docket 04-37. If granted, this would change the comment deadline from May 3 to June 18. The ARRL says it wants the extension to provide enough time for the National Telecommunications and Information Administration (NTIA) to complete a BPL interference study that is currently under way and report on the results. At press time, the FCC had not acted on the ARRL request.

FCC Cracks Down on Truckers, Fishermen

The owners of four trucking companies, two seafood companies, and one fishing boat have all been cited by the FCC for operating without a license on amateur frequencies. Three of the trucking companies are in North and South Carolina (the fourth is in Idaho), all allegedly operating on 10 meters, and the fishing boats are in the Pacific Northwest, allegedly using 2 meters.

BPL Info Available Online

Both the ARRL and *CQ* are making information about BPL available for hams to use in learning about the situation and helping to explain it to others. The ARRL has a brief non-technical PDF file available, called "Broadband over Power Line: Why Amateur Radio is Concerned about its deployment." It can be downloaded at <http://www.arrl.org/tis/info/HTML/plc/BPL-leave-behind.pdf>. *CQ* has a webpage, accessible from all of its magazine home pages, with links to articles, recordings of BPL interference, BPL "talking points" and letters to the editor of the *Wall Street Journal* (responding to a *Journal* article on ham radio and BPL) from *CQ VHF* Editor Joe Lynch, N6CL, and *CQ* Editor Rich Moseson, W2VU. The *CQ* "BPL Info Center" is at <http://www.cq-vhf.com/BPL.html>.

Ham Fined $11,000 for Repeated Interference, Ignoring FCC

A ham in California whom the FCC says caused deliberate interference to repeaters and then refused to accept several certified letters from the Commission has been fined $11,000. According to the FCC's Notice of Apparent Liability, Daniel Granda, KA6VHC, deliberately interfered with two different repeaters, and when FCC notices were sent by Certified Mail, they were returned as "unclaimed." However, copies sent by regular first-class mail, the FCC noted, were *not* returned by the post office. The fine is $7,000 for the alleged interference and $4,000 for not responding to FCC notices. Granda may seek reduction or cancellation of the fine but must file supporting financial documents to prove any claimed hardship.

Ham Radio and Amber Alert

A story in our sister publication, *Popular Communications*, about REACT teams joining the Amber Alert program to spread the word about abducted children prompted a report by *Newsline* that it was unaware of any ham groups participating in the program. That, in turn, prompted a response from the Dauberville DX Association in Pennsylvania, which told *Newsline* that it is set up to issue Amber Alert messages on its website and its three repeaters.

One of the proposals in the FCC's mammoth NPRM released April 15 may resolve concerns about the legality of transmitting Amber Alert messages on ham radio when other services are available. The FCC is proposing to "clarify that amateur stations may at all times and on all channels ... make transmissions ... which may be instrumental in saving human life and property."

Young Ham Award Deadline June 30

Nominations for the 2004 Newsline Young Ham of the Year Award must be postmarked or e-mailed by June 30. The award, which is co-sponsored by *CQ*, honors hams 18 years of age and younger who have made significant contributions to their communities or to amateur radio. Details and nomination forms are available on the Amateur Radio Newsline website at <http://www.arnewsline.org>, or by mail from Amateur Radio Newsline, 28197 Robin Ave., Santa Clarita, CA 91350.

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.

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HAM-IV
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The most popular rotator in the world! For medium communications arrays up to 15 square feet wind load area. *New* 5-second brake delay! *New* Test/Calibrate function. *New* low temperature grease permits normal operation down to -30 degrees F. *New* alloy ring gear gives extra strength up to 100,000 PSI for maximum readability. *New* indicator potentiometer. *New* ferrite beads reduce RF susceptibility. *New* Cinch plug plus 8-pin plug at control box. Dual 98 ball bearing race for load bearing strength and electric locking steel wedge brake prevents wind induced antenna movement. North or South center of rotation scale on meter, low voltage control, max mast size of 2 1/16 inches.

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

HAM-V

HAM-V
$949.95
with DCU-1

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

ROTATOR OPTIONS

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

Digital Automatic Controller

DCU-1
$649.95

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

RBD-5
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NEW! Automatic Rotator Brake Delay

Provides automatic 5-second brake delay -- insures your rotator is fully stopped before brake is engaged. Prevents accidentally engaging brake while rotator is moving. Use with HAM II, III, IV, V, T2Xs. Easy-to-install. Includes pre-assembled PCB, hardware.

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

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

AR-40

AR-40
$289.95

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

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

AR-35 Rotator/Controller

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For UHF, VHF, 6-Meter, TV/FM antennas. Includes automatic controller, rotator, mounting clamps, mounting hardware. 110 VAC. One Year Warranty.

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For antenna arrays up to 8.5 sq. feet mounted inside tower or 5 sq. ft. with mast adapter. Low temperature grease good to -30 F degrees. *New* Test/Calibrate function. Bell rotator design gives total weather protection, dual 58 ball bearing race gives proven support. Die-cast ring gear, stamped steel gear drive, heavy duty, trouble free gear train, North center scale, lighted directional indicator, 8-pin plug/socket on control unit, snap-action control switches, low voltage control, safe operation, takes maximum mast size to 2 1/16 inches. MSLD light duty lower mast support included.

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

HDR-300A

HDR-300A
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For ***king-sized*** antenna arrays up to 25 sq.ft. wind load area. Control cable connector, *new* hardened stainless steel output shaft, *new* North or South centered calibration, *new* ferrite beads on potentiometer wires reduce RF susceptibility, *new* longer output shaft keyway adds reliability. Heavy-duty self-centering steel clamp and hardware. Display accurate to 1°. Machined steel output.

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

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CQ editorial

BY RICH MOSESON,* W2VU

Down on the (Re)Farm

The FCC has apparently decided to deal with the ARRL's proposal for "refarming" the (old) Novice HF subbands separately from the League's proposal to create a new code-free entry-level license, which it's calling the "new Novice" (see "Washington Readout," page 44). That's good because it's all confusing enough without having to juggle "old" Novices and "new" Novices while standing on the head of a grandfathered Technician.

But ... being tradition-bound not to do anything the simple way when there's a more complicated and confusing method available, the FCC has bundled the ARRL's "refarming" proposal into a Notice of Proposed Rulemaking (NPRM) that tries to deal with a dozen petitions that have been sitting on someone's desk in Washington in most cases for two to three years. That's too bad, since it won't let us take the time and space here to fully investigate the origin of the word "refarming" to describe a plan to update subband allocations. (When were they "farmed" the first time?) Our guess, without doing any legitimate research, is that it was probably Elmer that done come up with it, somewheres out there in the vast Hinternet.

Stupid names aside, there's a lot of substance not only to the League's "refarming" proposal but to the whole FCC NPRM (WT-Docket 04-140), which was released just a few days before our deadline. Fred Maia, W5YI, will cover the NPRM in detail in next month's "Washington Readout," but since the June 15 comment deadline will have passed by the time you receive that issue, we want to give it some basic coverage here. "VHF-Plus" Editor Joe Lynch, N6CL, covers the VHF-related items in his column this month ("Yet another time it pays for me to be among the last to submit my column to *CQ*," says Joe), beginning on page 86, so I'll look at the major HF-related issues here.

"Refarming"

Back in 2002, the ARRL petitioned the FCC to expand the phone subbands on 80, 40, and 15 meters by eliminating the segments set aside for CW operation by Novices and Technicians with code credit. The League's proposal would give Novices and Techs-with-code CW privileges on all General Class code/data subbands on 80, 40, 15, and 10 meters, with RTTY/data privileges as well on 10 meters. Half of each of the old Novice bands would then be opened up to voice use, as follows:

75 meters: 3725–3750 – Extra only (+ 25 kHz); 3750–3800 – Advanced & Extra only (+ 25 kHz overall for Advanced, but – 25 kHz of exclusive space); 3800–4000 kHz – General, Advanced, & Extra (+ 50 kHz for General).

40 meters: 7125–7175 – Advanced & Extra only (+ 25 kHz for both overall, but – 25 kHz of exclusive space); 7175–7300 kHz – General, Advanced & Extra (+ 50 kHz for General).

15 meters: No change overall for Advanced & Extra; General subband would begin at 21,275 (+ 25 kHz for General; – 25 kHz exclusive Advanced/Extra segment).

10 meters: No changes proposed for General, Advanced, and Extra Classes.

Clearly, General Class hams would be the big winners here, but considering the number of upgrades to General since the code speed requirement was lowered to 5 words per minute, it is probably justified.

What is ridiculous, though, is the ARRL's and the FCC's contention that elimination of the "old" Novice bands is justified by falling numbers of Novice and Technician-Plus licensees. They are falling, of course, since the FCC in 2000 stopped issuing new Novice and Tech-Plus licenses, and began renewing Tech-Plus licenses as Technician licenses. There is no longer an accurate count of how many Technicians have passed their code exams, since this information no longer has to be reported to the FCC and is no longer tracked in the Commission's database. The number of Techs passing their code tests clearly has grown along with those upgrading to General since 2000, but nobody's keeping track. We're not saying we oppose the "refarming" proposal, just that it's based on incomplete information.

Amplifiers for 12/10 Meters

Back in 1978, in the heyday of the CB boom, the FCC tried to limit the use of illegal amplifiers on CB by banning the commercial manufacture and sale of RF power amplifiers capable of operating between 24 and 35 MHz, and limiting individual amateurs to building no more than one such amplifier per year from a kit. The net result has been that hams—who are allowed to transmit with up to 1500 watts PEP on the 12- and 10-meter bands—have been barred from purchasing equipment enabling them to do so, while those CBers who want to operate illegally high power still do it with impunity, just ordering their amplifiers from overseas (or purchasing "export-only" models from less-than-scrupulous U.S. manufacturers/dealers). The FCC has finally woken up to this reality and is proposing on its own to lift the ban on commercial amplifiers for 12- and 10-meter ham use, as well as the restriction on kit-building. It notes that the Part 95 CB rules will continue to prohibit use of external RF power amplifiers on CB. This is a welcome move after a quarter century of hams (and ham manufacturers) being punished for the sins of a minority of CBers.

Sky Command

Several years ago, Kenwood introduced a system for using a dual-band FM handheld or mobile rig to remotely control and operate an HF transceiver. This "Sky Command" system uses the 440-MHz band to send control signals and transmit audio, but uses the 2-meter band to retransmit the received HF audio. Amid fierce opposition to the system by the ARRL, the FCC ruled it was illegal because the 2-meter leg was "auxiliary" communications, currently permitted only on 222 MHz and above. However, the FCC also invited Kenwood to petition for a change in those rules if it felt that the limitation was no longer needed. Kenwood did so in 2001 and the petition has sat untouched until now.

In this NPRM, the FCC is proposing to legalize Kenwood's system by allowing auxiliary communications on 2 meters. N6CL discusses this at greater length in his "VHF-Plus" column this month. We expect the ARRL will continue to oppose this, but feel the FCC should adopt it, for the reasons Joe explains in his column.

Other Stuff

The NPRM is 71 pages long and deals with a raft of other issues as well, from "willing" your callsign to a particular club after you die (proposed to be adopted) to a proposal for color-coded amateur licenses, based on license class (denied). As with most such FCC proposals, there is a short turnaround time for comments. We recommend that you download the full Notice if your internet connection is up to the task, read it, and file comments if you are so inclined.

The complete NPRM, WT Docket 04-140, is available in Word, PDF, or text format at the following addresses: Word: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-79A1.doc>; PDF: <http://hraunfoss.cc.gov/edocs_public/attachmatch/FCC-04-79A1.pdf>; Text: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-79A1.txt>. Comment deadline is June 15, with reply comments due by June 30. 73, W2VU

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

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announcements

• The following special event stations will be on the air in June:

NJ2BB, from the 4 Sisters Reunion, New Jersey, to celebrate the 50th reunion of the four Iowa Class battleships (*USS New Jersey* – NJ2BB, *USS Missouri* – KH6BB, *USS Wisconsin* – N4WIS, and *USS Iowa* – to be announced), which sailed together in June 1954; 1200 UTC June 5 to 2359 UTC June 6. NJ2BB will issue a certificate for working all four stations. For frequencies, QSL routes, and up-to-date information, including the callsign for the *USS Iowa*, go to: <http://www.nj2bb.sister.html>.

WW2LST/MM & W2T, from the eastern seaboard, WW II *USS LST-325* D-Day Memorial Cruise; W2T will be operational when the *LST-325* is in Boston Harbor and in the Washington, D.C. area; WW2LST/MM will be on the air the last week in May and the entire month of June. Daily operating schedule as follows—1500 UTC on 14310 kHz (±QRM), 1700 UTC on 14300 MM Service Net to advise where WW2LST is operating, 0200 UTC on 7210 (±QRM), 0300 UTC on 3910 (±QRM). Time permitting, also look for both stations at 0500 UTC on 7233.5, 3905 Century Club Net; and 0700 UTC on 7235 HHH Net. Send QSL with SASE to Bob Wilder, AF2HD, 6032 Idlemoore Court, Theodore, AL 36582-4117. Also, the LST-325 is looking for a TCS-12 (WW II transmitter-receiver) power supply, and a 50-amp, 12-VDC metered power supply (non-switching), plus filters that cover the signal spotlights so they can conduct light contacts with other ships. If you have any of these items to contribute (tax deductible), please contact Bob, AF2HD, at the above address.

W3HEM, from Baltimore, Maryland, to commemorate the role of electronics during D-Day; Historical Electronics Museum ARC; 1400–2200 UTC June 5 & 6 in the General portion of the HF bands SSB and CW. For certificate and QSL, send QSL and 9×12 SASE with 60 cents postage (for QSL only, send business-size SASE) to HEMARC W3HEM, P.O. Box 746 MS 4015, Baltimore, MD 21203. For more information e-mail: <w3gr@arrl.net>, or on the web: <www.qsl.net/w3gr>.

KC7KEY, from Maple Valley Days, Maple Valley, Washington; 10th anniversary of the Maple Valley ARC; 1600–0400 UTC June 12 on 3.965, 14.267, 21.347, 28.455 MHz. For certificate send QSL and 9×12 SASE to MVARC, P.O. Box 488, Maple Valley, WA 98038.

K9G, from Quad Cities (Rock Island and Moline, Illinois, and Davenport, Iowa), celebrating 150 years of the Grand Excursion (see <grandexcursion.com>), and including marine mobile operation from the *Celebration Belle* riverboat; Green River Valley ARS; 1800 UTC June 23 to 1800 UTC July 4 on 14.270, 21.305, 7.260 MHz. QSL to Peter Beedlow, NN9K, 741 Greenway Ave., Colona, IL 61241.

VE3MIS, from Streetsville Bread & Honey Festival, Mississauga, Ontario, Canada; Mississauga ARC; 1400–2000 UTC June 5 & 6 on 7.227, 14.240, 21.315, 28.480 MHz. For certificate send QSL and two IRCs or two green stamps and SAE to MARC, c/o Michael Brickell, 2810 Bucklepost Crescent, Mississauga, Ontario, Canada L5N 1X6.

• The following hamfests are slated for June:

June 4–6, **Wenatchee (WA) Hamfest**, Dryden Gun Club, Wenatchee, Washington. Contact <KA7ZNA@msn.com> or <N7RHY@gte.net>.

June 5, **Sangamon Valley RC Hamfest**, Illionois State Fairgrounds, Cooperative Extension Bldg., Springfield, Illinois. Contact Ed Gaffney, KA9ETP, 217-628-3697, e-mail: <egaffney@family-net.net>. (Talk-in 146.685; exams 9 AM)

June 5, **Grand Rapids Independent Repeater Assn. Hamfestival**, Hudsonville Fairgrounds, Grand Rapids, Michigan. Contact Kathy, 616-698-6627 (after 4 PM EDST), e-mail: <ira@w8hvg.org>; <www.w8hvg.org>. (Talk-in 147.16; exams 10:30 AM)

June 5, **Bangor (ME) Hamfest**, Hermon High School, Bangor, Maine. Contact Roger Dole, 207-848-3846, e-mail: <rdole@hermon.net>; <www.n1me.com>. (Exams)

June 6, **Hall of Science ARC Hamfest**, NY Hall of Science, Flushing Meadow Corona Park, Queens, New York. Contact Steve Greenbaum, WB2KDG, 718-898-5599, e-mail: <wb2kdg@arrl.net>. (Talk-in 444.200, PL 136.5, 146.52 simplex; exams 10 AM)

June 12, **Knoxville Hamfest & Electronics Exposition**, Knoxville Exhibition Center, Knoxville, Tennessee. There will also be a special Electronics Exposition and "sneak preview" Friday evening, June 11, from 6–9 PM ET. Contact Carol Whetstone, N4LFR, 865-673-0475, e-mail: <whetston@esper.com>; <www.w4bbb.org>. (Talk-in 147.300, 224.500, 444.575, exams 2 PM with advance registration at 1:30 PM)

June 12, **Franklin Repeater Assn. Picnic & Tailgate**, Bronco Club, Franklin, Virginia. Contact G. Stewart Tyler, WA4JUO, e-mail: <stu.tyler@juno.com>. (Talk-in 147.300, 131.8 Hz PL)

June 12, **Macon (MO) Hamfest**, Macon Vo-Tech School, Macon, Missouri. Contact <K0KY@arrl.net>. (Exams)

June 12, **K9UXZ Hamfest & Fleamarket**, Percival Springs Ultralight Airport, Effingham, Illinois. Information call 217-536-9990.

June 12–13, **Newington Amateur Radio League Hamfest**, Newington High School, Newington, Connecticut. Contact Dan Miller, K3UFG, 860-2063379, e-mail: <k3ufg@arrl.net>; <www.narl.net>. (Exams Sunday)

June 13, **Six Meter Club of Chicago Hamfest**, DuPage County Fairgrounds, Wheaton, Illinois (also will feature vintage radios). Call 708-442-4961, e-mail: <wa9rij@mc.net>. (Talk-in 146.52, 146.37/97; exams 9–11 AM, call the previously listed phone number to preregister)

June 19, **Raritan Valley Radio Club Hamfest**, Piscataway, New Jersey High School. Contact Marty Ficke, KD2QK, 732-968-6911, e-mail: <kd2qk@optonline.net>. (Talk-in 146.025/625, 447.250/442.250, PL 41.3, 146.520)

June 19, **Midland ARC Hamfest**, Michigan Army National Guard Armory, Midland, Michigan. Contact Bill French, AB8JF, 989-835-5562, e-mail: <ab8jf@arrl.net>; <www.qsl.net/w8kea>. (Talk-in 147.00+, exams)

June 20, **Lake County ARC Hamfest & Computer Show**, Lake County Fairgrounds Industrial Arts Building, Crown Point, Indiana. See <http://www.qsl.net/w9lj/index.html>. (Exams)

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If you think the days of cannibalizing old TV sets to build new radios are long gone, think again. K8JWR has a plan, plus great tips on building your own components and meters!

The Phoenix QRP Transceiver

Rising from the Ashes of a Junked TV

Part I

BY DAN METZGER,* K8JWR

The Greeks of 2500 years ago were great storytellers. Aesop told short ones, such as "The Hare and The Tortoise" and "The Boy Who Cried Wolf," and Homer wrote long ones, such as *The Odyssey of Ulysses,* the story of a man fighting his way back home after the Trojan War. One of my favorites is the story of the great bird Phoenix, which was incinerated on a funeral pyre but magically rose from its own ashes to a new life.

Well, after my 11-inch color TV incinerated itself recently, it, too, rose from the ashes and acquired a new life as a 40-meter QRP transceiver (see photo A). Here's the story of my Phoenix QRP rig and how you can build one, too.

Back in 1959, when I first got my General license, many hams built their own transmitters almost entirely from parts salvaged from junked black-and-white televisions of the early '50s. Photo B shows such a rig, which I built as a high-school junior. It ran 40 watts (input) AM and CW on 40, 80, and 160 meters, with plug-in coils. I remember that my total cash outlay was $2.98, with most of that for the bouncy-needle plate-current meter.

Now I'll admit that today, as a teacher of electronics, I'm pretty well set up with oscilloscopes, RLC meters, chassis-forming tools, and the like. However, I began to wonder if there weren't still hams out there who would love to home-brew a rig, but like that teenager in 1959, have nothing but a pocket multimeter, a junked TV, and three bucks to work with. It's almost possible; here's how close I came.

*6960 Streamview Dr., Lambertville, MI 48144
e-mail: <dmetzger@monroe.lib.mi.us>

Photo A– The author's Phoenix QRP transceiver, built from the "ashes" of a dead TV set. (Photos by Michael Croke)

• Most of the small parts, and a fine 3-inch speaker, were salvaged from that 11-inch color TV. The Auto-Manual Fine-Tuning pushbutton provided a DPDT switch, which became my Transmit-Receive switch. The TV's UHF F-connector became my antenna jack, and the screw terminals for the 300-ohm antenna served to connect the positive and negative leads of the 13.5-V DC supply. I suppose I could have salvaged some miniature earphone jacks for the key and headphones, but I wanted to stay compatible with the rest of the station equipment here, so I bought a couple of 1/4-inch jacks. A junked 1988-vintage VCR provided one of the crystals, the transmitter oscillator transistor, one of the trimmer capacitors, and four nice rubber feet. A few video and modem cards from an old PC supplied the two transistors and two mica capacitors for the transmitter output.

• My junk box furnished the front-panel knobs, an octal tube socket to hold the transmitter crystal, and the rotary potentiometer for making the tuning capacitor (more on that later).

• Items that I actually had to purchase included the transmitter crystal ($3.00 to $10, depending on your source), the CW-pitch trimmer capacitor ($1.00), and the LM-386 audio-amp IC (about $0.50).

• The cabinet side panels for this pro-

ject were made from two pieces of 1/4-inch "craft wood" (available at most hobby stores; see photo A). The front, rear, and top were formed from three pieces of 18-gauge aluminum. If no other source is available, these can be cut from the bottom of a square aluminum cake pan. The two simple bends in the front and rear panels can be made with nothing more than a bench vise. Sheet-metal screws hold the metal panels to the wood sides. The bottom is a piece of glass-epoxy PC board, about 5 inches × 6 inches, copper-clad on one side. The epoxy boards are dull green

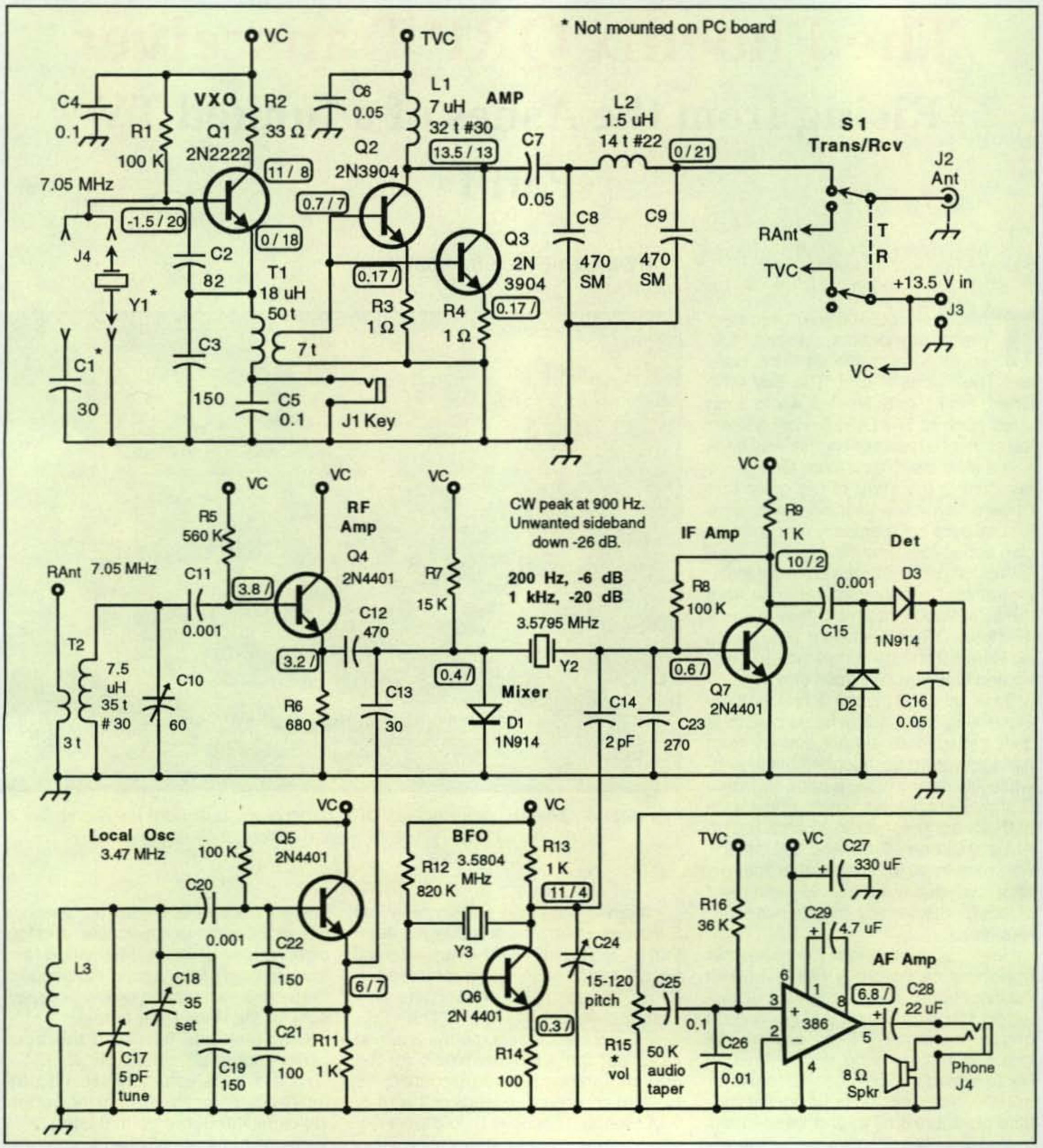

Fig. 1– Schematic diagram of the Phoenix transceiver. Notes: Boxed numbers give approximate DC/AC peak voltages with RF probe; the output is 3 watts across 72 ohms; power to the final amps is 300 mA × 13.5 volts = 4.1 watts; receiver drain is 25 mA; transmitter oscillator 75 mA; total 400 mA. Moving crystal from one side of J4 to the other shifts frequency by 1 to 3 kHz, depending on crystal characteristics. Coils are wound on Singer plastic sewing machine bobbins with No. 26 wire, unless otherwise specified. Match the betas of Q2 and Q3, each of which should also have heat sinks.

in color, and can easily be cut with a tin snips. Stay away from phenolic boards, which are brown or yellow. They crumble and crack too easily.

Finding the Salvage Units

Television receivers to salvage for parts are as common as fleas on a dog. If you don't have one, put the word out among your relatives, neighbors, and co-workers, and you'll get more than you can handle. Just be sure they understand that you're not going to fix the sets for them! Try to find portable sets from the 1975 to 1988 era. Later model sets are likely to contain mostly ICs and surface-mount components and are of no use to us for this project.

VCRs, answering machines, radios, tape players, and personal computers from the 1978 to 1988 era are also good sources for salvage parts. Of course, there's no telling what you'll find inside each salvage unit, but the experiences recorded here are typical.

Caution! TV picture tubes can store high voltages for an indefinite length of time. Before doing anything else with a picture tube, clip a lead from the TV chassis to the shaft of a plastic-handle screwdriver. Work the screwdriver blade under the rubber cap that connects the red high-voltage wire to the picture-tube cone. You may hear a few "pops" as you make contact, indicating discharge of the tube capacitance.

Photo B– A transmitter built by the author in the late 1950s from the innards of an old TV. Using plug-in coils, it put out 40 watts of AM or CW on 40, 80, and 160 meters.

Caution Again! Picture tubes are under vacuum, so the air pressure on the outside is not balanced by an equal pressure inside. At 14.7 pounds per

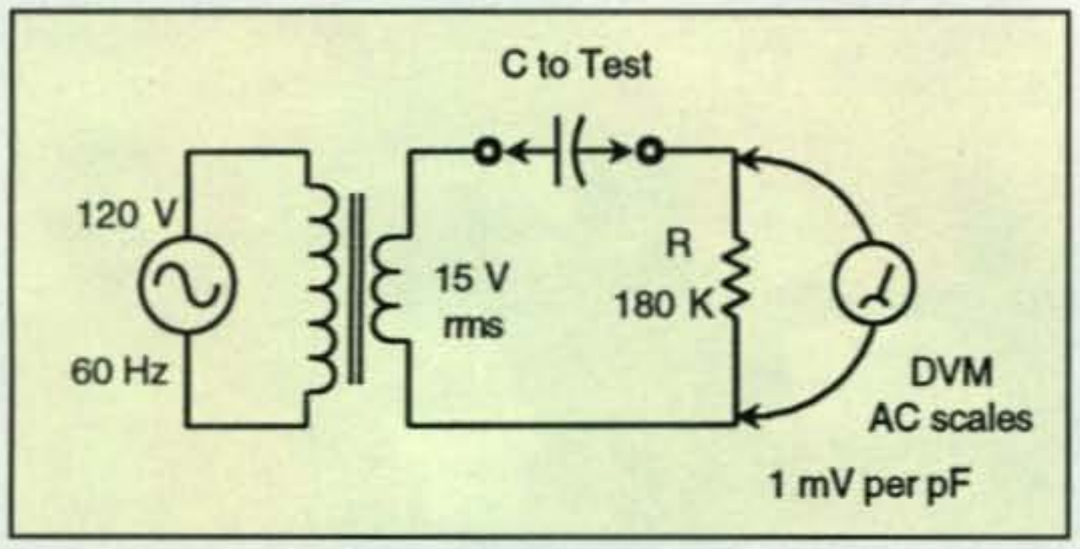

Fig. 2– An easy-to-build capacitance meter. See text for details.

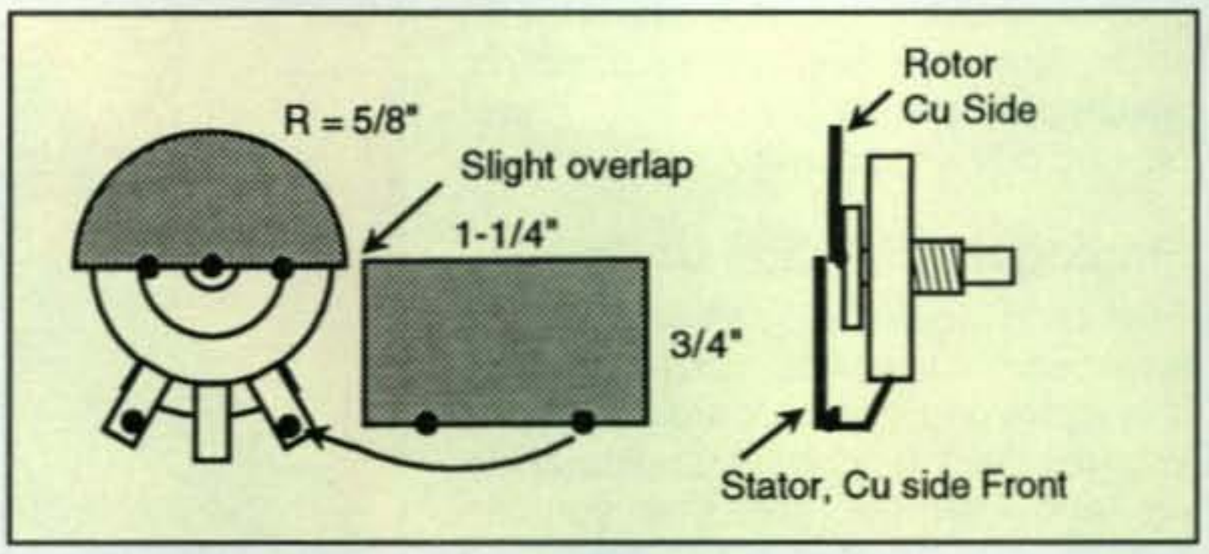

Fig. 3– Here's how to build your own tuning capacitor from an old potentiometer and two pieces of PC-board material. See photo C and text for details.

Photo C– A homebrew tuning capacitor made from a potentiometer and two pieces of PC-board material. See text and fig. 3 for details.

square inch, this can amount to a ton of force, even on a 14-inch tube. If the tube shatters, flying glass shards can be lethal! Thus, treat the tube gently and never set it out with the trash, where it might become an object of curiosity for the neighborhood kids.

Removing the Resistors and Capacitors

The resistors you find are likely to be 1/4- or 1/8-watt, 5% units. They use the standard color code, but a bright light and a magnifying glass may be needed to read them. I used a spring-loaded solder sucker, and then straightened the crimped pins with a knife blade to remove the ones I wanted. If you prefer, you may use solder-wick (it's just coax braid) to soak up the old solder. The resistor values in this project are not critical, so if you can find something within 30% of what is marked on the schematic (fig. 1), you'll be okay. For example, R1 is marked 100 K, but could be anything from 68 K to 150 K without much effect on circuit operation.

Most of the capacitors you salvage will be ceramic-disc types. They most likely will use a number code similar to the resistor color code—first digit, second digit, multiplier—with the value in picoFarads. Thus, 151 means 150 pF, and 473 is 47000 pF, or 0.047 µF. Values below 100 pF are marked with only one or two digits: 33 means 33 pF, and 2 means 2 pF. If a capacitor is marked 470, it is probably 470 pF and just using an older code. Ignore the letters after the value digits. They refer to tolerance and temperature limits. In particular, K means ±10% and J means ±5%. The K does not mean kilo.

A Quickie Capacitance Meter

Capacitor codes are tricky enough such that an independent measurement is desirable. Fig. 2 shows a quick test setup that you can put together in five minutes to read the value of any capacitor from 2 pF to 2000 pF with an ordinary DVM. You can use any source of 10- to 20-volt, 60-Hz AC that might be available. We could do a whole lot of mathematics to find the value of R appropriate for your AC voltage, but it is much easier to pop in a known 1000-pF capacitor and adjust the value of R until your DVM reads 1.000 volts. Each millivolt then represents 1 pF for your unknown capacitor.

As with the resistors, you can use anything within 30% of the values in the schematic for most of the capacitors. Transmitter output capacitors C8 and C9 should be mica types within 10% of the 470 pF indicated. If you absolutely can't find micas, you might try two 0.001-µF ceramics in series (making 500 pF), but expect half a watt or so loss in transmitter output. C13 might need to be adjusted to get best receiver sensitivity, which will be when the RF mixer voltage across diode D1 is about 0.5 volts p-p. C14 likewise may need to be adjusted for optimum BFO injection,

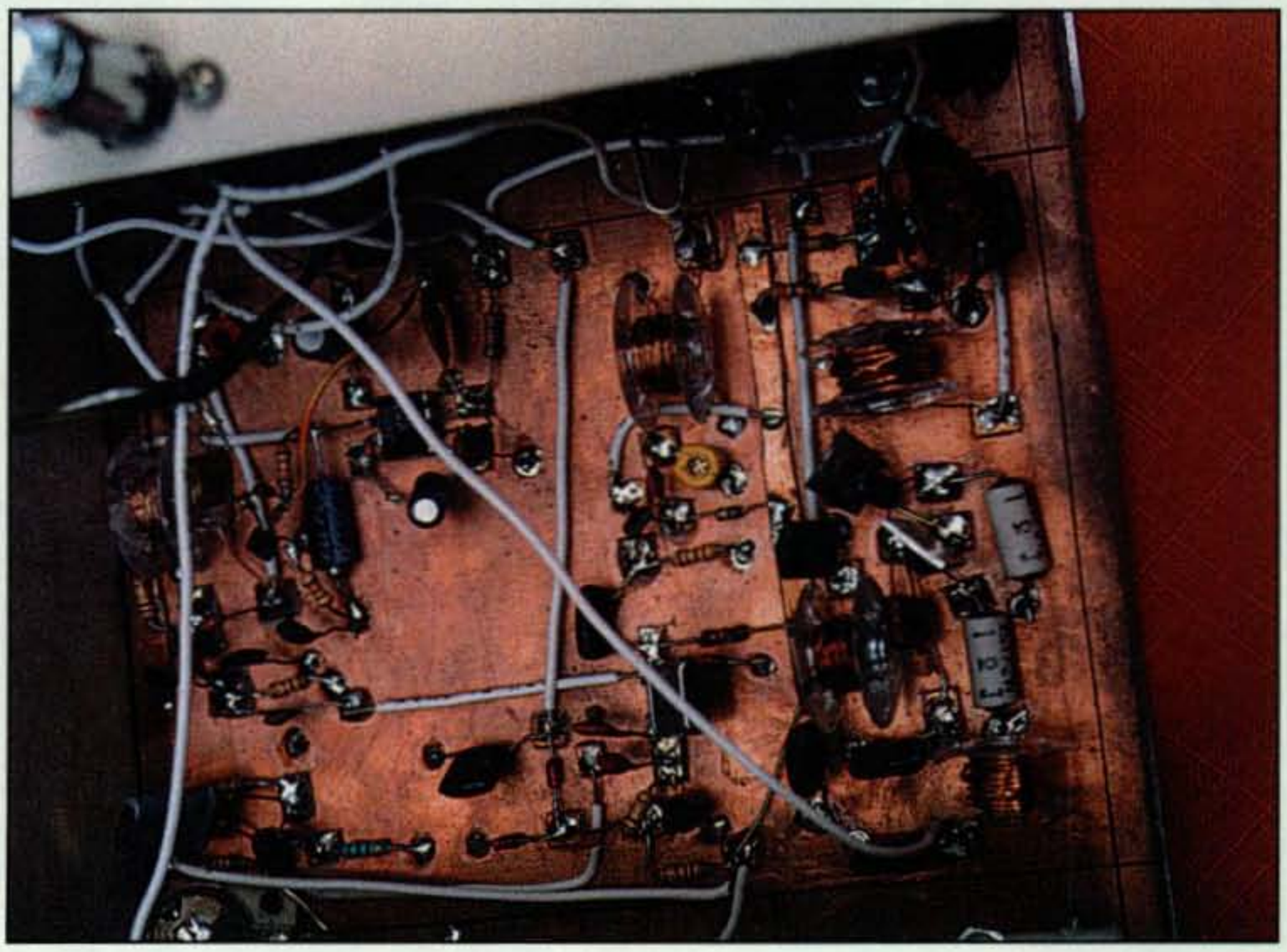

Photo D– The coils are wound on inexpensive plastic bobbins designed for Singer sewing machines. See text for details.

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FT-897D

HF/50 MHz 100 W/144 MHz 50 W/430 MHz 20 W
20 W (Optional FNB-78 Battery Required)

60 m Band

TCXO DSP

DSP
DIGITAL SIGNAL PROCESSING
Included

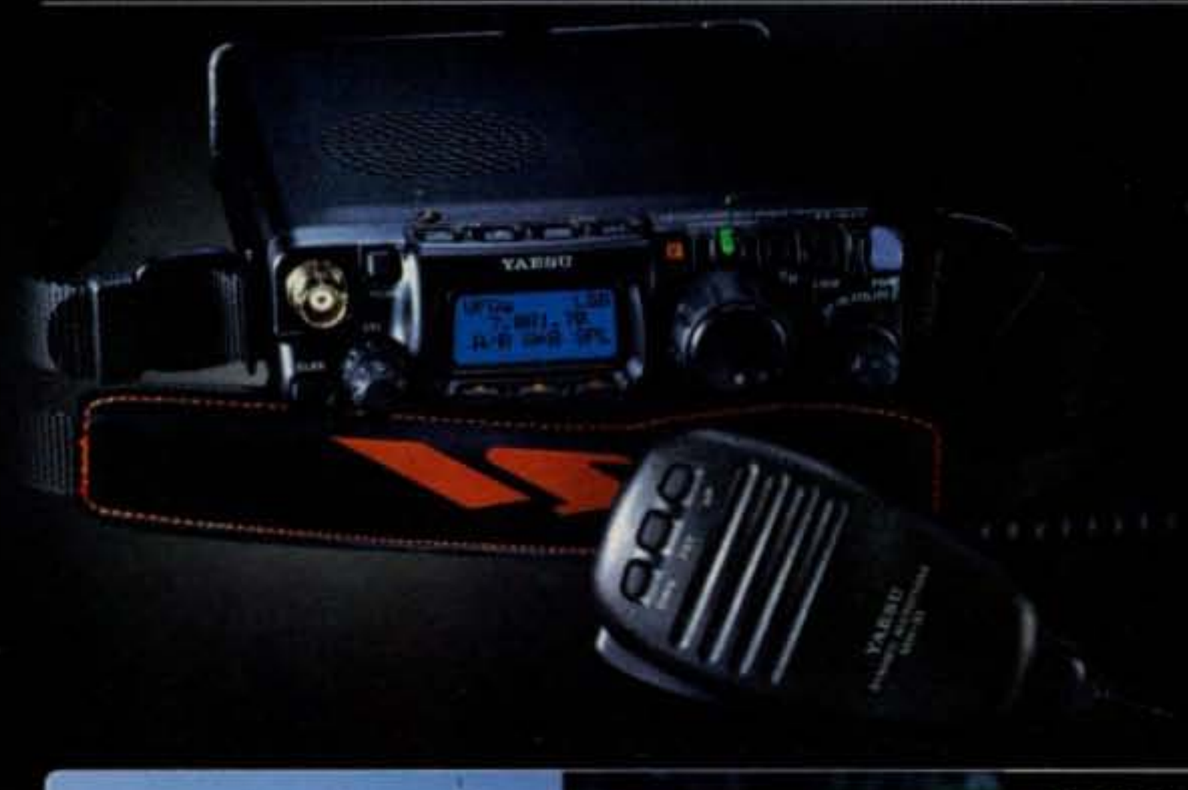
ULTRA COMPACT
ALL MODE MOBILE TRANSCEIVER

FT-857D

HF/50 MHz 100 W/144 MHz 50 W/430 MHz 20 W

60 m Band

DSP



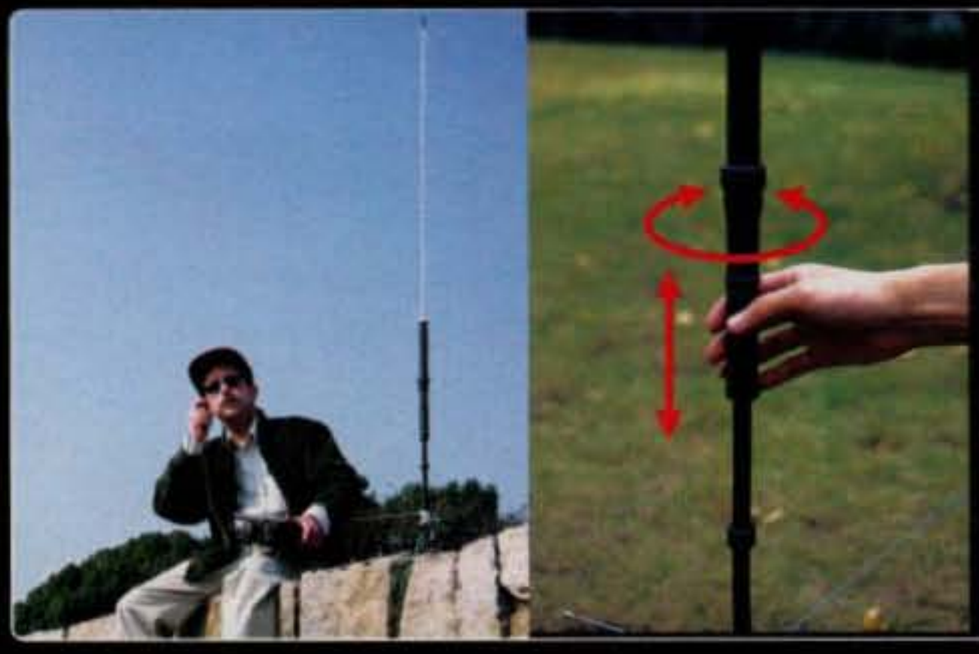
FNB-85 1400 mAh Long-Life Ni-MH Battery and NC-72B Charger Included

ULTRA COMPACT
ALL MODE PORTABLE TRANSCEIVER

FT-817ND

HF/50/144/430 MHz 5 W

60 m Band



ATAS-25 Manually-Tuned Portable Antenna

The ATAS-25 is a manually-adjusted portable antenna ideal for field use with the FT-817. Designed for mounting on a standard camera tripod (1/4" stud), the ATAS-25 is tuned by sliding the shorting ring of the loading coil up or down and selecting the appropriate number of top sections. Counterpoise wires are supplied.

The ATAS-25 is constructed of high-grade materials for maximum efficiency, and it's the perfect traveling companion for your FT-817!

Freq. Range: Amateur Bands 7-450 MHz.
Max. Power: HF/50 MHz: 100 W SSB/CW (50% Duty, 1 min. TX/RX)
AM/FM: 50 W
144/430 MHz: 50 W
Size: Max. Length 7'3" (2.2 m)
Min. Length for Carrying: 2' (0.6 m)
Weight: 2.1 lb. (930 g)

ATAS MICRO

YAESU
Choice of the World's top DX'ers

Vertex Standard
US Headquarters
10900 Walker Street
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Get "Back to Basics" with YAESU's New FM Dual Band Mobile
One-Touch Operation / Wide Receiver Coverage Included

High Power Output
(50 W VHF/40 W UHF)

Wide Receiver Coverage
including AM Aircraft Reception,
NOAA Weather Alert Broadcasting* *USA Version

Five One-Touch "Hyper Memory"
Transceiver Configuration Keys

Over 1000 Memory Channels
with Alpha-Numeric Labels,
Twenty Memory Groups

WiRES™ Internet Linking Compatibility

144/430MHz DUAL BAND

ACTUAL SIZE
*Simulated LCD display

DUAL BAND

FT-7800R
144/430 MHz DUAL BAND
FM TRANSCEIVER

YAESU FM Mobile Series

QUAD BAND DUAL RECEIVE

29/50/144/430MHz QUAD BAND

FT-8900R
29/50/144/430 MHz FM QUAD BAND TRANSCEIVER

DUAL BAND DUAL RECEIVE

144/430MHz DUAL BAND

FT-8800R
144/430 MHz FM DUAL BAND TRANSCEIVER

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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.

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

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Choice of the World's top DX'ers

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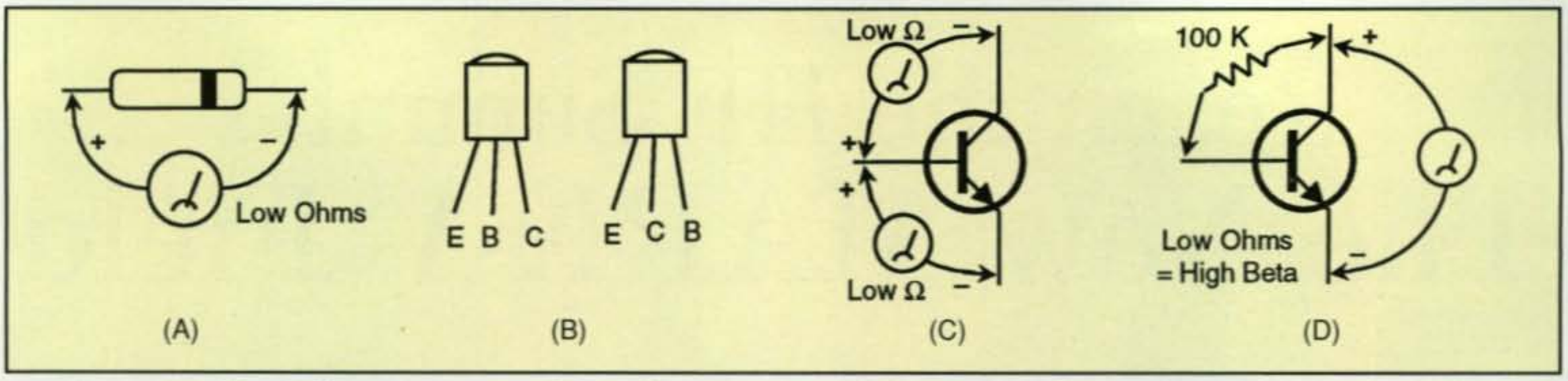

Fig. 4– How to use a portable multimeter as a transistor checker. See text for explanation.

indicated by an RF voltage of about 3 volts peak at the collector of Q7.

I found trimmer capacitor C10 in the TV, and C18 in the VCR. I had to buy C24. Their values were measured with the test setup of fig. 2. If, for example, you must use a 35 pF (instead of 60 pF) for C10, you might try putting a fixed 30 pF in parallel to peak the circuit at 7 MHz. You can also experiment with the value of C19 to put the local oscillator at 3.5 MHz on your station receiver with C18 at mid-range and C17 at minimum. C24 might also consist of a fixed capacitor in parallel with your trimmer. The objective is to get the BFO to oscillate 900 Hz above the IF frequency set by Y2. Use your ohmmeter to determine which lead of the trimmer is connected to the adjustment screw and solder that lead to ground. This will prevent detuning if you touch the screw with a metal alignment tool.

Build Your Own Tuning Capacitor!

If you are lucky enough to have a single-plate variable capacitor in your junk box, by all means use it for C17. If not, don't spend ten bucks for one; you can make one from a few pieces of single-sided PC-board material and a rotary potentiometer from an old volume, tone, contrast, or similar control. Fig. 3 shows how, and photo C shows how it should look. Cut a square of PC material 3/4 inch × 1 1/4 inches for the stator. Cut a half circle 1 1/4 inches in diameter for the rotor. Remove the back cover from the pot and break out the resistance track with a knife blade and a long-nose pliers. Bend the two outside terminals back to support the stator, copper side to the front. Solder the rotor plate to the rotating shaft and arm part of the pot, copper side to the front. Now solder the stator in place. Use the rotor for the grounded side of the variable capacitor. (Some newer potentiometers use the back cover to hold the rotor assembly in place, and some have only aluminum rotor parts, which will not take solder. These obviously are not suitable for conversion to a tuning capacitor.)

Cadging Coils, Digging for Diodes, etc.

The coils in this project are wound on plastic bobbins designed to hold the lower thread in Singer brand sewing machines (see photo D). They are available at most "big box" discount stores, four for $1.25. The bobbins have two holes in the sides to let the leads out. Transformers T1 and T2 have a few turns wound over the main windings, and you will want to drill two more holes near the rim of the bobbins to accommodate the extra leads.

My scrap TV had three good sources of enamel-insulated wire for winding the coils. An RF filter in the AC line provided about four feet of No. 22 wire for L2 in the transmitter output network. You want to use the largest possible wire here to minimize power loss. An audio output transformer yielded about ten feet of No. 26 wire, which was used for L3 and for the secondary of T1. I was able to unwind yards and yards of No. 30 wire from the picture tube's deflection yoke for the other coils. Except for L2, the wire size is not critical; use what you can find. It's a good idea to form a cap of kitchen foil to protect the plastic bobbins while soldering. Otherwise, getting the soldering pencil as close as 1/4 inch from them can melt the plastic.

Type numbers of easily purchased transistors and diodes are given on the schematic, but the objective is to use whatever can be salvaged from the TV or VCR. The three diodes must be silicon signal types. They will be small, glass-cased, with a band around the cathode end, which is the "line" of the symbol. The larger power-supply diodes with black plastic cases are not suitable for RF applications.

Almost any small-signal silicon NPN transistors will work well in the receiver section. Avoid transistors that have extra-large cases, as they are likely to be higher-power types with inadequate high-frequency response for this project. You should expect to do quite a bit of transistor swapping in testing and troubleshooting this project, so if you have transistor sockets, use them. If not, at least keep the transistor mounting pads fairly large and in the clear to facilitate removal and replacement. Q1, in particular, may have quite an effect on whether your old surplus crystals will oscillate.

Special care should be taken in selecting Q2 and Q3. They should be of the same type, capable of dissipating at least 350 mW each, and matched for beta. Beta is the number of times a transistor amplifies current—the ratio of collector current to base current. A 1/4-inch × 1/2-inch piece of flat metal should be glued to the flat face of each one to act as a heat sink.

Fig. 4 shows how to test a transistor with an ohmmeter. In (A) you determine which lead of your ohmmeter puts out a positive test voltage by checking a diode. (Some DVM ohmmeters use a test voltage below 0.5 volt, in which case the diode will show megohms of resistance both ways.) The two common pin arrangements for small-signal transistors are shown at (B). Identifying the leads and determining whether the transistor is NPN or PNP is shown at (C). A positive voltage at the base should show low resistance to either emitter or collector. If this cannot be verified, the transistor may be PNP, or an FET, or some other device. Fig. 4(D) shows how to obtain a relative measure of transistor beta. Lower ohms readings correspond to higher betas.

Color TV sets and VCRs generally contain a 3.58-MHz crystal. These may look like the usual aluminum-can device, but be on the lookout for anything marked 3.58, even if it looks more like a mylar capacitor than a crystal.

We'll give you some time now to collect and sort the parts, and be back in Part II with details on how to wire and test your Phoenix QRP transceiver. ■

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

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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

Results of the 2003 CQ WW VHF Contest

BY JOHN LINDHOLM,* W1XX

"This is such a nice contest." – KØPG "Another CQ contest with great conditions; the date change worked out well." — KB8U

"With both 6- and 2-meter super enhanced band conditions both days, it turned out perfect for my QRP station." — NØURW

"Once-in-a-lifetime contest openings to places such as CN, 9H, etc." – W3SO

"Great contest! What a great 2-meter opening on Sunday AM." — W4GRW

The Quahog Audio Reflector was replaying the exuberance posted right after one of the greatest contests of all time—the July 19–20, 2003 CQ VHF World-Wide VHF Contest. The members of the Contest Quahogs of Rhode Island (CQRI) listened intently as the audiotape rolled on at their spring meeting held at the Quonochontaug Grange. Propagation was the prime topic.

Propagation

Bob, K2DRH, in EN41 led off the analysis: "This was one of the most fun contests I've worked in awhile. Right from the opening gun, there was 6-meter *E*-skip in multiple directions for two solid hours, wonderful tropo from the Dakotas to the Carolinas, and even a little aurora thrown in for good measure. It was a real kick to hear W3ZZ on 6-meter tropo again Saturday night after working them on aurora in the afternoon. Their S9 signal absolutely delighted both of us. After that I heard them on 2 meters the rest of the night and all the next morning, sometimes 20 over 9! Conditions were so good I worked Bill, W3IY/R, in FM19 on 2-meter tropo, then QSY'd him to 6 meters, where we also worked.

"On Sunday 2 meters sounded like 20 meters…hard to find a clear frequency. The high point was when Ivars, KC4PX, in Florida (EL98) called me on my 6-meter run frequency late Sunday afternoon to tell me I was 60 over. He talked me into trying 2 meters. I knew the tropo opening didn't extend that far south, but we tried it anyway. I was amazed to hear him on forward scatter, weak with a lot of rapid QSB, but workable. Gary, NW5E, in the same grid, heard us, so we tried it and completed also. Both bands were still going great when the contest ended. It was sad to see it end."

Also chiming in was KB3HUA: "Without a doubt the best contest I've ever entered. There was action coming in all the time from every direction." From N2NRD: "The contest started with a bang. Nice opening into 8s, 9s, and VE3, then to VE1 and Europe. The next day was open into the deep South and Midwest. This test had it all—single and double hop, aurora, and scatter." N8II offered: "The best score so far in a VHF contest thanks to some openings in several directions. The test started with 6 meters open to Africa and Midwest U.S. First EU was worked just before 2000Z and the last around 2100Z, catching ISØGQX and 9H1XT for new DXCC credits. Sunday found long-lasting *E*-skip to TN and the Gulf Coast briefly, followed by many hours into FL. Also worked TG9NX and V31WD for new ones. Saturday PM featured aurora around 2300Z."

W1XX: "First noticed the nice European opening when an F1 station called in on my SSB run frequency way up the band. I hastily

turned the beam northeast to snag a dozen EU stations, mostly on CW, until about 2050Z." Elite stations in the northeast, such as K1TOL and VE1YX, made the most of the short opening, while WA2FGK may have logged the largest number with 23. The high point for WO9S in EN61 "was working EH7RM for my first EA on 6." It was short but sweet.

Conditions in much of the North American continent may well have been one for the contest records. Next up on the meeting's agenda was a peek at the highest scores.

The Top Scorers

At the meeting, the club president shared an e-mail summary of contest scores from the Contest Director, who was unable to attend because the meeting conflicted with visiting hours at a New Jersey facility housing Buddy Cianci. The overhead projector flashed the top scores on the wall.

With the superlative conditions, all previous records for this contest fell. K2DRH led all scorers in the U.S. with 212K points. Bob, who won Single Op All Band (SOAB) two years ago with brick amplifiers, "dusted off the 8877s for the first time in a VHF contest from the Illinois QTH." His prodigious station sports mega-aluminum on several 100-foot-plus towers.

Though a 6-meter entry only, KC4PX produced the second best U.S. score at 136K.

Ivars milked the hours-long opening to Florida from his Merritt Island QTH in EL98 with Q and grid highs of 721 and 166. Also breaking 100K points at 123K in SOAB was Herb, K2LNS (at WA2FGK), who thinks the "CQ WW contest is going in the right direction." Then there was W1XX at 101K who operated portable from Catamount, a 1900-foot ski area on the MA-NY state border.

The eastern terminus of the duct led right to Charlotte, NC, where W4GRW was ready, posting a record 2-meter-only score with 280 QSOs in 73 grids. Bill "can't wait 'til the 2004 contest." On the road also in the Carolinas was rover W4VHF, again winning the Jack

**44 Longlane Road, West Hartford, CT 06117*
e-mail: <w1xx@cqww.com>

Kerouac award. Ted and Itice maximized the Qs and limited the traveling to a score of 135K. In the QRP category, NØURW finished first, trading places with N6MU, who did not get the same enhancement enjoyed in flyover country.

Signing W3ZZ from West Virginia, the slimmed-down version of the K8GP "Grid Pirates" thumped all scorers. Getting all the good propagation, Gene & Co. amassed a total of 1198 QSOs and 290 multipliers for a whopping score of 459K, and they were shorthanded much of the time! W3SO went multi this time and scored a nifty 128K from the mountaintop clubhouse in FN00.

This is *the* worldwide VHF contest, and DX participation increased 53% and the number of countries reporting doubled. This validated efforts made to publicize the contest in DX journals, overseas reflectors, newsletters, and websites. Top SOAB DX station was Roland, DL2OM, with 76K. As in North America, the second highest score was a 6-meter-only entry from TA2RC/P with 65K points. This was only Ozer's fourth 6-meter operation, as he "depends on written permission from Turkish officials." He "operated portable from his vehicle on a hill 350 meters asl, running 100 watts to a 3-element ZX Yagi ....twice reaching the 100 QSO per hour rate." He is Mr. Enthusiasm, concluding, "I love this band!"

Other excellent single-op EU scores were posted by Jose, CT1DHM, with 49K points and HB9FAB with 46K. The continent of Africa was heard from, as the Canary Islands entry of EH8BPX with 256 Qs in 139 grid locators brought a lot of happy smiles. The OK2KJT Radio Club paced the multi-operator entries with 122K, followed by YMØKA, OK1KIM, while F6IFR, our perennial leader, opted for 2-meter operation only, with F4ARM doing 6-meter honors for France.

In Asia, Thailand as usual was a hotbed of 2-meter FM activity with 21 entries. Individual stations there run 10 watts, and the many university club stations compete to a high level. E21DKD repeats as Single-Op winner, while HS3NNE is the Multi-One high scorer.

QRP Hilltoppers

The 2003 contest paved the way for a portable QRP category of limited time on a trial basis. Setting up a competitive portable operation—be it QRP or not—can be a huge undertaking. The principal limiting factors are providing for food and an overnight stay. Backpacking to remote higher locations doesn't always lend itself to a prolonged stay. Enter the "Hilltopper" or portable QRP class, limited to six hours of operation. Such short-duration QRP mini contests are common in EU. It's a contest within a contest.

Hilltopper NØJK was "thrilled to work W3ZZ—over 1000 miles—on 2-meter tropo from central Kansas with a 4-element Yagi at 10 feet. Best tropo opening in many years!" Others ID'd as QRP Hilltoppers were NØLX in DM79, K1JX in FN31, W5RZ in EM35, and N3AWS in EM90, who added: "Contest was typical Florida summer with

TOP SCORES

WORLD

All Band

DL2OM.....76,942
CT1DHM.....49,206
HB9FAP.....46,368
SQ6ELV.....13,464
OK1CZ.....4,554

6 Meters

TA2RC/P.....65,758
UW5U.....47,265
VE1YX.....36,848
EH8BPX.....35,584
UR5QU.....26,329

2 Meters

DK5DQ.....34,320
E21DKD.....22,310
E20YGG.....6,510
HS8GLR/9.....5,526
E20MXA.....4,016

Rover

HS9LPV.....924

Multi-Op

OK2KJT....122,914
YMØKA.....69,738
OK1KIM.....69,454
F6IFR.....62,496
HS3NNE.....19,840

USA

All Band

K2DRH.....212,952
WA2FGK....123,876
W1XX.....101,088
K3ZO.....99,528
K9HUY.....96,696
K3DNE.....79,212
K1TEO.....72,960
N3HBX.....72,080
N4MM.....70,520
NV8V.....51,120

6 Meters

KC4PX.....136,935
K4EA.....69,020
K1TOL.....53,818
W4WRL.....50,715
NL7AU.....34,410
W5PR.....32,155
N2NRD.....30,613
K2PS.....22,360
WD5K.....22,339
N8II.....21,070

2 Meters

W4GRW.....40,880
NØLD.....5,964

QRP

NØURW.....33,245
N6MU.....27,432

Rover

W4VHF.....135,286
K1DS.....57,236
N6DN.....49,192
KØPG.....29,256
K9ILT.....28,980

Multi-Op

W3ZZ.....459,650
W3SO.....128,760
AF4HX.....94,360
K4SCH.....57,969
W4OH.....31,724

QSO LEADERS BY BAND

WORLD

Single-Op

50 MHz		144 MHz	
TA2RC/P	427	E21DKD	485
UW5U	345	E20YGG	465
VE1YX	329	HS8GLR/9	307
CT1DHM	326	DK5DQ	264
EH8BPX	256	E20MXA	251
UR5QU	233	DL2OM	202
YU1QT	136	HB9FAP	152
YZ1EW	135	HS5AYO	141
UXØFF	134	HS2JFW	131
DL2OM	123	E21EIC	120

Multi-Op

50 MHz		144 MHz	
YMØKA	360	HS4NLW	514
OK2KJT	318	HS3NNE	496
F4ARM	170	OK1KIM	451
		HS4IVS/1	442
		F6IFR	434
		HS8HWD/1	352
		HS6RMY	333
		E21CJN	283
		E20WIE	275
		OK2KJT	248

USA

Single-Op

50 MHz		144 MHz	
KC4PX	721	W4GRW	280
K9HUY	584	K2DRH	222
K4EA	493	NØDQS	137
K2DRH	490	WA2FGK	130
K3ZO	444	W1XX	118
NJ2F	408	NV8V	104
WA2FGK	406	N6MU	101
W1XX	388	K1TEO	96
K1TOL	379	N3HBX	87
NL7AU	370	KB8U	83

Multi-Op

50 MHz		144 MHz	
W3ZZ	789	W3ZZ	398
W3SO	380	AF4HX	295
N4DXY	198	K4SCH	167
AF4HX	184	W3SO	158
K4SCH	179	W4OH	79
W4OH	150		
W5LCC	142		
W1QK	111		
VO1NO/WØ	109		

thunderstorms, heat, and bugs. But had a ball! Make QRP hilltopping permanent." *CQ* has done just that (see the contest announcement elsewhere in this issue).

Rookies

Rookies are those new to this contest, VHF contesting in general, or those who have been QRT for a long while. They are the lifeblood of this contest and they can really expect to compete. We heard from many of them, such as KØJJM: "First effort, great fun! Farthest contact was on 2 meters to Mt. Mitchell, NC." K8YC "found the periodic pipeline open to selected geographic locations and the minute by minute fading and reappearance of distant stations fascinating." For KG4PXF, the contest provided "his first 6- and 2-meter contacts."

Newbie stations also included KE4SCY, KG4RUL, W6KA, N1SXL, W5GN, N2NRD, Z36W, and many others who did not specifically identify themselves as such. The contest hums on this influx of new blood. The enthusiasm of VHF contest newcomers was best captured by Bruce, N9BX, his "first time on 6 and 2 meters in 38 years. What a great contest. I had a ball!" Bruce is a certificate winner.

The Contest Quahogs were impressed with the recruitment efforts of the Lawton-Fort Sill (OK) Amateur Radio Club. Don, NL7CO, and others assisted club members in submitting electronic-formatted logs, including key stroking members' paper logs. Way to go! Champ, E21EIC, did likewise with the many university clubs in Thailand, resulting in the usual flood of HS logs. Other clubs take note!

Philosophy 101

The "Old Timer" stepped up to the lectern, which consisted of three stacked lobster traps. The "newbies" suffered through the usual dissertation on the virtues of the good old days of VHF contesting with Polycomms, Lunchboxes, and the eerie green eye of the Gonset Communicator. However, a responsive chord was struck on the need for variety in our VHF contest diet.

The *CQ* two-band format is not only ideal for those who haven't yet invested in a mega-band station, but it also produces a more frenetic HF-oriented style of contesting. Stations with big signals call CQ to attract those usually less equipped to answer. It makes for nice "runs" both for the CQer and the station responding in the search and pounce (S &P) mode.

Pointing in the direction of the veteran VHF contesters, the OT asked: "Remember

GRID MULTIPLIER LEADERS BY BAND

WORLD

Single-Op

50 MHz		144 MHz	
TA2RC/P	154	DL2OM	66
EH8BPX	139	DK5DQ	65
UW5U	137	HB9FAP	43
CT1DHM	126	E21DKD	23
UR5QU	113	EA2AP	14

Multi-Op

50 MHz		144 MHz	
YMØKA	167	OK1KIM	77
OK2KJT	107	F6IFR	72
		OK2KJT	44
		HS3NNE	20
		HS6RMY	18

USA

Single-Op

50 MHz		144 MHz	
KC4PX	166	K2DRH	82
K9HUY	152	W4GRW	73
K3ZO	151	NØDQS	55
WA2FGK	147	N4GN	47
W4WRL	147	NV8V	46
K2DRH	146	KB8U	43
N4MM	145	NØLD	42
K1TOL	142	WA2FGK	39
K4EA	140	NØURW	39
K3DNE	137	K9SM	38

Multi-Op

50 MHz		144 MHz	
W3ZZ	200	W3ZZ	90
W3SO	137	AF4HX	64
AF4HX	76	K4SCH	57
W5LCC	74	W3SO	48
N4DXY	73	W4OH	39
W4OH	64		
K4SCH	56		
VO1NO/WØ	54		
W1QK	52		

10 or 15 years ago when you could really run stations on 2 meters? In today's contests, 2 meters is only a liaison frequency for coordinating microwave contacts." "Not so in the CQ VHF Contest!" he emphasized, pounding his fist through the top layer of slats of the improvised podium.

He continued to make the point that diversity exists in HF DX and domestic contests. Some are inclusive of all the bands from 160 to 10 meters. However, there are also contests that limit band usage, such as the 10-meter and 160-meter contests. Likewise, there are so-called VHF contests inclusive of all bands through the microwaves. Also, there is the CQ VHF Contest for just the lower two VHF bands, 6 and 2 meters. Makes perfect sense! It provides variety, which is the spice of VHF contesting life.

The audio reflector provided some evidence. "I like the two-band competition as I can actually work 'all bands' in this one." — *KE8RO*. "I like the format of not running around the bands. It continues to be a winner." — *K1TEO*. W2UDT summarized: "Keep the two-band concept."

Stats and Mega-Thanks

Unexpectedly, the Contest Director arrived at the meeting. After delivering the obligatory Quahog secret handshake, he reported on contest statistics. A record total of 296 logs were received, an increase of 136% from the previous year. Great conditions helped, but so did adopting the standard Cabrillo format for electronic submission—a necessity for gaining "world class" status as a contest. For many this was their first introduction to the robot. The exposure may have created a few "error messages," but persistence paid off. Congratulations all!

The Cabrillo format necessitated development of log-processing software, and the credit for that goes to N6TR and The Boring Amateur Radio Club (K7RAT), and a huge TU to Dave, NC1C, who tailored the software specifically to this contest so as to produce reams of statistics to analyze the results. For example, 95.6% of the logs were computer processed for scoring, dupes, contact cross-checked, busted calls, correct exchange, percentages for "uniques," calls "not in log," etc. The total number of contest QSOs exceeded 40,000. From those fed into the "cruncher," 9475 different stations were active, 46.5% of which (or 4405 stations) worked at least two different stations. 797 grid squares were VHF radio active. NC1C also organized a "Grunt Labor Force" consisting of himself, WB1AVA, K. Davies, and "The Family Guy" to keystroke most of the paper logs received.

Additional kudos to Steve, N8BJQ, who produced the 2002 certificates; the IARU societies, who publicized the contest worldwide; "Champ," E21EIC, who promoted the contest in Thailand; Larry, N6TW, who activated the logs-received function on the CQWW website; and Trey, N5KO, who was of tremendous help in initiating the Cabrillo format for submission of logs. Thanks also

(Continued on page 104)

If you've ever listened to single sideband on HF, you'll know that high-quality audio is NOT one of its best features. But if you hook up the AOR ARD-9800 modem to your HF SSB rig and make a digital voice contact, that all changes—radically.

CQ Reviews:

AOR ARD-9800 Digital Voice Modem

BY RICH MOSESON,* W2VU

It's been nearly two decades since I last had this feeling ... when, for the first time, I heard the BRAAAAP of a packet radio signal and saw my callsign appear on the computer screen. I can't really describe the feeling, except to say that I recognized it immediately when I felt it again, even after a gap of more than 18 years.

It was 1985. I'd had my TNC for several weeks, maybe even a couple of months, and while I had read all the articles about how packet works, I couldn't figure out how to work anyone with it! When I finally made that first contact, I felt like I was part of something new and special in amateur radio—and indeed, packet radio was the beginning of a revolution in our hobby that continues to this day, the integration of computers and digital technology into the fabric of amateur radio. I was privileged to be in a position to experience and report on the next step in that progression—the introduction of a digital voice option on commercial VHF and UHF radios[1]—and now, a digital voice modem that can be connected to virtually any HF amateur transceiver.

Getting on the air with the AOR ARD-9800 Fast Radio Modem was just like my experience two decades ago with getting onto packet—except that more help was more readily available (more on that later)—and very similar to the experience *CQ* Publisher Dick Ross, K2MGA, had with getting onto single sideband some 45 years ago (see "Just Like the Old Days!"). It's not plug-and-play. You have to make careful adjustments to the modem. You have to fiddle with adjustments on your transceiver. You have to try and fail several times in making contacts. But when you finally get it right, and get the right band conditions, you hear that packet-like BRAAAAP and the green light comes on and this FM-quality voice comes out of the speaker of your SSB receiver calling *you,* it's all worthwhile. But I'm getting ahead of myself...

The ARD-9800 Fast Radio Modem from AOR is capable of producing and decoding digital voice, text, and photos. It can be used with virtually any HF SSB transceiver, using the mic in and speaker out connectors. (W2VU photos)

The ARD-9800

AOR introduced the ARD-9800 Fast Radio Modem at the 2003 Dayton Hamvention®. As we approach the 2004 show, a small but growing cadre of hams is experimenting with these devices, learning the ins and outs of digital voice ... and even digital video. The box itself is pretty simple. It contains sockets for a microphone (one is provided, but you can substitute your own with a properly-wired connector), a cable to the mic input on your rig (build your own or buy one from them; I'd recommend the latter for reasons I'll explain later), an audio-in connector from the external speaker jack on your receiver, and a jack for connecting an external speaker of your choosing (there's also an internal speaker). In addition, there are connectors for a serial cable to your computer and video in/out (more on those later). As for controls, there's a power switch, a mic level adjustment, a switch to go between analog and digital, a transmit button that's used for non-voice modes, and a volume control for the speaker. That's it.

Here's how it works for digital voice: On transmit, when you key the mic, a 1 1/2 second data burst is generated (sounding much like the BRAAAP of packet or the tones you hear

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

when connecting to the internet via a dial-up modem), then you talk into the microphone and an analog-to-digital (A/D) converter changes the electrical impulses from your voice into a digital datastream, which is then sent on to your rig's mic input. The digitized audio signal is tailored to fit in a typical SSB bandwidth of 3 kHz. In an analog receiver, the transmitted digital signal sounds like noise. The magic, though, is what happens at the receiver of a ham who has another ARD-9800 hooked up.

On receive, the 9800 automatically detects a digital voice signal (that header provides the information it needs to go, "Oh, this is digital, I'll switch over.") and automatically decodes it. You hear the header, you see the "mode" LED that's normally red and the "busy" LED that's normally off both turn green, and then this voice comes booming out of your speaker. It really is magic ... when it works the way it should. It doesn't always work the way it should, but most of the hams who are using 9800s realize that they're experimenters, that they're learning as they operate, and that what they learn will be used in the future to advance the state of the art in HF digital voice in amateur radio.

The Audio

This is what really jumps out and grabs your attention. The audio quality is what you'd expect to hear on FM, not SSB, but there it is—full fidelity, no noise, just the voice of the other station. This is the Holy Grail that ham radio audiophiles have been seeking for the past 50 years, ever since single sideband displaced AM as the predominant HF voice mode—the audio quality of AM with the bandwidth of SSB. It's been an elusive goal for a half-century, but it is now within reach. On a solid link, this audio is just as rich and full-bodied as anything coming out of an AM or FM transmitter, with absolutely no noise. We've come full circle with HF audio, as we see the return of clarity and quality to HF voice communications.

Making Adjustments

We're not used to this anymore, but you have to make adjustments to make this work. You need to start by turning off all the digital signal processing features in your rig (the 9800 does the DSP work for you), such as noise reduction, noise blanking, etc., along with the speech compressor on the transmit side. You'll have two mic gain adjustments to make—one on the 9800 with the front-panel "clicker" so you don't under-drive or over-drive the A/D converter, and then on your rig so that you don't under-drive or over-drive the outgoing RF signal. Like a packet signal, an audio level that's too low or too high won't work. The same applies on receive, and the adjustment here is quite simple. There's an LED marked "Over" on the ARD-9800 which flashes to let you know you're overmodulating on transmit (occasional flashing is OK; if it's on solid, you've got to back down the mic gain on the unit). On receive, if the incoming signal level is too low, the LED flashes; if it's too high, it comes on steady. In between, in the range that's "just right," to quote Goldilocks, the LED goes out. This is what you want (if the LED doesn't come on at all in receive, you've got a problem unit and you should contact your dealer or AOR about a replacement).

Some of the more advanced users are getting brave enough to turn their DSP back on and tailor their transmit audio settings to maximize the tones being transmitted by the 9800. This has to be done in conjunction with another user who can let you know when you've gone too far. At this point, the whole thing is an inexact science. For example, I borrowed an IC-706 from *CQ* Digital Editor Don Rotolo, N2IRZ, and have it set up for pretty reliable digital voice communications. My own IC-746, though, with more bells and whistles, still needs additional adjustments.

The ARD-9800 Fast Radio Modem hooked up to W2VU's borrowed (from N2IRZ) IC-706, along with the small power supply below for the 9800. It's essential to use a regulated, non-switching supply with the 9800.

Limitations

There are two categories of limitations here—limitations of the mode and limitations of the unit. Let's look at mode limitations first. This is digital, and if you're familiar with any other form of digital communications, from packet to your cell phone, then you know that there is no such thing as a noisy signal. It's either there or it's not. I commented to several folks I contacted that the traditional RS signal report is useless in digital voice. It's either 59 or not there! Actually, there is a curious kind of "noise" that does creep in when a signal is close to the noise level or there's QRM from adjacent analog stations—as the D/A converter tries to make sense of the noise, it throws out random sounds along with the desired voice signal. If it's really bad, the desired signal gets lost in this "noise" just as it would in analog. In addition, if the signal you want is not sufficiently above the noise level, then the unit will not fully decode the header and won't switch into digital at all. You can "force" it into digital by pressing the "transmit" button while receiving in analog, but you'll get just the beeps and bloops described above because there's not enough signal there for the unit to properly decode.

This sensitivity to the signal-to-noise ratio is perhaps the greatest limitation of the unit itself that I observed. As soon as things get noisy, either from adjacent stations or an overall increased noise level, it starts to lose the ability to decode the incoming signals. And with the variations in noise that are a constant on HF, this is a tricky area. There's a range within which it works beautifully, but if the band starts to change and the signal drops below a certain level in relation to the noise, then it's no-go. I had several instances when I was able communicate in analog with a station whose signals were weak and noisy, but not in digital. My rough estimate based on watching the S-meter was that the digital signal has to be at least two S-units above the noise in order to be decoded properly.

This was corroborated independently by at least one member of the ARD9800 Group on Yahoo.com (more about this group later). Butch Mason, W6KAG, reported that in tests

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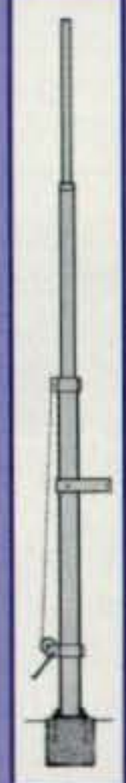

MA SERIES CRANK-UP MASTS

MAST MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	50 MPH (sq. ft.)	70 MPH (sq. ft.)	LIST PRICE	SALE PRICE
MA-40	40'	21'6"	242	16.5	6.8	$1,209	$1,079
MA-550	55'	22'1"	435	22	9	$1,875	$1,669
MA-550MDP	55'	22'1"	620	22	9	$3,584	$3,179
MA-770	71'	22'10"	645	15.5	5.5	$3,091	$2,789
MA-770MDP	71'	22'10"	830	15.5	5.5	$4,890	$4,329
MA-850MDP	85'	23'6"	1128	15.3	6.3	$6,591	$5,889

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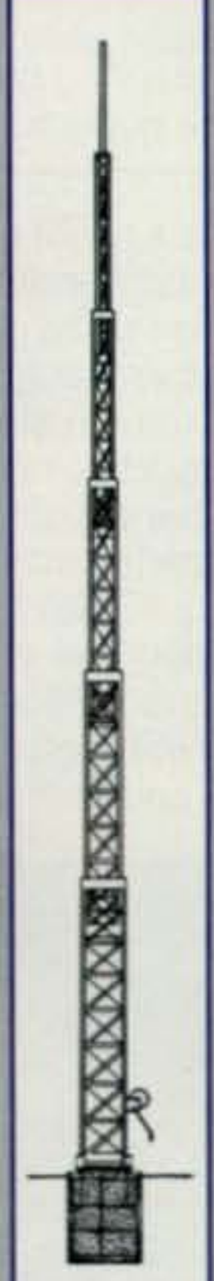

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Just Like The Old Days!
Digital Voice and the Dawn of SSB

What in the world is a piece about the early days of SSB doing here in the midst of an article about digital voice transmission? It's the outgrowth of a conversation between W2VU and K2MGA regarding the experiences of some early users of the new AOR digital voice adapter. Being somewhat older and greyer of beard than W2VU, I was likening what Rich and others are experiencing with the new AOR Digital Voice Adapter to our experiences with SSB back in the 1950s, especially when we first began to tinker with it on 6 meters, a bastion of AM.

My first SSB encounters were about 1958. By then, SSB had been pretty well established as a viable means of HF voice communications, although it was still overshadowed by the dominant AM. A great deal of commercial equipment was available, and although much of it was costly, it wasn't so expensive that it was beyond the reach of a growing number of hams. Led by some milestone homebrew projects such as the W2EWL "Cheap and Easy SSB" exciter in 1956 which grew from the "SSB Jr." published in *GE Ham News* in 1950, these homebrew phasing-type exciters were capable of putting out about 10 or 20 watts on either 75 or 20 meters. From them grew early breakthrough products such as the Central Electronics 10A, 10B (75/20m, plug-in coils) and 20A (all band, bandswitching). But they all tended to be a bit finicky and drifty, and if you built your own phasing exciter, much of your shack time was spent nulling the carrier and adjusting the phasing to maximize the unwanted sideband suppression. But that was part of the fun!

Getting on 6-meter SSB involved mixing the 20-meter output of a 10A/B against a 36 Mc (no MHz then!) crystal-controlled signal, giving USB output on 6. Pretty early on, a product was introduced by a little company called P&H Electronics which was a complete package that went between the 10A/B and the coax relay and put out about 10 watts on 6. All the setup lacked was a VFO. Ahh, but that leads us back in time to a different part of the tale.

The earliest ham SSB exciters were often filter types using homebrew multi-pole lattice filters built from WW II surplus FT-243 crystals in the 455 kc range that were available by the bucketful on Radio Row (known today as Ground Zero) in New York City for almost no money at all. Sifting through hundreds of crystals would yield matched frequency pairs which would collectively yield the desired filter bandwidth, when properly applied. For the phasing enthusiasts, a milestone was the introduction of the B&W 350 plug-in audio phase shift network that took much of the heartache out of building and adjusting your own.

Regardless of how the SSB signal was generated, the 455 kc USB signal was mixed up to 9 Mc. Using a converted war-surplus BC-458 transmitter ($7.00 brand new from G&G Radio) as a VFO, the 4.0 to 5.3 Mc output was either added to or subtracted from the 9 Mc SSB signal. That produced a USB signal on 20 meters or an LSB signal on 75 meters. (That's the origin of the world-wide convention: LSB below 20 meters; USB on 20 meters and up. How many of you knew that?)

What About Digital Voice?

How does any of this relate to digital voice? Think about it. Our early SSB efforts were anything but perfect and reliable. We were able to communicate on the new mode, most of the time. And a good part of our shack time was spent trying to get the doggone lashup to work properly. And we suffered the catcalls of the diehard AMers about our "Donald Duck" signals. But we were doing what hams have always done: We were tinkering and learning and moving the state of the art forward. And that's what the early adopters of digital voice on HF are doing as we speak.

To those critics who say that it's not as good as it ought to be, that it's not perfect, that they're going to wait until it's perfected before they try it out, I say the following:

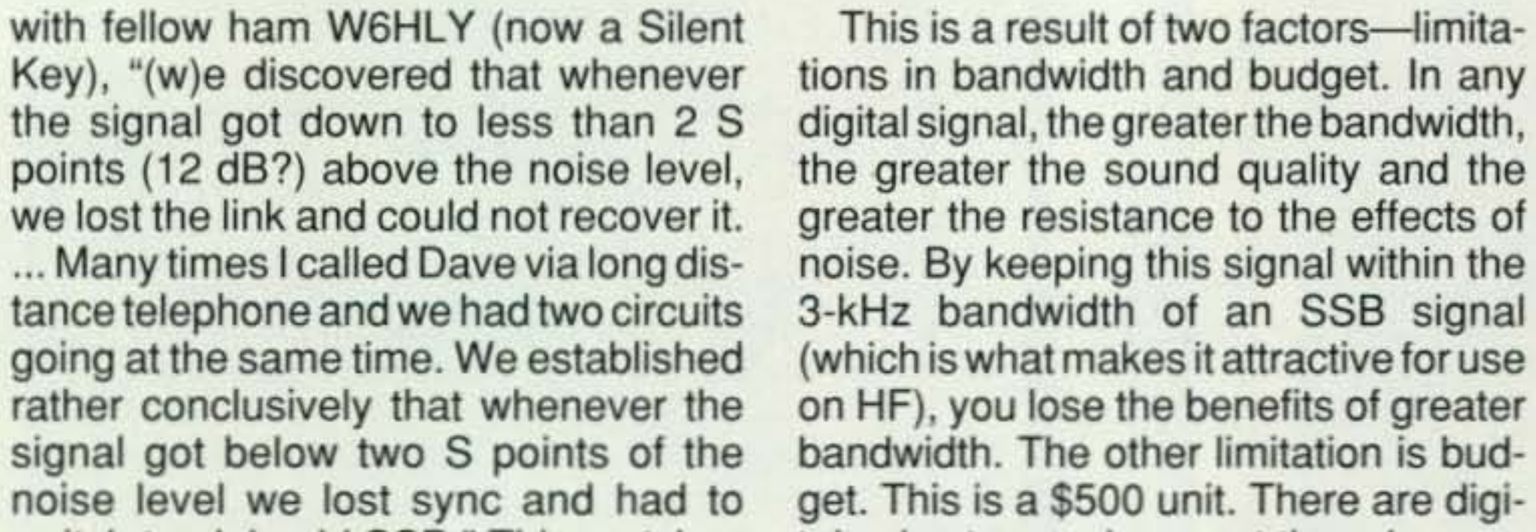
"Hooray for the folks who have the courage to reach beyond the conventional. They're the ones who have always made ham radio work, and they always will be." And as a significant side note, our appreciation of the commitment and the courage of AOR in developing this product and bringing it to market should not be taken lightly.

—Dick Ross, K2MGA, Publisher, CQ

with fellow ham W6HLY (now a Silent Key), "(w)e discovered that whenever the signal got down to less than 2 S points (12 dB?) above the noise level, we lost the link and could not recover it. ... Many times I called Dave via long distance telephone and we had two circuits going at the same time. We established rather conclusively that whenever the signal got below two S points of the noise level we lost sync and had to switch to plain old SSB." This matches my experience exactly.

This is a result of two factors—limitations in bandwidth and budget. In any digital signal, the greater the bandwidth, the greater the sound quality and the greater the resistance to the effects of noise. By keeping this signal within the 3-kHz bandwidth of an SSB signal (which is what makes it attractive for use on HF), you lose the benefits of greater bandwidth. The other limitation is budget. This is a $500 unit. There are digital voice transceivers out there in commercial and military use that aren't as sensitive to noise problems, but their cost is generally several thousand dollars per unit, well outside the budgets of most hams. What AOR has done here is to find some middle ground—a system that works very well when conditions are right and that fits within many ham budgets, and that gives those hams who are adventurous enough to try it and put up with the frustrations that go along with something experimental the means with which to make those experiments, to discover its strengths and limitations, and to build a body of knowledge that will help the next generation of digital voice equipment perform even better. Butch, W6KAG, suggests that the digital voice signal could be made more "robust" if the bandwidth was broadened to that of two, or even three or four, SSB signals. This would certainly help, of course, but would also defeat one of the primary goals here, that of providing digital voice within the bandwidth of a single SSB signal.

Butch also notes that he and W6HLY "were two of the first six hams on SSB and were students at the US Navy Postgraduate School at the time. ... Our experience during the SSB campaign



There are very few controls on the ARD-9800. On the front panel there's a connector for the included microphone, a volume control for the built-in speaker, and a mic gain control, plus a switch to toggle between analog and digital transmit modes (receive switching is automatic). There's also a "transmit" switch, which is active only for digital video.

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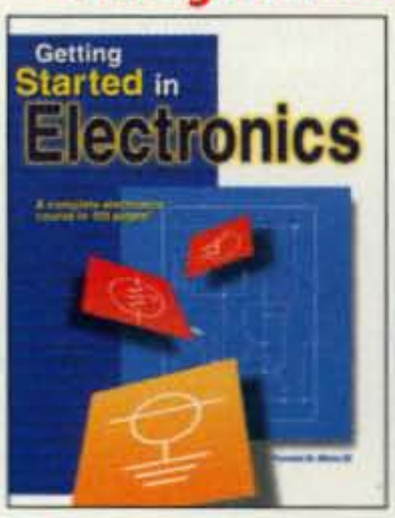

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Is it Voice or Is it Data?

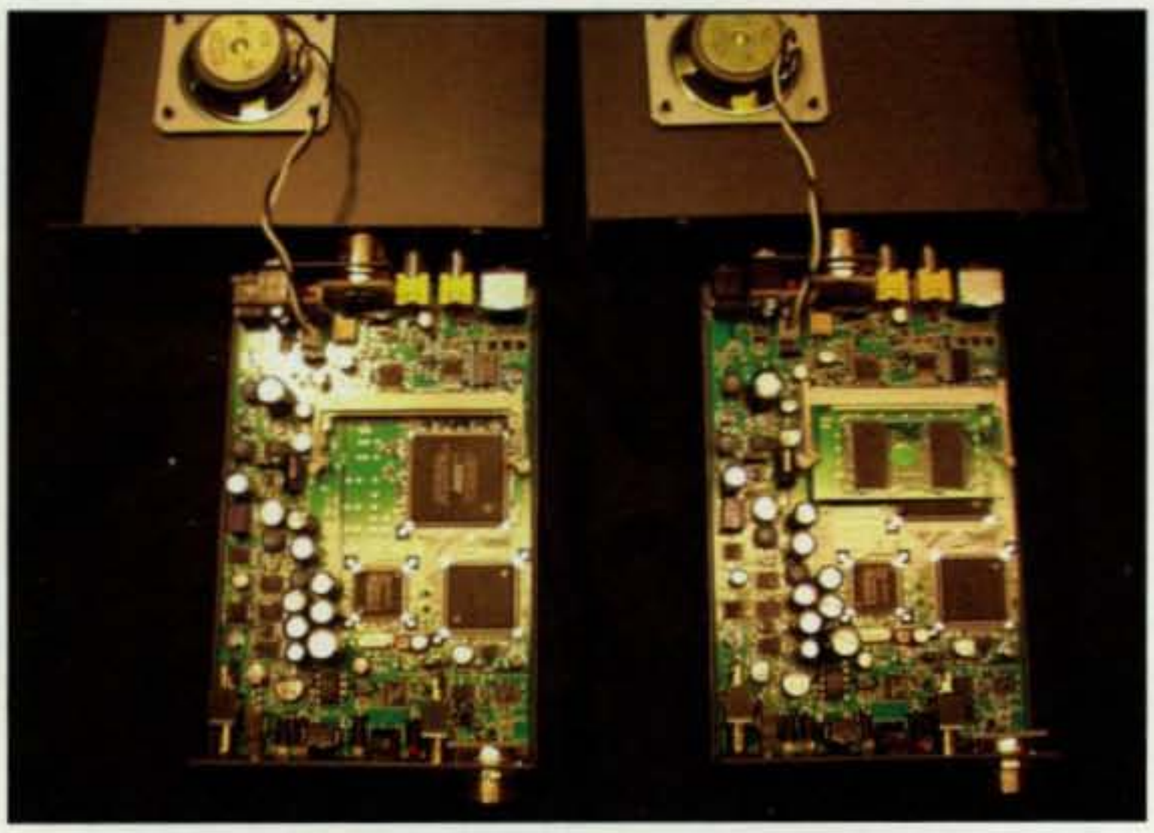
One item of ongoing discussion on the ARD9800 e-mail reflector is whether the output of your transmitter when using the device in digital mode is voice or data. This is an important discussion, because the bands and frequencies on which you may operate will depend on the answer. The majority feels that voice is voice, regardless of the method of transmission, and that digital voice may be used only on bands and subbands where voice is permitted. Same for the digital slow-scan TV images that the 9800 can transmit and receive. Image is image, and the method of transmission is irrelevant.

The data folks say method of transmission is everything, that what goes out on the air is all that should matter to the FCC, and that what goes out on the air is a digital bitstream, whether it's carrying a signal that will be translated at the receiving end into text on a screen, voice through a speaker, or an image on a TV monitor. Under this theory, there are several operators conducting digital voice QSOs on 30 meters, a band on which only CW and data are permitted. They say they're legal because they're only transmitting data. How that data is processed is irrelevant because that's not done on the air. The FCC has not weighed in with an opinion.

Both sides here have valid points, and as digital voice and image transmission becomes more widely used, it is an issue with which the FCC will need to deal in an intelligent way. Here at *CQ*, for several years we have been quietly promoting the concept of replacing mode-limited subbands with bandwidth-limited subbands. This way, anything that fits within a designated narrow bandwidth would be permitted in what are now the CW/data subbands; while the current voice/data subbands would allow wider signals, equivalent to the bandwidths of today's SSB or AM voice signals; while wider signals (FM, for example, or high-speed digital signals) would continue to be limited to frequencies above 29 MHz. This would encourage further experimentation in digital compression, etc. There is no reason, for example, to limit digital transmissions on HF to 300 baud if compression techniques permit you to pack a 2400- or 9600-baud signal into the same bandwidth. Recently, Bonnie Crystal, KQ6XA, proposed a comprehensive bandwidth-based approach to subband allocations. She suggests four subband categories, with maximum bandwidths of 500 Hz (similar to current CW), 3 kHz (similar to current SSB), 10 kHz (similar to current AM/narrow FM), and 25 kHz (similar to current wide FM and higher-speed digital signals). We haven't had a chance to examine it closely and are not endorsing it in anything more than its concept, but it's a good starting point for a discussion that needs to begin now, so the rules can be changed to accommodate new transmission modes before the rules themselves become obstacles to progress. For more on Crystal's bandplan proposal, see <http://www.qsl.net/kq6xa/freqplan/> on the web. —*W2VU*

(which took 10 years) indicated that any mode that could not hold its own and win any challenge from existing modes was doomed to failure on the HF bands. We had a clear 9-dB advantage with SSB and finally won the battle..." He's probably right, but as he notes, it was a battle that took ten years to win, and as K2MGA points out in his sidebar, the early years of SSB were anything but easy for those hams experimenting with the mode and trying to bring it into general use.

Another problem noted by several members of the Yahoo!Groups list is susceptibility to RF interference from the transmitter itself. I have not had any of these problems myself, but was aware of them before I started, and I made sure everything was properly grounded and I put ferrite cores on every wire I could. In addition, my antenna is out in my back yard, separated from my shack by a horizontal distance of at least 30–40 feet. People operating underneath rooftop antennas seemed to have more severe problems. There are suggestions on the Yahoo!Groups site, the ARD9800 Liaison site, and the AOR web page for dealing with this RFI problem. Regardless of whether the 9800 should be hardier in terms of RFI susceptibility, if you have RF in your shack, there are any number of good reasons why you should try to locate the source/cause and eliminate it.



Interior view of the ARD-9800. Unit on the right has the add-on memory board required for digital image transmission and reception.

Some people have also had power-supply related problems, mostly from not following the manufacturer's advice. AOR recommends *not* using a switching-type power supply and says it's essential that you *do* use a regulated supply.

One thing that will almost certainly have to wait for a future generation—immunity to BPL (Broadband over Power Lines) interference. We had hoped that digital voice might be a technical solution to the interference problem posed by the advent of BPL, and even considered driving to a BPL test area and trying to carry on a digital voice QSO in areas where an analog QSO would be impossible. Unfortunately, BPL signals appear primarily as noise, and the sensitivity of this unit to increases in the noise level doesn't make that test worthwhile. However, the potential is certainly there, particularly since digital noise is different from analog noise if you're a digital receiver, and in many cases that receiver should be able to separate out the desired signals from the others. Not yet, though. At least not with this technology in this price range. We'll see what inventions are born of necessity in the future.

Getting Help

Trying to get the ARD-9800 set up and operating on your own is a sure-fire recipe for frustration. The technology is still developing and the user base on the ham bands is just too small at this point to be able to plug it in, adjust everything so it "looks right" at your end, call "CQ digital voice," and expect to get an answer. You will need help, especially in the early going (and just about everyone is still at that stage, so everyone is learning together and sharing information).

One difference between the early days of packet and the early days of digital voice is the internet. Eighteen years ago, when I was trying to figure out how to work packet as opposed to how packet worked, I needed to make lots of long-distance phone calls, starting with the few people I knew who were involved with the mode and moving on to others who "knew the ropes" and could explain it all to me so I could explain it to others.[2] Today, the internet makes the process much easier,

and the ARD-9800 operators you'll find online are friendly and helpful (they want more people to contact!).

There are several sources of information on the internet, starting, of course, with AOR's own webpage for the unit, <http://www.aorusa.com/ard9800.html>. A good jumping-off point for finding other users is the "ARD-9800 Liaison Web Site" (not affiliated with AOR) at <http://www.rfelectronics.com>. This site includes a listing of active users, organized by location, with e-mail addresses, operating tips and info on the latest firmware upgrade, plus links to sites with all the technical information you could ever want.

Next is the ARD9800 group on Yahoo! at <http://groups.yahoo.com/group/ARD9800>. In order to access useful information here, you will need to set up a free Yahoo! account and join the group (it's easy; just click "Join This Group," then click "Sign Up Now" and follow the prompts). You can use your existing e-mail address or a new one, which will be the ID you set up on Yahoo! I chose to use the new address, even though it involves checking one more e-mail account every day, so I'd have a separate spot for all of my ARD-9800-related messages.

Part of the Yahoo! ARD9800 group is an e-mail reflector. You can either view the messages when you log into the group area, or see the messages in your own e-mail in-box. This is an extremely valuable way to keep in touch with other users and to set up skeds. The group site also includes a chat area (which I've never seen active—after all, we have the world's first and biggest chat room, called ham radio!), links and photos, and a very valuable tool called a database, which in this case is a table on which members can post when they're monitoring and on what frequency; just remember to change it when you turn off the radio! Using the information on this listing, I was able to make two random (non-scheduled) QSOs on one weekend afternoon.

When you're first starting out, though, plan on scheduled QSOs, and if your phone plan gives you free long distance, plan on some on-the-phone time as well. I used the operator listing on the RF Electronics site to discover another ARD-9800 user, John Marrin, KB2KH, just a few miles from where I live. John and I spent a long time on the phone and on the air trying to get things working properly, and he even loaned me a spare unit (his brother's) in order to compare performance of that one with the evaluation unit I'd received from

The rear panel of the 9800 has connectors for a computer serial cable (for text modes), video in and out (for digital video), the output cable to the transceiver mic connector, audio in and out, and DC power.

AOR. Another John, John Deegan, K9XT, in Indianapolis, also spent a long time on the phone and on the air with me as we tested things out over a longer-distance path. Their help has been invaluable. Thank you, John and John! I'm sure you'll find other operators to be equally helpful.

Operating Frequencies

There are no "established" digital voice frequencies as yet, although most of the activity is toward the top end of the SSB portions of the HF bands. Some of the more popular frequencies appear to be 14.320, 14.260, 18.163, 7.265, and 3.960 MHz, all plus or minus other band activity. Again, there is nothing formal and most of the time people will use the group site or e-mail to locate a vacant frequency and try to hook up. As this mode becomes more popular, though, some sort of "gentlemen's agreement" will have to be reached regarding commonly-used frequencies, as has been done for text-based digital modes (RTTY, PSK, packet, etc.) and slow-scan TV. Analog voice and digital voice are not particularly compatible, mostly because the analog station may not even realize there's a QSO in progress on the frequency you're using (he'll hear only noise) and may unknowingly transmit right on top of you and unintentionally interfere with you (a strong analog signal will prompt the "beeps and boops" discussed earlier, or if strong enough, cut off your link altogether). It's probably a good idea to start out in analog, announcing that you're going to digital voice, and to periodically return to analog to note that you are engaged in a digital voice QSO on the frequency.

Video and Text Modes

The ARD-9800 may also be connected to your personal computer to operate in text modes and, with added memory, to send and receive digital image files as well. I didn't have the opportunity to test these modes, and apparently, neither have any of the other people in the ARD9800 group. We'll have to defer any evaluation of those modes to a future article.

Conclusion

So, should you run out and spend $500 for an ARD-9800 to join the digital voice revolution? That all depends on what you're looking for. If you're looking for a plug-it-in-and-turn-it-on device with the dependability of a mature mode such as SSB or FM, then no, this probably will not be a good investment for you. You'll be too frustrated. If you're a real techie, working with cell-phone quality digital voice and the latest in DV codecs and algorithms, then no, you'll probably be disappointed in the lack of sophistication. But if you're a ham who wants to be in on the ground floor of something completely new and different—if you want to be able to talk about the early days of digital voice the way I talk about the early days of packet and K2MGA talks about the early days of SSB—if you want to help establish a beachhead for a new mode in ham radio, then yes, this will probably be a good investment for you, and you will get more than your money's worth in disappointment and elation, frustration and fun. And you'll be helping to set the course for our hobby's future.

Notes

1. See "*CQ* Reviews: Alinco DJ-596T Handheld With Digital Voice Option," *CQ*, June 2002.
2. See "Packet Radio—How to Work It (*Not* How it Works)," *CQ*, June/July, 1986.

To learn more...

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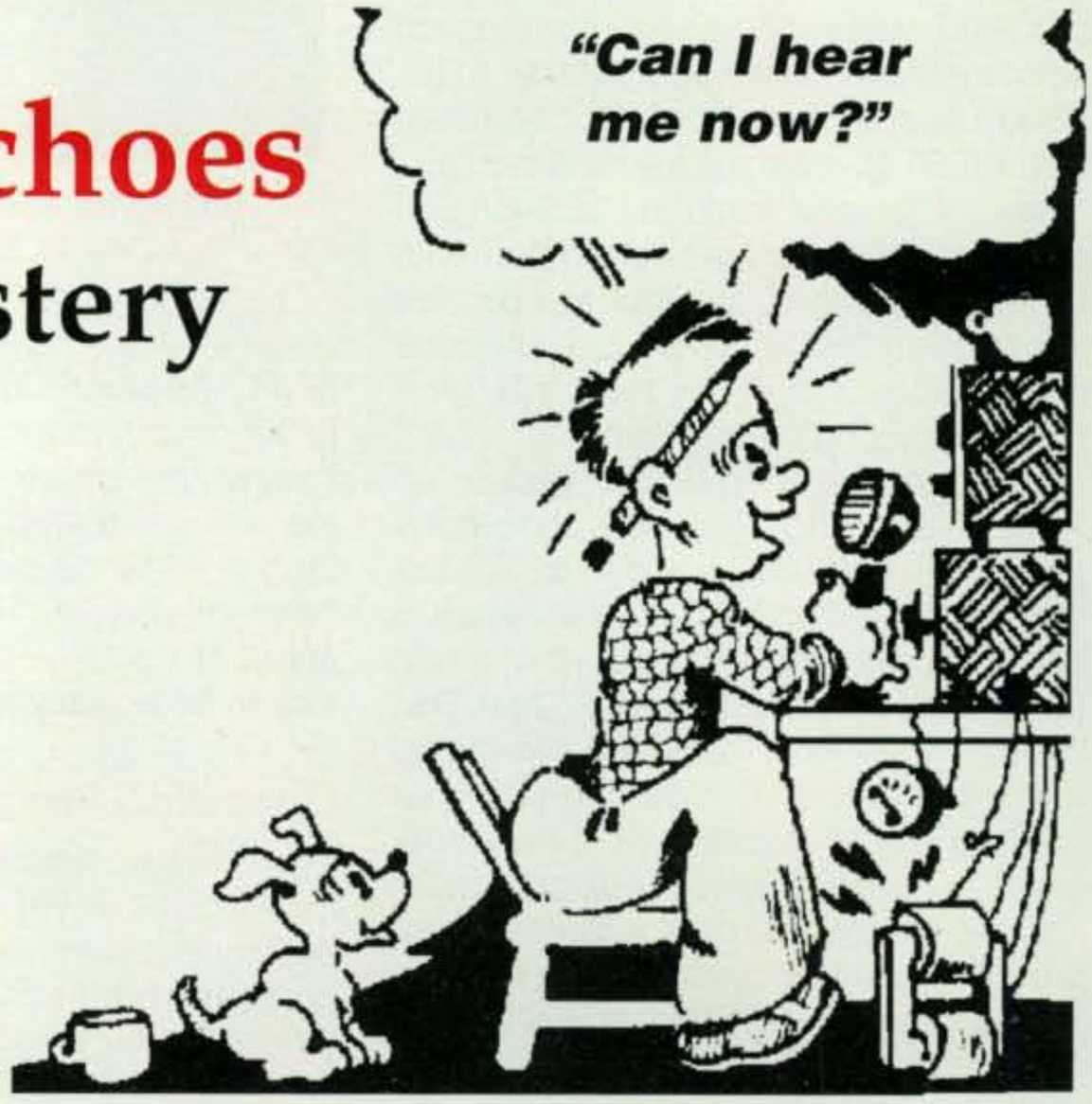
Long-Delayed Echoes, or LDEs, have been observed for years but never explained. The author, a leading authority on radio communications, seeks input from hams with LDE experiences of their own to try to find some answers.

Long-Delayed Echoes
An Enduring Mystery



BY BOB SHRADER,* W6BNB

The designation LDE stands for "Long-Delayed Echoes" and refers to transmitted radio signals that return to the sending station some time after the signal has been sent. For example, one autumn day, while adjusting my rig on 18.070 MHz at 4:30 PM local time, I noted that every time I sent a short dot it was followed by a similar, much weaker, received dot (I was using a Yaesu FT-920, which has a very fast break-in circuit). This signal was received a small fraction of a second after the short dot I had sent.

"This kind of "echo" is not really an echo, although it may be thought of as such."

This kind of "echo" is not really an echo, although it may be thought of as such. It's actually a transmitted signal that goes up into the Heaviside layers[1] of the ionosphere and works itself all around the world, probably over both poles, and comes back down to Earth at the transmitting point. Since the circumference of the world is about 25,000 miles and radio signals travel at the speed of light, about 186,000 mi/sec, their travel time around the world is roughly one eighth of a second.

To my ear, the timing of the dots seemed reasonably correct. Each dot had to be very short in order for me to hear the received "echo" come back as a complete dot. When a dash was sent, it resulted in hearing the end of the locally sent dash with a short, weak tail on it. On this particular day, after about 20 minutes the echoes were no longer heard. This is no big deal. Amateurs and other radio operators have heard such once-around-the-world, or two-polar, signals for decades.[2] They are most likely to occur during the hours before, during, or after sunset or sunrise, when the energy from the sun is distorting the Heaviside layers and while they are wildly billowing around up there.

The next day at the same time the same thing was tried again, but no echo-signals were heard on 18.07 MHz. Several other bands were tried. A very short echo-time signal was heard on 28 MHz. Any short dot was heard a fraction of a second later, and any dash was heard to have a very short, weak tail on it.

At about 7:30 that same evening, I was tuning up on 3.555 MHz and just for the heck of it, I transmitted a short dot or two. These have to be *very* short dots, something like the length of a dot sent from a bug or a keyer set for perhaps 50 words per minute. Lo and behold, there was a distinct weak dot following any short transmitted dot. Any dash always had a weak tail on it. My XYL, Dorothy (another kind of Dot), W6ECU, was called in to witness the "echoes" and verify their existence. A tape recording was also made of the dots and their echo-signals. Due to QSB, some of the echo dots were weaker than others or faded out for a short time. After about a half hour, the echoes weakened and disappeared. Several other times, I have heard LDEs on 3.5, 7, and 14 MHz and other HF bands. Again, they were usually best heard within a couple of hours of sunset or sunrise.

Since then there have been innumerable times when I've heard fast echoing dots for a period of half an hour to an hour or so, but not necessarily near sunrise or sunset. This means that my signals must have gone up into the Heaviside layers, hit a billowing Heaviside cloud, and were reflected back to me. That would make it a very rapid and a real echo, but not an LDE. Maybe it would be a Short Delay Echo, or an "SDE," although I have never heard of such a term!

A High-Altitude Mystery

Such actions are fairly easy to understand, but how about what Jack McCoy, W6WYW, an old-time Society of Wireless Pioneers (SOWP) operator, has heard up at his 2000-foot

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altitude home in Sonora, California? When I told him about my echo-signal experiences, Jack reported that several weeks earlier he had heard interfering signals on his 3.555-MHz SOWP net CW transmissions while acting as a Net Control Station (NCS). No other stations heard the QRMing signals that he heard. With a little off-net-time testing, he found that he was getting LDEs of his own transmissions. They were not the fraction-of-a-second sound-echoes that I'd heard, but ones which were delayed from 1 to perhaps 7 seconds, depending on which night he made his test.

Then one night, while again acting as NCS, he was able to determine that he was hearing reflections of his own transmissions a couple of seconds after he sent them. They were strong enough to interfere with, and even prevent him from reading, some of the weaker answering net members! I could not hear the interfering echoing signals at my station about 150 miles to his northwest. All member-station signals sounded perfectly normal to me.

What could cause such a 1-second to 7-second delay? The moon is about 222,000 miles away. For signals to bounce off the moon and return would take about 444,000/186,000, or 2.4, seconds. However, that would be a constant echo time, not the varying 1- to 7-second times observed on different nights. Why couldn't I hear them, too?

How about the sun? It is roughly 93 million miles away. For a radio signal to reach the sun and be reflected from it, which is doubtful, or orbit it and return, which is more doubtful still, would require roughly twice 93 million miles, or 186,000,000/186,000, or 1000 seconds, about 17 minutes. Mars, Venus, and Mercury are no better, because they essentially are at a constant distance over any few days or even weeks. With only 100 watts into Jack's low, single-wire half-wave antenna, there is no way a reflection from any of our celestial bodies out there could be heard with any modern amateur HF receiver.

This has not been an isolated incident for Jack. There was one night when he sent three dots on 80 meters and listened for their echoes while holding a stop watch. That night it took 72 seconds—more than a minute—before his "S" came back to him! Thus, he tried it again and the time was the same. The commonly heard sound of signals undergoing QSB indicated that it was not some joker trying to play a trick on him by keying a low-power oscillator to mimic his transmissions.

Jack's crowning LDE action came on the night of October 11, 2001, when he was the NCS for the SOWP Thursday night net at 8 PM local time. He heard no LDE interference during his transmissions or while listening to member replies, so everything went quite well. However, after the net was over, while making out his log and after all other stations had signed out for the night, he suddenly heard a weak signal *signing W6WYW, sending his preliminary SOWP net information, and then all his calls to the net members.* The signals were quite weak and had quite a bit of QSB on them, but it was exactly what he had sent to all of the 30 or so stations who were called up and/or who answered him that night. He could not hear any echoes from answering stations, but except for some dropouts due to QSB, everything he had sent was coming back to him. This was something like 30 minutes after the original signals had been sent! My receiver was still turned on for quite a few minutes after the net, but I heard no echoes at my QTH 150 miles away.

The Big Question

The big question, then, is: What is causing these very long LDEs? How could these things happen? Does Jack's 2000-foot altitude have anything to do with his very long LDE receptions? We have tossed around possibilities of signals somehow following the magnetic

field or other fields that stretch out far behind the Earth on its dark side. However, there seems to be no reasonable answer there either.

How about an extraterrestrial space ship flying around out there somewhere that reflects Jack's signals? Unlikely for a variety of reasons. Ignoring the question of whether such things exist, if there were any such metallic space ships flying around in outer space, they would act as really great reflecting objects for all of our signals all of the time. I do wonder if some of our airplanes may be producing short-time LDEs of signals we cannot account for. An airplane that happens to be about a half-wavelength long should make a great reradiator of HF signals! (We know airplane scatter can be used on VHF and UHF.)

Can You Help?

How about other HF amateurs? Are you hearing LDEs, too? Have you ever sent short dots to try to hear LDEs? Did it work? If so, at what local times and on what frequencies did you hear them? Are they only at sunset and sunrise hours? What is the time period between a dot and its "echo"? Over how long a period are they audible? If they are different from those explained here, it would be interesting to know about them. Unfortunately, if you do not have a transceiver with very fast break-in operation, you probably will not be able to hear less-than-a-second around-the-world signals. Also, I find that I am more likely to hear LDEs by setting my receiver AGC to "fast" or off.

Does anyone have any reasonable explanation of what is causing Jack's very-long-delayed echoes? We would like to know. This is no April Fool's story. It's all true. Jack swears it is. He actually has a tape recording of those very weak and deeply fading LDE signals that night. He had heard LDEs the night before, so he bought a little tape recorder to record any others that might appear, and they did appear that next night. Whatever the explanation, it certainly is very weird! We look forward to hearing your ideas and experiences.

Notes

1. The Heaviside layers is another name for the parts of the ionosphere that bend radio signals back to Earth, most specifically the *E*-layer. Oliver Heaviside (1850–1925) was a self-taught British mathematician and physicist who predicted the existence of a conducting layer in the upper atmosphere in 1902. It is also sometimes referred to as the Kennelly-Heaviside layer, honoring American electrical engineer Arthur Kennelly, who independently came to the same conclusion as Heaviside at nearly the same time. The existence of the ionosphere was proved in 1923 with the reception of radio pulses that had been transmitted straight up into the sky.—*W2VU*

2 . I recall, many years ago, as a radio operator on a ship off India trying to make contact with San Francisco coastal stations, my fellow operators and I would often hear one signal coming to us from over the North Pole and a very short time later the same slightly more delayed signal coming to us from over the South Pole. Very confusing to try to copy!—*W6BNB*

About the Author

Bob Shrader, W6BNB, literally "wrote the book" on radio communication. He is the author of *Electronic Communications,* a standard reference for RF engineers everywhere and the basis for many amateur and commercial license exam questions. He is also a frequent contributor to *CQ.*

BY DAVE INGRAM,* K4TWJ

The Joys of Outdoor HF'n—Part II

Last month's column focused on mobiling and operating portable in the great outdoors and included a collection of tried-and-proven tips to help newcomers get started in the game. The column was fast moving and condensed, but it still overflowed available space. We thus continue this month with more views and notes we are sure you will find interesting even if your time for traditional automobile-on-road-mobiling is limited. In fact, HF'n outside the car—such as from some scenic outdoor site or famous landmark—is one of the hottest new trends going today. It is also a special pursuit everyone can get into easily and affordably. Before we delve into that, however, let's look at the closest thing we have seen to a Mini Cooper mobile and some new mini-mobile antennas.

Photo A– Small on size, big on DX! Jose Antonio Carretero Sevilla, EA1CVN, rocks the bands from the roadways and by-ways of Spain every weekend with this cool-going Peugeot mini mobile. The little four-cylinder beauty sports a Kenwood TS-50 with a multiband antenna and delivers maximum QSOs-per-gallon.

Cool-Going Mini Mobile

From across the Atlantic and the friendly back roads of Spain comes views of a trim and petite HF mobile guaranteed to steal the hearts of sports car enthusiasts everywhere (photo A). The setup belongs to Jose Antonio Carretero Sevilla, EA1CVN, and consists of a Kenwood TS-50 and Comet-type DX-UHV antenna mounted high up on a 1995 Peugeot 106 with a four-cylinder, 1.1 liter engine. Wimpy? No . . . sporty! Remember the hot little bug-eyed Sprite of the 1960s? It only had a .850 liter engine with two single-barrel carbs, and it ran great. A 1.1 liter engine is big by comparison. The little Peugeot averages over 35 miles to the gallon of petrol, which means it can zoom past almost every big SUV on the road—when they stop for another wallet-flattening tank full of fuel, that is. Further, the Peugeot is small enough to roll indoors and store in a hallway or spare bedroom during inclement weather, something you dare not do with a Hummer or Escalade!

Jose says a hectic lifestyle limits his hamming to mobiling during weekends, but he still works his fair share of DX—and more—with the setup. Sort of kindles your thoughts to think smaller rather than larger, doesn't it?

Trim 'Tennas

What would you say is the most often cited reason many amateurs go mobile on 2-meter FM rather than HF: rig cost, complexity of installation, or operation? Surprisingly, a fair number of folks cite the fumbles associated with tall antennas. Ah, but a simple and easy solution you can use exclusively or swap with a tall 'tenna is now available: the Iron Horse mini-antennas (photos B and C).

These little monoband gems are made in 75- through 10-meter versions and look like half-size ham sticks, with an approximate height of 43 inches for 75 or 40 meters and 31 inches for 20, 15, or 10 meters. When supported by a regular 3/8-24-thread trunk-lip mount, an Iron Horse antenna stands only a couple of inches above an automobile's regular AM/FM radio antenna. It is unobtrusive, and it radiates a reasonably good signal for its size. A half-size mobile antenna obviously cannot be expected to work as effectively as a full-size antenna. It is super-handy for casual use in confining situations, however, and it is easily interchanged with a tall 'tenna when traveling open roads. Iron Horse also produces a pack of five Quick Disconnects to complement their antennas. You just screw the short bayonet base piece into your mount and attach mating chrome sleeves to each antenna's base, and then changing bands is a 4-second push-turn cinch.

Like any over-enthusiastic radio amateur, I can never resist dinking with mobile antennas and try-

Photo B– Iron Horse's new half-size monoband HF antennas are ideal for low-profile mobiling with a regular trunk mount, and they are also handy for quick-mounting on hatchbacks of SUVs or Peugeots. (Details in text.)

*4941 Scenic View Drive, Birmingham, AL 35210
e-mail: <k4twj@cq-amateur-radio.com>

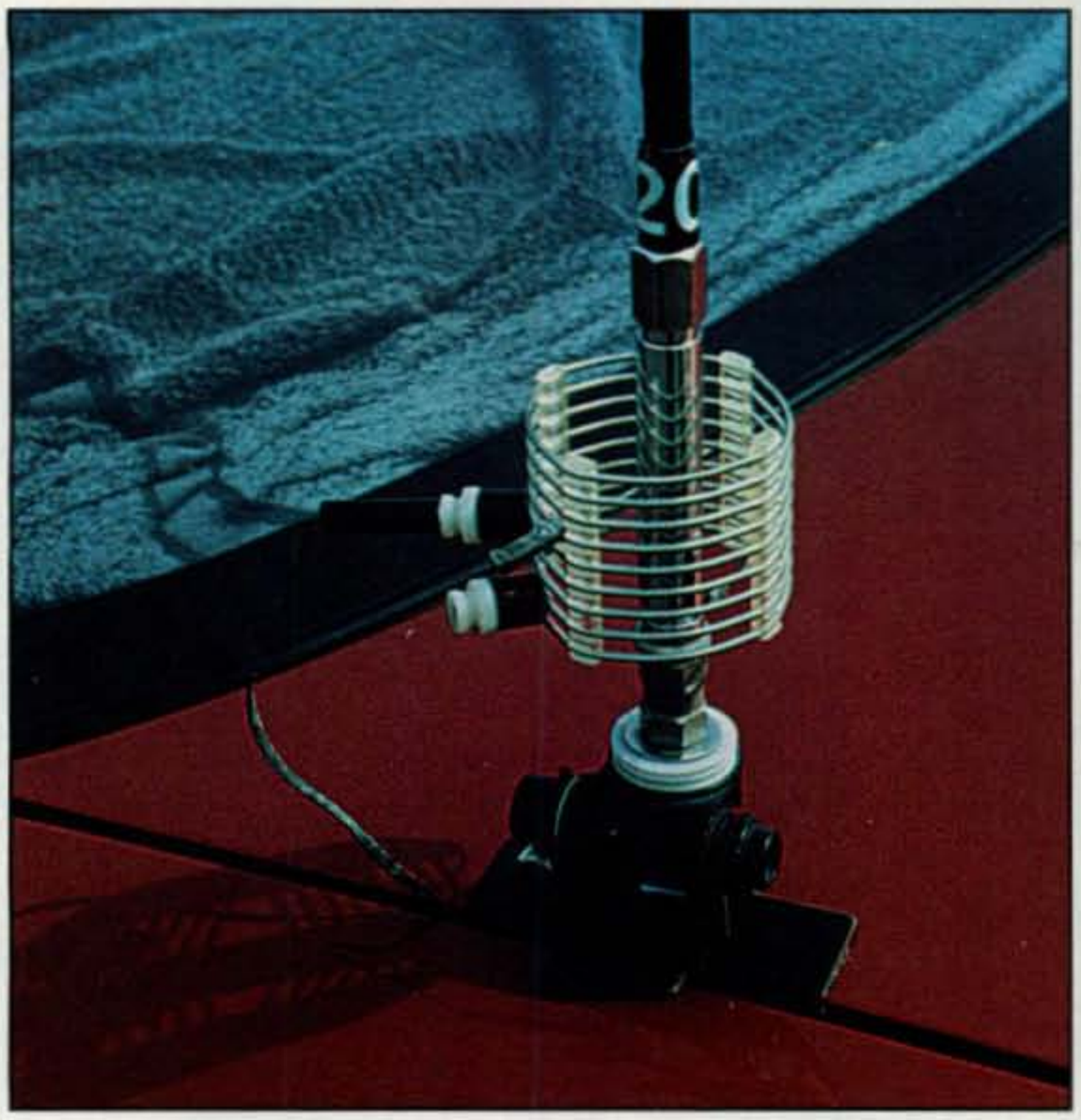

Photo C– Close-up view of the optional Iron Horse Quick Disconnect for easy band changing, plus the tapped base coil I added for impedance matching. (Discussion in text.)

ing to improve their performance (sound familiar?). Applying that K4TWJ philosophy to the Iron Horse mini antennas, I first added a base impedance matching coil as discussed in last month's column. Then I pursued my old trick of adding a tall top whip to a "one band up" mast to increase overall height and radiation ability. Briefly recapping, the base coil (for 30, 20, and 17 meters) is four turns of number 14 solid wire wound open-air style with $2^{1}/_{2}$ inch diameter. It connects between the bottom of the antenna (where it screws into the mount) and ground.

With respect to the tall whip/stinger mod, I used an MFJ-259 Antenna Analyzer and found a 37-inch whip mated with a 15-meter mast (and a base matching coil) worked 20 meters quite well. A couple of days later I reflected back and realized I was defeating the mini-antenna's main asset of a short, go-anywhere radiator and put it back to original length. I documented the mod idea, however, as it should be great (possibly with a small Bugcatcher-type capacity hat added) for working 60 meters with a 40-meter Iron Horse 'tenna. Again, an MFJ Antenna Analyzer makes retuning or modding a cinch.

Ready to go HF mobile with a low profile? Iron Horse mini antennas are a handy way to get started. They are available from amateur dealers nationwide, and more information is available from their manufacturer, ATOC Technologies, P.O. Box 36, Covington, OH 45318, or on the web: <www.atoctechnologies.com>.

Alcatraz Calling

During a recent business and weekend vacation trip to San Francisco, Mike Greenwood, KC4VG, seized the moment to try something different in HF'n—operating personal portable from Alcatraz (photo D). As you may know, Alcatraz is built on a large rock formation near the San Francisco Bay area. It is surrounded by deep water and nicknamed "The Rock."

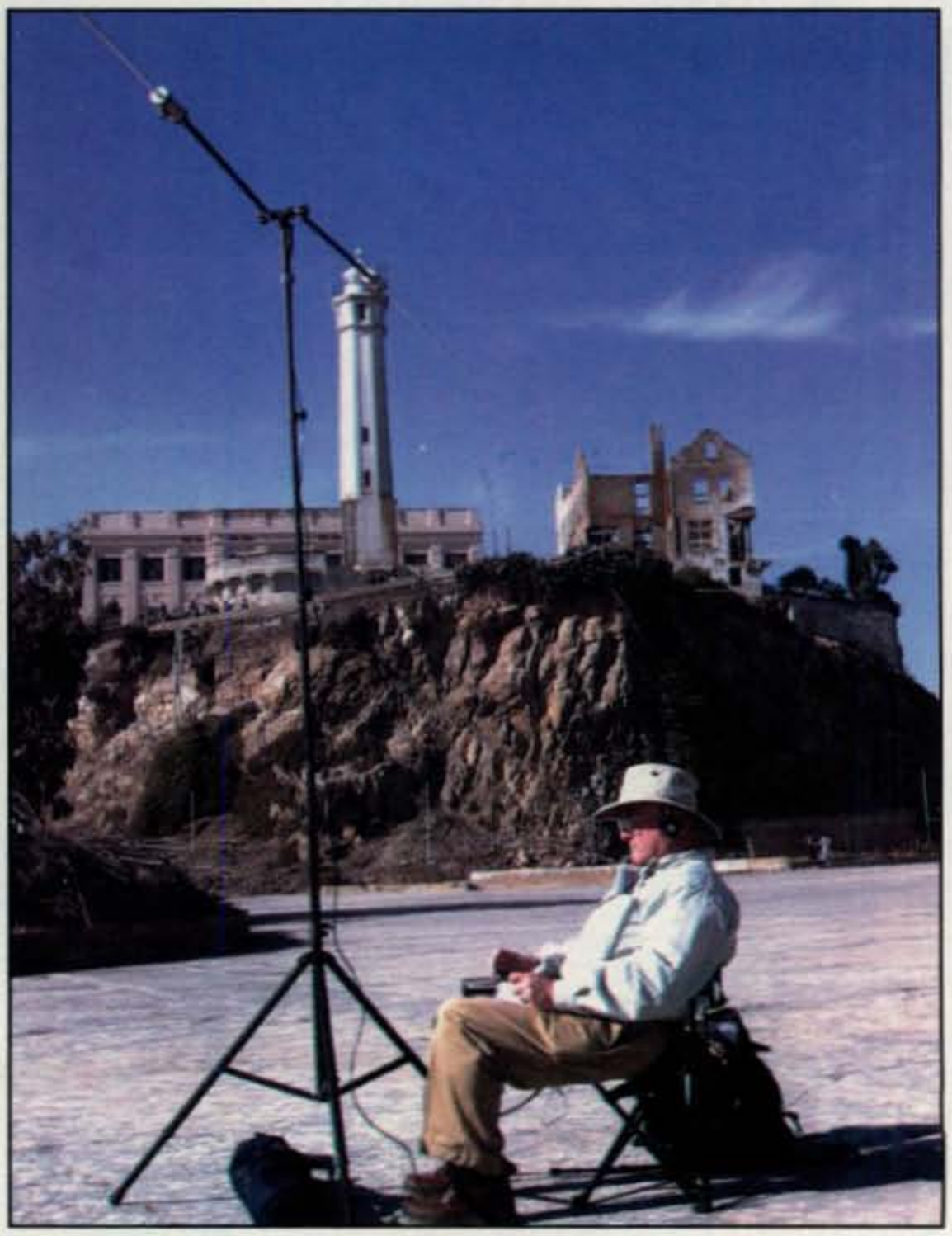

Photo D– Mobile without the car and working a pile-up to boot best describe Mike Greenwood, KC4VG's brief personal-portable or HF-Pack-type operation from Alcatraz. Mike used a Yaesu FT-817 with extra battery pack and Buddipole antenna (carried in travel bags) and enjoyed an afternoon filled with enjoyable QSOs (national security regs prohibit overnight stays on Alcatraz). (Photo courtesy Mike, KC4VG)

Photo E– Do you like mobiling—really big-time mobiling? The SS Lane Victory, *based in San Pedro, California, offers one-day fun cruises six times a year and its ham shack is open for operation by visiting radio amateurs. Listen for W6LV/MM on 20 meters SSB around 14.260–14.270 MHz between 1700 and 2200 UTC during July 17 or 18, August 14 or 15, and September 11 or 12 and join the adventure! (Photo courtesy Jan Michaelis, KE6CJM)*

Personal Portable: How To Do It

Does the idea of operating HF-Pack style capture your attention? That's understandable. It is a most entertaining pursuit, and the unique sites for brief operations are endless. What are the keys to success? Use a small, energy-efficient transceiver, a breakdown and easy-to-reassemble antenna, and carry one or two extra battery packs so you have plenty of "juice" to work the pile-ups with a decent signal (fig. 1). If you use a vertical (those collapsible and "pocketable" jobs are handy), visualize it like mobiling without the automobile. Stretch out a quarter wavelength of wide braid or shield removed from an old piece of coax cable to synthesize the vehicle's metal frame and act as a ground or counterpoise. If the counterpoise catches on obstacles or trips up people, opt for a mini-dipole. Either way, remember to periodically check the setup's SWR to ensure it does not rise excessively as you move around, and then enjoy your special time in the (radio) limelight!

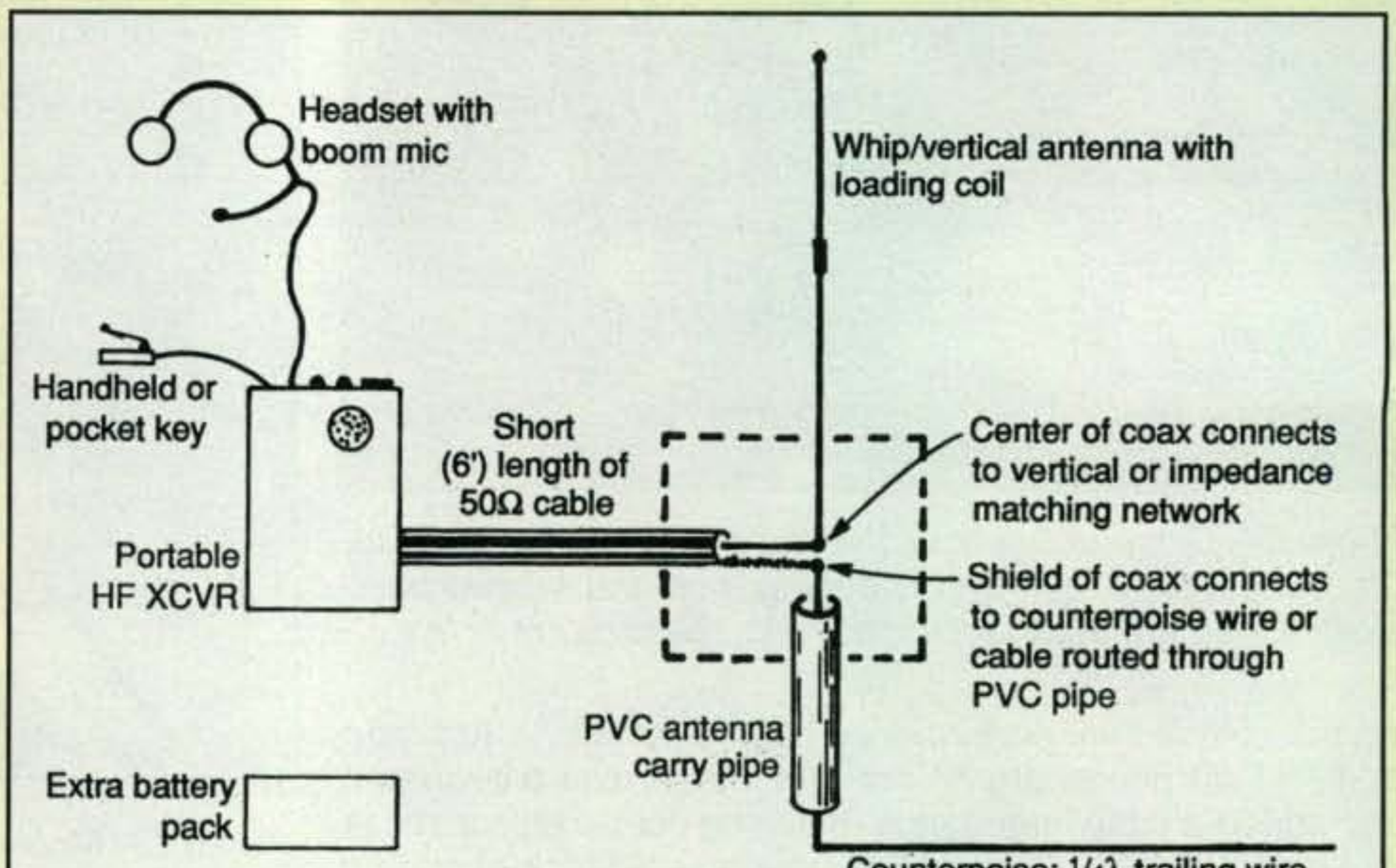

Fig.1– "How to do it" outline of a personal portable or HF-Pack-type setup. Including a quarter-wavelength counterpoise is very important when using a vertical antenna. Checking SWR often is also encouraged. (Details in text.)

For many years it was the U.S.'s foremost maximum-security prison and housed many hardened criminals, including the infamous Al Capone. Being distanced from the mainland and accessible only by boat, it was considered "inescapable." Some of America's Most Wanted managed to escape, however, and the prison eventually closed and soon fell into disrepair. Today it is a national landmark and tourist site handled by the National Park Service and operated as a limited-access park by the Golden Gate National Recreation Board. Tourists visit "The Rock" each day, although national security regulations prohibit overnight stays. Since San Francisco Bay is an enclosed body of water, Alcatraz does not qualify for IOTA (Islands On The Air) status. It does, however, qualify for the U.S. Islands program (number CA0055) and the Lighthouses On The Air awards.

Mike says his Alcatraz operation was short, but it produced enough good memories to last a lifetime. He used a Yaesu FT-817 and Buddipole antenna plus an extra battery pack in a knapsack which was also used to carry the transceiver. Most of his (limited) operating time was spent on 17 meters, around the HF Pack "handout" of 18.157.5 MHz, where low-power signals always have priority. Mike has several other special portable operations to his credit, including stints from the Marconi Wireless Station site on Cape Cod, a small island in the Bahamas, and while aboard a cruise ship in the Caribbean. Jolly good show, Mike. That's what we call enjoying amateur radio life!

Seaworthy Mobile

Like to be part of something different, unique, and really big in the world of HF mobiling? Climb aboard or tune in one of the *SS Lane Victory*'s single day-cruises scheduled for mid July, August, and September 2004 and 2005 (photos

Photo F– The SS Lane Victory*'s original and beautifully restored radio room has three transmitters, three receivers, and a classic L F Auto Alarm system. Classy! (Photo courtesy KE6CJM)*

Photo G– The SS Lane Victory*'s ham shack sports a romantic blend of classic Heath, Hammarlund, and Hallicrafters gear, with a Kenwood TS-940 included for present-day flair. Now that's mobiling in style! (Photo courtesy KE6CJM)*

E, F, and G). The *SS Lane Victory* is a 455-foot long, 10,000-ton Merchant Marine cargo ship that has been retired, revamped, and proclaimed a (floating) National Historical Landmark. It is harbored at Berth 94 in San Pedro, California (near Long Beach and LA), and it is open to visitors year round. Six times a year the *SS Lane Victory* embarks on one-day cruises around Los Angeles Harbor and Catalina Island, and guests with amateur radio licenses are invited to operate from the ship's ham shack as W6LV/MM. Yes, and what a fun cruise it is, with guided tours, great food, a Dixieland band, and a mock-up air attack and rescue to keep everyone entertained. Upcoming cruises are scheduled for July 17 or 18, August 14 or 15, and September 11 or 12, depending on weather (all cruises are on Saturday or Sunday). You can learn more about the cruises by contacting the *SS Lane Victory* staff at P.O. Box 629, San Pedro, CA 90733, telephone 310-519-9545 or via <www.lanevictory.org>. If you cannot join the cruise, listen for W6LV/MM on 20 meters SSB around 14.260 to 14.270 MHz and between 1700 and 2200 UTC during the aforementioned weekends to garner your own special QSO and QSL. It could easily prove to be one of the top special-event operations of the year.

The *SS Lane Victory,* incidentally, has an interesting history. It carried munitions in the South Pacific during the latter part of World War II, ferried troops and evacuated civilians during the Korean War, and also delivered goods during the Vietnam era. The ship has been featured in movies including *The Titanic, Jag, the X Files, Baywatch, Buffy the Vampire Slayer,* and more.

Our special thanks to Jan Michaelis, KE6CJM, for sharing details of the *SS Lane Victory* with us. Listen for the ship and join the adventure!

Conclusion

That winds down the views for now, but rest assured more new and exciting ideas and mobile-enhancing goodies are on tap for the months ahead. In fact, I am presently performance-testing a new antenna base impedance matching device that blows away traditional capacitor and/or coil units. Stay tuned and check <www.k4twj.com> for details as/when available, and keep on mobiling on HF!

73, Dave, K4TWJ

What You've Told Us...

Our April survey asked for your opinions on each major facet of the ARRL's proposal to essentially continue the license restructuring process that the FCC began four years ago. The response was overwhelming.

To start, 88% of you report being ARRL members, and 72% say the League represents your views on amateur radio issues most of the time. Now, going to the specifics, 58% of you favor creating a new no-code entry-level license with a limited mix of voice, code, and digital privileges on HF and VHF bands, while 36% disagree and 6% have no opinion. On the question of whether to eliminate the code requirement for General Class, 52% of you disagree while 44% agree and 3% have no opinion. Opinions are stronger on the Extra Class code requirement: 50% say keep it at 5 wpm (as ARRL proposes), while 35% say it should be increased and 13% think it should be eliminated (only 1% had no opinion). Also getting the thumbs-down was the proposal to merge Technicians (with and without code credit) into the General Class without additional testing (55% against, 42% in favor, 3% no opinion). On the other hand, 54% agree with upgrading Advanced Class hams into Extra Class without additional testing, while 40% disagree and 5% have no opinion.

The League's proposal to "refarm" current Novice CW subbands to expand phone bands on 80, 40, and 15 meters (the FCC has just proposed doing this, too), gets the OK from 57% of you, while 32% disagree and 10% have no opinion. Also getting approval from *CQ* readers is the ARRL proposal to limit "new Novice" power to 50 watts on 28 MHz and above, to avoid the need for RF safety questions on the entry-level license exam (54% agree, 36% disagree, 9% no opinion). Finally, half of you (50%) believe adoption of the ARRL's plan or something very similar will help ham radio in the long run, while 29% feel it will hurt the hobby long-term and 11% don't think it'll have much effect in either direction.

Our free subscription winner this month is M. Weber, WA2RZJ, of Lockport, NY.

Reader Survey
June 2004

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

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

This month and next, we continue asking nosy questions about hamfests and you.

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

1. When was the most recent hamfest you attended? (We know, we asked this last month; we're asking again)

Within the past 12 months 1
1–2 years ago 2
3–5 years ago 3
More than 5 years ago 4
Never been to a hamfest 5

2. What did you get when you made your most recent hamfest purchase? (Circle all that apply)

New transceiver for home use 6
New transceiver for mobile use 7
New handheld transceiver 8
New antenna 9
New accessory 10
Used transceiver for home use 11
Used transceiver for mobile use 12
Used handheld transceiver 13
Used antenna 14
Used accessory 15
Books/magazines/CDs/Videos 16
Other 17
No hamfest purchases 18

3. How did you make your most recent purchase of ham equipment?

From a dealer...
- ... at a hamfest 19
- ... at a store 20
- ... by phone or mail order 21
- ... online 22

From another ham...
- ... at a hamfest 23
- ... in person (not at a hamfest) 24
- ... via a magazine or newsletter classified ad 25
- ... via an online classified ad 26
- ... via an online auction site (e.g., eBay) 27
- ... via on-air swap shop 28

Other 29
No recent purchases 30
Don't own any ham gear 31

4. If you have *not* been to a hamfest in the past three years (or have never been to a hamfest), why not?

Get better deals online 32
No hamfests near me 33
Not enough new gear 34
Not enough used gear 35
Not enough free time 36
Not enough interest 37
Other 38
Don't know 39
I have attended a hamfest in the past three years 40

Thank you for your responses. We'll be back next month with a new topic.

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DJ-196T 2 Meter HT

This rugged VHF HT is built for heavy use and keeps coming back for more. Put the power of 5 watts and 40 memories to work for you. The large alphanumeric display makes it easy to manage and the full-size backlit keypad makes field operations easy, with direct frequency input and clearly marked secondary functions. Nothing's held back, with autodial memories, DCS, CTCSS encode+decode, and even a built-in theft alarm!

DJ-296T 222 MHz HT

Finally! A 222 MHz HT that's affordable and built Alinco-tough. If you're not on 222, you're missing a band that's open for action. An amazing 160 memories allows you to store frequencies over a broad service area. This full-power HT sports a Ni-MH battery, external power port, high performance antenna, CTCSS encode+decode, DCS, autodial and more. Are you only using part of your privileges? Alinco can help you get on 222 MHz today!

DJ-496T UHF HT

From 430 to 450 MHz, your DJ-496T opens the door to amazing possibilities, from basic voice communications to controlling repeaters, remote bases, working through cross-band transceivers and more. The 40 memories come up on a large, alphanumeric display and the high capacity Ni-MH battery provides long-lasting power. CTCSS encode+decode, DCS, cable cloning and a host of optional accessories to suit your particular operating needs.

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washington readout

BY FREDERICK O. MAIA,* W5YI

FCC Accepts Three Petitions Seeking Amateur Radio Restructuring

In late March the FCC circulated a Public Notice seeking initial comment on three Petitions for Rulemaking that request major changes to the Amateur Service licensing structure.

We covered one of the Petitions, from the American Radio Relay League (ARRL), in our April column. The other two were submitted by the National Conference of Volunteer Examiner Coordinators (NCVEC) and a little known "grassroots" organization that calls itself the Radio Amateur Foundation (RAF). The three petitions join 15 others that were filed since the end of the 2003 World Radiocommunication Conference held in Geneva last summer.

WRC-2003 adopted a package of revisions to the international Radio Regulations that are specific to the amateur services. Among them was a revised Article 25, the basic international law applying to the Amateur Service. The new Article 25 went into effect on July 5, 2003.

The most dramatic change was an end to the requirement that radio amateurs prove their ability to manually send and receive Morse code signals when operating on the high-frequency bands. The new regulation now leaves it up to the individual countries to determine whether or not a person must be Morse proficient. The bottom line is that Morse code is no longer an internationally required qualification. That set off a wave of changes around the world as one by one, countries eliminated the requirement. Many countries simply abolished the requirement without a lot of legal maneuvering.

However, it is not easy to do that in the United States. Our governmental system requires that the public be involved when changing federal agency regulations. Rulemaking in the United States is governed by the Administrative Procedures Act of 1969, which requires an agency to notify the public of planned policy changes. Citizens are then given a chance to voice their opinions of the new rules, and by law, their input must be considered by the agency.

It is a lengthy process and rule changes in the Amateur Service historically have taken about two years to go from origination to enactment ("Report and Order"). Regulatory changes may be initiated by the government in the form of a *Notice of Inquiry* (a NOI seeks information) or a *Notice of Proposed Rulemaking* (NPRM), which states the proposed new rule. The public may request a change by filing a *Petition for Rulemaking*. If the petition has merit, then the agency issues a *Public Notice* acknowledging the document. The public then has 30 days to comment on whether the agency should go forward with the rulemaking. That is the stage at which we are right now.

*Chairman, NCVEC Rules Committee
Member, Question Pool Committee
1020 Byron Lane, Arlington, TX 76012
e-mail: <w5yi@cq-amateur-radio.com>

The Three Petitions

The ARRL petition, assigned rulemaking file number RM-10867, asks the FCC to create a new entry-level "Novice" license class which offers limited HF CW/ data and phone/image privileges on the 80, 40, 15, and 10 meter bands, plus all VHF/UHF ham bands to 70 cm (450 MHz).

The League plan also would roll all Technician, Tech Plus (Technician with Element 1 credit), and General licensees into a new General license which no longer would require a Morse code examination. The ARRL envisions that more than 300,000 current Technicians automatically would gain General class privileges, and some 80,000 Advanced class licensees would automatically be upgraded to Extra class. Neither would be required to be tested further.

The ARRL plan still calls for Amateur Extra applicants to pass a 5-wpm Morse code examination. The General and Extra written exams would stay the same. Existing Novices would migrate into the "new" Novice entry-level class.

The ARRL included in its petition all of the elements of its 2002 HF "Novice refarming" petition (RM-10413), which proposes to eliminate the Novice and Tech-Plus telegraphy subbands and reassign the freed up HF spectrum to General and Extra class licensees.

RM-10868, filed by the Radio Amateur Foundation (RAF), wants the Technician license modified to allow restricted HF phone, data, image, and CW privileges. The group (which no one seems to have heard of) also requests that the 5-wpm Morse code test be retained for the General and Amateur Extra class. All existing Novices would be automatically upgraded to Technician; all Advanced to Amateur Extra without further examination. The licensing requirement for the General and Extra class would remain the same.

The RAF also wants to have all existing Amateur Radio question pools redone and kept secret. Applicants could only be retested after a 10-day waiting period. In addition, it would permit only Generals and Extras, or Technicians licensed more than two years, to request vanity callsigns.

The petition filed by the National Conference of Volunteer Examiner Coordinators (NCVEC) and assigned RM-10870 also asks the FCC to establish a new entry-level license which it wants called the Communicator class. NCVEC also left in place its July 2003 petition (RM-10787) calling for the elimination of all Morse code testing.

The NCVEC's petition is similar to the ARRL proposal in that it would upgrade all current Novices

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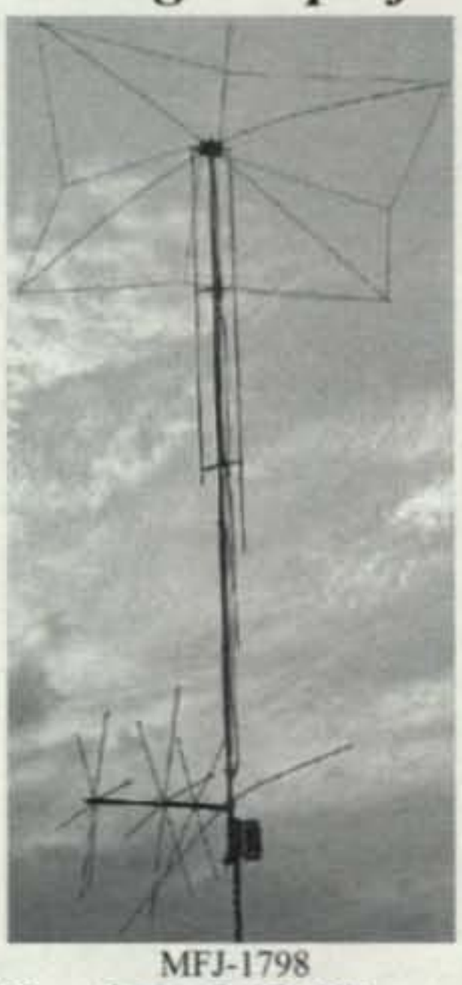

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to the new entry-level "Communicator" class, current Technician and Tech Plus (Technician with Element 1 credit) licensees to General, and all Advanced class licensees to Amateur Extra without further testing.

The new Communicator ticket would permit a power limit of 100 watts on bands below 24 MHz and 50 watts on all frequencies above 24 MHz. Communicator licensees would have to use commercially manufactured equipment (or gear built from a commercial kit). They could operate both voice and digital modes on 80, 40, 15, and 10 meters plus VHF and UHF up to 70 cm. Communicator class licensees would not be allowed to install repeater or remote base stations, be volunteer examiners, or establish club stations.

Under the NCVEC proposal, Communicator class licensees would have to pass a simple 20-question multiple-choice written exam and would be required to obtain, read, and certify their understanding of the Part 97 rules. The VECs' Question Pool Committee feels that it is impossible to cover the FCC rules in what would be a relatively few questions. The ARRL proposed 25 examination questions for its proposed entry-level Novice license.

While all three license restructuring plans call for changes to the present HF subbands, the NCVEC proposal seeks wider voice subbands and fewer exclusive CW/digital frequencies. The VECs proposed an additional 50 kHz of 80-meter voice spectrum over the ARRL proposal and 25 kHz more 40-meter voice spectrum for both the General and Extra class. At 15 meters, the General class would get an additional 75 kHz of voice spectrum over ARRL proposal; Extra class, an additional 50 kHz.

The NCVEC proposal also places more emphasis on the use of 15 and 10 meters for entry-level voice operation than does the ARRL. For example, the VECs proposed 700 kHz more 10-meter voice spectrum than did the ARRL. The VECs also suggested that Communicator class callsigns might come from the authorized but unallocated NA1AAA through NXØZZZ callsign block.

Comments Are Rolling In!

The three petitions may be viewed in their entirety on the FCC's online Electronic Comment Filing System (ECFS) located on the web at <www.fcc.gov/e-file/ ecfs.html>. When entering the RM number in the ECFS "Proceeding" field, RM must be in capital letters and the hyphen must be included. The petition itself will be the last one in the comment list.

At this writing, over a thousand comments have been filed. We have digested a wide range of the initial comments, many of which were filed verbatim on all three petitions. Here are some samples, which we quote verbatim:

If things are so bad that only code will get through, there are people that like code and they will be there to do it. But to require it for everybody is like requiring every American to learn smoke signals. Allow code, yes. Encourage code, yes. Require code, don't be foolish. The next major breakthrough in communications is out there. Don't shun it's development by running off the person that will bring it to the world. *...Ron Julian, NØOEF, Aguilar, CO*

I approve of the RAF proposal to create new questions for the amateur radio license exams and keep them out of the public domain. The current system of drawing from a published question bank encourages memorization of answers rather than learning the material. I also approve of a waiting period before retesting. *...Timothy H. Heaton, N7VU, Vermillion, SD*

The National Council (sic) of Volunteer Examiner Coordinators (NCVEC) have taken a more realistic look at both the present and

near future in United States Amateur Radio, not only in their viewpoint on International Morse Code examination testing but the interrelationship of Amateur regulations. ...I think the NCVEC petition in general is the best choice and applaud an almost radical approach towards future changes. It is for modernization, not maintenance of a living museum of old radio skills. It would seem the VEC are in the best position to know and experience, to "feel the pulse" of present-day radio amateurs of all classes, than those groups who have long adhered to more specialized and traditional activities within U.S. Amateur Radio. ...*Leonard H. Anderson, Sun Valley, California (Life Member, IEEE)*

The Technician class should not be automatically upgraded to the General class. It should be moved into the new Communicator class. ...*Joe M. Word, N9VX, Connersville, IN*

It would be a serious loss to prevent the beginner from building his own ham radio station. In addition, such a prohibition would communicate to the newcomers that ham radio is not a technical activity. Instead it indicates that hams are just users of equipment and not the builders of equipment. This is not the message that the Commission wants to send to amateur radio. The Commission should establish rules for Communicator Class amateur radio operators that do not prevent them from building their own amateur radio transmitters. ...*Nickolaus E. Leggett, N3NL, Reston, VA*

I feel that the telegraphy requirement for an Amateur Radio license is an insurmountable obstacle for many people who are otherwise qualified and needed in the Amateur Radio ranks. ...I passed the 13-wpm telegraphy exam only because I had to in order to upgrade my license class. If any one of us could have gained Amateur Radio privileges without it, we all would have done so. I do not feel that any person should be forced to demonstrate an ability, in any particular mode of operation, in order to obtain an Amateur Radio License of any class. ...*Phil Parrish, W4AIN, Magnolia, KY*

Along with the 20 meter amateur band, both 40 and 80 meter phone segments could be considered premium space, and access to these segments is one of the fundamental incentives for the radio amateur to upgrade to a higher class license. These segments should be the factor that motivates amateurs to take on the task of self-training, and upgrading to the General Class license. The Element 1 Morse telegraphy requirement should be retained for both the General and Amateur Extra Class license. ...*Earl Paazig, N8KBR, Frazeysburg, OH*

I think we need to keep 5 WPM Element 1 testing for Amateur General and above license. The entry level to amateur radio should not have to pass Element 1. I also think that entry level licensees should have a small portion of HF privileges in all bands, including 80, 40, 20, 15 and 10 meters. I also think that the question pool for General and up should be removed from public view. ...*Dan Harriman, KC5GXL, Orange, TX*

I strongly support the restructuring and licensing requirement changes proposed by the NCVEC. The new Communicator entry level license with limited power and HF privileges should serve to spark greater interest in the amateur radio hobby. Eliminating the Element 1 (Morse code) requirement from licensing should also serve to increase the number of licensees who have demonstrated an advanced level of knowledge of radio communications technology by removing an unnecessary roadblock. ...*Rodney Mark Jones, N5RMJ, Baltimore, MD 21214*

I submit that the RAF's proposal does nothing for the public good. Rather, it is intended to retard the purposes of the hobby and licensing of amateur radio operators. ...*Edward A. Cienki, Esq., N2EAC, Hammonton, NJ*

I believe the NCVEC plan makes the most sense of all. Morse code, though useful in its time, has gone the way of the stagecoach. We are using much faster and more efficient modes of travel and communication now. That doesn't mean my neighbor can't build and use a Model T if that's his desire. ...*Bart Hamilton, KD7VLC, Boise, ID*

I totally oppose any form of "grandfathering" (automatic upgrading). It's an insult to all of us that have earned our ticket! ... *Frank S. Mayer, WY3D, Elmer, NJ*

I believe that the Morse Code requirement should be eliminated for all licenses. With

the advent of computer-aided code conversions, this is an unnecessary roadblock for many people wanting to participate in the amateur radio networks. If someone wants to use code, that should be their choice but not a requirement for use of any band. If code is required on a band, computer-aided transcription should be acceptable. ...*Barbara Jackson, KI4CFR, Sarasota, FL*

I think the ARRL (RM-10867) and NCVEC (RM-10870) make the most sense in terms of 3 classes of licenses, revised spectrum and power levels. These proposals differ in detail but express a common theme of direction to travel in the ultimate decision the FCC could make (just eliminate Element 1 from RM-10867). ...I believe that the power levels should be reduced to 100W for General and 50W for Novice everywhere and leave the 1500W for Amateur Extra. ...RM-10870 makes an excellent point of restricting "Communicator" (I prefer Novice) operators to commercial equipment or commercial kits, and should be included in any decision the FCC makes. ...*Richard Faust, K9IVB, Sun City, AZ*

The Morse code requirement should be maintained for numerous reasons. The 5-words per minute is not unreasonable to ask for the privileges to operate Amateur Radio. Amateur radio without Morse is nothing more than Citizen Band. Lets keep our operating skills. ...*Phyllis L. Singer, KA7JCT, Howard, CO*

With my computer I can send and receive code without actually being able to "copy" it by hand. I have a neurologic problem that makes the code nearly impossible to use, but there is no waiver process in place. I have passed the written portion of the General class test, but because I cannot do the code, I cannot advance. ...*David Fields, KD7TTI, Hobart, WA*

The ARRL proposal wishes to grandfather all current Technician licensees to the General Class license without further testing or evaluation. This would place these individuals in the mainstream of ham radio on the HF frequency allocations where they have had little if any experience or skill in HF procedures and theory. I am opposed to any plan that supports such an action. ...*Robert Raymond, W7RJR, Spokane, WA*

We need an entry-level license class that will attract and reward those who wish to use current computer-based communication modes. This license must also encourage the motivated, knowledgeable computer user or computer professional who is already sophisticated in digital communication over wire services as well as wireless networks to enter our avocation. ...An entry-level class for Amateur Radio should not relegate its holders to a lonely underutilized radio subculture. It must give a number of lanes of a multi-lane highway. ...*John F. Wasciuk, WA8TON, Grand Rapids, MI*

The commission should drop all CW testing requirements for any Amateur Radio Service license. Morse code has a long and distinguished history in Amateur Radio, but technology is an ever-evolving entity. The original purposes for CW testing are no longer required from an operational or regulatory standpoint. ...Sending a message at five words per minute is excruciatingly slow means to convey a meaningful message and is hardly demonstration of proficiency in Morse code. ...The new entry-level license should have a title that precludes any confusion with the existing or previous license classes. It should not be called Novice, the potential for confusion with two licenses have the same name yet different privileges are obvious. Particularly if existing Novices are not automatically converted to the new entry-level license. I recommend Communicator; it is different and has never been used before. ...*Curtis Robison, KC8PUY, Tiffin, OH*

The purpose of the amateur service, in my opinion, is not to have as many licensees as possible, but to have those that are dedicated enough to work hard and do the study required to join the ranks. Generally, this hard work promotes a well-behaved group. If these rule making proposals become reality, then there is only one step to follow after it, and that is just to issue a license to anyone that can fill the form out. During my decades of operation, I have seen a general decrease in the ability and quality of operators on the air. ...*Donald Clouse, W8PEE, Tucson, AZ*

The only differences between the [entry level] Novice license and the higher license

classes is in the frequency allocations allotted, the power levels permitted, and in the operation of repeaters or satellite stations. How a 25 question written element can adequately examine the applicant for proper station operation on every permitted emission type is a mystery. In the past, a 25 question written element was used to examine the Novice applicant for privileges that were limited to CW on HF, and, earlier, VHF phone. ...I feel that the ARRL has prepared a very poorly thought out petition for rulemaking. *...Scott A. McMullen, NJØE, Dripping Springs, TX*

Morse code has passed its usefulness as a gateway element in the Amateur Radio licensing process. It does not assure higher quality operators, evidenced by the number of "problem" amateurs of higher license classes. It blocks entry of potentially valuable members of our service. And its elimination for the Technician Class license in 1991 did not flood the service with poorly trained and badly motivated hams. I have met many new no-code amateurs who have been a tremendous asset, and who waited for the advent of the no-code license to become licensed hams. *...Gary Pearce, KN4AQ, Cary, NC*

I doubt I could pass the code due to my having a hearing deficiency in which it is hard for me to distinguish tones. With this limitation, I must ask if it is justified to continue to maintain archaic rules that prevent myself from advancing and enjoying operation on other spectrum? *...Bruce R. Wozniak, KC8VHR, Alpena, MI*

While I believe that Morse code is an archaic means of communication, I in no way believe that it should be totally eliminated from amateur radio. The Morse code requirement should be retained for the Amateur Extra class of license but at a rate of 5 words a minute, by doing this we will retain a vital link to where radio came from as we progress into the future. *...Richard B. Stillman, KE4CXP, Gloucester, VA*

As the international treaty Morse code requirement is passé, the Americans with Disabilities Act (ADA) comes into play [and] the whole issue of "reasonable accommodation" for a disability becomes an issue. I have already had individuals at testing sessions seek a waiver to the existing Morse code requirements due to the change in the international treaty. If Morse code is retained, the commission will have to adopt procedures to deal with waiver requests. This was a torturous undertaking for the 13 WPM and 20 WPM tests prior to April 15, 2000. This topic consumed more time than any other subject in FCC/VEC/VE communications. It will be equally torturous and consume as much of the Commission's time for a 5 WPM test whose only apparent function is to demonstrate proficiency for a signal communications mode with an old and honorable history. *...Scott Neustadter, W4WW, Huntsville, AL*

How many times in the past 20 years has Morse code been the sole mode of transmission and reception in times of emergency? How many times in the past 20 years have amateurs either used or heard an SOS call? How many amateur radio emergency nets on high frequency (HF) use single sideband voice as the preferred mode of communication in times of emergency? The Commission should seriously consider those questions in making its determination about the continued use of Element 1. ...The Commission should also seriously consider requiring amateur radio operators of all classes at the time of license renewal to take and pass updated written tests. This would require licensees to undertake a form of "continuing education" to keep up with changes to Amateur Radio Service rules and electronic theory. *...Clay Redden, KC4YAU, Prattville, AL*

I feel most strongly that the entry level no-code license class should have the ability to experience the use of SSB phone on the HF bands. However, I also feel very strongly that we must retain the Morse Code requirement. It has always been the most reliable form of radio communication during an emergency, and should also be used as a measure of achievement and reward for those Amateurs that are willing to give the time and effort needed to become more proficient communicators. *...William G. Smith, KCØGSB, Bellevue, NE*

I cannot see any good reason to continue any type of Morse code testing as a require-

ment for any class of amateur radio license. From an emergency operations perspective, there is no reason to exclude an otherwise fully qualified operator from operating voice or other non-CW modes on certain frequencies simply because they choose not to waste their time learning a skill they have no intention of using. ...*Michael Nie, KB8VMX, Cincinnati, OH*

First, I am strongly opposed to the automatic "grandfathering" of Technician class licensees (with or without Morse Code) to General class. This is too significant a jump in privileges for such a maneuver. Today's Technician-class and yesterday's Novice class licenses were the entry points to the Amateur Radio Service. So it should continue with the proposed new Novice-class. Those who hold current Technician and Technician with Morse licenses would still gain HF telephony privileges under the new proposed Novice-class license. Thus there is no purpose to upgrading even further to what is logically the next step for entry level licensees. ...*Peter Dougherty, W2IRT, Maspeth, NY*

Men who fear death will do almost anything to avoid it. Likewise, our organizations will do nearly anything to survive when threatened. The ARRL, along with others, believes that CW discourages new people from entering the hobby and therefore it must be eliminated. ...The no-code license did not result in increased digital technology, packet radio development, or Internet hybrid networks. Instead, it opened two meters to a large influx of former Citizens Band operators, who had been kept out of Amateur Radio by the code test. While most of these individuals have become good operators and have contributed much in the way of activity and public service, the fact remains that measured by its basic goals, the no-code license is a failure. ...*Jim Brown, NJ3B, Beaver, PA*

Times change. Let's let amateur radio in the US change with them. Progress is always painful for some of us, but greatly beneficial for most. I ask you to adopt the ARRL proposal, either keeping the 5 wpm mandate for Extra as proposed, or by eliminating the code requirement entirely, but by carrying out the ARRL license restructuring and "refarming" proposals. Whichever course you choose with regard to the telegraphy requirement, the code will not go away; it is much too popular, even among the hams of those nations which have "banished" it. It will continue in use, both by hand and by keyboard. ...*Albert Schramm, W3MIV, Ellicott City, MD*

Any time that you lower standards, it results in a new class of people that never had to work for their license. The value of their license, to them is not the same as someone that studied and accomplished a passing grade. When a person works hard for something, that person will safeguard their achievement. ...I will also submit that the ARRL has a vested interest in this and is not a true advocate to the amateur radio operator. The ARRL is a direct recipient of membership dues and stands to gain a significant windfall if these prospective new "hams" join the ARRL. ...*Paul L. McCord, Jr., K5GLH, Del City, OK*

Ham radio is dying of "old age." Go to any hamfest and do a rough estimate of the average age of all the hams at the event. There are very few young people at any hamfest. I estimate the average age of hams at around "baby boomer" age ...about 60 years old. Young people have stopped coming into the hobby. Morse code is dead. All the nostalgia in the world will not revive Morse Code ...or riding in carriages towed by horses or gas lamps in the living room. ...*Mark Morgan, WW9Z, Kingsland, GA*

As you can see, a wide range of views is represented in these comments, as well as wide variety in perceptions of "facts" about hams and ham radio today. Once the comment period and reply period are over, the FCC's job will be to sift through the 18 petitions (19, including the ARRL's initial "refarming" proposal) and the thousands of preliminary comments received, and try to find a middle ground that would become the basis for a Notice of Proposed Rulemaking, or NPRM. Another comment and reply period would follow, and then a decision would be made, most likely sometime in late 2005 or early 2006. Stay tuned...

73, Fred, W5YI

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math's notes

BY IRWIN MATH,* WA2NDM

The Reflex Receiver

When one looks at techniques and developments from the past, one cannot help but marvel at the ingenuity of the many experimenters in the "old days." This statement rang true during our "nostalgia" research for the April 2004 column, and the mail was plentiful, as it always is when we revisit the past.

At any rate, when looking through some old notebooks while doing the research (you can't believe what I have saved), we came across an interesting circuit that we would like to make you aware of this month. It is one with which we had personal experience. It is quite clever and really works well.

The circuit is for the so-called *reflex receiver.* Developed in the days when vacuum tubes were expensive, and then resurrected when transistors first came on the market (and were also expensive), this circuit makes a single stage do the job of two separate stages. There is no doubt that the principle is still valid, and perhaps this discussion will "spark" some readers' interest in getting back to homebrewing, particularly at frequencies where specialized transistors and components are still expensive.

The complete circuit is shown in fig. 1 and, as originally intended, was used for the AM broadcast band, although there is absolutely no reason why

*c/o CQ magazine

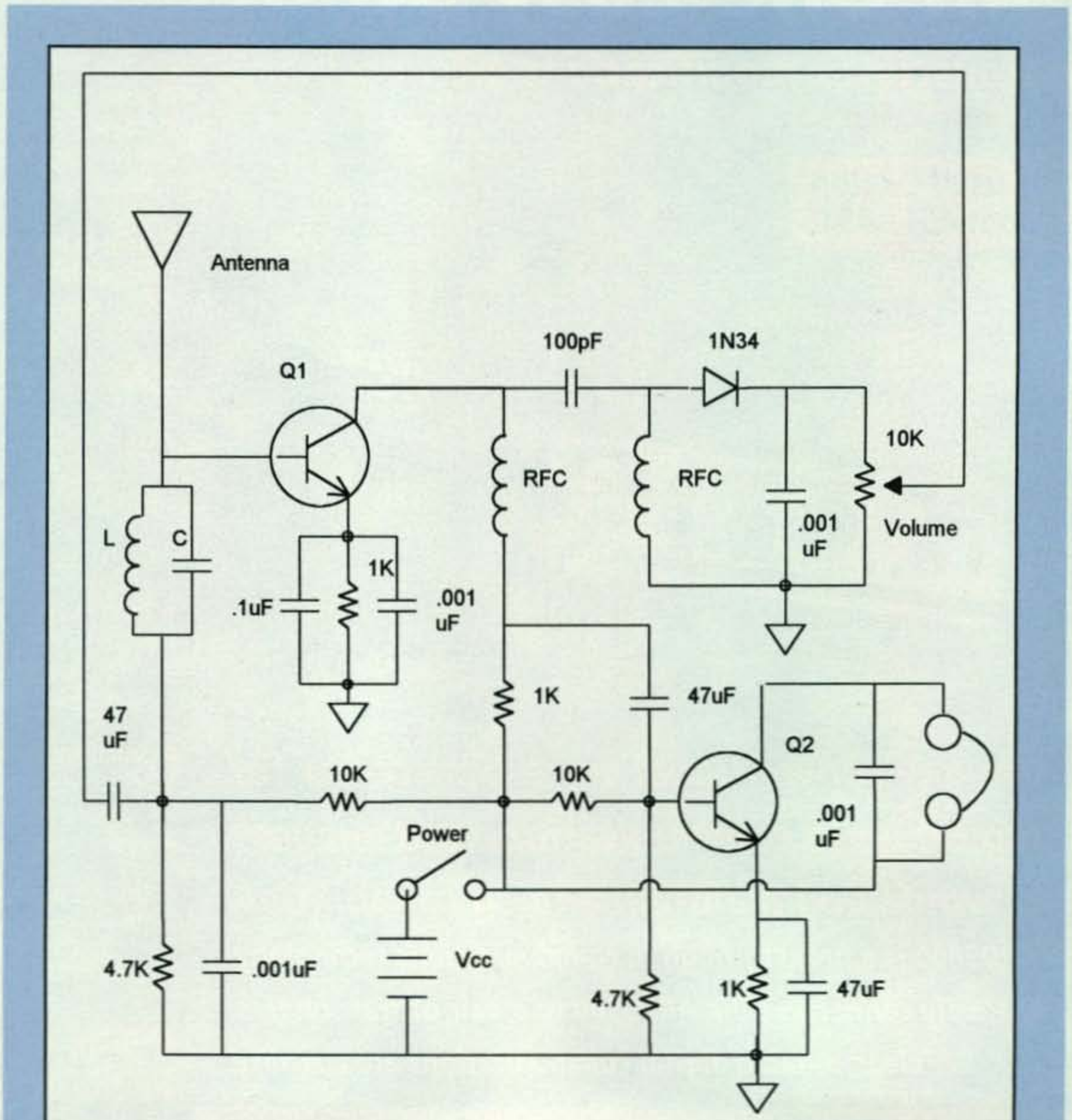

Fig. 1– The reflex receiver.

it would not work at higher frequencies well into the microwave region. Signals received by the antenna are first amplified by Q1, which at RF frequencies acts as a normal RF amplifier. Bias for Q1 is provided by the 10K and 4.7K resistors at the bottom of the tuned circuit and the bypassed 1K emitter resistor. You will note that the value of .001 µF provides a low impedance at these frequencies.

The RF choke in the collector circuit serves two purposes. First, at RF it provides a high-impedance load for the transistor. The amplified RF is then passed through the 100-pF capacitor and detected by the 1N34 diode. The .001-µF capacitor at the cathode of the diode assures that any remaining RF is shunted to ground. The resulting audio is then applied across the 10K volume control and fed back to Q1 via a 47-µF coupling capacitor. At this point, the .001-µF bypass capacitor across the 4.7K resistor (which previously shunted RF to ground) has no effect on the much lower frequency audio. The audio also easily passes through the inductor in the tuned circuit (which also has no effect at audio frequencies other than presenting a low impedance) to Q1 again.

Now Q1 becomes an audio amplifier. You will note the 47-µF bypass capacitor at its emitter, which assures proper audio amplification. Now the RF choke in the collector which previously provided a high impedance for RF simply acts as a low impedance, and the 1K resistor becomes the primary collector load. Audio across this resistor is applied to Q2, a standard audio amplifier stage, where it is amplified and used to drive earphones or even a small speaker. RF, which is present while Q1 is amplifying RF, is blocked from the audio stage by the RF choke as well.

When we first built this circuit many years ago, local stations could easily be received and would even drive a small speaker through a common 1000/8-ohm step-down transformer.

When one considers that Q1 easily operates at two different frequencies at the same time without interference, one could possibly extrapolate this principle and apply it to other groups of frequencies to save stages. As long as the differences are great enough to allow filters to separate the ranges, there is no reason why this principle cannot be used extensively. One even wonders if it can be extended to replace three or more individual stages. Your comments and the results of your experiments are invited.

73, Irwin, WA2NDM

public service

BY BOB JOSUWEIT,* WA3PZO

Public Service in the Name of Science

Public service and emergency communications don't always have to involve mass destruction, possible injuries, or the failure of normal communications. This month we take a look at amateur radio public service in the name of science.

The Wellsville Wave Project

In March and April of this year, members of the Bridgerland Amateur Radio Club teamed up with Utah State University's Physics Department, the Cache Valley Soaring Association, the National Weather Service, local middle and junior high schools, and others to conduct atmospheric-wave experiments in the high-mountain Cache Valley of northern Utah and southern Idaho. This informal team of volunteer scientists, engineers, students, and teachers hoped to learn if atmospheric standing waves that frequently form over the Wellsville Mountains in wintertime can travel upward to become atmospheric gravity waves that circle the Earth 60 miles above its surface. They used a collection of weather stations, radiosonde balloons, gliders, personal computers, radios, lidars, radars, infrared all-sky cameras, and fireworks blasts to conduct their initial pair of synchronized experiments on March 15 and 17, 2004.

According to Project Director Gil Moore, N7YTK, the intent of the experiment was to study standing waves that form when strong winds come out of the west and hit the base of the mountains. As the wind travels over the tops of the mountains, the air gets colder and the moisture in the air condenses, forming *lenticularis* clouds. "These are lens-shaped clouds that look like ocean waves," said Moore. "They seem to be standing still, when in fact the wind is rushing through them and down the east face of the mountains into the valley air mass." Scientists hope to learn whether these waves can resonate with the valley air mass and travel upward to produce atmospheric gravity waves in the mesosphere and lower ionosphere that can be observed only with special infrared cameras and radar. As part of a global weather study, scientists want to discover what conditions cause the atmospheric gravity waves to form.

What are Gravity Waves?

While many of us may not be familiar with the term *gravity waves*, most of us have seen them. If you have ever seen a motor boat go by, you know that it generally forms a wake behind the boat. The

*c/o CQ magazine
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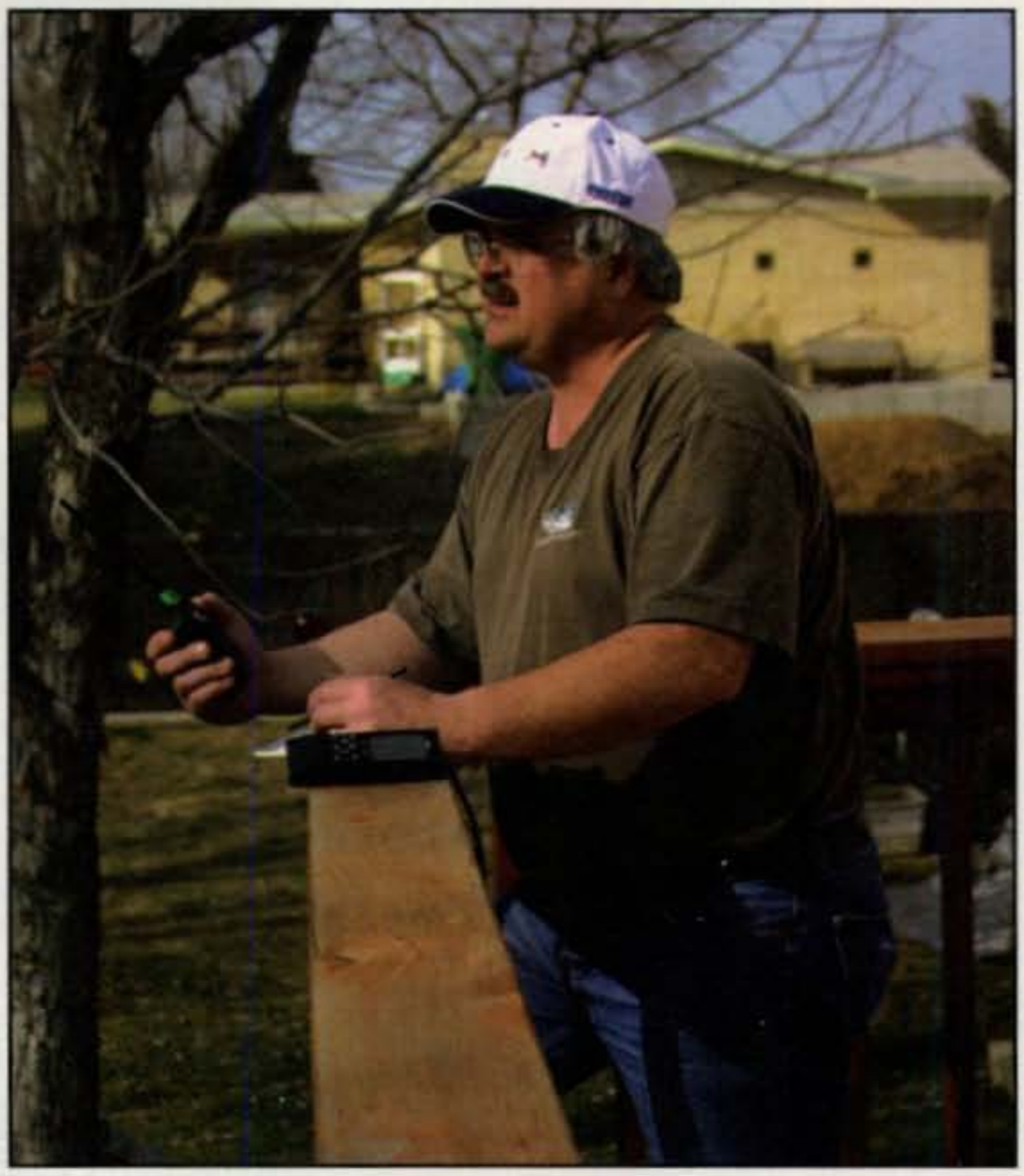
Kevin Reeve, N7RXE, helped study standing waves that form when strong winds come out of the west and hit the base of the mountains near the town of Wellsville, Utah. (Photo by N7RXE)

waves you see are gravity waves, lifted by the force of buoyancy and pulled back down by the force of gravity. If you have ever noticed clouds that form in regular bands of cloud and clear sky, you can say the clouds were formed as a result of gravity waves. According to the project website, gravity waves carry momentum and energy from the troposphere to the middle and upper atmosphere. The gravity waves cause a "drag" on the polar-front jet stream, which affects the development of cyclones and anticyclones, and thus the weather on the surface.

Project researchers explain that a special type of gravity wave is a *surface wave,* the waves you see on the surface of a body of water. Often the surface can be quite perturbed, with any one spot on the water rising and falling as waves from different directions and sources travel past. The atmosphere is similar, but the waves move vertically as well as horizontally.

Test Time

At 5:00 PM on both March 15 and 17, a glider was towed by an airplane toward one of the lens-shaped clouds that formed in the presence of an atmospheric standing wave over the Wellsville Range. Once the glider reached an altitude of 8000 feet, the pilot maneuvered near the cloud for the next hour. The pilot and passenger recorded position, wind speed and direction, temperature, and barometric pressure. These measurements were combined with readings made by the National Weather Service radiosonde balloons that were released from Salt Lake City, Utah, Elko, Nevada, and Boise, Idaho. These balloons documented the amount of wind energy flowing into Cache Valley in the Wellsville Wave.



Tyler Griffiths, N7UWX, checks his equipment and listens for a blast in the valley. (Photo by N7RXE)

Listening for a Bang

Project Director Gil Moore first worked with the Bridgerland Amateur Radio Club about seven years ago, flying balloons with amateur radio on board. "Hams did all the design work, and we flew commercial high-altitude balloons up to 10,000 feet with ATV, packet, telemetry, and several scientific experiments," said Kevin Reeve, N7RXE. Moore called on the local members to coordinate the launch of two fireworks, position themselves in a 35-mile radius throughout the valley, and record the time they heard the blast. The blast "is like putting a blob of dye marker into the wave, so when we see it we can say, 'Hey that's our wave,'" said Moore.

At exactly 6:00 PM each day, a 6-inch and a 16-inch salute firework were launched about 5 miles west of Logan on the west side of the valley. These fireworks were larger than those shot off at the Utah State University stadium every time the Aggie football team scores a touchdown. The "salute" made two distinct bangs—first, when the mortar charge went off to launch the salute upward, and then about 15 seconds later when the bursting charge (louder) went off at an altitude of 1200 feet. The blasts produced two shock waves that spread outward and upward at the speed of sound through the air mass within Cache Valley. Student volunteers from the middle schools in the valley, from Wellsville, Utah on the south to Preston, Idaho on the north, listened from their homes for the sounds of the two detonations. They measured the arrival times of the resultant shock waves by observing a digital clock display on their home computers that was transmitted over the internet by the National Institute of Standards and Technology in Boulder, Colorado.

BARC members also took readings from their homes and various locations in the valley as they listened for the blasts. Reeve commented that the signal from WWV and the java clock on <www.time.gov> were within a few hundred milliseconds of one another. Tyler Griffiths, N7UWX, was at his QTH in River Heights, Utah, some 5 miles from the launch site. He was listening to WWV being rebroadcast over the club's 2-meter repeater. Once he heard the sound, he reported his times to the net control station. Others went online and entered their information on the project's website.

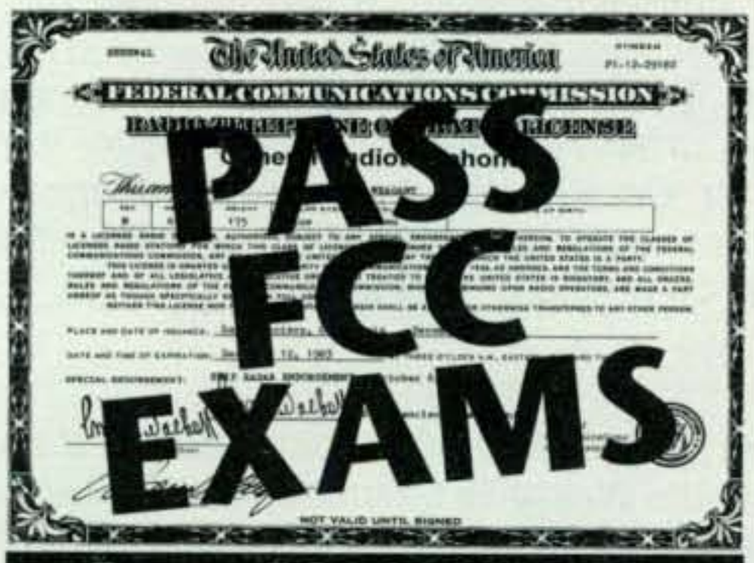
The Results

Although no gravity waves were specifically identified as having originated over the Wellsville Mountains during these initial tests, Moore said all of the instrumentation and the volunteer reporting network performed very well. The team was sufficiently encouraged by the results of the initial tests such that they planned to conduct an additional experiment in mid-April using a more powerful detonation set off at the ATK/Thiokol Propulsion plant southwest of Tremonton, Utah. Depending on the results of that test, we may be able to study larger detonations that will be conducted at the Hill Air Force Base Utah Test and Training Range.

Adding Some Excitement...

"The students are a vital part of the project," said Gil, who is an adjunct professor at Utah State University. "One of our major reasons for doing this is to provide some excitement for the kids in the valley as an adjunct to their classroom learning."

Reeve said, "Our club loves this stuff. It is what keeps us going and the enthusiasm for the hobby high. Not bad for a club of around 75 members." In the fall they'll be participating in more experiments, but will add a weather balloon with amateur radio on board. In September the club will support



and provide communications for the longest single-day bike race in North America—203 miles from Logan, Utah to Jackson, Wyoming. Reeves told *CQ* that they set up APRS (Automatic Position Reporting System) digipeaters and a portable repeater. "We use three to four repeaters, which gives us 90%+ coverage for the entire race through mountainous terrain."

Train Wreck: Mississippi Hams Respond

In early April, members of the Metro-Jackson Amateur Radio Emergency Service (MJARES) and the Jackson Amateur Radio Club (JARC) responded to the derailment of an Amtrak passenger train bound to Chicago from New Orleans. The accident occurred between Flora and Bentonia in rural Madison County, Mississippi following its departure from the Jackson Terminal. According to state officials, the train, "City of New Orleans," which had approximately 80 passengers on board, derailed at around 6:30 PM. Emergency responders on the scene near the Madison-Yazoo County line reported at least one death and between 80 and 90 injuries. The accident occurred approximately two miles from the nearest paved road. Approximately 13 agencies responded to the disaster, including volunteer firefighters, police and sheriff's deputies, the American Red Cross—and amateur radio operators.

Incident Commander Derrick Layton, Madison Fire Department EMS director, said the biggest problem was communicating, because most of the agencies were operating on different radio frequencies. The Madison Police Department's mobile command unit was set up at the staging area. Officers were spread out along the lengthy disaster site. Each was assigned to various areas such as medical triage, the top of the train, and the staging area.

Just as the JARC board had convened its monthly board meeting, President Jeff Sykes, K5VU, and other board members responded to the Central Mississippi Chapter of the American Red Cross's request for emergency communications. Less than an hour earlier, Billy Bob Sekul, N5XXX, JARC SkyWarn Coordinator and MJARES AEC, had placed members on alert at the request of the National Weather Service to support possible SkyWarn operations beginning early Wednesday morning.

Greg King, KD5HDZ, accompanied the Red Cross Emergency Response Vehicle as it brought water and snacks to emergency workers at the incident command post and the Madison County Sheriff's Office respite center at Tri-County Academy in Flora. Members Bill White, KC5WYY, and Terry Drake, KD5JPB, manned the JARC's radio station at the Red Cross Chapter, utilizing HF as well as four area repeaters. John Jenkins, KD5QQF, and Guy Harrell, KD5QQG, responded to assist in the disaster relief effort. MJARES Assistant Emergency Coordinator Ed Jones, W5GEJ, and District Emergency Coordinator Central MS Ron Brown, AB5WF, conducted RACES operations on behalf of the Mississippi Emergency Management Agency. Official Relay Station Lew King, W5LEW, stood ready to service NTS traffic and Disaster Wellness Inquiries.

MJARES members worked well into the early morning hours in support of Red Cross Disaster Services relief operations, passing vital messages relating to logistics and on-the-scene essential information. Ben Jones, AC5SU, of MJARES, coordinated volunteer efforts as ARES-Emergency Coordinator in conjunction with Red Cross staff and volunteers. Fortunately, rescue operations quickly turned into a cleanup effort as passengers were transported to six area hospitals and overnight accommodations.

Warning Issued

"The National Weather Service has issued a tornado warning for the following counties..." How many times have those words sent you and your loved ones heading for safety?

The answer may be once too often. This spring amateur radio operators around the country participated in severe weather exercises. In Pennsylvania, officials tested plans and procedures to respond to severe weather conditions. David Sanko, director of the Pennsylvania Emergency Management Agency (PEMA), said, "Severe weather can be dangerous and unpredictable." He continued, "Residents, businesses, and government officials must understand the potential impact of severe weather conditions and then be prepared to respond if those conditions occur."

Weeklong activities included community-based public-information programs, a one-day exercise, and a statewide test of the Emergency Alert Systems network. According to Sanko, the statewide exercise allowed county emergency managers to work with

schools, nursing homes, hospitals, and day-care centers across the state to test and review emergency response plans for severe weather problems under non-emergency conditions.

PEMA and the National Weather Service issued exercise-based weather reports of developing conditions. Information was carried over normal weather-forecast outlets as well as the Radio Amateur Civil Emergency Service network.

In addition to 67 county emergency management coordinators, 501 school districts, more than 300 hospitals and 600 nursing homes, and all day-care centers across the state were invited to participate in the weeklong activities. "I am confident these exercises will help government agencies, as well as special-care facilities, better prepare for Mother Nature's potential," Sanko said. "This level of preparedness translates directly into lives being saved and property protected."

Severe weather triggered six declared major disasters in Pennsylvania in 1996, a national record. Three declared flood disasters occurred in one month during 1999. Floods and record-breaking snowstorms caused more than $1 billion in damage and loss to residents, businesses, and local governments.

Severe weather can occur in any part of the country. Participating in a Skywarn event can be one of the easiest tasks if you are properly trained. If you are interested in learning more about Skywarn, check with your local ARES or RACES group or contact your local National Weather Service office.

With Thanks...

This month we learned how one club served in the public interest in the name of science, and how amateur radio can respond to an emergency with everyone having an assigned role. I would like to thank Kevin Reeve, N7RXE, for providing information on the Wellsville Project, and Mississippi ARRL Public Information Officer Robert Bullock, K5RWB, for information on the train-wreck response.

Do you have a story to tell? Sometimes an event doesn't involve severe weather or impact hundreds of people. Sometimes it's not even an emergency, but you and other amateur radio operators are providing a service to the community—in the public interest. Drop us a note and let us know of your involvement. Until next time . . .

73, Bob, WA3PZO

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IC-2GXAT/HP Simple use, maximum output. (left) This 144MHz FM transceiver is built for durability, splash-resistance, and 7W of maximum output. The 2GXAT offers 40 memories, 5 DTMF memories and redial, memory scan/skip, tone scan, and monitor function. 2.2"w x 4.9"h x 1.4"d, 12.9 oz ..... Closeout **$249.99**

IC-T2H SPORT More than enough power. (middle) The 6W Sport meets MIL SPEC for shock and vibration and is more than enough for long distances. The 2M HT boasts tone squelch, customizable keys, DTMF encode, 40 memories, 10 weather channels and cloning. 2.3"w x 5.5"h x 1.3"d, 14.8 oz **$99.99**

IC-T22A High performance, easy fit. (right) The 2M T22A provides 3W of communication power. It's packed with 40 memories (expandable to 80), memory back up, alphanumeric pager, CTCSS tone encoder, and mic remote control. 2.25"w x 4.81"h x 1.12"d, 10.9 oz **$199.99**

IC-V8 Quality, simplicity, anywhere. (left) This polycarbonate and die-cast aluminum 144MHz FM transceiver is constructed for durability. The 5.5W V8 offers 16-button keypad and 100 alphanumeric memories. CTCSS, DTCS and DTMF encoder standard. 2.13"w x 5.19"h x 1.38"d, 12.3 oz **$124.99**

IC-T7H Powerful output and ample receive audio. (middle) A 6W amp circuit provides superior transmit on VHF/UHF when 13.5 V DC is supplied. In addition, 500mW of AF is output from the speaker – easy to copy when noisy. Separate CTCSS tone encoder and enc/decoder standard. This 2M/440 MHz meets MIL SPEC. 2.25"w x 4.34"h x 1.06"d, 10 oz **$179.99**

IC-W32A User-friendly, independent band controls. (right) The full-function, 5W, 2M/440 W32A meets demands of both novice and experienced operators: simple use and advanced features. Separate tune/volume controls per band, simultaneous receive, 200 memories, and tone en/decode. 2.25"w x 5.41"h x 1.31"d, 1 lb **$259.99**

IC-T90A Compact, full featured. The 50/144/440 MHz T90A offers wideband receive with 5W. It features 555 alphanumeric memories with Icom's DMS scanning technology. The T90A also provides DTCS/CTCSS, DTMF encode, PC programmability and weather resistance. 2.53"w x 3.44"h x 1.16"d, 8.47 oz **$259.99**

IC-V8000 75W of "base" power. The V8000 also offers 25/10/5W. With the operator-facing speaker, audio is clear even when mobile. The 2M V8000 also features CTCSS and DTCS, standard DTMF encoder, 207 memories, FM narrow, and remote mic. 5.9"w x 1.97"h x 5.9"d, 2.22 lbs **$189.99**

IC-2720H Twice the versatility, twice the fun! The 2M/440MHz, 50/35W 2720H offers simultaneous receive capability, independent controls for each band, and Dynamic Memeory Scan with 212 memories. It also features CTCSS and DTCS, wideband receive, weather alert, auto repeater, remote control microphone, and compact remote control head. Mount controller to main unit with the optional MB-85. 5.5"w x 1.56"h x 7.38"d, 3 lbs (main) **$369.99**

IC-208H High power, wideband. This 2M/70cm mobile provides 55/50W, plus reduced power for local. The 208H covers 118-173, 230-549 and 810-999MHz (cell blocked) rx as standard. With improved DMS, detachable front, and 500 memories. 5.56"w x 1.56"h x 7.31"d, 2.65 lbs..... **$299.99**

IC-910H 100/75W stable output. This 2M/440MHz base provides a high performance receiver, 9600bps, satellite support. 99 memories, simultaneous rx. 9.5"w x 3.69"h x 9.4"d, 9.9 lbs **$1099.99**

IC-2100H-25N Durable 2M rig with superior RX IMD, performance. The 2100H25N offers 50W on transmit, extending its range. It also features CTCSS tone enc/decode, tone scan and 100 alphanumeric memories. It can be remote controlled using the new backlit mic. 5.5"w x 1.56"h x 7.09"d, 2 lbs, 10 oz..... **$169.99**

IC-2200H 65W and new digital features. With a familiar 2100H interface, the 2M 2200H adds optional digital capability providing modulated and demodulated clear voice and data. This mobile also offers 207 alphanumeric memories with DMS, standard CTCSS and DTCS encode/decode, 24 DTMF autodial memories, weather channel with alert, and FM narrow mode switchable. 5.5"w x 1.56"h x 5.75"d, 2.75 lbs..... **$229.99**

IC-706MKIIG Base features, mobile size. The 160-10M + 6M, 2M, 70cm Mark II G is constructed for stable, quality output with low IMD and spurious emissions. Tone squelch, DSP, auto repeater and 107 memories. 6.56"w x 2.28"h x 7.88"d, 5 lbs, 6 oz..... FREE RMK706 **$769.99**

IC-718 Origin of HF. With performance found in the HF all-band 718, such as wide dynamic range, high S/N ratio, and full duty operation, making distant contacts is easy. Experience its the latest RF and digital technology. 9.44"w x 3.75"h x 9.41"d, 8 lbs, 6 oz ..... FREE UT106 **$569.99**

IC-703 For QRP enthusiasts. The 160-10M 703 is capable of 5/10W and focuses on QRP performance. A portable HF unit, it features a relay-type antenna tuner, low current consumption, DSP, memory keyer and 105 memories. Ideal long distance communications. 6.56"w x 2.28"h x 4.88"d, 4.4 lbs ..... © **$619.99**

IC-703PLUS The 703, plus 6M..... © **$649.99**

IC-746PRO 32-bit DSP takes you higher. 100W, 102 memories, and a multi-function LCD command the HF/50/144 MHz 746PRO. 24-bit AD/DA converter and digital noise reduction. 11.3"w x 4.7"h x 12.5"d, 19 lbs, 13 oz.. FREE PS-125 © **$1379.99**

IC-756PROII Digital leap. All-mode, HF, 50MHz rig adding customer suggestions. The PROII offers 32-bit floating DSP, 24-bit AD/DA converter, selectable IF shape, and adjustable noise blanker. 13.38"w x 4.38"h x 11.2"d, 21 lbs, 1 oz.... FREE PS-125 © **$2299.99**

IC-7800 The big honcho! Icom launches the hottest rig with the most bells and whistles. The 200W, HF/50MHz 7800 is a fusion of 40 years of analog RF design expertise with cutting-edge digital technology. Built-in supply and auto antenna tuner, four 32-bit floating DSPs, TWO identical receivers...the kitchen sink! Be one of the first to own this incredible rig. 16.6"w x 5.9"h x 17.1"d, 55 lbs.... **$10599.99**

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VX-150 Designed to perform under the most difficult conditions. (left) This 2M 5W HT provides exceptional receiver performance with clean, clear transmit. Built to withstand outdoor use, the 150 is also outfitted with commercial-grade speaker and Omni-Glow™ keypad. 4.3"h x 2.3"w x 1"d, 11.5 oz **$119.99**

FT-50RD/41B Commercial-grade, military spec. (middle) It's rugged, reasonably priced, and simple to operate. Boasting 5W, the 50RD covers 144 and 430MHz while also offering the "widest" band receive allowable. Perfect for outdoor activities. Built with 112 memories, DCS/CTCSS encode, and ARTS™. 2.2"w x 3.9"h x 1.2"d, 11.5 oz **$209.99**

VX-1R Power out of the pocket. (right) This 500mW dualband (144/430MHz) HT gives the user wide receiver coverage in a small package. The 1R offers 291 memories, ARTS™, internal speaker, SmartSearch™, and dual watch. Also provides one-touch emergency and built-in CTCSS/DCS while operating for more than 11 hours on a single charge. 1.9"w x 3.2"h x 1"d, 4 oz ..... Closeout **$129.99**

VX-2R Smallest HT dualband! (left) This 1.5/1W dualband (144/440MHz) handheld offers VHF, UHF, shortwave, marine and aircraft bands, or WIRES™ linking. The 2R's wide band receive includes the AM broadcast band, continuous HF shortwave, VHF/UHF up to 729MHz, plus 800-960MHz (cell blocked). It also includes over one thousand memories (20 groups), CTCSS/DCS encode/decode and auto repeater shift. 1.9"w x 3.2"h x 0.9"d..... **$179.99**

VX-5R/VX-5RS Setting water resistance standards. (middle) Offering 5W (4.5W on 430MHz), the 5R/5RS cover 50/144/430MHz while providing short to microwave reception. Great for outdoors with optional barometric pressure unit. Black or silver. 2.3"w x 3.4"h x 1.1"d, 8.9 oz..... **$219.99**

VX-7R/VX-7RB The first submersible amateur HTs. (right) Water protected, the 50/144/430MHz, 5W 7R/7RB are rated for 3', 30-minute submersions. Magnesium bodies make them ideal for outdoors. Include dual/wide-band rx, status strobe, and WIRES™ key. Silver or black. 2.4"w x 3.5"h x 1.1"d, 9.2 oz..... **$309.99**

FT-7800R Get "back to basics." This FM, 144/430MHz mobile boasts 50 and 40 Watts output and 1000 memories. It also offers one-touch hyper memories, full-featured CTCSS/DCS, WIRES™ internet linking and wide receiver coverage. The 7800R has a large LCD and NOAA weather alert. 5.5"w x 1.6"h x 6.6"d, 2.2 lbs..... **$279.99**

FT-817ND Self-contained, battery-powered, multi-mode portable. The 5W 817ND is designed for operation on HF, plus 6M, 2M, and 70cm. Whether you perfer SSB, CW, AM, FM, Packet, or SSB-based digital modes, it is ready to join you on your next hiking, camping, or search-and-rescue adventure. Includes 1400mAh NiMH battery and charger. 5.3"w x 1.5"h x 6.5"d, 2.6 lbs... **$629.99**

FT-2800M Cool and quiet 65W operation. The most rugged 2M transceiver ever provides 65/25/10/5W with an extensive 221 memories, alphanumerics and CTCSS/DCS. The 2800M also features NOAA with weather alert, WIRES™ access, SmartSearch™, and excellent receive performance. With a bullet-proof front end and direct keypad entry, it's a dream come true. 6.3"w x 2"h x 7.3"d, 4 lbs..... **$159.99**

FT-8900R Leading the way in FM mobile design. The 29/50/144/440MHz 8900R has no peer among mobiles. This quad bander offers leading edge features like VHF/UHF full duplex, cross band repeat, independent operation on two bands, and six "Hyper Memory" keys to store configurations. The 8900R also provides 50W (35 on 440MHz), access to internet linking systems, over 800 memories, CTCSS/DCS, and built-in duplexer. 5.5"w x 1.6"h x 6.6"d, 2.2 lbs..... **$419.99**

FT-8800R Easy operation, ultimate dualband. This 144/430MHz 50/35W mobile offers simultaneous monitoring of one band while operating the other. Besides extended receive, the 8800R provides 1000 memories, cross band repeat, versatile scan and CTCSS/DCS. Looks similar to the FT-8900R above. 5.5"w x 1.6"h x 6.6"d, 2.2 lbs..... **$369.99**

FT-897D All-in-one portable base. The all-mode, multi-band 897D features high output 100W (HF/6M), 50W (2M), 20W (70cm), rugged construction, 200 memories, TCXO and optional internal supply and external antenna tuner. 7.87"w x 3.15"h x 10.3"d, 8.6 lbs ... **$889.99**

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digital connection

BY DON ROTOLO,* N2IRZ

Digital Amateur Television (D-ATV)

Digital communications are as old as amateur radio (Morse code *is* digital, after all) and Amateur Television (ATV) is almost as old as image communications, with radio amateurs at the forefront even before the first commercial TV broadcast. Today, like just about everything else, the world of video and TV is moving rapidly towards more digital technology. These days you can't avoid hearing about the latest satellite receiver or high-definition television (HDTV) setup.

This month we'll have a look at how ATV is going digital, the building blocks and what they do, and some ideas for those wanting to get involved. The move to digital ATV, or D-ATV, began a few years ago when some talented hams in Europe, capitalizing on inexpensive satellite receivers, built a digital video transmitting system. Building a digital ATV transmitter from scratch isn't for the faint of heart, and detailed construction information is far beyond the scope of this column. My intent is to tell you about how this technology works and, just maybe, get you interested enough to pursue it further.

ATV

Today, virtually all Amateur Television (ATV) transmissions, especially here in the U.S., are analog, using either Amplitude Modulation (AM) or Frequency Modulation (FM). Regular broadcast TV uses a form of AM known as Vestigial Sideband, or VSB, which keeps only a small part of one sideband (by convention, the lower) and a complete upper sideband. This allows the receiver to demodulate the signal more like AM than Single Sideband (SSB), considerably simplifying receiver design. However, TV broadcasters are under FCC pressure to convert to digital transmissions before the end of this decade.

Hams were there when Fast Scan TV became available, and so it is with digital TV as well. Here in the United States, few have not heard of High Definition Television, or HDTV. Some stations are already broadcasting HDTV signals. Its increased resolution—about that of a computer monitor, or triple what's available in analog broadcasts—combined with reduced noise and better color rendition provide for a much sharper and clearer picture. In fact, I read an article about some actors who were complaining about HDTV, as it shows all their flaws, such as caked-on makeup or skin blemishes, with excellent clarity. Perhaps they're afraid we'll learn they are just human like the rest of us.

Of course, when there's a transmitter involved, some hams will figure out a way to get involved. So it is with Digital ATV. At the close of the last century, I was privileged to witness a demonstration of a D-ATV setup designed and implemented by some friends in Germany. The hardware was ugly, the victim of many hand-soldered board revisions, but the picture was better than the TV we were using could display. While that system eventually was demonstrated in public, if you wanted one you'd have to build it yourself, since there were no kits or instructions available. More recently, two Dutch hams, Henk, PE1JOK, and Werner, PE1OBW, created a website to explain the system. As explained in the sidebar accompanying this article, at least one club has built a few board sets for sale, and some of the other links seem promising.

DVB Choices

A few years ago, when D-ATV was being developed, there were three major standards for Digital

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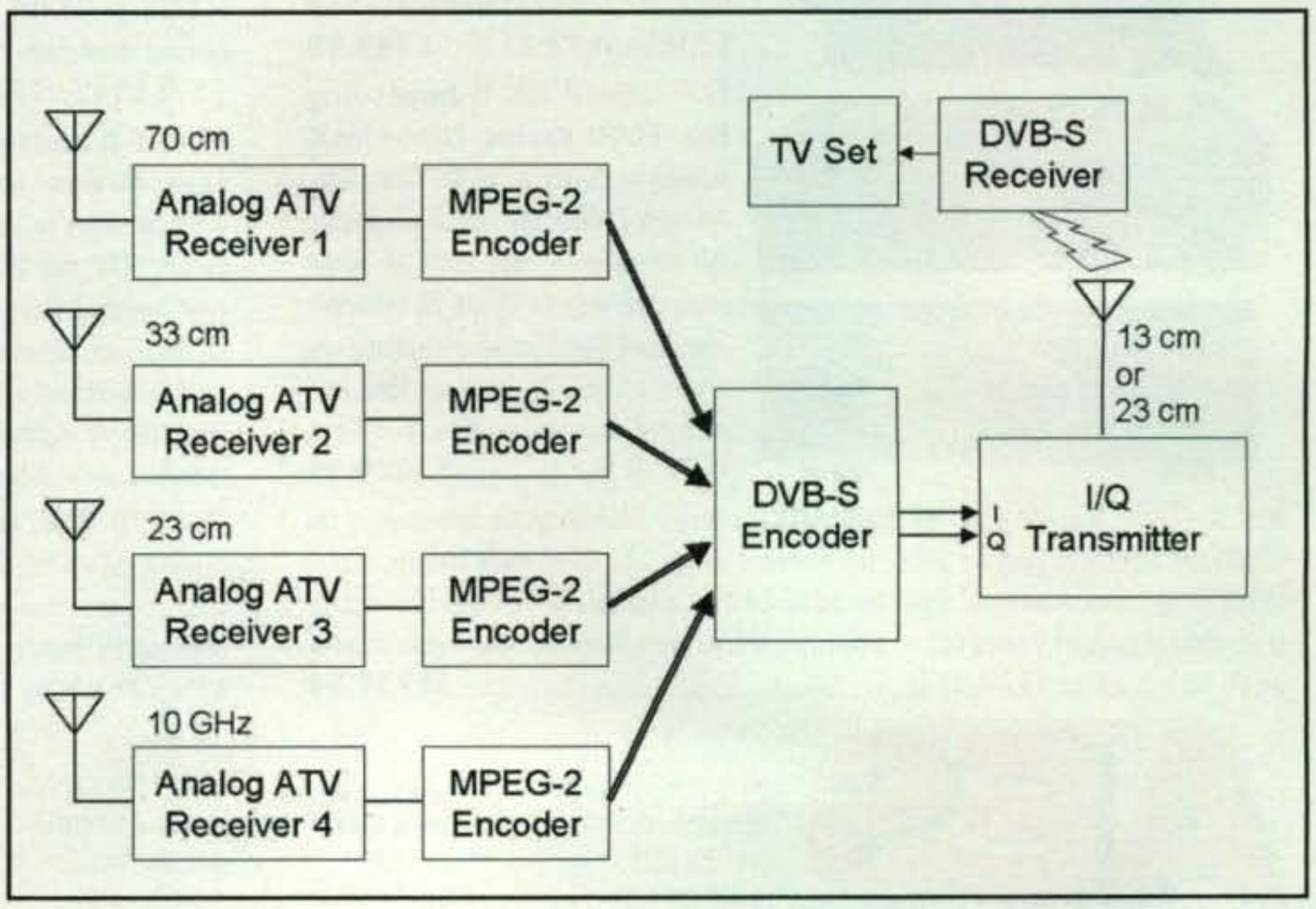

Fig. 1– A typical Digital ATV repeater site. The users uplink their video to the repeater as a regular analog signal, and it is repeated over a wide area as a digital signal. Each uplinked signal is carried on a different digital "channel" on the downlink, allowing many hams to use the repeater simultaneously.

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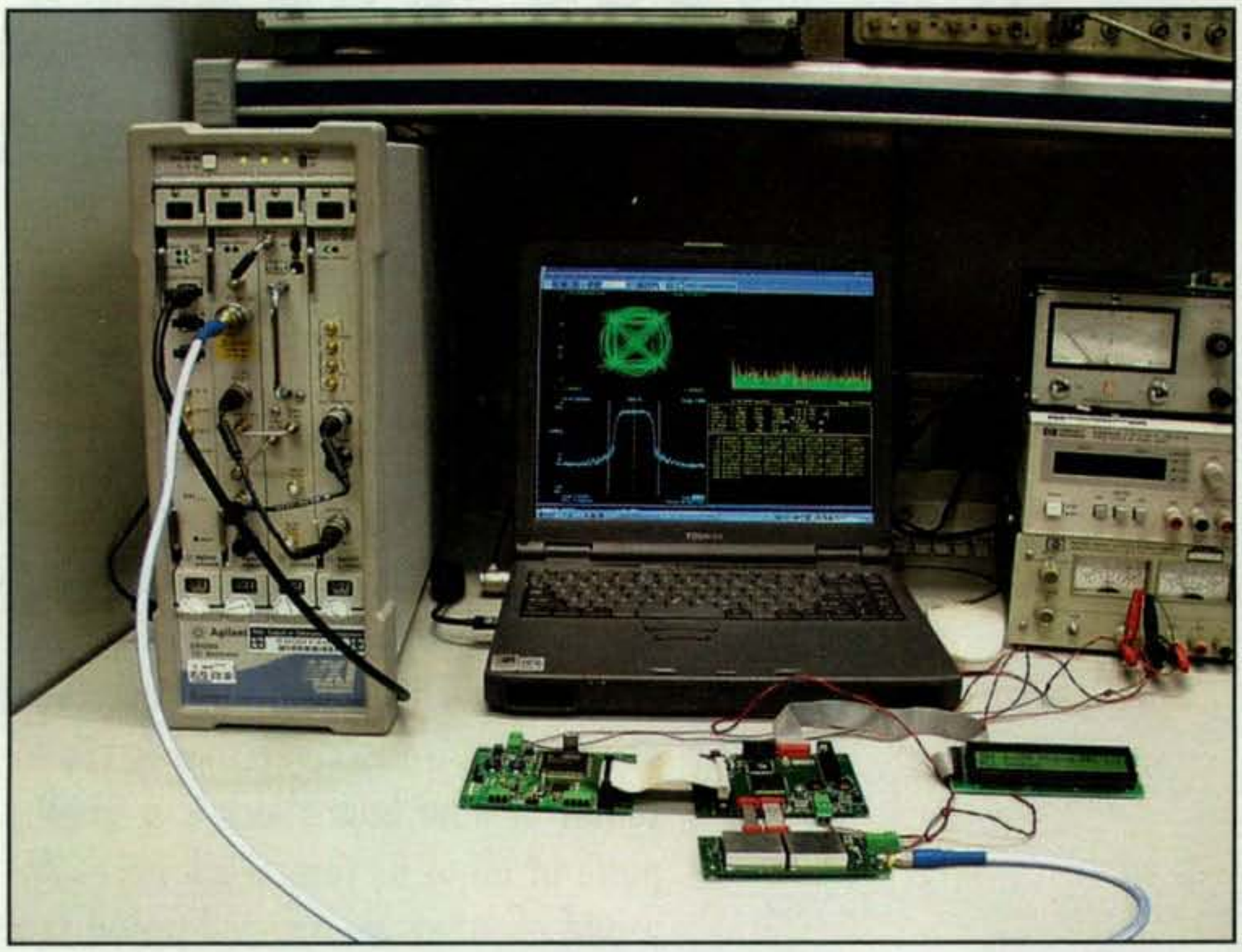

Photo A– The Dutch D-ATV boards under test. In front of the laptop computer are (from left to right) the MPEG-2 encoder, the DVB-S baseband encoder, and (toward the front) the transmitter. Note the LCD display, which is used by the DVB-S encoder to display status. (Photo courtesy of Henk, PE1JOK)

Video Broadcasting (DVB): DVB-C (Cable), DVB-T (Terrestrial), and DVB-S (Satellite). The DVB for Cable expects a very low noise environment, such as would be found on a cable network, and is poorly suited for over-the-air use. The DVB-T standard was created specifically for local terrestrial broadcast, with very strong resistance to multipath distortion, but it requires an ultra-linear signal path, including amplifiers, making the design of a transmitter non-trivial. The DVB-S standard works well with weak signals and places no heavy requirements on the amplifier linearity.

It appeared that the DVB-S standard was the best choice for an ATV system. A major advantage of DVB-S was the wide availability of set-top receivers, operating in the 950–2150 MHz range, that could be had cheap or for free. Testing showed that the weaker multipath performance wasn't really a problem. Thus, with the receivers being freely available, all that was left was the transmitter design. (Note that more recently introduced satellite TV systems prevalent in the United States, such as DISH Network and DIRECTV, use newer Digital Broadcast Satellite [DBS] standards that are incompatible.)

A Grounded Satellite

The transmitter needed to replicate the signal coming from a satellite. After all, that's what the receiver thought it was hearing. Most of the signal processing for a satellite broadcast is done on the ground, with the satellite acting as a repeater. A similar approach to D-ATV was implemented.

Because of the relatively high complexity (and cost) of the transmitter, the D-ATV implementation that made the most sense was to allow users to uplink into the D-ATV repeated site with normal Analog video, and have the repeater transmit in Digital, as shown in fig. 1. The DVB-S system allows for multiple downlink channels on the same signal, so multiple uplinks can be multiplexed onto different digital downlink "channels" at the same time.

Most of the design for a D-ATV system came from off-the-shelf hardware. Certainly, most amateurs already equipped for ATV have what they need to feed video to the repeater site, and set-top boxes, possibly equipped with a frequency converter, are readily available to receive digital signals from the repeater. The receivers for the repeater are commonly available as well, either commercially or built from an old VCR or TV. All that remained was to put a satellite—or at least what looked like one—at the repeater site.

Satellite hardware normally isn't available off the shelf, as you can imagine. Of course, this wasn't really a satellite; not only did it not have to withstand the rigors of space flight, it could be visited and repaired as necessary. On the other hand, quite a bit of signal processing was required, and the requirements were not trivial. Let's have a brief look at the hardware used for a D-ATV repeater.

Although there are at least two implementations of a D-ATV repeater that I am aware of (see sidebar), they both follow the same general architecture. The subject is far too complex to discuss in detail, but this general overview should provide enough information for you to understand what's involved.

Before we start, one point of clarification: These systems, designed and deployed in Europe, use encoders for the PAL standard, which is incompatible with the NTSC standard used in the United States. Although the Dutch website lists an NTSC version as optionally available, I've been unable to find information about one actually being built. Nevertheless, there are only minor technical differences between an NTSC and a PAL implementation.

The D-ATV System

The first piece in the D-ATV chain is the MPEG encoder. MPEG stands for Motion Picture Experts Group, a consortium which developed a number of standards for the (digital) compression of motion pictures and sound. Much like the JPEG standard for still images, MPEG compression can significantly reduce the amount of data required to represent a moving image. There are a few MPEG standards, including ones for audio. For D-ATV, MPEG-2 encoding was chosen.

Essentially, the MPEG-2 encoder is a specialized, real-time digital signal processor (DSP) for video compression. The German implementation uses a Fujitsu MB86390 MPEG-2 encoder along with considerable support circuitry, including a micro-controller and memory. The Dutch implementation doesn't specify the chip set, and you can't tell what it is from the photo, but it looks quite different from the Fujitsu evaluation board. One module is used for each video input stream. The output of this module is a wide, fast digital data stream, to handle the relatively high data rate.

The second piece of the chain is the DVB-S baseband encoder. This piece takes the MPEG-2 compressed video and audio data and converts it to a DVB-S signal at baseband, feeding it to the Quadrature (I and Q) transmitter. The German implementation can handle up

to four MPEG-2 input data streams, putting each one on a different digital channel. Although we're discussing Digital ATV, the output of this module is analog. After all, the real world, where transmitters live, is still analog.

The last module in the chain is the transmitter. Aside from the wide bandwidth, this is an ordinary I/Q transmitter. In fact, the design of the German version is based on a transmitter designed for high-speed packet. The output power is only a watt or two at 1.2 GHz, and even less at 2.4 GHz, but a decent linear power amplifier is not a problem. With some of the coding gain of DVB-S (about +10 dB) one can expect to use much less power than an FM ATV repeater for the same performance. However, path loss at 23 cm and 13 cm is greater than at 70 cm, and so it might end up an even exchange.

Receivers

The best part of the D-ATV system is that off-the-shelf commercial satellite receivers are used to convert the digital signal to something you can view on your television. Other than a decent antenna, no special equipment is needed to receive D-ATV. This makes for a very popular system. Users transmit their analog video into the digital system on regular ATV frequencies, and then receive their video (and the video of others) on a satellite receiver hooked up to their TV.

The receivers are commonly available in Europe, where much of the D-ATV activity takes place, but suppliers for DVB-S equipment in North America are few. While it's not impossible to find equipment—just search the web for DVB-S receiver—most of the suppliers are in Germany. The few that appear to be in North America seem suspicious to me. Two of them (www.cyberstore.com and www.fta-satellite.com) are especially suspicious, with absolutely no information about the company or location on the site. Places like that make me very nervous, and I do not recommend buying anything from them. Nonetheless, they do offer a range of equipment for DVB-S, so it might be interesting to see what equipment is out there. (If anyone knows anything about any of these North American suppliers, positive or negative, please let me know.)

For example, a PCI card for your computer can be had for under $100, and a stand-alone receiver for under $200. Perhaps one of the dealers in Germany might be willing to ship overseas; just be sure the equipment can output NTSC video. A quick search of eBay (www.ebay.com) found over 100 items, most of them receivers, for under $50. You just need to be sure of what you're buying: a DVB-S receiver (often called a Free To Air satellite receiver) with NTSC video output.

Therefore, the real expense of a Digital ATV system is the digital transmitter system, which I estimate might be built for about $1200. This is a perfect project for an active ATV group, which can convert its existing ATV repeater into a digital system with multi-channel capabilities. Both of the websites listed in the sidebar have general information about the design of their systems, but I'm confident that they would be happy to share their detailed knowledge with you, if you're serious about building a D-ATV system.

Digital Amateur Television is actually being used in Europe, and it won't be long before it makes its way to North America. This kind of project is perfect for an active ATV group to implement, since it requires a bit of money and expertise. The end users will rejoice, since their investment for the upgrade is minimal, and the ATV repeater's capacity will be vastly improved.

Summary

This month we took a look at yet another new digital mode for amateurs to use with their wonderful playground in the aether. The past few columns have looked at digital operating modes, so next time I thought we'd have a look at some hardware: Local Area Networks. Useful for sharing files at home or managing a serious contest effort, this how-to column will explain the nuts and bolts of assembling a computer network. Until then . . .

73, Don N2IRZ

Digital ATV Resources

Dutch D-ATV site, <http://www.xs4all.nl/~pe1jok/>: This English-language site discusses the Dutch D-ATV project, showing test results and performance specifications, along with an in-depth discussion of the rationale for many of the choices made. An excellent starting point.

German AGAF ATV site, <http://www.agaf.de>: This site, mostly in German but with some English translations, offers the most detailed resources and information on D-ATV, including firmware downloads and PC-board patterns. They even note that their first run of 80 D-ATV board sets has just been delivered to those who ordered them. They also offer memberships and subscriptions to their ATV magazine at <http://www.darc.de/distrikte/g/t-agaf/formular.html>, which is a curious mix of German and English. This would be the place to start if you're serious. I would imagine that e-mail contact in English would be okay.

German D-ATV site, <http://www.d-atv.de>: This German-only site is a good source for D-ATV info and photos, albeit a bit old. If German isn't one of your languages, see the next site. You could also try one of the free translation sites available on the web, but technical terms may not be in their dictionaries, and don't expect a good "translation" of grammar and syntax.

SR-systems, <http://www.sr-systems.de/en/index.htm>: Primarily a small consulting company, it lists the D-ATV modules and hints that they are available for sale. Contact Stefan Reimann, DG8FAC, for more info.

Of course, a Google search of Digital Amateur Television will bring up a few dozen additional sites.

qrp

BY DAVE INGRAM,* K4TWJ

Gear Updates and QRP Contesting Notes

We trust curious onlookers accepted our April column's challenge to give QRP a go and found it a delightfully exhilarating experience. As you will recall, we suggested reducing the output power of your present 100-watt transceiver to 5 or 10 watts for testing the waters of QRP, so to speak. While this approach is a convenient way for newcomers to discover the sheer fun and QSO pull power of QRP, it still lacks the adrenaline-pumping excitement of spanning long distances with an extra-small and "genuine QRP" transceiver. That, dear friends, is a gusto treat that must be experienced first hand to be fully appreciated! That is also the main focus of this month's column as we revisit another well-known rig in the world of QRP, the SGC-2020 HF transceiver now with Adaptive Digital Signal Processing. Let's begin with the SG-2020, then briefly discuss a low-cost, high-performance antenna, plus some upcoming QRP operating events everyone should find attractive.

Photo A– The rough 'n ready SGC SG-2020 HF transceiver is easy to use, loaded with big-time features including DSP, and works like a champ. The little rig's power output is adjustable from 1 to 20 watts for QRP'n and also for communicating during adverse band conditions. (Photo courtesy SGC)

SG-2020 Update

The ultra-compact SGC SG-2020 shown in photo A is a time-proven HF transceiver that is quite popular among QRPers worldwide. Indeed, we hear a fair number of 2020s on the air (and we have also enjoyed using one on several occasions), and they always do a very good job—at home, in the vehicle, and/or while operating portable. It is an outstanding transceiver for QRP!

The SG-2020 is well-built, easy to operate (features are direct-accessed via pushbuttons rather than menu settings), reasonably priced, and works both CW and SSB on 160 through 10 meters. Output power is adjustable from 1 to 20 watts (a nice reserve for the "tough times"), and there are enough fancy features to keep even the most discriminating operator happy. How so? The transceiver has 20 memories, a CW keyer, an SSB speech compressor, noise blanker, passband tuning, RIT, a 2.7-kHz IF filter, and built-in audio filters with bandwidths down to 100 Hz. Newer versions of the SG-2020 also include "second generation" Adaptive Digital Signal Processing, or ADSP2, which continuously analyzes receive noise levels and sets or adapts its own noise reduction level accordingly. It's cool, and it helps you copy weak signals right down to a band's noise level. How can you distinguish new and older version 2020s (they look alike)? The newer ones (with ADSP) have "ADSP2" printed on their main tuning knobs.

The SG-2020's Adaptive Digital Signal Processing circuitry is also available as a stand-alone PC board/module for adding to an existing transceiver or as a self-contained unit with a speaker for fixed, mobile, or portable operations (photo B; also see speaker review, May *CQ*). Both the module and speaker utilize audio-level DSP, so installation is a snap. You just connect it to your rig's 12-volt DC supply, connect or plug it into the audio or earphone/ speaker line, and switch it on. The ADSP works automatically, reducing noise by 13 or 26 dB, as you select and also reject "tune up" tones by 50 to 65 dB. It is a little gem, especially for good mobiling.

Look closely at an SG-2020 and you will notice it is built like a proverbial battleship. Indeed, you can stand or sit on the thing without even denting or bending its case. The SG-2020's circuit design is equally impressive with its low energy demands

Photo B– The ADSP system included in SGC's 2020 transceiver is also available in a stand-alone ADSP speaker that can be used fixed, mobile, or portable, as desired. Top-mounted pushbutton selects two levels of noise reduction and tone rejection. (Discussion in text.)

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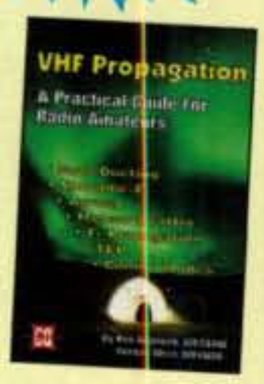

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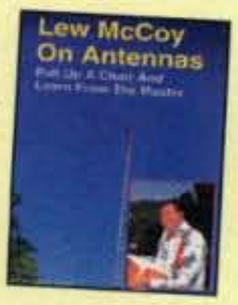

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Summer Homebrew Sprint (CW)	July 11 2000–2400 UTC	3.560, 7.040, 14.060, 21.060, 28.060 MHz	RST, State, ARCI number or Your QRP power level

Fig. 1– Upcoming QRP contests. Give them a go and join the fun of QRP! For more information go to <www.qrparci.org>.

and a 40-watt-capable RF power-amplifier section that "loafs along" at 5, 10, or 20 watts output. It is a rig you can quickly connect to a 12-volt lantern battery and use "field day style" almost anywhere. For extra flexibility, the front panel has sockets for both a hand key and an electronic paddle. Further, T/R switching time when using the hand-key socket is close to full break-in, while T/R delay with the paddle socket is more akin to semi break-in operation. Some folks have expressed concern over T/R relay noise when operating full or fast break-in style, but thus far SGC reports no relay failures. Like good keys and paddles, they just keep on working with amazing reliability. If the fast relay T/R switching seems annoying, however, you can simply "latch" the relay by holding the mic's PTT bar down while transmitting.

Another SGC item you will surely hear more about in the future is the new SG-211 Mini SmarTuner. This 1.5" × 4.5" × 7" delight is a completely hands-free "plug and play" automatic antenna tuner especially designed for impromptu portable and/or mobile operations. It matches both balanced and unbalanced antennas with impedances from 0.3 to 6000 ohms, operates on internal AA batteries with an estimated life cycle of five years, and requires no rig control or interface cable. You just connect it to the antenna (typically at its feed point), route a regular 50-ohm coax cable from the SG-211 to your transceiver, and transmit. The mini SmarTuner automatically senses the band/frequency and tunes for a low SWR. Put this thing at the feed point of your portable antenna, and you are ready for no-fumbles backpacking on a moment's notice.

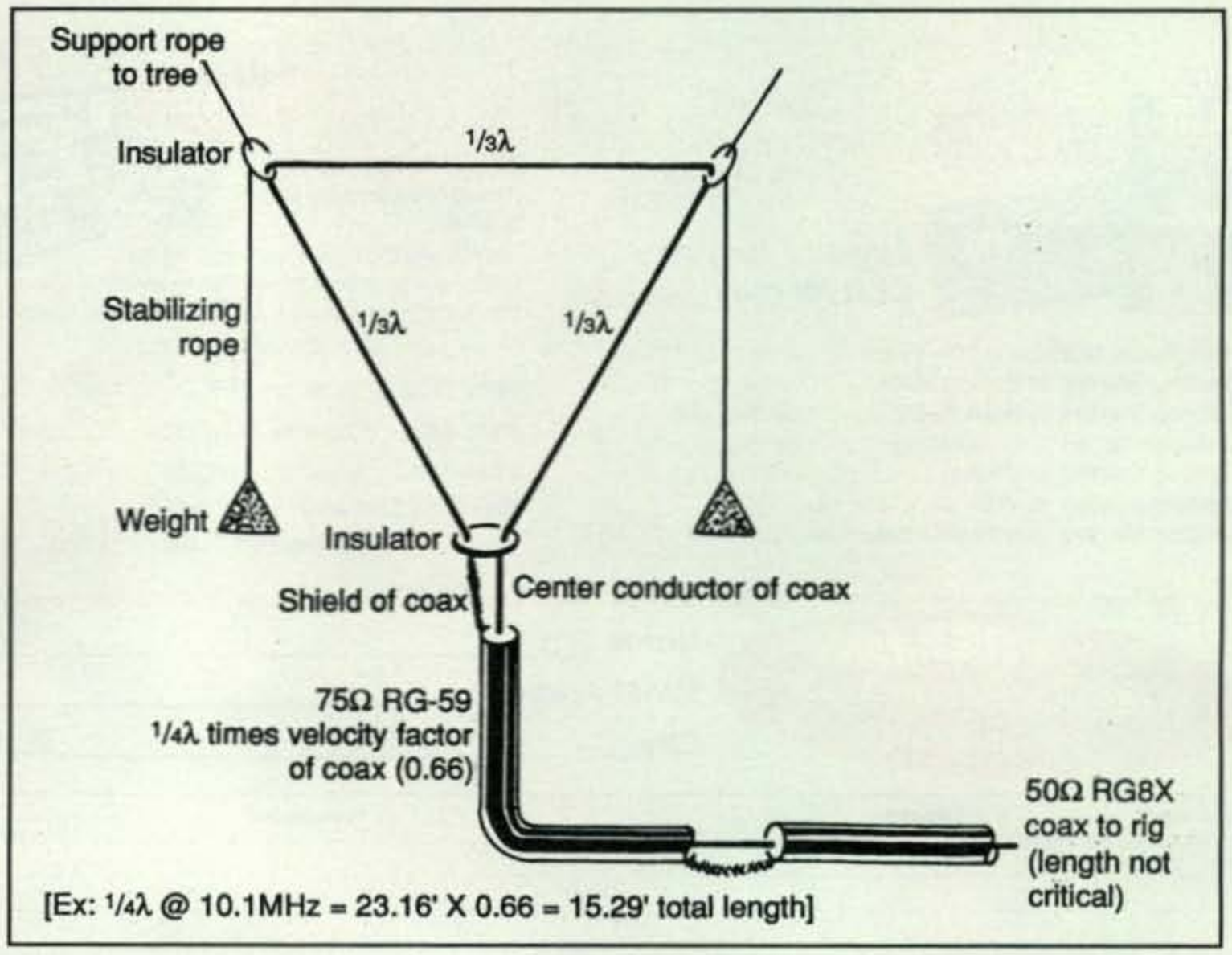

Fig. 2– The classic Delta Loop antenna, with a K4TWJ-added twist . . . err, invert. The apex is down rather than up, so the longest span of wire is high in the air, while the feed point is close to the shack. The overall result is a bigger signal regardless of the power level.

Wow! The SG-211 covers 1.8 to 60 MHz and handles up to 60 watts of power. More details on it, the ADSP speaker, and the SG-2020 transceiver are available from SGC at <www.sgcworld.com> or at 1-800-259-7331. Check them out.

Contesting with QRP

Ready to experience a double dose of lighthearted weekend fun with QRP? Join the Milliwatt Field Day activity running piggyback with the ARRL's traditional Field Day competition scheduled for June 26 and 27, and the QRP ARCI Summer Homebrew Sprint coming up July 11. You will meet some really sharp operators and surprise yourself at how well QRP "reaches out" at the same time! The Milliwatt Field Day event follows the same times, rules, and information exchanges as the ARRL's Field Day and also embraces CW, SSB, and digital modes of communication. Despite the name, you need not run only milliwatts of power to enter; the usual QRP level of 5 watts is quite acceptable. Grab your favorite QRP rig, a long-life lantern battery for power, a roll-up wire antenna, and head for the hills. It's that easy! Concerned about being "trampled" by the stronger signal boys? Operate within 5 or 10 kHz of the popular QRP frequencies of 3.560, 7.040, 14.060, 21.060, and 28.060 MHz, and you will make plenty of QRP QSOs—well, a respectable number anyway.

The Summer Homebrew Sprint is a short 4-hour, CW-only event that runs from 2000–2400 UTC on July 11. It is a terrific way to "get your feet wet in QRP," it is a "laid back" affair, and it is ideal for working a fair number of states via QRP in a single afternoon. Once again, you will find most of the activity within 5 or 10 kHz of 3.560, 7.040, 14.060, 21.060, and 28.060 MHz. Listen (closely, please) for stations calling CQ QRP or CQ Test or call your own CQ QRP if activity is sparse. The associated/QSO exchange is RST, state, and QRP ARCI number. If you do not have a number (are not a member of QRP ARCI), substitute your power level (example: 569, AL, number 1289 *or* 5 watts). There are numerous categories of entry, including all bands, single band, 5 watts, 1 watt, 250 milliwatts, and a new 20-times score multiplier for running 55 milliwatts of power. Wow—what a blast! More details on the contests, log entries, and the QRP International may be found at <www.qrparci.org>. Go for it, and listen for me, too. I will be the weak one running low power.

The Delta Loop—Inverted

A fair number of readers have asked us to revisit and answer some questions on the classic Delta Loop highlighted in our column a few years ago, so let's take another brief look at this ever-popular antenna (fig. 2). The Delta Loop utilizes a full wavelength of wire—twice the amount of a dipole—so it has more surface/capture area for "outworking" a regular dipole. I also prefer to mount it "inverted style" with its apex down rather than up, as it then fits between trees too close together to support a dipole. I also find the "inverted" position enhances performance by placing the greatest length of horizontal wire at the highest point for maximum signal radiation, while placing the feed point closer to the rig and minimizing feedline losses.

Several readers asked if small-gauge hook-up wire is suitable for making the Delta. Sure, provided it is large/strong enough to hold its full-loop weight and is not strained so it will snap as tree limbs move with the wind. I use black insulation-covered number 22 stranded wire for a 30-meter Delta Loop, and it disappears against tree backgrounds. Other readers asked if the RG-59 matching section can be deleted. Sure. Performance will drop ever so slightly and minimum SWR will increase to around 1.5:1, but an antenna tuner can sidestep that pitfall.

Answering another question, if the loop hangs or terminates near the shack window, the main (50 ohm) feedline can also be eliminated and the loop's feed point connected directly to an antenna with balanced output. Remember, however, you and your gear will then be within the antenna's induction field. Use QRP and stay alert to potential entanglements with RF feedback.

Finally, remember a real Delta Loop is a monoband antenna. You may be able to RF-load it on another band, but a specific-band dipole will probably outwork it. Heed our suggestions, and your cut-to-order Delta Loop will work like a champ.

On that final space-overflowing note, we must again bow out for another month. More gear reviews and several quick-brew mini-projects you will love are "in the works" for our following columns, however, so stay tuned for more QRP fun than the law allows!

73, Dave, K4TWJ

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

Get on the Air!
Antennas to Get You Going Right Now

Last month we took a look at the essentials for your very first ham radio station. This time let's take a closer look at an extremely important element of any radio station—the antenna. Since there are many references available on this topic, let's focus on very simple antennas for HF and VHF that you can connect to your radio almost instantly, so you can get on the air *right now*.

The simple antenna tricks presented here can also be very useful if the antenna you *really* want is out of stock. Instead of waiting and whining, you can build your own "sky hook" and get on the air right away. Plus, if you are stuck someplace and need an antenna in an emergency, remembering these ideas will come in handy.

Building antennas requires some ingenuity, just like the character Richard Dean Anderson played in the television series "MacGyver." If you recall, MacGyver could make almost anything with a roll of duct tape and his Swiss Army knife....

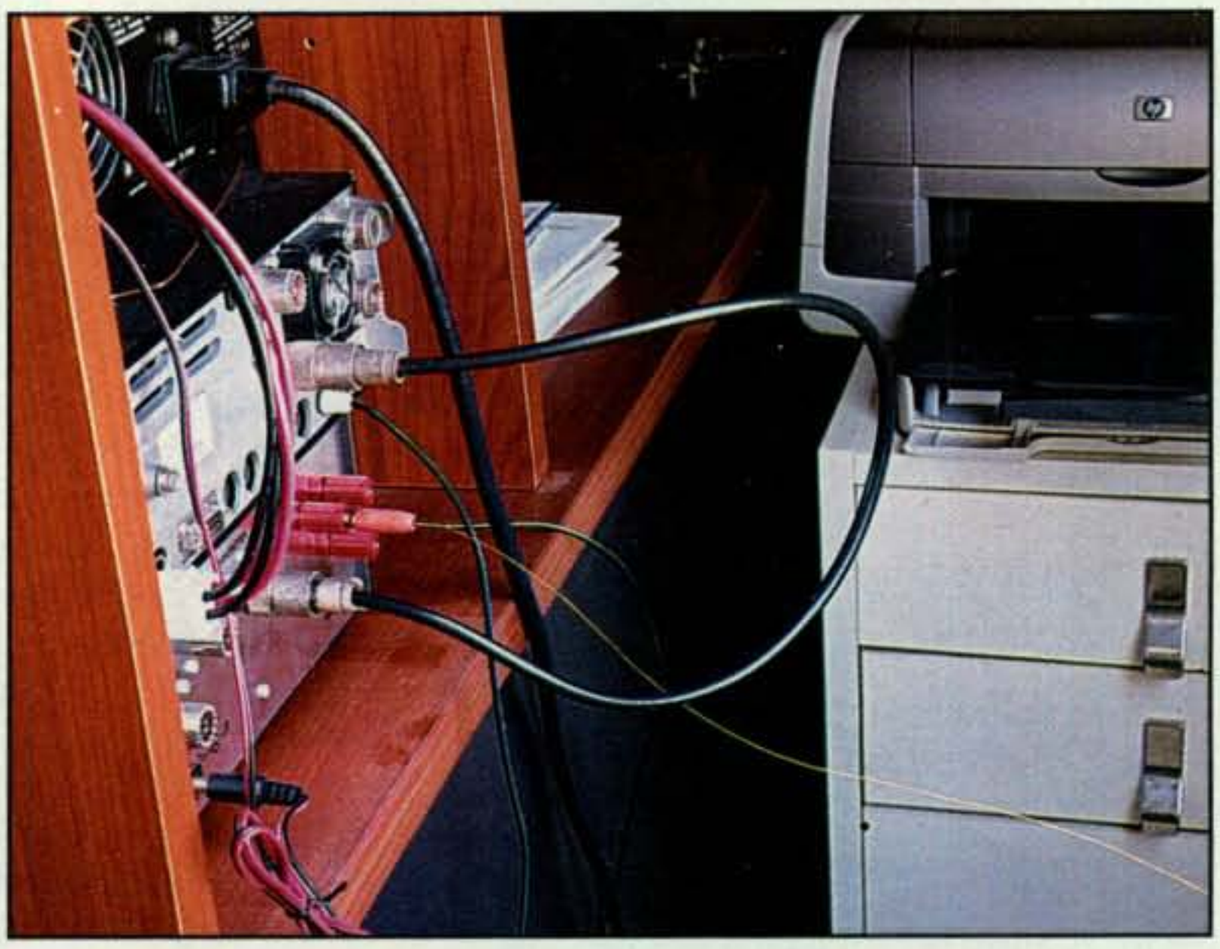

Photo A– The simplest antenna is just a piece of wire. Here's a shot of the back of a simple HF radio station, a Yaesu FT-817 all-mode, all-band transceiver and an MFJ Deluxe Versa Tuner II. Just barely visible in this photo is the antenna, which is made of thin enameled wire.

Know What to Expect (or Not to Expect)

The antennas described here are compromises, alternatives to something larger and more efficient. You cannot expect to work every station every time. However, these antennas will get a signal out of your radio and into the air.

I am convinced that just about anything made of metal can be used as an antenna, if you can tune it up to make your radio think the impedance is 50 ohms. For example, Patty Winter, N6BIS, has worked 100 countries (qualifying her to be a member of the ARRL DX Century Club [DXCC]) using a Heathkit transceiver and a motor-home awning as the antenna!

Another good friend of mine lives in a "walk-up" apartment in New York City. He is very active on all VHF and UHF FM bands as well as almost all the HF bands. He uses VHF/UHF mobile antennas with magnet mounts, stuck to air-conditioner units on the roof. For the HF bands he uses a G5RV wire antenna and a tuner.

First, for HF operations the simplest antenna is a random-length, end-fed wire. As the name implies, it is just a single wire going to an antenna tuner and then to your rig. The antenna tuner must be capable of accepting a "wire antenna." Very fancy automatic units are available from the radio and accessory manufacturers. However, manual units are less costly and are also available (see photo A).

An improved wire antenna is a resonant, or tuned, antenna, such as a dipole or inverted-Vee. Actually, the inverted-Vee is a dipole suspended in the air with the center at the highest point and hanging down like an upside down "V." When I was younger and knew less, I would take the equation 468/f in MHz, cut my wires, and then hang up the antenna on a tree or TV mast. Oddly (or perhaps not so oddly), the antennas made right from the formula never gave me a standing-wave ratio (SWR) of 1:1. The actual SWR measurements were always well above that. Thus, I would just use an antenna tuner to "fake" out the radio into thinking the antenna was of 50 ohms impedance.

Of course, the reason why the formula never works is because of the variations in ground conductivity, nearby objects such as other antennas or structures, and height above ground. All of these factors influence antenna performance and SWR.

Later, however, a contest-mentor friend of mine, Mike Reagan, NI7T, showed me that making a

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e-mail: <kh6wz@cq-amateur-radio.com>

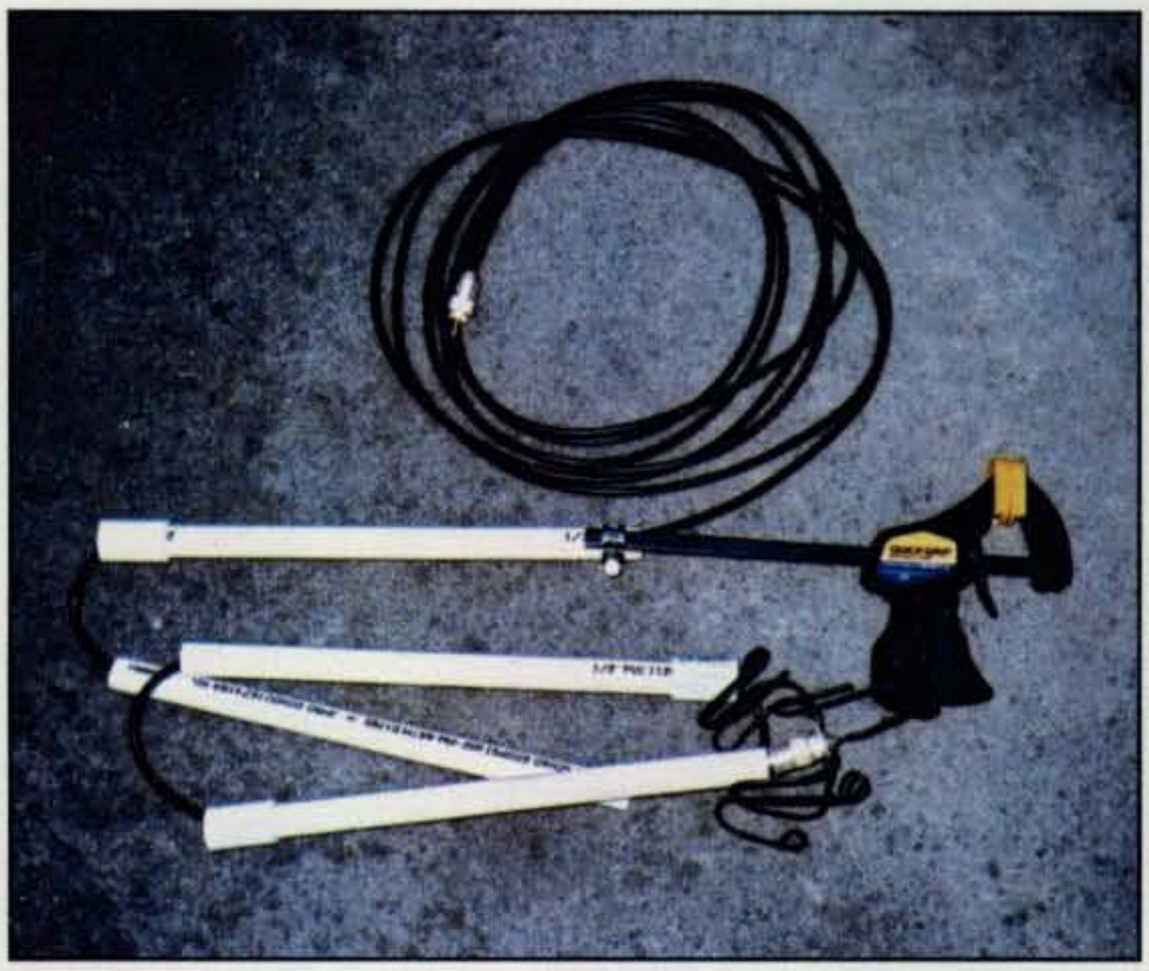

Photo B– The "squishy ground plane" is made of 12-guage, insulated solid-copper wire and can be carefully crushed or folded into a little ball for transport. Here, half-inch PVC pipe with couplers and a QuickGrip® woodworker's clamp complete the antenna.

"real resonant dipole" is possible. Get out your calculator. This requires some arithmetic.

We take the traditional formula as a starting point, and add a few more inches so that the center and end insulators can be tied off. We then erect the antenna, with coax cable attached. Next the antenna is checked to see where it actually resonates. In other words, we do not check for the SWR within the frequency we want; we turn this around to see what frequency the antenna is working on *now*. The easiest way to do this is by finding a friend who has something called an "antenna analyzer," which will show you the resonant frequency (or frequencies) of any antenna. There are really expensive commercial units out there, but many hams use one of two more reasonably priced units from Autek (see below) or MFJ (models 259 and 269).

Next calculate the relationship between the actual frequency and the antenna length versus the desired frequency and the actual length. The wires should be a bit longer than what we need, because it is always easier to cut something shorter rather than make a wire longer. The "adjustment formula" goes like this:

Desired Length = Actual Length × Actual Frequency/Desired Frequency

Cut the antenna length to this real-world adjustment. The antenna is now resonant for the proper frequency in the "real world."

This same formula can be used with just about any antenna and any frequency. I am not sure why it took me so long to figure this out, and even then someone had to show me this technique. (Most all of the antenna books I read or have on my bookshelf mention the "cut and try" method, in which you build the antenna slightly longer than needed, put up the antenna, and measure the SWR at your desired frequency. Since you know that it is made longer than it should be, you cut a small length off each end. Then measure SWR again. You cut and try over and over again until you either get tired of putting the antenna up and down, or you achieve a decent

Photo C– The "squishy ground plane" is shown here unfolded and clamped to the multi-purpose rack on my vehicle. Mind the overhead clearance! For "man-pack portable" operations, the antenna can be lashed to a backpack frame. The number and lengths of pipe can be varied to adjust height.

(1:1 or close) SWR. Actually, now that I think about this, the instructions that came with the SWR Analyst from Autek Research mention this "trick." Way to go, Autek!

Okay, enough talk about theory versus reality. Now it's time to get the tools out. Again, there are lots of references on building wire antennas, so I will just kick in my few words of advice here.

Three Things First

One, be very careful as you install the antenna. Make sure that no one—including people and pets—can come into contact with the wires and either get an RF burn or become entangled in the wires. Stay away from power lines, and make absolutely sure that no part of the antenna can come into contact with a power line—or vice-versa.

Second, build any antenna to last. By this I mean to say that even if the antenna you are building right now might be

considered temporary, sometimes it becomes permanent. Therefore, build your antennas to last. Make sure all joints are mechanically and electrically sound, and try to minimize mechanical stress as much as possible. For example, don't let the antenna scrape against a tree. Instead, route the wire away from the tree.

Third, make sure you have an adequate ground system. There is an "RF ground" and an electrical ground. If you are not able to make an adequate ground system, you may consider a counterpoise, or resonant ground system. A counterpoise system is usually a quarter-wavelength wire. You can run them outside, along the wall, or you can toss them out the window and let them hang. You can also stretch them out on the floor, and roll them up and put them away when you are finished operating. Remember to prevent accidents, making sure no one can trip over them.

Oh, yes . . . I mentioned a "resonant length." You can indeed put an antenna tuner on the ground system to make the radials resonant, although you probably do not have to go to that extreme. MFJ has something called an "artificial ground," which is actually an antenna tuner in disguise. *(Ground radials are not required for a dipole and are important primarily for a vertical or other "unbalanced" antenna.—ed.)*

References

Check the offerings in The CQ Store on antenna books:
<http://www.cq-amateur-radio.com>
An excellent reference on the G5RV:
<http://www.cebik.com/g5rv.html>
Patty Winter, N6BIS, aluminum awning antenna:
<http://www.wintertime.com/OH/hobby.htmlPHOTO>
"Effective Portable Antennas for 75/80 Meters," by Scott Harwood, Sr., K4VWK, *CQ*, November 2002, p. 48
Wire ground plane: *The ARRL Handbook for Radio Amateurs,* 2002 (and other years) Chapter 20, "Antennas and Projects"

Manufacturers

Autek Research: <http://www.autekresearch.com>
MFJ Enterprises, Inc.: <http://www.mfjenterprises.com>
Yaesu USA: <http://www.vxstdusa.com>

VHF and Above Antennas

A lot of ham activity takes place on the frequencies above 30 MHz. Also, since physical length becomes shorter as frequencies go higher, the VHF bands become very attractive to a lot of people.

Going back to our topic of getting on the air immediately, there are many kinds of antennas you can build or buy. However, I want to tell you right now *not* to do something you might be thinking about. You have a 2-meter handie-talkie, and those, of course, are all ready to go once the battery is charged. Well, okay, you need to program in the frequency, the offset (the "plus" or "minus" function), and any sub-tone (CTCSS) to get on your local repeater system. The antenna is always included, so you're all set.

Now you have a mobile type of radio, and instead of installing it in your car, you want to turn it into a "base station" with a suitable power supply and antenna. You also are thinking that the rubber-duckie that came with your 2-meter HT could be a "quick and dirty solution" to your 2-meter mobile-radio-turned-base-station antenna needs. *Don't do it.* Although fine for receive, the normal flex antenna that comes with your HT is *never* to be used on the back of any mobile transceiver. My once-roommate Bruce Kampe, WA1POI, "tried this at home" a long time ago. That melted rubber-duckie remains in his shack as a reminder of something *not* to do. No, the coil didn't melt, but the rubber/plastic jacket sure did.

Here are some ideas that *do* work (see photo B). I call this the "squishy ground plane," because you literally can smash it into a ball to put it away. This antenna is not a new idea; there are many references to this classic design. However, here are a few tricks I think you may find useful. As you can see, the coax is routed inside a length of 1/2-inch diameter PVC pipe. The connector holds the antenna in place. Although a bit floppy, it is very effective and simple.

Now look at photo C. A half-inch PVC pipe mast is clamped to objects with the QuickGrip® woodworking clamp, available at hardware stores and home centers. I am sure you can come up with other alternatives and ideas as well. Just do some browsing at your favorite hardware store. Oh . . . remember the old rule about antennas: Higher is better. However, in the case of the mobile squishy ground plane, you have to be careful about vertical clearance. If you make the mast too long, you will not be able to go through your favorite drive-through food place....

I hope these ideas will inspire you to build your own sky hooks. Perhaps more important, though, I hope you remember these ideas in case "something happens" and you need to improvise a solution in a hurry.

73, Wayne, KH6WZ

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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

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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

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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

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EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
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GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
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MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

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

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what's new

BY KARL T. THURBER, JR.,* W8FX

The Bug, Smart Battery Charger, 222-MHz Transceiver, and more . . .

This month in your "What's New" column, we'll narrow our focus to some noteworthy ham-shack accessories, software, books, radio resources, and other items we think will be of real interest to you. Let's dig right in.

Accessories for the Shack

The BUG from Pro.Fit. Pro.Fit International, Inc. is known for its quality and innovative vehicle-mounting solutions. Recently, the company announced a new and unique vehicle mount for small devices, which it calls the BUG (photo A).

The BUG is a versatile mount for securing narrow-profile radio-control heads for amateur, satellite, VHF, and other radios. The BUG features two arms which rotate on a solid shaft and pivot independently to align with a variety of hole patterns. Optional double-faced adhesive is pre-cut for each arm to secure devices without screws.

The BUG is secured with a flexible mounting pad having an adhesive back, making installation fast and simple in any vehicle. Proven in the field, the adhesive used has superior holding power, yet can be removed without residue or damage.

The low-profile body design allows for easy adjustment with a single twist of the thumbscrew. The BUG may be mounted in a variety of locations on the dash or console, even in a hanging position near the vehicle's rear-view mirror.

Contact Pro.Fit International, Inc., 1335 Eagandale Court, Eagan, MN 55121 (1-800-388-0073; e-mail: <sales@pro-fitintl.com>; on the web: <http://www.pro-fit-intl.com>). All products can be seen and purchased at the website.

Smart Battery Charger from A & A Engineering. A & A Engineering features "smart" battery chargers on its website. Particularly impressive is its 5 Amp Smart Battery Charger (photo B), for standard lead acid or gel-cell batteries. It has three distinct operating states. Initially, it controls the charging current to a pre-set "bulk" value. When the current tapers down to a specific level, it then tops off the battery with an elevated "full charge" voltage. After top off, it enters the "maintenance mode," where it dutifully maintains the battery at a precision "float level" value.

The smart charger doesn't have a trickle mode. If your battery accepts a full charge, the charger will issue zero current in the maintenance mode. A very important feature is a precision temperature-tracking voltage reference. This reference is specifically temperature compensated to track the temperature characteristics of lead-acid cells.

Equally important, this is a "noise-free" linear charger, not a noisy switching-type charger—an operating feature that helps minimize TV and radio interference of the kind frequently experienced when using a switching-type charger. If switching-type regulated power supplies are a problem, consider this method of powering your rig(s).

Photo A– Pro.Fit International, Inc. has announced a new, unique vehicle mount for small devices called the BUG. It's a versatile mount for securing narrow-profile radio control heads for amateur, satellite, VHF, and other radios. Details are in this month's column. (Photo courtesy Prof.Fit International)

Photo B– Shown is A & A Engineering's 5 Amp Smart Battery Charger, for standard lead-acid or gel-cell batteries. It's a "noise-free" linear charger, not a noisy switching-type charger. This feature helps minimize TV and radio interference. (Photo from the A & A Engineering website)

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e-mail: <w8fx@cq-amateur-radio.com>

Fig. 1– The respected German firm Kuhne electronic GmbH develops and manufactures professional devices in the frequency range of 0.1 to 50 GHz. Shown here is the comprehensive and useful Kuhne homepage. The high-performance Kuhne TR222H Transverter, for 222 MHz, is profiled in this month's column. (Screen capture from the Kuhne electronic website)

Amateurs have used this charger in many applications, both in everyday use and in emergency backup situations. Indeed, the 5 Amp Smart Charger, in conjunction with a deep-cycle battery, provides the power for many stations. The assembled #155-ASY charger is $139.95; for shipping via UPS insured, add $10.50.

For more information, contact A & A Engineering, 2521 W. La Palma, Unit K, Anaheim, CA 92801 (714-952-2114; e-mail: <W6UCM@aol.com>; or on the web: <www.a-aengineering.com>).

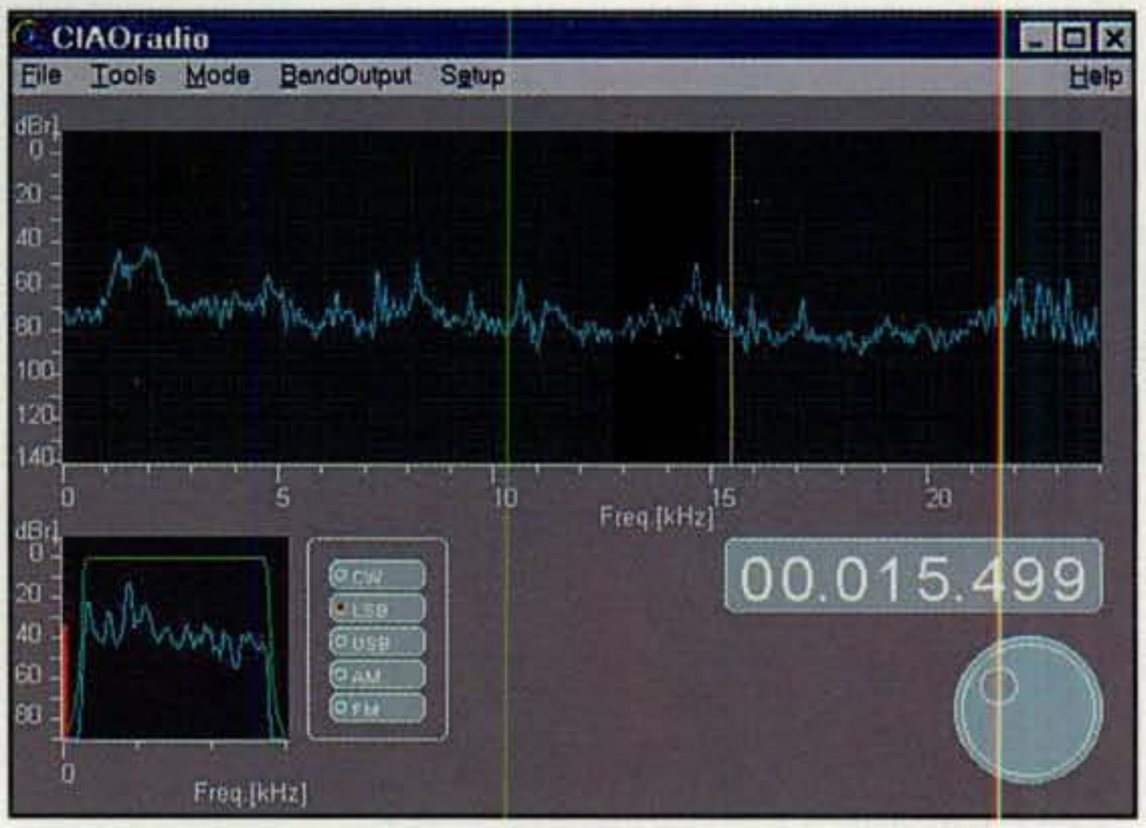

Fig. 2– CIAOradio, or Computer Interface Audio Out Radio, is a program for using a personal computer equipped with a full-duplex audio card as a demodulator receiver plus signal-level analyzer. The program's main spectrum screen is shown here. (Graphic from the antenneX website)

New 222 MHz Transverter from Kuhne Electronic Microwave Components. Kuhne electronic GmbH (see fig. 1) develops and manufactures professional devices in the frequency range of 0.1 to 50 GHz, including amplifiers, mixers, oscillators, and other devices built to customer specifications.

The high-performance TR222H Transverter is the combined result of a circuit design using state-of-the-art components and of the firm's long experience in microwave trans-

Fig. 3– If you're interested in satellites or astronomy, you've come to the right place if you've clicked on the Heavens Above website. It will tell you just where to look for objects in the heavens. The website features a host of new, customizable features. Point your browser to <http://www.heavens-above.com>. (Screen capture from the Heavens Above website)

Fig. 4– The staff at BuyLegacy.com sells hard-to-find and brand-name products not normally available elsewhere. The firm specializes in electronic, telecom, and network products. New inventory arrives weekly. Check out the site at <http://www.buylegacy.com>. (Screen capture from the BuyLegacy.com website)

verters. The TR222H is specially designed for demanding VHF amateur radio applications such as high-performance contest stations, but can be modified for professional use in the 200-MHz frequency range.

The receiver path is able to cope with very large interference levels from other transmitters, a situation common to contest sites with other high-power transmitters in the neighborhood. A triple resonator helix bandpass filter provides optimum rejection of out-of-band signals, and a high-level ring mixer with output diplexer converts the input signal to the IF band at 28 MHz. The overall gain in the receiver path was deliberately set to only 15 dB, as even high-performance HF transceivers can still have large signal problems at 28 MHz.

The transmitter path uses a second 17-dBm ring mixer for upconversion from 28 MHz to 222 MHz, and two cascaded triple resonator helix bandpass filters are used to achieve an exceptionally clean transmit signal. An output low-pass filter provides a harmonic suppression of more than 60 dB.

For more information and pricing, contact Kuhne electronic GmbH, Scheibenacker 3, D-95190 Berg, Germany (tel. 0049 [0] 9293 - 800 939; e-mail: <kuhne.db6nt@t-online.de>; on the web: <http://www.db6nt.de>). Or contact Kuhne's U.S. dealer, SSB Electronic USA, 124 Cherrywood Drive, Mountaintop, PA 18707 (570-868-5643; on the web: <http//www.ssbusa.com>).

Photo C– One of the most popular Klingenfuss Publications offerings is the 2004 Super Frequency List on CD-ROM. *More than 40,000 entries cover both broadcast and utility stations. The CD connects easily to leading receiver control programs, and hundreds of full-color screenshots are included. (Photo from the Klingenfuss Publications website)*

Software and Computers

CIAOradio. CIAOradio, or Computer Interface Audio Out Radio, is a unique, new radio/antenna software release (fig. 2). It's a program for using a personal computer equipped with a full-duplex audio card as a demodulator receiver plus signal-level analyzer for amateur radio applications.

Before CIAOradio, few radio hobbyists could afford access to the sophisticated and costly equipment needed to make tests with reasonable precision. Now this very affordable, high-precision software is available. With a suitable PC running Windows®, you can, among other things: digitally filter and demodulate signals from 0–24 kHz; digitally filter, demodulate, measure, and record signals in the HF range; and measure the gain of antennas in line-of-sight mode or ionospheric mode.

The software was developed by Italian amateurs Claudio Re, I1RFQ, and Oscar Steila, IK1XPV. The software was introduced in their co-authored article published by antenneX (December 2003) and entitled "A New Digital World: The 'CIAO Radio Project.'" You can read the antenneX article, plus see details about the software and how to purchase it, by going to: <http://www.antennex.com/Sshack/ciaoradio/ciaoradio.html>.

The link is sponsored by antenneX Online Magazine, P.O. Box 271229, Corpus Christi, TX 78427-1229 (1-888-855-9098; e-mail: <info@antennex.com>; web: <http://www.antennex. com>). Be sure to check out the website, which is replete with e-books, CDROM collections, antenna articles, software, modeling files, and other useful and authoritative antenna information.

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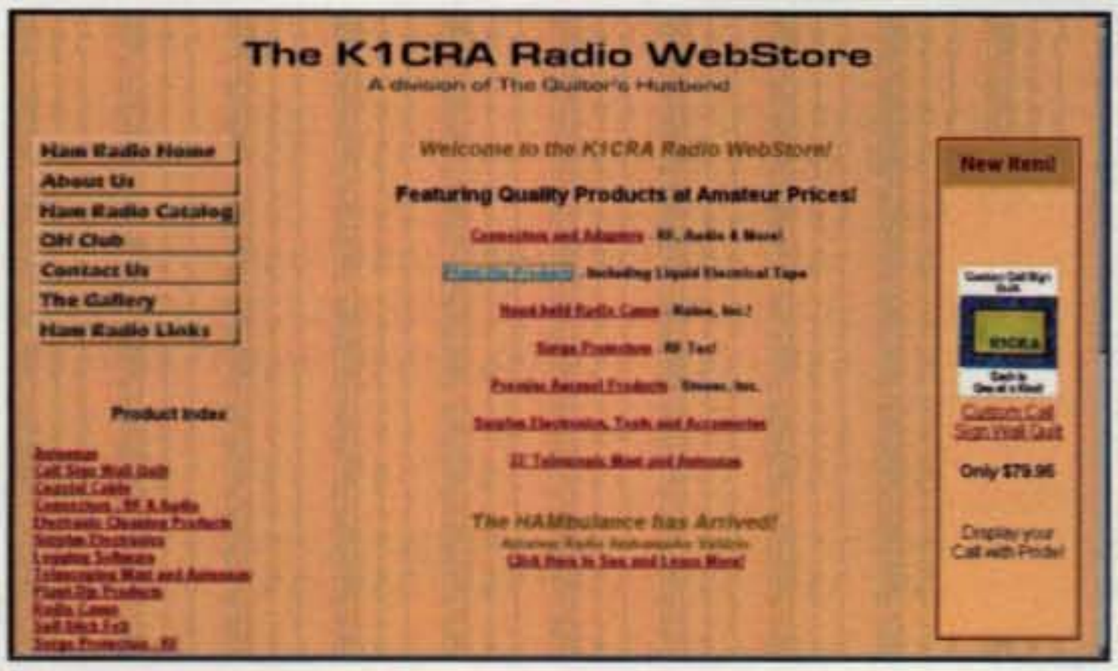

Fig. 5– The K1CRA Radio WebStore features "quality products at amateur prices." The website is a particularly good source for Liquid Electrical Tape, sold under the Performix® Brand name, by Plasti Dip International. Check out the K1CRA website at <http://www.k1cra.com>. (Screen capture from the K1CRA Radio WebStore website)

al shortwave (HF) radio monitoring. On its website you'll find dozens of sample pages from a rather comprehensive list of products, plus fascinating live radio monitoring screenshots.

The firm is an international publisher and, by consequence, all products are published in English. However, Klingenfuss does business worldwide, and it can converse with customers in multiple languages, including Creole, English, French, German, Indonesian, Italian, Malay, Portuguese, and Spanish.

Klingenfuss offers a number of different products, including the *2004 Super Frequency List on CD-ROM, 2004 Shortwave Frequency Guide, 2004 Guide to Utility Radio Stations, Radio Data Code Manual, Encyclopedia of Intelligence and Secret Services,* and more—including signal sound CDs, and analyzers and decoders.

One of the most popular offerings is the *2004 Super Frequency List on CD-ROM* (photo C). More than 40,000 entries cover both broadcast and utility stations. The CD connects easily to leading receiver control programs, and hundreds of fascinating, new full-color screenshots are included on the disc.

For more information, contact Klingenfuss Publications, Hagenloher Str. 14, D-72070 Tuebingen, Germany (tel. +49 7071 62830; e-mail: <info@klingenfuss.org>; on the web: <http://www.klingenfuss.org>). Note: The *Super Frequency List on CD-ROM* also is available domestically from the ARRL at <http://www.arrl.org/shop>.

New on the Net

Heavens Above. If you're interested in satellites or astronomy, you've come to the right place if you've checked out the Heavens Above website (fig. 3). It will tell you just where to look for objects in the heavens. The site is developed and maintained by Chris Peat, at Heavens-Above GmbH, and it features many new, customizable features.

The website's aim is to provide you with all the information you need to observe satellites and other space vehicles, as well as spectacular events such as the dazzlingly bright flares from Iridium satellites.

Heavens Above is an interesting and capable, user-friendly website. You plug in your city name (or latitude and longi-

where various satellites will appear. The website not only provides the times of visibility, but also offers detailed star charts showing the satellite's track through the heavens.

All of the site's pages, including the graphics, are generated in real-time and customized for your location and time zone. Frequent visitors will notice that the site has changed in appearance somewhat, and it also has added the option of user registration, to facilitate new, customizable features.

For more information, just go to <http://www.heavens-above.com>.

From the Bookshelf

Clouds Over Paradise. Thayer K. Miller, N3TM (ex-WA3EFH) let *CQ* know that he's completed writing *Clouds Over Paradise—An Around the World Adventure,* an account of his adventures when he was radio officer on the cruise ship *Yankee Trader.* He believes the book will appeal to you if you are interested in amateur radio, ocean sailing, travel, and high-seas adventure.

This "true story thriller" is an exciting account of a trip around the world, including places such as Seychelles, Kenya, Ethiopia, Sudan, Egypt, Denmark, Sweden, Norway, and Iceland. The book describes life on the cruise ship; ship operation; profiles of passengers, crew, and characters ashore; storms; and near tragedies at sea. The story is told in meticulous detail, based on original logs, diaries, and notes. The monumental work of 480,000 words is centered on the world expedition of 1973–1974. In it, the author experienced many exciting and dangerous adventures. The author also describes his amateur radio operation from the ship, and the vital role played by the international amateur radio fraternity in effecting his escape from dire circumstances.

The book is available on CD in PDF Windows® format. The first edition is $19.95 including s/h. Send your order and payment to Thor Press, P.O. Box 48, Harmony, PA 16037. The author may be contacted directly via e-mail at <thayermiller@hotmail.com>.

Radio Resources

BuyLegacy.com. The staff at BuyLegacy.com (fig. 4) has been selling hard-to-find and brand-name products not normally available elsewhere. The firm specializes in electronic, telecom, and network products. New inventory arrives weekly. All items are limited to stock on hand, and not all products are listed due to rapid inventory changes. You can e-mail the firm for any of your requirements you don't find on the website.

Products are sold and represented by manufacturers' original part number, so you need to confirm that the part number you plan to purchase meets your requirements. Detailed descriptions may not be available for all items for sale, so you may want to visit the manufacturers' sites for more data. If you don't see what you want, you can send BuyLegacy.com detailed specifications of the item you need, and they will attempt to find it.

The firm assesses a 15% restocking fee on all returned products. While there are no returns on software, defective products are gladly exchanged.

BuyLegacy.com also buys your exess, surplus, and obsolete inventory—any quantity, any condition, any brands. If you have something to sell, send your list with detailed part numbers, condition, location, and asking price.

For more information, contact BuyLegacy.com, 1786 La Costa Meadows Drive, Building 104, San Marcos, CA 92069 (760-891-0810; e-mail: <info@buylegacy.com>; on the web: <www.buylegacy.com>).

The K1CRA Radio WebStore. Craig Andersen, K1CRA, of the K1CRA Radio WebStore (fig. 5), features "quality products at amateur prices." Craig encourages you to browse his catalog and let him know if he can be of assistance. His ideas for products come from you, so he asks that you send in your ideas for new products, your "Gee, I wish" list, and questions or comments.

In perusing the website, I notice that one of the featured products is Liquid Electrical Tape, sold under the Performix® Brand name, by Plasti Dip International. Besides the tape, which many refer to as "Duct Tape in a Can"SM, Craig sells the Plasti Dip aerosol spray, thinner, primer, and other related products.

In case you haven't heard, the various Plasti Dip products are increasingly popular as a good vehicles to weatherproof connectors, repair cables, insulate, protect, or do just about anything with plastic. The website sports several pages that list many ways you can use the innovative Plasti Dip products.

For more information, contact The K1CRA Radio WebStore, 5435 South Abbott Road, Armor Plaza, Orchard Park, NY 14127 (telephone 1-888-248-3484; e-mail: <assistance@k1cra.com>; and on the web: <http://www.k1cra.com>).

We Get Letters

Before wrapping up things this month, we would like to acknowledge some of the good folks who took the time and trouble to correspond with us in recent months.

In no particular order, a tip of the ol' W8FX hat goes to Bob Raymond, NE1I; David Rosner, WA2MZZ; Ric Strachen, C6ANI; Charles Herbst, KE2SP; Scott Castonguay, KC7UOC; Tim Duffy, K3LR; Mac McMillian, W8XF; Ralph Bilal, WDØEJA; and all the rest who took the time to check in with us.

A special note: If you e-mail us, please include your full name and callsign, if any. It would be nice to know we're corresponding with a real person, and not just an e-mail address!

Short Bursts

Column Contributors Welcome! Are you, by chance, offering for sale a new product you'd like to tell us about and share with *CQ* readers? By all means, let us know what you're up to. While a polished, professionally prepared new-product announcement or "press release" would be most welcome, one certainly isn't necessary for an announcement of your product to appear in the "What's New" column. We can help you along the way. You can contact us by e-mailing your columnist at <w8fx@cq-amateur-radio-com>.

Also, if you think your new product might be a candidate for an advertisement in *CQ,* by all means contact the *CQ* Advertising Manager, Arnie Sposato, N2IQO. It's easy to advertise in *CQ,* and Arnie can help you develop a winning ad. Contact Arnie at telephone 516-681-2922, fax 516-681-2926, or by e-mail at <arnie@cq-amateur-radio.com>.

Wrap-Up

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

Overheard: Over the years I have found that breaking of the rules has unintended consequences—especially when it's my own rules that I've broken.

73, Karl, W8FX

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radio classics

BY JOE VERAS,* K9OCO

Phasing Sideband

Single-sideband, suppressed-carrier, as it was formally and properly known in its early days, has long been the dominant mode for voice communication on the amateur HF bands. It is rooted in a series of experimental transmissions at the Stanford University radio club in late 1947.[1] Papers and magazine articles followed, and the ranks of amateurs eager to try the new method of voice transmission grew. The mode's long proper name was soon truncated to *sideband* or, simply, *SSB*.

A single-sideband transmitter is a translator. It translates a frequency, or band of frequencies, in the audio spectrum to a frequency, or band of frequencies, in the RF spectrum. It generally can be said two methods exist for generating a sideband signal: filter and phasing. Commercial and homebrew rigs of both types were common through the 1950s, but commercially manufactured phasing transmitters are all but unheard of today. If your transmitter or transceiver was made during the last 35 or 40 years, it is most likely of the filter variety.

Photo A– The Central Electronics 200V phasing single-sideband transmitter was produced in 1961 and sold for $795. (Photos © Joe Veras, 2004, all rights reserved)

The Basics

How does each type work and what is the difference between them? Let's begin by stating some common goals. An SSB transmitter should (1) eliminate the carrier, (2) remove one of the two sidebands produced in the modulation process, and (3) deliver output on the desired frequency. Each type of generator meets these goals well, but does so in a very different way.

The filter method lends itself to the simplest, most easily visualized presentation. Fig. 1 shows the basic components and signal flow of such a transmitter. The speech amplifier may not only increase the level of the microphone signal, but also tailor its characteristics, sending *communications-quality* audio on to the next stage. The balanced modulator is a type of mixer. It has one input from the speech amplifier and another from an RF oscillator. In a filter-type sideband generator, this oscillator runs at a fixed frequency. When both RF and audio signals are applied to this balanced mixer, it produces sum and difference frequencies (upper and lower sidebands) mirroring the modulation, but the RF carrier frequency is canceled. This double-sideband, suppressed-carrier signal now goes to the filter, which has a bandwidth narrow enough to pass one sideband while slicing off the other. In our simple, block-diagram transmitter, the low-level single-sideband signal is sent to a mixer where the VFO heterodynes it to the operating frequency. One or more stages of linear amplification are usually required between this mixer and the coax connector for the antenna.

The phasing method is not necessarily more complicated; its block diagram has more blocks, though. Our simplified phasing transmitter (fig. 2) also begins with the microphone plugged into a speech amplifier. Even though the two types of sideband generators have this much in common, careful attention must be paid to what happens to the voice signal in the speech-amplifier stages of a phasing rig. The filter offers forgiveness for many sins, deliberate or unintentional, in the stages that precede it. Phasing rigs do not dispense such grace. The audio networks integral to this method are able to hold the required 90° phase shift over a frequency range of 300–3000 Hz, but not much beyond that. Therefore, it is important that the circuits be equalized for, or emphasize, frequencies within these limits. By happy coincidence, voice frequencies most effective in communication lie within these boundaries as well.

A real-life transmitter, more complicated than our block-diagram version, would likely have one or more audio stages in the speech amp/phase shift network/balanced modulator chain. It is important for these stages to have (1) stable gain, (2) identical phase shifts, and (3) very low distortion. Designers of early phasing rigs aimed for 1% Total Harmonic Distortion in the audio circuits of their transmitters, while a figure of 10% might have been acceptable practice in a filter-type rig.

*P.O. Box 1041, Birmingham, AL 35201
e-mail: <k9oco@cq-amateur-radio.com>

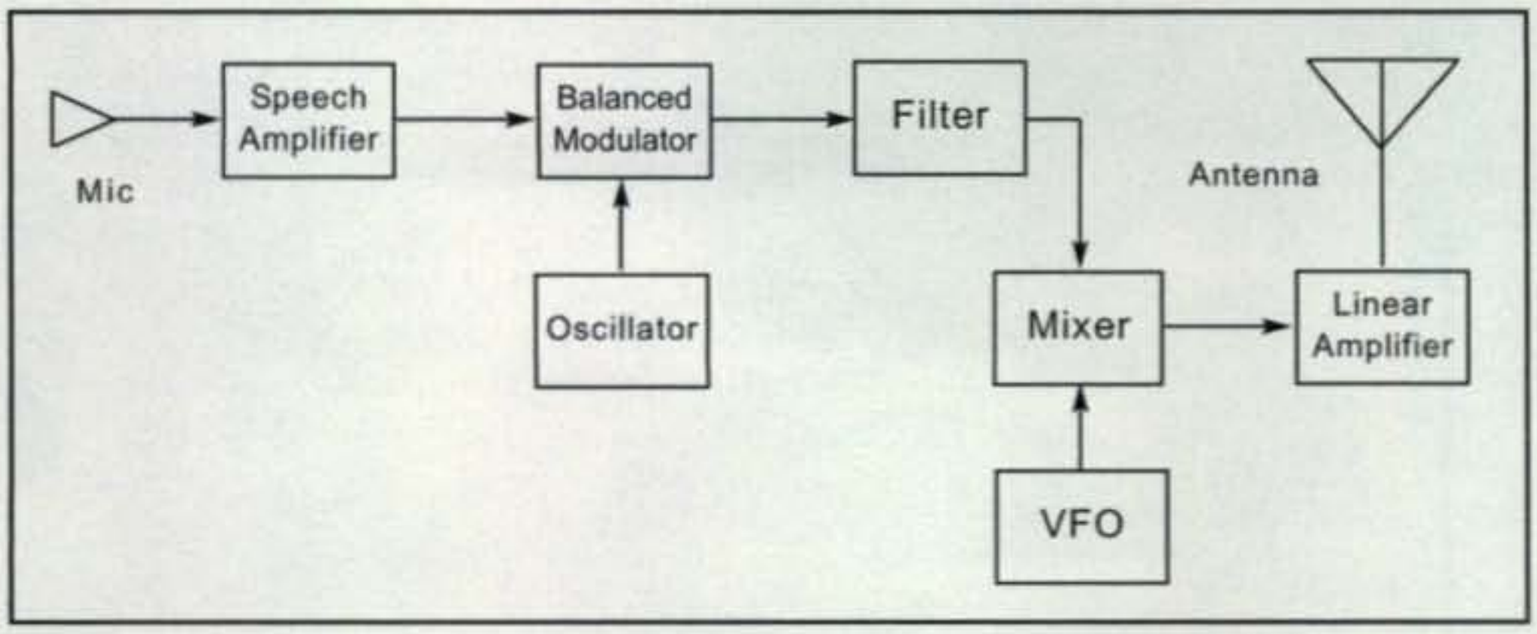


Fig. 1– Basic components and signal flow of a filter-type single-sideband transmitter.

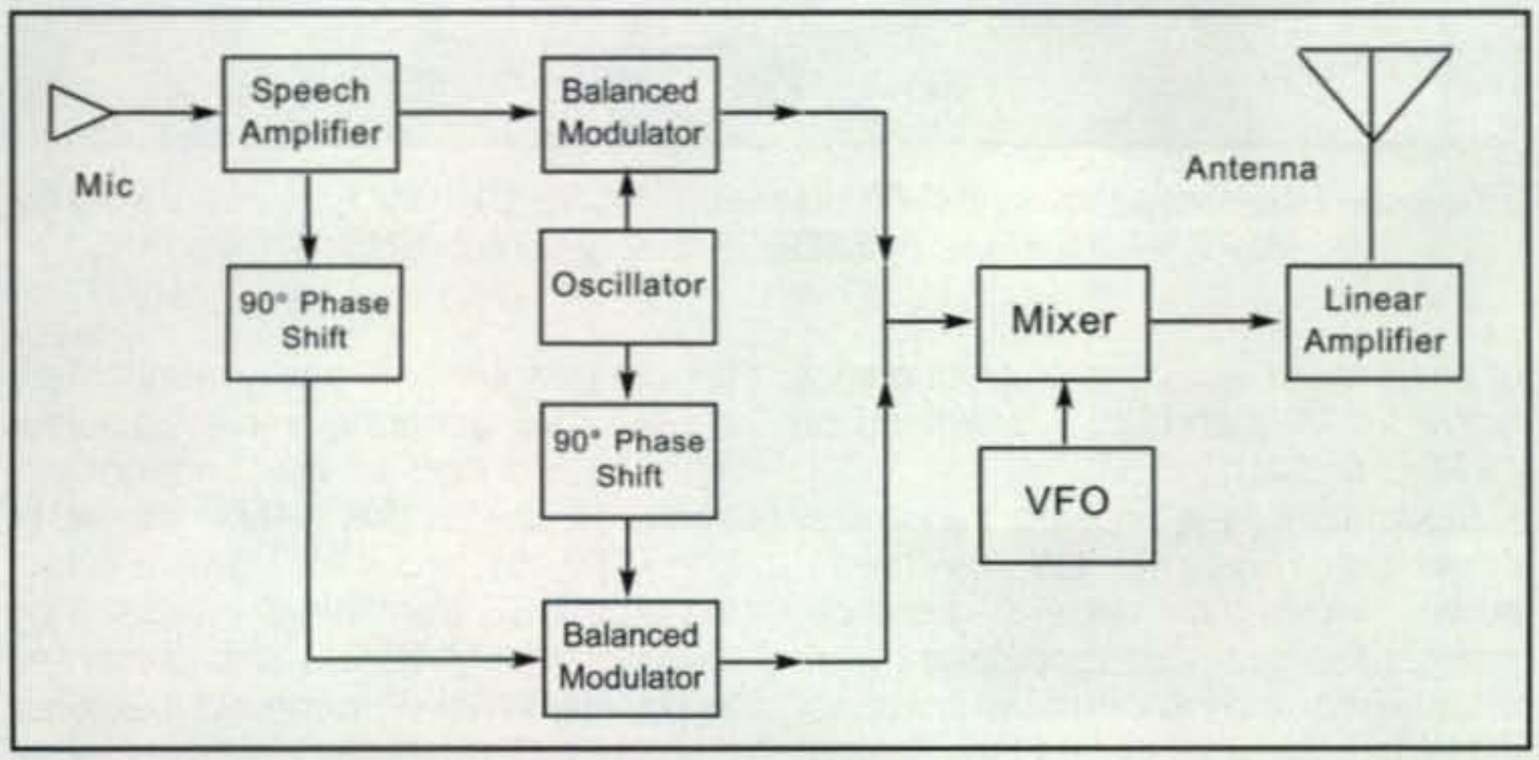


Fig. 2– Block diagram of a simplified phasing transmitter.

The balanced modulator functions as it did in the description of the filter transmitter, only now we have two of them. Audio and RF are fed straight to one balanced modulator, yielding a double-sideband, suppressed-carrier signal at its output. The signals from the speech amp and RF oscillator are also fed through separate 90° phase-shift networks before being applied to the second balanced modulator. The output from balanced modulator #2 will also be a DSB signal with suppressed carrier, but one of the sidebands (let's say the upper sideband for sake of this example) will be in phase with the upper sideband from balanced modulator #1 and its lower sideband will be out of phase by 180° from #1's lower sideband. When the balanced-modulator outputs are combined, the in-phase upper sidebands reinforce one another and the out-of-phase lower sidebands cancel out one another. Presto! Single sideband. Sideband selection, from upper to lower, in the output can be changed by reversing either the audio or RF connections to the balanced modulators.

Unless you choose to operate perpetually on only a single frequency (several groups come to mind), filter-type transmitters must generate sideband in one place and heterodyne it to another one or more times to reach the desired operating frequency. In theory, a phasing rig can generate its sideband right at the final output frequency, operating on much the same principle as a direct-conversion receiver. The difficulty encountered is maintaining a consistent 90° in the RF phase-shift network across the tuning range covered by the transmitter. I don't know of any commercial transmitters employing the technique, but homebrew projects have put this theory into practice.[2] Both filter and phasing transmitters have followed the pattern of generating SSB at an Intermediate Frequency, then mixing it with a signal from a fixed or variable oscillator. In sideband's early days, it was common practice to use a 9-MHz exciter and a VFO that tuned upward from 5 MHz. The sum frequencies (9 + 5 to 5.35) produced a 14- to 14.35-MHz output for the 20-meter band; the difference frequencies (9 – 5 to 5.5) resulted in 3.5- to 4-MHz coverage of 75 and 80 meters. This two-bands-for-the-price-of-one feature also created the convention

Photo B– Lakeshore Industries' Phasemaster II SSB/CW/AM transmitter sold for $279.50 in kit form or $329.50 factory-wired; 1955–57.

of using lower sideband on frequencies below 14 MHz and upper sideband on 14 MHz and above.

Modulation in a phasing transmitter could take place at full, on-the-air, power levels. In general practice, though, the balanced modulators work at low levels and the last stage in a phasing rig is a linear amplifier of the desired power input.

Transmitter Designs

The transmitter designs published by the early sideband experimenters most often used a filter. Commercially manufactured filters were available in the late 1940s, but most amateurs found their cost prohibitive. The published filter circuits weren't easily duplicated, either. They generally achieved selectivity by working at low frequencies, some as low as the 10-kHz range. In late 1950, the circuit for a 5-watt, phasing-type SSB transmitter designed by Don Norgaard, W2KUJ, and presented in *GE Ham News*[3] made sideband accessible to Everyham . . . at least those familiar with chassis punches and a soldering iron.

Norgaard's *SSB Jr,* as it was called, not only did away with AM phone's carrier and superfluous sideband, it didn't bring any frills with it, either. The transmitter didn't have a VFO, VOX, or much power, but it gave hams curious about the new mode an affordable place to start. Eldico introduced a commercial

Photo C– The Hallicrafters HT-37 was a phasing cousin of the company's HT-32 filter transmitter series; 1959–63, $495.

version of the circuit in early 1951, and much of Norgaard's transmitter design ended up in the Central Electronics 10-A (see "Radio Classics," *CQ*, September 2003) when it came on the market in 1953. Although the throne has long been vacant, Central Electronics reigned as king of the phasing realm. It followed the 10-A with an improved 10-B and a more capable 20-A. The real jewels in its crown were the 100V and 200V transmitters. A photo of the 200V leads off this month's column, fittingly right where it belongs among phasing rigs—up at the top. The Central Electronics product line included phasing receiver adapters, a Q-Multiplier, a VFO compatible with 9-MHz SSB transmitters, a modulation monitor scope, and a no-tune linear amplifier. The company was acquired by Zenith in 1959 and, sadly, was shut down by the industry giant a couple of years later.

Lakeshore Industries of Manitowoc, Wisconsin manufactured phasing SSB transmitters in the 1950s. Its first Phasemaster transmitters—9-MHz exciters all—hit the market in 1954, and the series continued through the Phasemaster II-B, last produced in 1958. Lakeshore also made accessories, including a receiving adapter and a VFO, as well as a couple of linear amplifiers. The Lakeshore Phasemaster II appears in photo B.

By the early 1950s, the factors that had driven experimenters away from filter rigs and toward phasing transmitters were fading fast. As the post-war economy improved, the price of filters mattered less. At the same time, filters were getting much cheaper. Surplus crystals finally were coming on the market and hams were making their own lattice filters. The same materials available to manufacturers were showing up in reasonably priced commercial products for those who didn't wish to "roll their own." When Collins entered the sideband market, the heart of all its gear was the company's own mechanical filter.

Except for equipment produced by companies specializing in the technology, such as Central Electronics and Lakeshore, most phasing transmitters had disappeared by the end of the decade. By the middle of the 1960s, all of them, including a couple of Hallicrafters holdouts, were gone.

On The Air

Around the beginning of this year, I decided to take phasing sideband personally. I have been on the air frequently with an all-phasing, only-phasing station pulled from my vintage-gear collection. My transmitter is a Hallicrafters HT-37 (photo C). On the market between 1959 and 1963, it was one of the last phasing transmitters. I believe its successor, the HT-44, was the last of the phasing rigs. The '44's production run ended in 1965.

Bringing the HT-37 out of mothballs, I was surprised to rediscover what a nice transmitter it is, certainly much nicer than anything I had during my own beginning adventures with single sideband in the early 1960s. The nearly $500 price tag might have had something to do with that. The HT-37 runs about 100 watts out with a pair of 6146s and covers 80 through 10 meters. Rather than a load-and-dip tune-up procedure, you tune the final-output circuit for maximum power on the front-panel meter. The transmitter is intended to work into 50 ohms, much like modern solid-state rigs. If the antenna presents a load much different from that, a matching network (antenna tuner) is in order.

Using a separate transmitter and receiver means going through the zero-beating process when you wish to talk to a station coming through the receiver's speaker. The transmitter is not automatically there, something we tend to forget after a couple decades' of constant use of transceivers. Sometimes, when the frequency excursions are large, the driver and final stages must be peaked, too. I eventually refined my technique so that all of these extra knob turnings do not take more than a few seconds, handy in case the station being pursued is rare DX. Another set of controls that are part of the basic tune-up process has not been seen on the front panel of transmitters since the end of the phasing era. The two small *Carrier Balance* knobs allow the operator to tweak the transmitter's 12AT7 balanced modulators and null out unwanted carrier.

Voice-control operation was a big selling point used by SSB evangelists seeking converts among the AM crowd during sideband's early days. One of them must have oversold Hallicrafters' engineers on the idea; the HT-37 has no provision for push-to-talk or even a footswitch. A simple PTT mod was published years ago, but the radio weighs 80 pounds and I have no desire to take it from its shelf in the hamshack and lug it downstairs to the workbench unless it is broken. The transmitter's VFO is capacitor-tuned and fairly linear in its coverage of 500 kHz per band segment. The tuning rate is slow enough to make the zero-beating process easy. It is sim-

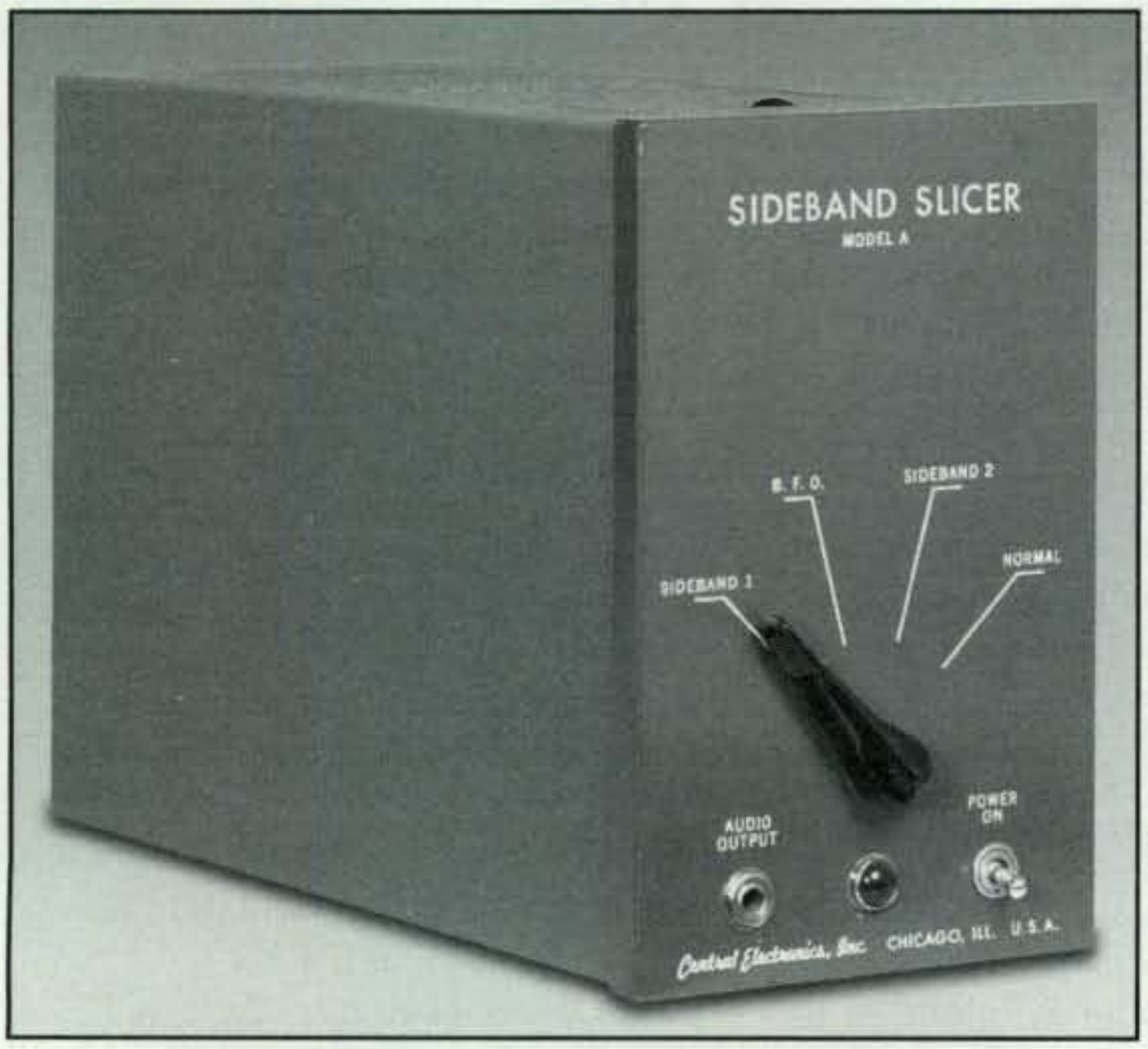


Photo D– Central Electronics sold its Model A Sideband Slicer as an outboard upgrade to give older receivers improved SSB selection and detection; 1955, $49.50 kit/ $74.50 factory-wired.

ilar to units in the company's HT-32 series, a tested and refined design.

Achieving the second half of my all-phasing, only-phasing station goal required phasing sideband selection on receive. My alternatives here were limited. My teenage sideband adventures used a Central Electronics Model B Sideband Slicer, a receiving adapter introduced in 1955 (see "Radio Classics," *CQ,* September 2003). The Sideband Slicer taps into the output of the host receiver's last IF stage, detouring the signal to its own detectors, phase networks, and audio stage before returning it to the receiver's audio output stage. Without going through the whole process again, complete with block diagrams, it may be sufficient to say the receiving adapter works on the same principle as the phasing transmitter—only in reverse. All these years later, in critical hindsight, I am disappointed Central Electronics didn't use a better detector setup or a crystal-controlled local oscillator, although I understand some of the tradeoff with regard to the oscillator.

I don't have a Model B Slicer now, but the Model A (photo D) in my collection is similar enough and I decided to use that. They are essentially the same thing, with the Model B Signal Slicer having a built-in Q-Multiplier. The NC-101X needed to duplicate my earlier station was not available either, so I chose an HRO to pair with the Model A Signal Slicer. Its National PW dial offers a similar look and feel; the band spread and relatively slow tuning rate are benefits on sideband. The receiver must be operated with the audio gain control advanced to near maximum and only enough RF gain used to provide copy of the desired signal. The receiver's AVC is turned off. In addition to the extra hands needed for the transmitter operation described above, an additional appendage would be welcome on the receiver side because it is necessary to "ride" the RF gain control while tuning across the band.

Once the T/R switching and receiver-muting issues were resolved and hard-wired, the first few contacts were made

with the new setup. I easily fell into a comfortable routine, operating much as I did more than 40 years ago. Some things have changed, though; I'm not stuck in a corner of my parents' basement anymore. My phasing-SSB operations over the past months have ranged from rag-chews on 75 meters to chasing DX on 20. Many stations have delivered compliments on my audio quality, then expressed surprise when I tell them my station dates from the Eisenhower era. That superb sound has always been a hallmark of phasing transmitters, and they are capable of delivering it if the operator pays proper attention to doing things correctly. The microphone I use with the HT-37 is an Astatic 10-DA, a high-impedance, dynamic mic with a response curve tailored for SSB communication. This presents the HT-37's speech amplifier with the range of audio frequencies it finds most useful. It is important not to run the gain of this stage too high. Over-driving the balanced modulators, sending them a distorted signal or audio with distortion products outside the operating range of the phase-shift networks, will result in a *terrible* on-the-air signal. Please, no speech processors!

In using this vintage setup, I have relearned the lesson that clean audio is a virtue unto itself. It is not only courteous, good practice, it gets through. I have been pleasantly surprised at the pile-up busting potential of a clean 100 watts and modest antennas. I'm not usually the first one through, but I don't find myself 20th in line, either.

Operating my phasing station over these past months set me to wondering if any company ever made a phasing *transceiver*. I couldn't think of one and a search of my own resources didn't turn up anything, so I turned to that most comprehensive vintage-radio knowledge base—the *Boatanchors* e-mail reflector. My inquiry there yielded nothing either, at least not in the technology and timeframe we list members consider relevant. Dave Thompson, K4JRB, pointed out that the PC-based Kachina transceiver of half-a-dozen years ago generated sideband using the phasing method. It did so using digital signal processing, however, not with plug-in B&W 2Q4 phasing networks or discrete components.

In Closing . . .

Many thanks to Jim Allen, NU6AM, and Herman Cone, N4CH, for their hospitality in hosting the photo sessions that made the pictures of the Lakeshore Phasemaster II and Central Electronics 200V, respectively, possible.

Visiting sideband's past has been both entertaining and instructional. This hobby can become too serious and driven; how easy it is to turn it into something besides a diversion from the things in life that are *supposed* to produce ulcers! I'm having a good time with vintage sideband and intend to explore other aspects of it. No hurry, though. Summer is on the way. Summertime, when the livin' is easy.[4]

73, Joe, K9OCO

Notes

1. On 21 September 1947, single sideband test transmissions were made from W6YX at Stanford University. Commercial radiotelephone and point-to-point services had been using sideband for a number of years prior to that, and there is some evidence of amateur sideband operation by W6DEI in the mid-1930s.

2. Rick Campbell, KK7B, "A Multimode Phasing Exciter for 1 to 500 MHz," *QST*, April 1993, pp. 31–37.

3. Don Norgaard, W2KUJ, "SSB Jr.," *GE Ham News*, November–December 1950.

4. Credit and apologies to George and Ira Gershwin.

vhf plus

BY JOE LYNCH,* N6CL

FCC Proposes Sweeping Changes to the Amateur Radio Service

On April 15, 2004, the FCC issued a cleanup Notice of Proposed Rulemaking (NPRM) concerning a dozen previous proposals for revamping the Amateur Radio Service (ARS). Known as WT 04-140, the NPRM has a comment deadline of June 15, 2004 and a reply comment deadline of June 30, 2004.

The NPRM addresses the following proposed changes to the ARS: revise the operating privileges of amateur radio operators in four high-frequency bands; permit auxiliary stations to transmit on the 2-meter amateur service band; permit amateur stations to transmit spread-spectrum communications on the 1.25-meter band; permit amateur stations to re-transmit communications from the International Space Station; allow amateur service licensees to designate the amateur radio club to receive their callsign, in memoriam; prohibit an applicant from filing more than one application for a specific vanity callsign; eliminate unnecessary restrictions imposed on certain equipment manufacturers; allow amateur radio stations in or near Alaska more flexibility in providing emergency communications; and eliminate unnecessary rules in the amateur radio operator license examination system.

Because the scope of this column is oriented to VHF and above, discussion of the proposed changes in the NPRM will focus on items relevant to that area. More extensive coverage of the whole NPRM will appear in *CQ* in next month's "Washington Readout" column.

Amateur Auxiliary Operations on 2 Meters. In 1997 Kenwood developed a system called Sky Command, in which the user controls a fixed HF station via a pair of dual-band transceivers. The system operates in full duplex, using a 70-cm frequency to transmit audio and control commands to a dual-band transceiver at the remote station and a 2-meter frequency to transmit received audio via the remote station's Sky Command transceiver to the operator's transceiver. Such operation came under the FCC's definition of auxiliary operations, which were only permitted on amateur radio frequencies above 222.15 MHz.

Here is the rub: When Sky Command was introduced, it used a special version of Kenwood's TH-79 dual-band HT, which operated on 2 meters and 70 cm. In response to the introduction of the product line, the ARRL refused to run ads for the Kenwood VHF and above rigs that enabled such operations, while at the same time continuing to run ads for equipment that could be controlled by the Sky Command system, such as the TS-570, TS-870, and TS-2000 transceivers. When Kenwood first asked for a blanket waiver of the rules restricting amateur auxiliary operations on the higher VHF and above frequencies, the ARRL and others took a position in opposition to Kenwood, citing the overcrowded condition of the 2-meter ham band. The FCC denied the waiver.

In response, Kenwood filed a petition for a change in the rules in which it requested specific frequencies on the 2-meter band (above 144.5 MHz, except 145.8–146.0 MHz) be authorized for auxiliary operations. Subsequently, the FCC issued an NPRM to deal with Kenwood's petition. Again, citing overcrowding on the 2-meter band, the ARRL and others opposed the petition. In the ensuing four years, the proposal languished. Now Kenwood's proposal has resurfaced in this NPRM.

What has changed in amateur radio operations in the past four years is that while the ARRL's *Repeater Directory* would lead one to believe that there is a huge amount of FM operations taking place on the VHF and above ham bands all across the country—in particular the 2-meter band, it being the workhorse frequency allocation—in reality, actual operations on these repeaters have declined significantly, to the point where at times in some metropolitan areas not a single repeater can be heard operating despite the *Directory* listing a dozen or more for that area.

On the other hand, with the increasing numbers of residential subdivisions prohibiting the installation of amateur radio antennas, and Broadband over Power Lines (BPL) looming as a potential threat to interfere with HF operations, there is a

VHF Plus Calendar

May 8 to Aug. 8	Six Meters Marathon (See text for details.)
June 3	Moon Perigee and Full Moon.
June 4–7	Six Club Contest (See text for details.)
June 6	Moderate EME conditions
June 7	*Arietids* meteor shower predicted peak
June 9	Last Quarter Moon; *Zeta Perseids* meteor shower predicted peak
June 12–14	ARRL June VHF QSO Party (See text for details.)
June 13	Poor EME conditions
June 17	Moon Apogee and New Moon
June 18–19	Ham-Com Hamfest (See text for details.)
June 20	Moderate EME conditions
June 25	First Quarter Moon
June 26–27	Field Day (See text for details.)
June 27	Moderate EME conditions; *Bootids* meteor shower predicted peak
June 28	*Delta Aquarids S* meteor shower predicted peak
June 29	*Beta Taurids* meteor shower predicted peak

—EME conditions courtesy W5LUU

e-mail: <n6cl@fuller.edu>

growing need to establish remotely controlled HF amateur radio stations that would be free of such restrictions and potential interference issues. Perhaps the time has come for this modification to the regulations, which will permit auxiliary transmissions on certain frequencies in the 2-meter band.

Spread Spectrum. In 1995, the ARRL proposed relaxation of FCC rules regarding spread-spectrum operations on VHF and above frequencies. Opposition to the ARRL's proposal was centered on the potential for the noise floor increasing on the bands in which spread spectrum would be permitted. In particular, weak-signal operators such as the Radio Amateur Satellite Corporation (AMSAT), Bill Tynan, W3XO, Ron Klimas, WZ1V, and others stated in their reply comments to the ARRL's proposal that spread spectrum would be disruptive to nearby stations that are using satellite or EME (earth-moon-earth) communications. Subsequently, in November 1999 the FCC relaxed the rules regarding spread-spectrum operations.

Two years ago, in the ARRL's so-called *Refarm* petition pertaining to the reallocating of Novice and Technician HF subbands, the ARRL also proposed that the FCC authorize the use of spread-spectrum communications in the 1.25-meter ham band. Citing improving technology and the successful acclimation of spread-spectrum communications on the existing UHF ham bands, the ARRL then asked for authorization on VHF, specifically in the 222–225 MHz ham band. In this NPRM the FCC is in apparent agreement with the ARRL for the use of this 3-MHz wide ham band. Going one step further, the FCC has also proposed the authorization in 4-MHz wide ham bands of 6 and 2 meters. Commenting on its proposal to authorize spread-spectrum communications on 6 and 2 meters, the FCC writes:

> It appears to us that because both of these bands are wider than the 1.25 m band, these two additional bands may be even more useful for SS experimentation than the 1.25 m band because more spectrum is available for spreading of the emissions. We also see no reason that the restrictions on SS emissions in other bands would not be sufficient to insure that amateur stations transmitting SS emission types do not impact the operation of other amateur stations in the 6 m and 2 m amateur bands. Additionally, we see no technical reason why we should propose authorizing amateur stations to transmit SS emissions in the 1.25 m band, but not the 6 m or 2 m amateur bands.

The ARRL's proposal received two comments, one in favor and one opposed. Frank Lynch, W4FAL, who is a Frequency Coordinator for the Southeastern Repeater Association (SERA), wrote in support of the ARRL's proposal, and Rich Eyre-Eagles, K7REC, who lives in Mesa, Arizona, wrote in opposition to the proposal, citing the possibility of interference to hams in southern California operating FM on the 1.25-meter ham band. It remains to be seen how the FCC's proposal to include 6 and 2 meters along with 1.25 meters will be received.

Retransmission of International Space Station Communications. In another cleanup proposal, the FCC plans to authorize the retransmission of International Space Station (ISS) communications on the amateur radio frequencies. This proposal came as a result of a December 2001 petition by the NASA John H. Glenn Research Center Amateur Radio Club, which requested that the FCC allow retransmission of communications between a manned spacecraft and its associated Earth stations. The proposal was inclusive of all space vehicles, including the ISS and space shuttles. In the past, the FCC had granted waivers for the retransmission of space-shuttle communications, ultimately amending the rules to allow the specific retransmission of the space-shuttle communications. It was the petitioner's concern, however, that because the ISS is not a shuttle, the retransmis-

sion of ISS communications may be a technical violation of the FCC's rules.

With eleven comments filed on the petitioner's proposal, eight were in favor, citing technical and educational reasons, and three were opposed, citing potential interference to other amateur radio communications. In an internal review, the FCC determined that there was no reason to not proceed with a proposed change that would allow retransmission of ISS communications. Furthermore, they concluded that rules regarding interference are already in place. Even so, they want comments regarding "whether any distinctions exist that should result in disparate treatment between the two retransmissions."

Unlicensed Operation in the 420–450 MHz Band. On January 2, 2002, Dr. Michael C. Trahos, KB4PGC, requested amendment of the Amateur Radio Service rules and the Personal Radio Service rules to authorize a service similar to the Family Radio Service (FRS) in the 420–450 MHz band. His justification was that radios programmed for a European Personal Mobile Radio (PMR) service, which operates between 446.0 and 446.1 MHz, were being illegally imported into the U.S. and subsequently are being used for personal unlicensed communications. Essentially, Trahos requested that the FCC legalize the use of the PMR 446 radios by visiting non-U.S. resident foreign nationals on a license exempt secondary basis to amateur service operations. With 120 respondents to the proposal, all of them opposed, the FCC has agreed with them and has declined to seek comments on the Trahos proposal.

Station Identification. In its Refarm petition, the ARRL proposed what amounts to an editorial correction to the definition of what constitutes identification of a repeater station. Stating that the regulations permit either voice or CW identification by repeater stations, it was the ARRL's contention that the absence of any reference to MCW could be construed as MCW not being allowed as a form of identification for a repeater station.

By contrast, the FCC doesn't seem to see that a problem exists, commenting:

> As an initial matter, we note that our Rules authorize an amateur station operating as a repeater to transmit a phone emission on any channel on which a repeater may transmit. Further, a station may transmit its call sign using a phone emission, which includes a MCW emission when it is transmitted for the purpose of identifying the station. Therefore, because our Rules permit an amateur station operating as a repeater to identify the station using an MCW emission, we find no reason to revise Section 97.119(b)(2) as requested by the ARRL.

Amateur Station Operation on the 902–928 MHz Band. It was not well known that the FCC restricts amateur radio operations on the 902–928 MHz ham band for amateurs living in certain areas in Colorado and Wyoming. In 1990, the FCC waived the restrictions by setting forth different slices of spectrum within the 33-cm ham band where amateur radio transmission may take place. These frequency allocations include the 902.0–902.4 MHz, 902.6–904.3 MHz, 904.7–925.3 MHz, 925.7–927.3 MHz, and 927.7–928 MHz frequency segments. This waiver was for an indefinite period.

In yet another part of its Refarm petition, the ARRL proposed that the FCC editorialize this wavier by incorporating it into the rules, "so as to make the operating limitations clear to all. The waiver grant was applicable to all radio Amateurs, and the benefits of it should be publicized as widely as possible."

The FCC agreed, writing: "We believe that inserting these limitations into our Rules is a reasonable manner to make these limitations known. For these reasons, we propose to amend Section 97.303(g)(1) as the ARRL requests."

Space Station Launch Notification. It is one of those rules that regularly got waived every time it was supposed to be applicable. Presently, the FCC requires the sponsors of a space station satellite to file with the Commission written pre-space-station notifications 27 and five months before initiating space-station transmissions, seven days following initiation of these transmissions, and no later than three months after termination of these transmissions. Historically, since the inception of these regulations none of the sponsors of the space stations were able to comply with these regulations. Accordingly, all have been granted waivers.

Addressing this problem became the undertaking of AMSAT, which filed a request with the FCC in December 2002 to amend the rules to require the filing of pre-space station notification information within 30 days after obtaining a launch commitment rather than 27 and five months before initiating space-station transmissions. In support of this request, AMSAT argued that amateur service licensees cannot comply with the 27-month notification requirement because secondary payload launch commitments, which amateur-satellite service space stations invariably fly as, rarely become available 27 months or more in advance.

In response to AMSAT's proposal, the FCC felt that 30 days was insufficient to provide adequate time for them to review the notification and make a determination as to its sufficiency. Therefore, its counterproposal is to require that pre-space notification be submitted within 30 days after the launch vehicle is determined, but no later than 90 days before the space station is integrated into the launch vehicle.

The FCC also expressed concern over debris mitigation plans of an amateur service space station. Essentially, the Commission was putting those who develop and sponsor space stations on notice that an insufficient plan for debris mitigation might result in modification of the terms of the license granted to the space station. To that end, it is seeking

comments as to how these concerns should be codified or dealt with in the new regulation.

Third-Party Communications. Of concern to those who operate packet and other forms of data transmission is the FCC's proposed change to the handling of third-party communications. First, in revising Section 97.115 of the rules, it proposes adding to the existing list of individuals who are not eligible to be third parties a former licensee whose license was not renewed after a hearing. Second, it proposes to clarify that only a station transmitting a RTTY or data emission may be automatically controlled while transmitting third-party communications.

Limitations Imposed Upon Manufacturers. While it is not of direct concern to the VHF and above operator, it is noteworthy that the FCC proposes to do away with its restrictions on the manufacturing of amplifiers capable of operating within the 24–35 MHz frequency spectrum. In addition, it proposes to do away with the restriction on the building of amateur radio RF amplifiers by amateurs, specifically what constitutes a kit for an amplifier. The FCC itself suggests eliminating this confusing and ambiguous regulation.

Public Service Communications. Of concern to the VHF operator is what is permissible communications. The FCC realizes that current regulations have the potential of hamstringing communications that may be necessary for the saving of lives and property. In response, it proposes to amend Section 97.111(a) to clarify "that amateur stations may at all times and on all channels authorized to the control operator, make transmissions necessary to meet essential communication needs and to facilitate relief actions." Also, it proposes to delete Sections 97.401(a) (concerning disaster communications) and 97.401(c) (concerning the priority given to disaster communications), as modification of Section 97.111(a) will eliminate the need to retain these two sections in the rules.

Radio Amateur Civil Emergency Service (RACES). In keeping with the changes in how the FCC handles emergency communications and its designation of certain frequencies to be voluntary emergency communications frequencies for particular disasters, the Commission no longer sees the need to designate certain frequencies for RACES communications. Therefore, it proposes the elimination of the designation of these frequencies.

Repeater Regulations. In another cleanup action to the regulations, the FCC proposes making the following editorial changes to the repeater regulations:

> The rules applicable to repeater stations are found in Sections 97.203(h) and 97.205 of our Rules. We will consolidate these rules in Section 97.205 by redesignating Section 97.203(h), a notification requirement applicable to a repeater within 16 km of the Arecibo Observatory, as Section 97.205(h). We believe that consolidating the rules in one section will simplify their use for licensees.

Technician Class Licensees and the VEC Program. Because there are no more unexpired Technician Class licenses with documents granted before February 14, 1991, the Commission proposes to revise Section 97.505(a)(9) to refer to only expired Technician Class license documents granted before February 14, 1991.

In addition, because of a quirk in the regulations, it is now possible for a former Technician Class licensee who was licensed prior to February 14, 1991 and who received credit for passing the code test to carry forward that credit to a future examination, while an expired Technician Class licensee who was licensed after February 14, 1991 cannot receive the same such credit. In commenting on this anomaly, the FCC wrote:

> We believe that an examinee who holds an expired Technician Class license and who has passed the telegraphy examination element should receive examination credit for this element regardless of when their Technician Class license was first granted. Therefore, we propose to add Section 97.505(a)(10) to our rules so that an examinee who holds a Technician Class license document granted after February 14, 1991, and who has documentation showing they have passed a telegraphy examination element, will receive examination credit for this element.

Finally, since Section 4(f)(4)(A) of the Act requires the preparation of an amateur radio operator examination by an amateur radio operator who holds a higher class of operator license than the class of license for which the examination is being prepared, the Commission will amend Section 97.507(a)(2) to remove authority for a Technician Class amateur radio operator to prepare a Technician Class operator license examination.

If you are interested, copies of the 71-page document may be downloaded at the following addresses:

Word: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-79A1.doc>;

PDF: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-79A1.pdf>;

Text: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-79A1.txt>.

Current Contests

May–August: The **Six Meters Marathon 2004** is open to all amateur radio operators worldwide. The objective is to work as many DXCC entities as possible on 6 meters between 8 May (0000 UTC) and 8 August (2400 UTC). The results will be continuously updated at <http://www.50mc.tk>. For more information, contact Hannu Saila, OH3WW, e-mail: <marathon@saila.org>.

June: The major **Six Club Contest** will be the first weekend in June, from 2300 UTC, June 4 to 0200 UTC, June

7. All logs are due 30 days from ending date of the contest and they go to <w4wrl@aol.com>. For more information see <http://6mt.com/contest.htm>.

ARRL June VHF QSO Party: The dates for this contest are June 12–14. Complete rules are in the May issue of *QST*. Rules can also be found on the ARRL website: <http://www.arrl.org>. Many are making plans to activate rare grids. For the latest information on grid expeditions, check the VHF reflector (vhf@w6yx.stanford.edu) on the internet. This is a very popular VHF contest. For weeks in the run-up to the contest postings are made on the VHF reflector announcing rover operations and grid expeditions. It is a contest that will create plenty of opportunities to introduce the hobby to your friends who are not presently working the VHF-plus bands or who are not hams.

SMIRK Contest: The SMIRK 2002 QSO Party, sponsored by the Six Meter International Radio Klub, will be held from 0000 UTC June 19 to 2400 UTC June 20. This is a 6-meter-only contest. All phone contacts within the lower 48 states and Canada must be made above 50.150 MHz; only DX QSOs may be made between 50.100 and 50.150. Exchange is SMIRK number and grid square. Score 2 points per QSO with SMIRK members and 1 point per QSO with nonmembers. Multiply points times grid squares for final score. Awards are given for the top scorer in each ARRL section and country. Send a legal-size SASE for a copy of the log forms. Log requests and logs should be sent to Pat Rose, W5OZI. Logs should be sent by August 1 to Pat at P.O. Box 393, Junction, TX 76849-0393. For more information see <http://www.smirk.org>.

Field Day: ARRL's classic, Field Day, will be held on June 26—27. Complete rules for this contest can be found in *QST* and at <http://www.arrl.org>. In years past, great European openings have occurred on 6 meters. Also, as happened in 1998, tremendous sporadic-*E* openings may occur. Certainly, this is one of the best club-related events to involve new people in the hobby.

July: CQ WW VHF Contest, July 17–18, 6 and 2 meters only. See the rules elsewhere in this issue.

Convention

The annual **Ham-Com** hamfest will be held June 18–19 in Arlington, TX. As always, the North Texas Microwave Society will present a microwave forum. For further info, see the Ham-Com website: <http://www.hamcom.org/>.

Calls for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings*, or both. For more information, questions about format, media, hardcopy, e-mail, etc., contact the person listed with the announcement. To date this year the following organizations or conference organizers have announced calls for papers for their forthcoming conferences:

The 11th **International EME Conference** will be held on the campus of the College of New Jersey, in Ewing, NJ, August 6–8. Submit your proposed paper/talk topic as soon as possible to Marc Franco, N2UO, at <eme2004@qsl.net>.

The 2004 **TAPR/ARRL Digital Communications Conference** will be held September 10–12 at the Airport Holiday Inn in Des Moines, IA. You'll find more conference information on the web at <http://www.tapr.org/dcc/>. Send your submission by August 10 to: Maty Weinberg, ARRL, 225 Main St., Newington, CT 06111, or via e-mail to <maty@arrl.org>.

The **Microwave Update** conference dates are October 14–16, and it will be held in the Dallas-Ft. Worth area of Texas. The contact person is Kent Britain, WA5VJB, at <wa5vjb@cq-vhf.com>. Material must be submitted to Kent no later than August 16. For more information, see the North Texas Microwave Society's URL: <http://www.ntms.org>.

Current Meteor Showers

Between June 3 and 11, the *Arietids* meteor shower once again will be evident. This is a daytime shower, with the peak predicted to occur on June 7 at 0400 UTC. Activity from this shower will be evident for around eight days, centered on the peak. At its peak, you can expect around 60 meteors per hour traveling at a velocity of around 37 km/sec (23 miles per second). On June 9 the *Zeta Perseids* is expected to peak at around 0100 UTC. At its maximum, it produces around 40 meteors per hour. On June 28 the *Delta Aquarids S* shower is expected to peak. The *Bootids* is expected to make a showing between June 26 and July 2, with a predicted peak on June 27 at 1930 UTC. On June 29 the *Beta Taurids* is expected to peak at around 0800 UTC. Because it is a daytime shower, not much is known about the stream of activity. However, according to the book *Meteors* by Neil Bone, this and the *Arietids* are two of the more active *radio* showers of the year. Peak activity for the *Beta Taurids* seems to favor a north-south path.

And Finally . . .

As you have read in this column, there certainly are a number of changes—both major and minor in nature—which the FCC proposes. It is a lot to digest and then comment on by June 15, 2004. Even so, your comments count. Please take the time to make them before it is too late.

Until next month... 73 de Joe, N6CL

Announcing:

The 2004 CQ World-Wide VHF Contest

Starts: 1800 UTC Saturday, July 17, 2004
Ends: 2100 UTC Sunday, July 18, 2004

I. Contest Period: 27 hours for all stations, all categories. Operate any portion of the contest period you wish. (*Note:* Exception for QRP Limited.)

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

III. Bands: All authorized amateur radio frequencies on 50 MHz (6 meters) and 144.00 MHz (2 meters) may be used as authorized by local law and license class.

IV. Class of Competition:

For all categories: Transmitters and receivers must be located within a 500 meter diameter circle or within the property limits of the station licensee's address, whichever is greater. All antennas used by the entrant must be physically connected by wires to the transmitters and receivers used by the entrant. Only the entrant's callsign may be used to aid the entrant's score.

1. Single Op—All Band. Only one signal allowed at any one time; the operator may change bands at any time.

2. Single Op—Single Band. Only one signal allowed at any one time.

3. Single-Op All-Band QRP. There are no location restrictions – home or portable – for stations running 10 watts output or less.

4. Single-Op QRP Portable Limited. This is the "Hilltopper" QRP category for all-band portable stations, who are limited in time to a maximum of 6 hours continuous. Backpackers and portables who do not want to devote resources and time to the full contest period are encouraged to participate, especially to activate rare grids. Any power source is acceptable.

5. Rover. A Rover station is one which is manned by no more than two operators, travels to more than one grid location, and signs "Rover" or "/R" with no more than one callsign.

6. Multi-Op. A multi-op station is one with two or more operators and may operate 6 and 2 meters simultaneously with only one signal per band.

Stations in any category, except Rover and QRP Limited, may operate from any single location, home or portable.

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

VI. Multipliers: The multiplier is the number of different grid locators worked per band. A "grid locator" is counted once per band. *Exception:* The rover who moves into a new grid locator may count the same grid locator more than once per band as long as the rover is himself or herself in a new grid locator location. Such change in location must be clearly indicated in the rover's log.

A. A rover station becomes a new QSO to the stations working him or her when that rover changes grid locator.

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

VII. Scoring: One (1) point per QSO on 50 MHz and two (2) points per QSO on 144 MHz. Work stations once per band, regardless of mode. Multiply total QSO points times total number of grid locators (GL) worked.

Rovers: For each new grid locator visited, contacts and grid locators count as new. Final Rover score is the sum of contact points made from each grid locator times the sum of all grid locators worked from all grids visited.

Example 1. K1GX works stations as follows:

50 QSOs (50 × 1 = 50) and 25 GL's (25 multipliers) on 50 MHz

35 QSOs (35 × 2 = 70) and 8 GL's (8 multipliers) on 144 MHz

K1GX has 120 QSO points (50 + 70 = 120) × 33 multipliers (25 + 8 = 33) = 3,960 total points.

Example 2. W9FS/R works stations as follows:

From EN52: 50 QSOs (50 × 1 = 50) and 25 GL's (25 multipliers) on 50 MHz

From EN52: 40 QSOs (40 × 2 = 80) and 10 GL's (10 multipliers) on 144 MHz

From EN51: 60 QSOs (60 × 1 = 60) and 30 GL's (30 multipliers) on 50 MHz

From EN51: 20 QSOs (20 × 2 = 40) and 5 GL's (5 multipliers) on 144 MHz

W9FS/R has 230 QSO points (50 + 80 + 60 + 40) × 70 multipliers (25 + 10 + 30 + 5) = 16,100 total points

VIII. Awards: Certificates suitable for framing will be awarded to the top-scoring stations in each category in each country. Certificates may also be awarded to other top-scoring stations who show outstanding contest effort. Certificates will be awarded to top-scoring stations in each category in geographic areas where warranted.

Geographic areas include states (U.S.), provinces (Canada), and countries, and may also be extended to include other subdivisions as justified by competitive entries.

Unique, handsome plaques will be awarded to the highest scoring stations. For more information on the CQ VHF Contest Plaque Program see <http://www.cqww.com/VHFplaques.htm>.

IX. Miscellaneous: An operator may sign only one callsign during the contest. This means that an operator cannot generate QSOs by first signing his callsign, then signing his daughter's callsign, even though both callsigns are assigned to the same location.

A station located exactly on a dividing line of a grid locator must choose only one grid locator from which to operate for exchange purposes.

A different multiplier cannot be given out without moving the complete station at least 100 meters.

Making or soliciting QSOs on the national simplex frequency, 146.52 MHz, or your country's designated national simplex frequency, or immediately adjacent guard frequencies, is prohibited. Use of commonly recognized repeater frequencies is prohibited. Recognized FM simplex frequencies such as 146.49, .55, and .58, and local-option simplex channels may be used for contest purposes.

Aeronautical mobile contacts do not count.

Contestants should respect use of the DX window, 50.100–50.125 MHz, for intercontinental QSOs only.

UTC is the required logging time.

X. Log Submissions: Log entries must be submitted by September 1, 2004 to be eligible for awards. Submit your electronic log in the Cabrillo format created by all major logging programs. Send via e-mail attachment to <cqvhf@cqww.com>. Subject line: Callsign [used in the contest] only.

Those using paper logs are urged to utilize "web forms," which allows you to transcribe your logs for entry on-line and automatic Cabrillo submission. Web forms can be found at <http://www.b4h.net/cabforms/cqwwvhf_cab.php>.

For those without e-mail access, paper logs may be submitted to: CQ VHF Contest, 25 Newbridge Rd., Hicksville, NY 11801 USA. Questions may be sent to <vhf-questions@cqww.com>.

contesting

BY JOHN DORR,* K1AR

Fisher . . . A Memorial

June's Contest Tip

Here is a simple operating tip to try in the next contest. Do you ever consider asking a station you're working how your operating frequency sounds on his end? What may seem as being completely clear for you, may be QRM-ridden on the other end. A simple question that results in a slight movement in frequency can have dramatic results in your run rate. This is not a question that needs to be limited to SSB, either. After all, these problems can exist on CW as well. A five-second conversation may add many QSOs to your score!

Calendar of Events

May 22–23	Baltic Contest
May 29–30	Great Lakes QSO Party
May 29–30	**CQ WW CW WPX Contest**
June 5–6	RSGB National Field Day
June 12	Asia-Pacific Summer SSB Sprint
June 12–13	ANARTS WW RTTY Contest
June 12–14	ARRL June VHF QSO Party
June 19	Kid's Day Contest
June 19–20	All Asian CW DX Contest
June 19–20	West Virginia QSO Party
June 19–20	SMIRK Contest
June 26–27	ARRL Field Day
June 26–27	King of Spain SSB Contest
July 1	RAC Canada Day Contest
July 3–4	Venezuela Ind. Day Contest
July 10–11	IARU HF World Championship
July 17–18	**CQ WW VHF Contest**

As we grow older, we usually benefit from the investments we've made in our lives. Hopefully, our financial situation is strong. We begin to enjoy the freedom from the responsibility of caring for children who have moved on, although that is often short-lived with perhaps a new crop right on their heels. We treasure life-long relationships in new and exciting ways. All of this discussion, however, is hardly the basis for a contest column. . . . or, is it?

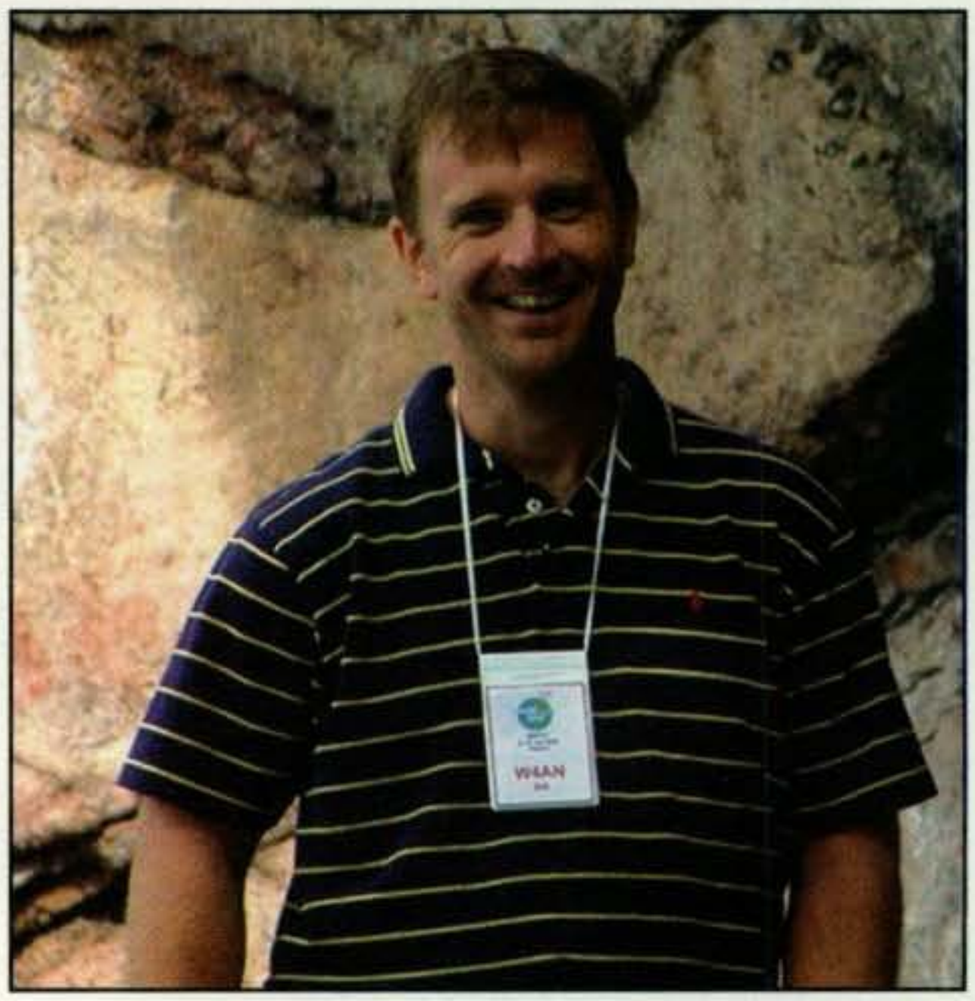
Many of you often have heard me say that one of the primary reasons why contesting has had such staying power for me has little to do with the on-the-air aspects of the sport. Sure, who can turn down the opportunity to run stations at staggering speeds or operate at some of the world's finest contest stations? However, like most aspects of life, our interests center on healthy relationships. After all, contesting would be a dull endeavor indeed if you never had the chance to talk about it with others who share your interest. The same is true for any activity in life, whether it be work, home life, or following your favorite football team.

Thus, as I write this month's column, I grieve. Not because I'm sitting here feeling sorry for myself, but because contesting lost one of its finest—Bill Fisher, W4AN, known to his friends simply as "Fisher." To be honest, I really don't remember the first time I met Bill. Isn't it funny how that works with so many people? There's no doubt, however, that he occupied a significant place in the fabric of my contest experience, going back at least 10–15 years.

As it has turned out for so many, Bill connected with the cognoscenti of contesting, beginning his contest career as KM9P back in the days of K4VX in Hannibal, Missouri. He had that intense competitive spirit that was infectious. As you got to know Fisher, you wanted to know him even more. Understanding Bill's desire for excellence was a science in itself, and anyone who was part of the Fisher experience quickly learned that this desire went way beyond ham radio. In many ways, Bill's strengths were his weaknesses, too. Whether it was his passion for bike riding, business, or family, Bill did not understand the concept of doing things halfway.

Bill Fisher was a doer. It was all he knew. Whether it was his world-class contest station up in the mountains of Dahlonega, Georgia, or the incredible contributions that came from his founding of <www.contesting.com> and <www.eham.net>, Bill got stuff done.

I grew to know and understand Bill in a big way during the early '90s when we used to talk on the telephone almost daily. Bill and I were very similar. In our own ways, we would even compete on the telephone. As a CQ WW contest would start to appear on the summer's radar, the "head games" would begin as I reminded him that no one could possibly win that contest from Georgia. Of course, that only fueled an even greater competitive spirit in Bill, a spirit that resulted in his winning the CQ WW CW Contest in 1999. At that point, I had had quite a ride in single operator contesting, benefiting from the combination of operating in the Northeast and using K1EA's superstation to do it. I'll never forget that moment on 3830 when I report-



Bill Fisher, W4AN. (Photo courtesy Bob, N6TV)

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e-mail: <K1AR@contesting.com>

ed my score, confident of winning the contest and putting that upstart from Georgia in his rightful place. As Bill read off his score, I remained certain that all was well . . . until he got to 40 meters. How could I have lost by 400 QSOs? However, then 20 meters came and I pulled into the lead again, only to learn that Bill had crushed me on 15 meters. When it was all said and done, I lost by 300K (see Table I), making this contest one of Bill's greatest achievements in contesting. We talked about it for years afterward and even gave a joint presentation at the Dayton Hamvention® Contest Forum, including a fake "fist fight" at the end. But that was and is what friendships are all about, and that's the Bill Fisher so many of us got to know and love.

A Proud Guy

In a lot of ways, Bill Fisher was too stubborn for his own good. He didn't accept help very often on any level. That first became obvious to me when I had the chance to visit his contest station up in the mountains of Georgia. As we drove to a place that was miles from civilization (after all, his neighbor was the U.S. Park Service), the antennas appeared on the horizon like the sun rising to the east. It was truly a memorable sight as tower after tower came into view. Bill then proudly told me he had constructed the entire site by himself, with the exception of the 40 meter Yagi. That was a staggering claim made to someone who can sometimes get flustered by the challenges of an 80-meter dipole in the trees. However, this was the quintessential Bill Fisher we all respected.

Bill displayed his independence in everything he did. While he did seek advice and input on his internet venture, Spoke Technology, he never asked for anything else. His maintenance of his contest websites was a labor of love, not a labor of profitability. Only on rare occasions did he ever ask for financial assistance. That was Fisher.

Band	QSOs	Zones	Countries
160	41	17	32
80	165	24	71
40	1274	33	100
20	772	36	106
15	1037	35	110
10	1083	32	107
Total	4372	177	526

W4AN Final Score: 8,925,991

Band	QSOs	Zones	Countries
160	26	10	17
80	336	22	76
40	849	30	95
20	1044	38	116
15	865	36	113
10	1118	31	107
Total	4238	167	524

K1AR Final Score: 8,600,186

Table I– W4AN/K1AR claimed scores in the 1999 CQ WW CW Contest.

Many Just Didn't Know Him

While Bill had a lot of friends, there was a sea of people who really didn't know him. In many ways, Bill was a private person, keeping his challenges of life to himself, yet quietly contributing in ways that we're still trying to fathom. Shortly after Bill's death, Bob, KØDD, wrote the following tribute. I want to share it with you, as it epitomizes how people felt upon hearing the news:

Gentlemen,

I don't know if I have the right to enter my comments here in Bill's memorial. We were not close friends; we didn't IM each other daily. We didn't even pick up the phone and call each other on Christmas Eve.

Bill was the young upstart, seven years my junior. He was one of the new guys in contesting, starting his rise while I was on top of my form. He was the 50 over 9 signal up the band while I was trying to put another notch in my Grip.

I'm out here in South Dakota, off the beaten trail. I make my ham acquaintances at places like Dayton. We'll all recognize callsigns, tip a few beers, and talk about the big one that got away or was snagged late, late at night.

For me, my Dayton friends and their mutual respect are what makes all the hard work in contesting, DXing, and building big stations worthwhile. Bill was one of those guys. A smile on his face, twenty minutes of conversation once a year, a tip of a drink, and a nod of his head in recognition is that special spot he held with me. What this young upstart became was a real cool guy. He built his place in history and filled it well. He had many loving friends who will miss his presence. For me Dayton will never be quite the same.

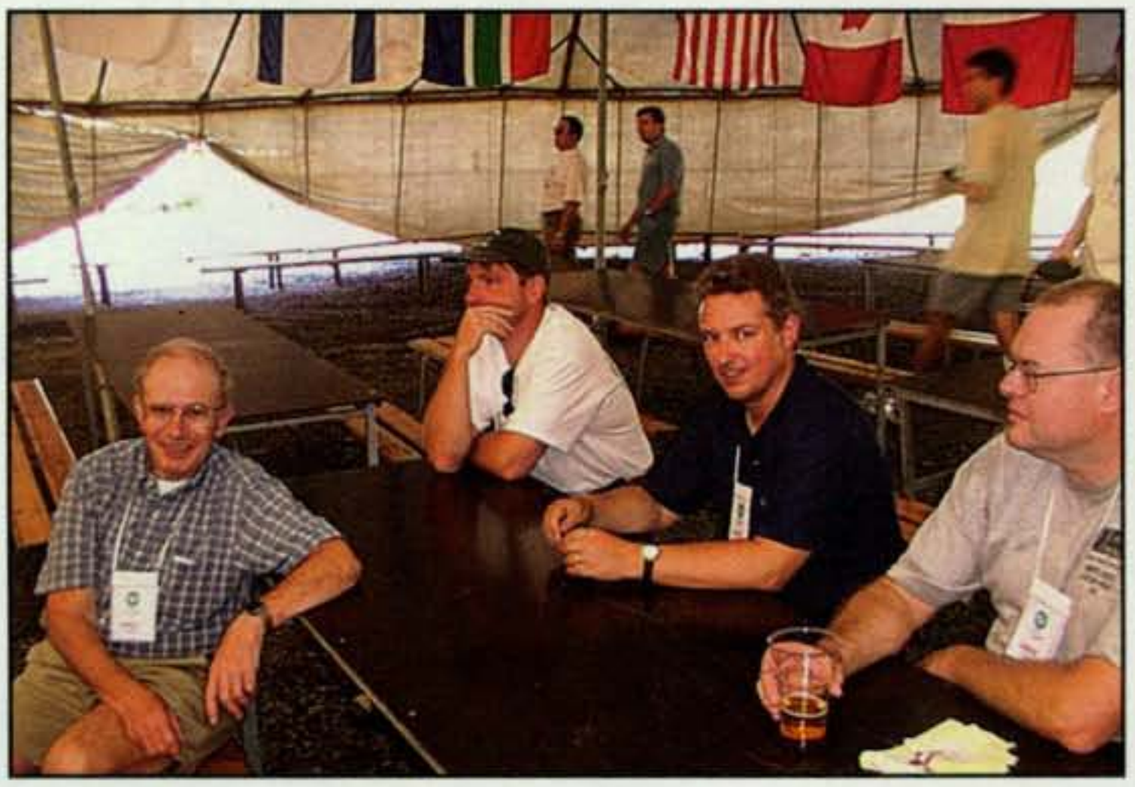
I can only feel he's in a better place—no QSB, DX always Q5, 2 QSOs ahead of the competition, funds and space to build to his wildest imagination, and the respect of those who passed before him. I am honored to have known him, and impressed by the love and respect shared by his closest friends.

W4AN, RIP, until we meet again. Then, you'd better move up 2!

Bob Bonner, KØDD

A Final Tribute

I've only scratched the surface on the one we called Bill Fisher. Bill was as complex as a fine wine, and not unlike a vintage wine, Bill, too, improved with age. Fisher was brash and opinionated, but you always knew where you stood. He had a low tolerance for complacen-



When it came to contest preparation, it was all business for Bill, W4AN, as seen in this photo taken at WRTC 2002 in Finland. Left to right: K6LL, W4AN, K1TO, and N5RZ.

cy, and that, too, was infectious. He was serious about his sport but also knew how to smile.

It's no surprise that on the day of his memorial service in Atlanta, 100 hams (and hundreds of others) arrived to pay their last respects. Bill deserved every bit of those accolades, although he would have hated every minute of the spotlight. That was Bill Fisher—competitor, contributor, businessman, and friend.

Contest Errata

The following are **2003 CQ WW WPX Contest** corrections and omissions:

CW

NG6O was omitted from the USA Multi-Two listing. They finished #2 in the U.S.

OH1F and LY4CW were omitted from the Europe Multi-Two lisiting. OH1F finished #3 and LY4CW finished #4 in Europe.

W4SVO was omitted from the Top USA 21 MHz listing. He finished in 5th place.

SSB

N4SEA was incorrectly listed in the USA 4th district. He should have been listed in the 8th district.

The operators at K8UP were K8UP and K8KHZ.

CQ WW DX CW Contest All-Time Records

In the September 2003 issue of *CQ*, on page, 38, CT8T (op. OH1NOA) should have been listed as the new CW Single Operator, All Band, High Power European record holder with a score of 7,416,123 in the 2002 contest.

What follows is a brief piece written by Ward Silver, NØAX, that I had the honor of reading at Bill's service:

When I saw the title of the e-mail, W4AN SK, my heart skipped a beat. I just couldn't possibly be seeing it right. It had to be some strange Charles Dickens-like vision, a blot of mustard, a piece of undigested gruel. But there it was, undeniable in black and white. I read Trey's message several times, trying to get my mind to accept it. However, reluctantly, here we are.

Fisher. All you had to say was "Fisher." What sprang to mind in rapid succession was "top ten operator, station builder, internet wiz, visionary, mentor, friend"—and that's just to those of us in the radio game. He had several other lives all burning as brightly at the same time. Fisher was amazing and set standards to which many of us vainly aspire. What hole in the fabric of the universe allowed that much energy to pour out through one guy? He was just fun to watch, the handsome devil, as he gobbled up whatever he chose to do.

Now the door is closed and we will see our clever magician no more. Not on the air, not in a cleverly turned e-mail, not on the phone, and not at two in the morning having a laugh in the halls of the Crowne Plaza. Those jobs are left to us. The ripples—no, waves—marking Fisher's wake will echo for a long time across our radio sea. It is up to us to keep his vision burning, and this we shall do as friends who cared and now share our sadness. So long, and thanks for it all—Fisher.

(thanks, Ward, NØAX)

While it's now time to say goodbye, we all can take heart in knowing that Bill set the gold standard for measuring success. We can only hope that when our day comes, our peers will look at us in some small way with the same level of respect that's been given to Bill in recent weeks.

So long, dear friend. We'll be talking soon on another band. . . . RIP, de John, K1AR

Final Comments

While I know that I'm probably going to have to write more of these types of columns rather than less, I can only hope that we will have an "off-time" from the task for a while. If you didn't see my column on personal heroes (September 2003), I suggest you dig it out and think about those you respect and make sure you let them know it while they are still with us. I know in my case, I wish I could have told Bill Fisher where he stood just one more time.

That's all for this month. The warm weather is here in the northeast, and I have an 80-meter 4-square to put up over the next few months. See you in the summer contests. 73, John, K1AR

BY CARL SMITH,* N4AA

On-the-Air Practices

Visalia and the Dayton Hamvention® are behind us now, and we're looking forward to the summer vacation period—at least here in the U.S. Warmer temperatures also will finally let us get out and repair all the winters damage to the antennas, build new ones (especially for the low bands), and get ready for the operating activities of the summer season.... You know, Field Day, IARU contest, etc.

Major DXpeditions to Rodrigues (3B9C) and Banaba (T33C) have come and gone, although they are still ongoing as I write this. More YA and YI stations show up every week. Remember when these two were way up on the Most Wanted lists? More DXpeditions are in the planning stages, but we'll have to wait awhile until the plans are firm enough for any announcements to be made about them. You will really appreciate at least a few of those which have been "rumored" to me.

Have you worked J., VY1JA? He's usually one of the very few available to pass out that much needed Yukon/NWT multiplier in contests. Not only does he like contesting, J. also participates in another activity—TaeKwon-Do. Here J. (on the right) is being presented with his 4th Dan Certificate from Grand Master S. L. Kopperrud on April 3rd. J. says, "This is another, and very important, part of who I am." (Congratulations, J.) (Photo courtesy of J. Allen, VY1JA, and Steve, N3SL)

Operating Ethics

I guess in recent years I've gained somewhat of a reputation as being a "nut" about operating ethics. I get e-mail quite often on some aspect of operating procedures, etc., urging me to comment on this or that. Recently, a few of them came up that I thought merit some commentary.

Giving Callsigns. I remember getting one of those famous FCC "Pink Tickets" decades ago. I was cited for "failure to give the callsign of the station being called." What could I say in response? I was guilty! I was doing what we all do today—jump into a pile-up and just give your call (but *never* only the last two letters). The station comes back to me, gives me a report, and I go back with "TU 599 N4AA." *Rarely,* if ever, do we hear the "proper" exchange of callsigns in a DX QSO, most particularly with a DXpedition, and even more during contests. We are making a big *assumption* that we really worked that station. If we didn't fully exchange callsigns, etc., it could be he really worked someone else. This doesn't happen often, but it happens. Oh, yeah, here we go . . . "It's a waste of time" . . . "It serves no purpose" . . . and on and on. Virtually all of us have joined the *me now* crowd that doesn't have time to do the whole thing to make it "right."

Oh, I forgot to mention that some 15 years after that first "Pink Ticket" I got another one. Guess what it was for? Yep, "failure to give the callsign of the station being called." I had done it again! I later found out that I wasn't the only one that time. Hundreds of citations were sent for the same offense, all coming from the same pile-up. It wasn't much later when the FCC modified the rules and we were "allowed" to use the common practice of just signing our call. It's still a little "iffy," but they let us get away with it nowadays. Good or bad? Well, everyone is going to have an opinion on that one, so just let your conscience be your guide.

"DX Frequencies." Another item that recently came up concerns the "DX frequencies." You know the ones—14195, 21295, and 28495 for SSB, and 14025, 21025, and 28025 for CW. I'm not sure how these came to be known as "DX frequencies," but I'm sure someone will tell us. Whatever the reason, they seem to have worked out pretty well. Most DXpeditions adhere to them for transmitting while listening up (or down), working split. Some modification has been employed when there are multiple DXpeditions running at the same time. The teams work it out so they can both work the same band without overlapping pile-ups, and that's good. The problem seems to be the non-DXer who either doesn't understand, or

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The WPX Program

CW

3131	IZ1DFI	3134	RWØWR
3132	ON4CD	3135	DL1RMI
3133	OK1FMX	3136	W9IND

SSB

2896	OK1FMX	2899	W3UTD
2897	AE9DX	2900	EA1AUM
2898	JO1WZM		

Mixed

1935	DL1RMJ	1937	W9IND
1936	VA3IX		

CW: 400 OK1FMX. 450 IZ1DFI. 600 W9IND. 1200 WB9IHH.
SSB: 450 AE9DX. 600 WB9IHH.
MIXED: 600 WB5JID, W9IND. 1250 VA3IX. 1400 WB9IHH. 1950 UA4SKW. 2750 ON4CAS. 3400 I5RFD. 3750 HA5DA.

Africa: WB9IHH
No. America: W3UTD.
Europe: W3UTD

Award of Excellence with 160 Meter Bar: WB9IHH

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP K0JN, 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, ABØP, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, 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, 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, W4BP, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX.

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, HB9DZZ, 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, DL6ATM, W2OO, RU3DX.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101 USA. *Note: WPX will not accept prefixes/calls which have been confirmed by computer-generated electronic means.*

Please Note: As of February 2004, the price of the 160 meter bar for the Award of Excellence is now $6.50.

Here are Paul, 3DAØAX/NØAH; Andy, 3DAØTM; and Chuck, 3DAØCG/W4GMY during a short DXpedition to Swaziland last March. Paul and Chuck were part of a group led by Frosty, K5LBU. Chuck says, "Andy, the president of the Swaziland ARC, stopped by and presented us with official hats. Later we went to his home and visited with him, his wife, and their two sons. His visit made the trip much more special, and visiting the home and station of a local ham was a real treat for both Paul and me."(Photo courtesy of Chuck, W4GMY)

Marion, DF4UM, is an "old-timer," being licensed over 25 years. Because she has two small children, operating time is limited to early mornings, as she works in her own shop the rest of the day. Marion says that she likes DXing on 40 meters CW. (Photo courtesy of John, KDØJL)

doesn't care, about these "special" frequencies. We hear stations on or near these frequencies calling CQ, carrying on rag chews, and just enjoying the hobby without a care about a DX station wanting to operate on that "special frequency."

Should we avoid these DX frequencies? Should we have the "nerve" to ask someone to move just because a DX station "might" want to come on that frequency to operate? We, as DXers, are familiar with the frequencies, and I believe most of us avoid operating on them. However, we are not the only ones operating on these bands, and I don't think we can expect every amateur to know, and acknowledge, that these are "reserved" frequencies for DX operations. We must remember that

specific frequencies are not "assigned" to anyone in amateur radio. We can attempt to explain the situation to our non-DXer friends and suggest that they should avoid these few frequencies. However, they don't have to abide by our "gentlemen's agreement" and can operate where they choose as long as it doesn't become malicious interference. That is a situation to discuss at another time and place. The amateur bands are large enough for all of us to share them for our own particular aspect of the hobby. Let's all be more respectful of one another and try to " Do unto others, as you would have them do unto you."

Out of Band. Finally, I received a note from a reader commenting, "Today I once again heard U.S. stations on 40 SSB calling DX out of the U.S. subband, this time on 7090." He went on to say, "While ignorance is no excuse, I think I finally figured out why at least

5 Band WAZ

As of April 6, 2004, 649 stations have attained the 200 zone level and 1387 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:

K4ZA DL6RAI

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)
NN7X, 199 (34)
KF2O, 199 (26)
IK1AOD, 199 (1)
DF3CB, 199 (1)
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)
SM7BIP, 199 (31)
PY5EG, 199 (23)
SP5DVP, 199 (31 on 40)
W8AEF, 199 (40)
K8RR, 199 (26)
UU5JR, 199 (4)
W8GF, 199 (22)
N4NX, 199 (26)
N4MM, 199 (26)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
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)
N4PQX, 198 (26)
RU3DX, 198 (1, 6)
UT5JAJ, 198 (12, 30)
N6HR/7, 198 (34, 37)
OE2LCM, 198 (1, 31)
EA7GF, 198 (1, 27)
W7SX, 198 (18, 23)
UT3UA, 198 (1, 6)
HA1RW, 198 (1, 31)
CT3DL, 199 (26)
W9XY, 198 (22, 26)

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

KD2GC (158 zones)
UA9CGL (181 zones)
N2NB (162 zones)
CT3DL (199 zones)
IK8YTA (153 zones)
K9UQN (168 zones)
ON4CD (170 zones)
GØJHC (168 zones)

Endorsements:

EA1JG (189 zones)
EA8LS (200 zones)
N4PQX (199 zones)
W9XY (198 zones)
WØSF (200 zones)
K4ZA (200 zones)
DL6RAI (200 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, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

The WAZ Program

10 Meter SSB

561 ..... JAØIAA
562 ..... W6RKC

12 Meter SSB

32 ..... K5UR
33 ..... DU1KT
34 ..... 7M2PSC

15 Meter SSB

608 ..... KA4RRU
609 ..... EA8LS

17 Meter SSB

34 ..... DU1KT

20 Meter SSB

1125 ..... N3DV
1126 ..... K9UQN
1127 ..... DS1JFY

40 Meter SSB

102 ..... EA8LS

80 Meter SSB

81 ..... EA8LS

10 Meter CW

186 ..... N2NB
187 ..... HB9EAA
188 ..... JF2LEX

15 Meter CW

319 ..... JJ1LBJ

80 Meter CW

60 ..... K4ZA
61 ..... WØSF

160 Meters

192 ..... WS9V
193 ..... N5FG
194 ..... UA6MF
195 ..... S50U
196 ..... JT1CO

All Band WAZ SSB

4906 ..... DS1JFY
4907 ..... K4SLC
4908 ..... 7M3IYU
4909 ..... CT3DL
4910 ..... CT3BD
4911 ..... EA7ATX
4912 ..... SM6BQL
4913 ..... KB4CRT

Mixed

8298 ..... UA9CGL
8299 ..... RD3AF
8300 ..... VA3IX
8301 ..... K8BZ
8302 ..... GØJHC
8303 ..... N8ABW
8304 ..... W6TE
8305 ..... WB5JID

All CW

415 ..... IK1XPP

RTTY

144 ..... HL2FDW
145 ..... KU4J

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

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

5155 .....9A2AA	3808.....N6JV	3237..WB2YQH	2944 ....IT9QDS	2550 .....W7OM	2203 .....W4UW	1773 .....W7CB	1521 .....NG9L	1090 .....W2OO
4695 ..W2FXAQ	3768.....YU1AB	3175.....KØDEQ	2824.....W2ME	2510 .....K9UQN	2126 ..WB3DNA	1772 .....VE9FX	1502 .....KX1A	933 ....SM7GXR
4257.....W1CU	3668.....N4MM	3166.....K9BG	2772..YU7GMN	2422....W8UMR	2070 .....I2EAY	1765.....KØKG	1487 .....WT3W	865.....N5DD
4211 .....9A2NA	3589 .....N5JR	3140.....I2EOW	2720 .....K2XF	2399.....W6OUL	2018.....HA9PP	1697 .....Z35M	1472..OK1DWC	803.....VE3NQK
4149 .....EA2IA	3548 .....N9AF	3121...PAØSNG	2701 ..WA1JMP	2385.....K5UR	2005 .....VE6BF	1674 .....YBØAI	1369 ..KW5USA	738.....AK6I
4111.....F2YT	3489...SM3EVR	3082 .....IK2ILH	2650.....9A4W	2369....JN3SAC	1976 .....DJ1YH	1587 .....W2EZ	1226 ...EA2BNU	742 .....K5IC
3960 .....N4NO	3379 .....I2MQP	3011 .....W2WC	2642.....W9IL	2287 ...OZ1ACB	1958 ...CT1EEB	1561 .....N1KC	1220.....KU6O	710 .....KØCF
3822.....VE3XN	3291 .....KF2O	2987 .....HAØIT	2598.....W9OP	2212 ...PY2DBU	1837 .....AA1AS	1535.....AI6Z	1130 ..PY1NEW	697 .....KL7FAP
3816.....I2PJA	3281 .....S53EO							

SSB

4509.....IØZV	3226 .....EA2IA	2782 .....KF2O	2350 .....IN3QCI	2014 .....K2XF	1806 .....K3IXD	1533.....KI7AO	1190.....K4CN	893 .....KX1A
4027 .....ZL3NS	3221.....OZ5EV	2741...PAØSNG	2325.....CX6BZ	1994 .....W4UW	1721 ....DK5WQ	1520.....DF7HX	1162 ...EA5DCL	822.....K1BYE
4018.....VE1YX	3215 .....I2MQP	2734 .....4X6DK	2289.....HAØIT	1973 .....I3ZSX	1704.....IT9SVJ	1460 .....NG9L	1148.....AG4W	822.....W8UMR
3793.....I2PJA	3101 .....N4NO	2646 ...LU8ESU	2259 .....K5RPC	1969 ...CT1EEB	1698.....W6OUL	1385....JN3SAC	1082...VE7SMP	812.....KU6J
3649.....F6DZU	3049 .....F2VX	2618 ...OE2EGL	2086 .....W2WC	1954 ...CT1EEN	1670.....K8MDU	1384 ...LU3HBO	1078.....EA3KB	793.....KU4BP
3373 .....9A2NA	3004 .....N5JR	2594 .....I8KCI	2094 .....LU5DV	1942 .....W7OM	1669 .....W2FKF	1259 .....I2EAY	1048 ...EA3EQT	776 .....YBØAI
3353 ...EA8AKN	3000 .....I4CSP	2538.....KF7RU	2027.....NQ3A	1937 .....I8LEL	1562.....W2ME	1238.....LU4DA	1043.....AI6Z	733.....AK6I
3260 .....CT4NH	2990 ...CT1AHU	2516.....EA1JG	2028.....K5UR	1933 .....W9IL	1562...SV3AQR	1218 .....WT3W	990.....HA9PP	670 .....VE6BF
3234.....N4MM	2817.....I2EOW	2509.....EA5AT	2021 .....N6FX	1862.....EA7TV	1538 .....VE9FX	1194.....N1KC	903 .....N9DI	601 .....K7SAM

CW

4297 . WA2HZR	2959 . . . 9A2NA	2386. . EA7AZA	2146 . . . . N6FX	1893. . . EA5YU	1834 . . . . W9IL	1520 . . . 4X6DK	1203 . . K6UXO	953 . . . PY4WS
3532 . . . N4NO	2948 . . . LZ1XL	2380 . . . . KF2O	2112 . . OZ5UR	1882 . . . W7OM	1718 . . . I2EAY	1430 . . EA2CIN	1158. . . YU1TR	898 . . . . WT3W
3476 . . K9QVB	2694 . . . . N5JR	2268. . W8UMR	2043 . . . . K2XF	1867 . . . VE6BF	1712 . . . I2MQP	1342 . . . WO3Z	1132. WA2VQV	767 . . . . VE9FX
3361 . . . VE7DF	2476 . . . W2WC	2260 . . . I7PXV	2040. . JN3SAC	1847 . . IK3GER	1584 . . IK2ECP	1337 . . . . AC5K	998 . . . . T94GB	642 . . . PP6CW
3229 . . . EA2IA	2389 . . . . KA7T	2149 . . K9UQN	1939. . . . K5UR	1841 . . W6OUL	1531 . . . I2EOW	1235 . . . . . AI6Z		

some U.S. stations do it. This morning there were a couple of KP4s calling (legitimately) on 7090. I guess mainland U.S. stations figure that the KP4's are FCC licensed, so it's okay for them to operate down there, too." Well, folks, I'm here to tell you that if you are in the U.S., you are *not* allowed to operate below 7150 on SSB. Perhaps these are new licensees who are not familiar with the band/mode authorizations. *Every* station should be equipped with a frequency chart showing what modes are allowed on what frequencies. It matters not if you have been licensed for 10 days or 40 years; that chart should be as much a part of your operating position as your radio. If in doubt, check that chart. There is really no excuse for anyone to be operating outside of the band/mode authorizations.

A World of Difference

Last month I mentioned the DX Forum at the Charlotte Hamfest and the part of the program on receiving antennas for the low bands. It is interesting to note that shortly after that I got an e-mail from one of those in attendance telling me about his efforts with a couple of beverages. Jack, W4TJE, said in 27 years on the air he had worked maybe ten countries on 75/80 meters. After putting up two Beverages, during the ARRL SSB contest he worked 48 countries, with very limited operating time. Weeks prior to that he worked his first ever JA on 80 meters CW. Jack says he could not even hear the JA with his inverted-Vee, but he was 559, with no noise, on the Beverage. As Jack put it, "What a world of difference the Beverage makes."

This is typical of what one can expect in the next several years of the declining solar cycle. If you want to have fun, build your DX Challenge Award totals, strive for other awards such as 5-Band Worked All Zones, etc., you have to put forth a little effort to achieve those results. I personally am so intrigued with the flag

CQ DX Awards Program

SSB

2429.....CT3BM	2431 .....KB3DAI
2430 .....CT3EE	2132.....K1RB

SSB Endorsements

320 .....CT3BM/332	300 .....W9IL/306
320.....KD5ZD/321	275 .....K1RB/292

CW Endorsements

320 .....W9IL/329

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 335 active countries. Please make all checks payable to the award manager.

Giannis, SV9FBG, on Crete, has been on the air since 2000. He works all bands and prefers SSB. (Photo courtesy of John, KDØJL)

antenna (see the May column), that one of those will be installed here as soon as the weather clears and dries up enough for me to get outside to get it done. I'll let you know how it works for me.

Ham Radio for Dummies

Just as I was finishing this column, I received word of a new book by Ward Silver, NØAX, entitled *Ham Radio for Dummies* (ISBN number 0-7645-5987-7), which was to be available in mid-April. The book is designed to make ham radio easier to understand whether you have a license or not. There are 384 pages of explanations, tables, graphics, photos, and links to on-line resources. It can be read from cover to cover or used as a "get in, get out" desk reference. Ward said, "My goal was to produce the book I wish I'd had when I was just starting out—a Desktop Elmer, so to speak."

I'll be reviewing this book and will provide a preview next month.

Until next time, good DXing and remember—*have fun!*

73, Carl, N4AA

QSL INFORMATION

N7QXQ/HR6 via W7TSQ
N7YX/VE7 via N6HR
NZ2R via VE3EXY
OD5LX via SM5DJZ
OHØ/SMØGMG via SM5DJZ
ON8XJ via LA4LN
OY1JH via SM5DJZ
P29SI via JA1PBV
P29VR via W7LFA
P4/I2UIY via I2EOW
P40K via WM6A
P41C via W3UR
PJ2/W0CG via N9AG
PJ2/W8TK via N9AG
PJ2/WG9J via WF9V
PJ2C via N9AG
PJ2CC via W3UR
PJ2DX via N9AG
PJ2H via N9AG
PJ2HQ via N9AG
PJ2M via N9AG
PJ2T via N9AG
PJ2Y via G3SWH
PJ2Z via N9AG
PJ7/N7DD via W7RJ
PJ7D via W7RJ
PSØF via W9VA
PYØF/PY1ZFO via W9VA
PYØFF via W9VA
PYØFT via JA1ELY
PYØZFO via W9VA
PY1ZFO via W9VA
PY1ZFO/Ø via W9VA
R0AEM via UA9XC
R1AEM via UA9XC
R1ANC via ZS1OIN
R1NWS via RW3RN
R3AEM via UA9XC
R3ARC/1 via RW3RN
R4AEM via UA9XC
R6AEM via UA9XC
R9AEM via UA9XC
RAEM via RV1AQ
RIØF via N6ZZ
RU2QD via ES1QD
S91FC via CT1EAT
S92FC via CT1EAT
S97A via CT1EAT
SJ9WL via SM5DJZ
SK5LGT via SM5DJZ
SO/DL1VJ via DL8YR
SO5VJ via DL8YR
SV9/G4VXE via G3SWH
T20RE via HA8IB
T30M via YT1AD
T30RE via HA8IB
T30Z via YZ1AU
T32BW via HA8IB
T32LB via JA1LZR
T32T via LA4LN
T33C via F5CWU
T48Z via IN3ZNR
T5/DL1VJ via DL8YR
T5AR via SM5DJZ
T88BV via JA1PBV
T88WX via JA1WSX
TA1KA/2 via DL8YR
TA2FM via W3UR
TF/G4VXE via G3SWH
TI7/N1KO via W1ZS
TJ1AL via I2EOW
TJ1GG via I2EOW
TJ1GI via I2EOW
TJ1RA via I2EOW
TM0TLT via F6JOB
TM2Y via F6BEE
TT8AC via N4NX
TT8BC via K4PHE
TT8XZ via N5XZ
TU2OP via TU2CI
UA9CDC via G3SWH
UI1A via G3SWH
UI1B via G3SWH
UI8AA via G3SWH
UI8B via G3SWH
UI9AWD via G3SWH
UI9AWI via G3SWH
UI9BWR via G3SWH
UK8AA via G3SWH
UK8AWD via G3SWH
UK8BWR via G3SWH
UK8R via G3SWH
UR2QD via ES1QD
UR2SQ via UR2SQ
UU8AA via G3SWH
UU8JF via G3SWH
V3AUR via N5UR
V3UR via N5UR
V73B via N5UR
VE3/G4VXE via G3SWH
VI6EWT via VK6NE
VI6TI via VK6NE
VI8NT via VK6NE
VKØCW via VK6NE
VKØHI via VK6NE
VKØPB via VK6NE
VK2IA via DL8YR
VK4GL/P via VK4APG
VK6AA via DL8YR
VK6ANC via VK6NE
VK6BAT via N6ZZ
VK6DIR via VK6NE
VK6EWI via VK6NE
VK6EWT via VK6NE
VK6VJ via DL8YR
VK6WI via VK6NE
VK8VJ via DL8YR
VK8VJ/2 via DL8YR
VK9AA/9 via DL8YR
VK9L/DJ7ZG via DL7AFS
VK9LD via VK2GND
VK9N/DJ7ZG via DL7AFS
VK9NJ via G3SWH
VK9NYG via VK6NE
VP1AJ via N5UR
VP1UR via N5UR
VP2LGR via N5UR
VP2VEQ via N6ZZ
VP5BJX via N5UR
VP9/VU3SNM via 9V1SM
VQ9JY via N4JY
VY1DX via N6HR
W5/VU3SNM via 9V1SM
W6CIT via W1TE
W6UE via W1TE
W7/VU3SNM via 9V1SM
W8/VU3SNM via 9V1SM
WB4ZNH/3D6 via K4PHE
WB4ZNH/5X via K4PHE
WB4ZNH/A2 via K4PHE
WL7M via WD0M
WP4DX via WP4F
WP4N via WP4F
XE1ISC via LA4LN
XM6/VU3SNM via 9V1SM
XM7/VU3SNM via 9V1SM
XQØY via KD6WW
XQ3WTR via W3HC
XT2DX via G3SXW
XT9X via YU1AAX
XU7AAY via IN3ZNR
XU7AAY via N4ZC
XU7AAZ via IN3ZNR
XU7AAZ via N4ZC
XU7ACB via N6FF
XU7ACT via G3SWH
XU7ACU via G3SWH
XW3QBR via IN3ZNR
XW3ZNR via IN3ZNR
XX9X via N6XJ
XY5T via IN3ZNR
XY5Z via IN3ZNR
YA1AR via SM5DJZ
YA1BV via JA1PBV
YA1OS via SM5DJZ
YA8G via LA4YW
YBØAZ via W7TSQ
YB1DX via YB1DX
YB3ASQ via W7TSQ
YB3ASQ/9 via W7TSQ
YB3OSE via W7TSQ
YB9BON via W7TSQ
YCØAZ via W7TSQ
YC3OSE via W7TSQ
YI9XXX via WØXXX
YV6/WA8TFJ via N5UR
ZA1UT via OH2BH
ZC4T via G3AB
ZD8HR via N6HR
ZF1RE via N5UR
ZF1VX via G3SWH
ZF2NT via G3SWH
ZF2NT/8 via G3SWH
ZF2PD via N2LM
ZF2TM via N3ME
ZK1ASQ via W7TSQ
ZK1MA via W7TSQ
ZK2SA via JH7OHF
ZLØADV via DL8YR
ZS1RBN via G3SWH
ZW5SF via PP5CIT
ZYØFX via W9VA
ZYØRF via W9VA

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)

BY TED MELINOSKY,* K1BV

Awards Q&A

In last month's column I neglected to mention that KD7KST's USA-CA 500 county award was the first to be endorsed "All PSK31." USA-CA permits direct contacts using any mode and any authorized band. Anyone for a 432-MHz moonbounce SSTV endorsement?

Awards Q&A

The following questions came from my e-mail "in-basket."

Q: I've seen the term "Joker" used in award rules. What does this mean?

A: A "Joker" is a station that may be used to substitute for one or more required contacts. Read the rules carefully; this is often a club or special-event station.

Q: The USA-CA official rules state that all contacts must be confirmed by a QSL card. Can MRCs (mobile reply cards) be used, or is the traditional QSL required?

A: QSL card encompasses any type of written or printed document that confirms a contact. MRCs are a form of QSL card that permit multiple contacts with the same station to be recorded on one piece of paper.

Q: What about special-event certificates that contain QSO information? Can they be counted as QSLs?

A: Yes, see answer above. Any signed document containing complete QSO data may be used.

Q: Do I have to use the official USA-CA Record Book when applying for the award?

A: The booklet is optional. We will accept any computer-printed list as long as it contains the same information as the booklet.

Q: If you work a mobile station, what city do you use in the Record Book? On 14336, all they give is county.

A: When you apply, just write the word "mobile" in the column "CITY/TOWN." Most applications I see are composed of about 90% or more mobile stations.

James Kingsbury, NW6S, USA-CA All Counties #1090

This month we hear from James, NW6S, who was issued USA-CA All Counties #1090 on March 12, 2004.

When Ted, K1BV, sent me the e-mail confirming what I needed to do to complete my application for the USA-CA Award, he put in his usual request to submit a biographical sketch of myself. At first I thought, hey, that's great. Then I started to think about it and a touch of fear struck. What should I say, how much detail, etc.? After some thought, here it is.

I was born (1936) and raised in the small town of Reed City (population about 1,000 back then), which is in the central part of lower Michigan. I grew up learning to love hunting and fishing and just about everything outdoors. I went to college at Michigan College of Mining and Technology, which is now called Michigan Technological University. It's a small engineering college in the upper part of Michigan. When I went there, the ratio of guys to girls was about 50 to 1 and we got 10 to 12 feet of snow each winter, so conditions were favorable for studying, as there was nothing else to do. Tech also had a very good hockey team (which played against most of the Big Ten teams), which helped break up some of the long winter evenings.

After college I went to work for General Electric as a Mechanical Engineer. Shortly after starting work I got married to my wife of nearly 45 years. Obviously, to last that long something must be working right. We have one understanding: She doesn't want to be a ham and I don't want to learn to knit.

Eventually we ended up in Decatur, Illinois, where I got my first ham license, in 1963. We had to drive to the FCC building in Chicago to take the test back then. My first call was WN9HGX, which I later upgraded to WB9HGX. I made my first transmitter out of a pair of surplus 1625 tubes (807s with a different filament voltage), bought an NC270 receiver, and put up a small vertical antenna for my first station. I made less than 100 QSOs, because in 1964, when our second son was born, we moved across town to a larger house. I did not set up my station there because we were close to a lake and I took up crappie fishing instead. I used to get up early and catch them for breakfast.

In 1970 we moved to California and I started working for the Mattel Toy Company. I remained inactive on the air until 1975, when I went and took the test again and got WN6LFF, which I quickly upgraded to WA6LFF (try sending that in a CW contest) at the Advanced level. I became quite active then and completed 5 Band WAS in 1978. I started working on 5 Band DXCC and quickly realized I needed to upgrade to Extra class so I could work DX on the lower CW part of 40 meters instead of the split required for SSB. I upgraded to Extra and finished 5 Band DXCC in April 1992. I really prefer to work CW over SSB in contests and DXing because there is less splatter on the bands and I think it is easier.

I actually started county hunting in 1993 and worked about 250 counties, but got interested in contesting and never followed through with it. I retired from Hughes Aircraft Company in November 1996, and we moved to

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

James Kingsbury, NW6S
USA-CA All Counties #1090
March 12, 2004

USA-CA Honor Roll

500
DL9MEN .3291
W9HR 3292
NW6S.....3293
W8WV 3294

1000
W9HR 1654
NW6S.....1655

1500
W9HR 1383
NW6S.....1384

2000
W9HR 1282
NW6S.....1283

2500
W9HR 1201
NW6S.....1202

3000
W9HR 1111
NW6S.....1112

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.

Hendersonville, North Carolina. I quickly put up some dipole antennas and assembled my station to get on the air. I was overwhelmed by being able to work Europe and Africa without the so-called East Coast curtain in front of me. I improved my antennas by putting up a five-band quad for 20 through 10 meters and a horizontal loop for 80 and 40 meters and have lad lots of fun working DX and contests. I also started working RTTY and enjoy that mode as well.

On August 25, 2001, I started back into county hunting and worked WB4FFV. I remember, because I had to ask Jim, KZ2P, if the suffix was Sugar Sugar or Fox Fox Victor. I'm sure the 20 or 30 county hunters listening wondered who the new 6-lander was on frequency and if he was just passing by. Well, I guess now they know I'm here for the duration.

I have really enjoyed county hunting. It is quite different from DXing or contesting in that the character of the people is much different. Instead of just wanting a quick QSO, which is what happens when you work them, they are really interested in helping you work counties. Many will drive out of their way to get a county for you, and when it comes to technical assistance, it's almost unbelievable the experience and "been there, done that" knowledge they are willing to share. Everything from how to eliminate noise in your mobile to how to set up your computer is willingly shared.

Another thing I found to be quite interesting is to work a county hunter several times, form a mental picture of him or her, and then go to one of the conventions and have an eyeball QSO. It's surprising sometimes the difference between imagination and reality—hi hi.

I worked my last county (Anderson, KY) for All Counties on March 2, 2004 and received the card on March 8. Now I guess I can start on a second time around and try to finish up Bingo, Big Rigs, YLs, Teams, etc. The nice thing about county hunting is there is always some kind of challenge in front of you if you choose to pursue it.

In closing, I'd like to thank all of the operators who gave me a QSO and took the time to return a QSL card or MRC, the net controls on both CW and SSB who maintain order and provide help on the net frequencies, and especially the folks who go mobile in all kinds of weather, to rare counties, on bad roads, with gas at something above $1.75 a gallon. Folks, it wouldn't work without *you*! Also, if you are not a county hunter and would like to find out about it, you might check out the following website, <county-hunter.com>, or send a blank e-mail to <marac.org> and they will send you the info.

73, James, NW6S

DX Awards

The St. Teodosii Tyrnovski Award. There are relatively few awards from Bulgaria, other than the BFRA official series. Bulgaria – LZ is a common contact in most DX contests, and some big signals come out of CQ Zone 20. The

The St. Teodosii Tyrnovski Award is sponsored by the Balkan Contest Club for contacting its members and other LZ amateurs.

Balkan Sports Club (LZ1KZA/LZ5A) sponsors this award, which includes a handsome certificate, for contacting its members and other LZ stations. It recognizes the life and teachings of Saint Theodosios of Tyrnovo, who began his 14th century career in that rare DXCC country Mount Athos.

Contacts after 1 January 2000 count for this award. All bands and modes. Each station may only be contacted one time. You must earn 100 points by making contacts according to the following schedule:

1. Club station and special club calls LZ1KZA, LZ5A, LZ3EYAC, LZ26ZA, LZ125O, LZ1195IR are 10 points each.

2. Members: LZ1ASP, LZ1DP, LZ1FI, LZ1GAV, LZ1GC, LZ1MC, LZ1RT, LZ1WR, LZ1WX, LZ1ZF, LZ3FB, LZ3GA, LZ3HI, LZ3NN, LZ35ZF are 3 points each.

3. Contacts with any other LZ stations are 1 point each.

At least 20 points must be with members of the Balkan Contest Club. Send GCR list in alphabetical order and fee of 3 Euros, $US5, or 10 IRCs to: Balkan Contest Club LZ1KZA, P.O. Box 36, 4300 Karlovo, Bulgaria. For more information, see: <http://www.balkanclub.8m.com/>.

Mediterranean Islands Award. This award is issued for contacting islands located in the Mediterranean Sea. The website <www.mdxc.org/mia> lists an amazing total of some 1881 different islands, and incorporates and cross-indexes the island lists of other

The Mediterranean Islands Award is issued for contacting the islands in the Mediterranean Sea.

Mediterranean countries such as Croatia and Italy. Do you want a challenge? You can start off with IOTA (Islands On The Air), then work the additional non-IOTA islands listed for the Croatian Islands Award, and then start on the hundreds and hundreds of other islands that research has uncovered. The entry level requires only 30 islands for DX (50 for Europeans). From that point on, a lifetime of challenge is presented to even the most dedicated island hunters.

The Mediterranean Islands Award is available to licensed amateur radio operators and SWLs. It is issued on presentation of evidence of contact with (or, for SWLs, reception of) the minimum number of stations operating from islands located in the Mediterranean Sea according to the following rules.

1. Contacts since 1 January 1997, any band or mode, count for this award.

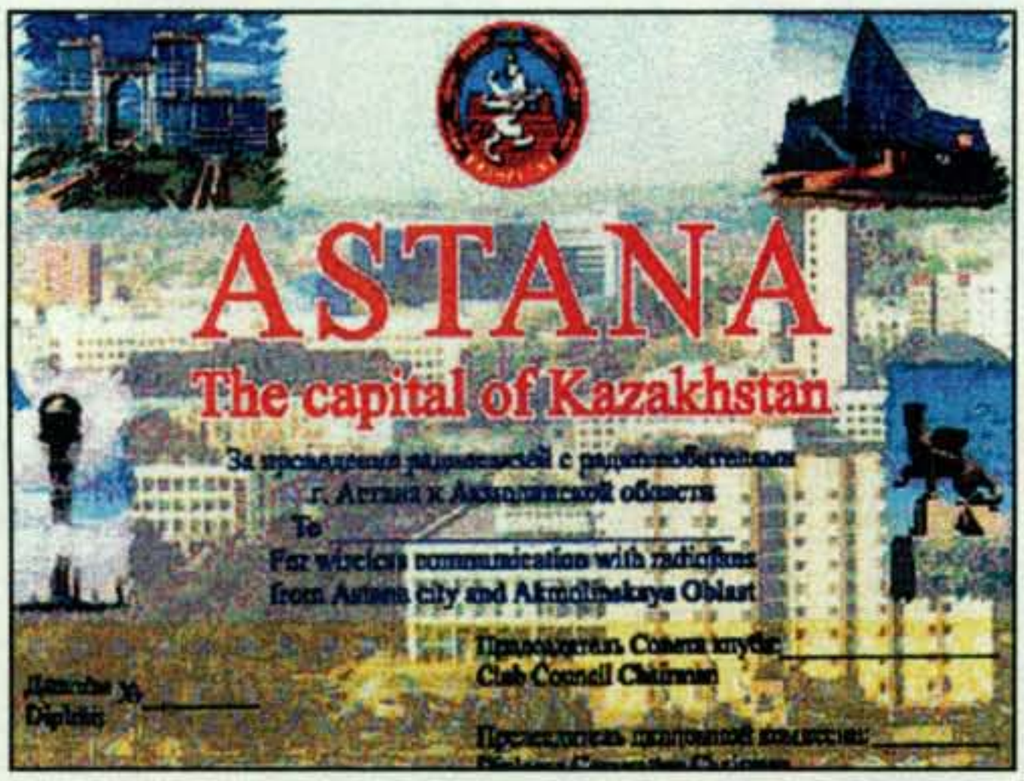
2. Endorsements as follows:

(a) Green Flag (basic award level)—50 different MIA reference numbers for European participants, or 30 different MIA reference numbers for participants outside Europe. At least one contact must be made with islands located in Africa and Asia.

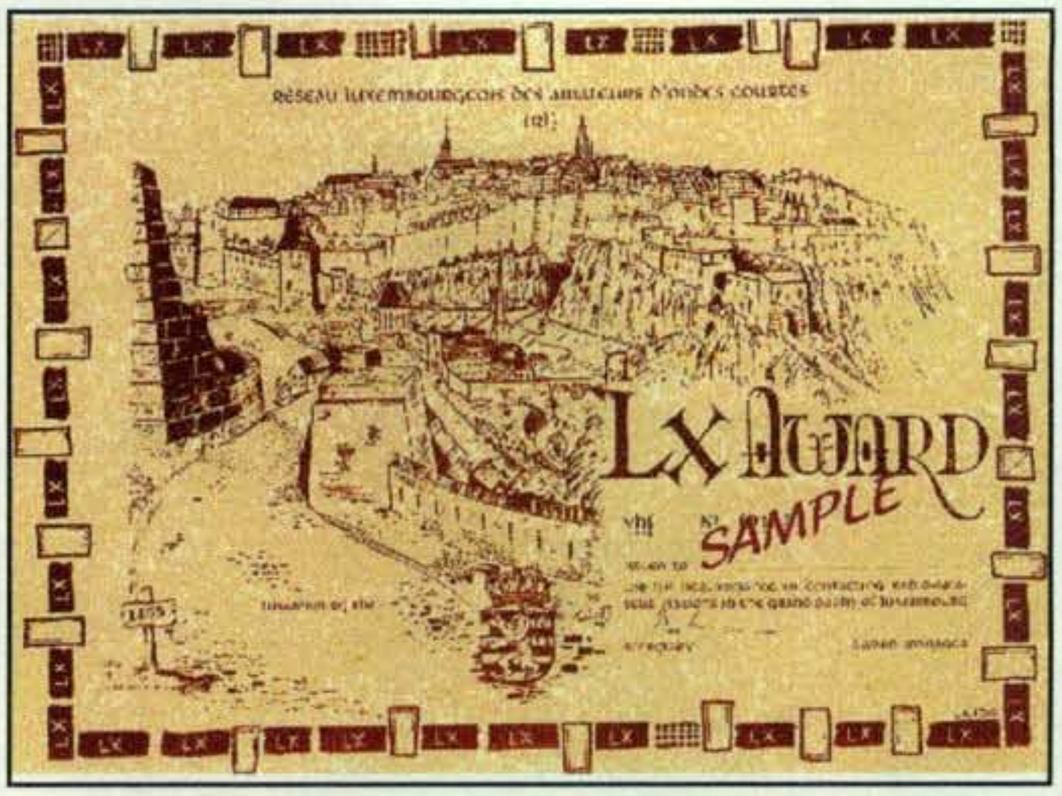
(b) Yellow Flag—100 different MIA reference numbers for European participants or 70 different MIA reference numbers for participants outside Europe. At least one contact must be made with islands located in Africa and Asia.

(c) Red Flag—300 different MIA reference numbers for European participants or 200 different MIA reference numbers for participants outside Europe. At least one contact must be made with islands located in Africa and Asia.

(d) Blue Flag—500 different MIA reference numbers for European participants or 300 different MIA reference numbers for participants outside Europe. At least one contact must be made with islands located in Africa and Asia.



The Astana award is named in recognition of the new capital of Kazakhstan.



The Luxembourg Award is issued for contacts with LX stations made after January 1, 1951.

(e) Honor Roll—800 different MIA reference numbers for European participants or 600 different MIA reference numbers for participants outside Europe. At least one contact must be made with islands located in Africa and Asia.

3. Stations who activate islands may receive a free certificate upon proof of their operating from a minimum of five different islands. Endorsements will be available for operating from 10, 15, 20, 25, etc., different islands.

4. Fee for each award is 20 Euros or $US20. (The award is a specially inscribed plexiglass-mounted, free-standing certificate.) Endorsement cost is 5 Euros or $US5 each. Mediterraneo DX Club members are entitled to a 10% discount. Sponsor requires use of its application form available at <http:// www.mdxc.org/mia>, which should be sent along with all of the QSL cards, appropriate fees, and return postage to the MIA Award Manager, MDXC, P.O. Box 245, 87100 Cosenza CS, Italy. (Club members are permitted to send photocopies, front and back of the cards.)

5. Local checkpoints will be appointed to deal with applications from their country or area. Before sending your application, visit the MIA website (www.mdxc.org/mia) to see if you can submit it to a local checkpoint.

6. The website contains a list of all eligible Mediterranean islands, listing some 1881 different islands and cross-referencing them to IOTA and other country-based island programs, such as Croatian Islands.

Kazakhstan Diploma Astana. From Kazakhstan comes the Astana award, recognizing the country's new capital city. The Republic of Kazakhstan was founded in 1994. Interest in developing the natural resources of this Central Asian country is bringing change and development, including a new capital.

Earn at least 100 points by contacting stations in the city of Astana and the Akmolinskeye Region of Kazakhstan, including the former Kokchetav region. All contacts must be with different stations. Contacts from 1 March 2004 are valid for the award. All bands and modes may be used.

Point values are as follows: individual stations = 3 points; club stations = 5 points. SWLs will need confirmation from at least 30 stations.

The following stations are valid for the Astana award: UN7EX, UN7EV, UN7EP, UN7EAN, UN7ECK, UN7EAK, UN7EAC, UN7EAS, UN7ECX, UN7ECY, UN7ECA, as well as all stations using the prefix UNxB, where x is a number from Ø to 9.

The award is free, although the sponsor requests at least 3 IRCs to cover the cost of mailing. Send GCR list to: Drobyshev Vladimir Petrovich, P.O. Box 88, Astana 473000, Republic of Kazakhstan (e-mail: <un7bf@mail.ru>).

The Luxembourg Award. Luxembourg is not exactly a rare European country, although it is on the scarce side. Probably the best way to make LX contacts is during contests when native stations and expeditions are often on the air. There's an interesting twist to the rules for this award, which gives you up to 75% of the needed points for working the same station on the five HF bands. The award features an old engraving of a walled city.

Contacts with LX stations after 1 January 1951 count for the award. SWL okay. European stations earn 30 points, 20% of which should be on 1.8, 3.5, or 7 MHz. Each contact is worth 1 point. All others need 20 points. Contacts on 14, 18,

On the Cover

It must be tough getting "shack time" at the Johnson household in Bemidji, Minnesota—even with two complete contest-grade stations! Each member of the Johnson family is not only a licensed ham but also an accomplished DXer and/or contester, starting with "Dad," Glenn, WØGJ, who splits his time between his practice as an orthopedic surgeon, traveling to remote places (such as Bhutan) to train physicians in his specialty, and of course, ham radio. A 2003 inductee into the CQ Amateur Radio Hall of Fame, Glenn led the A52A DXpedition to Bhutan in 2000 and helped reestablish ham radio in the mountain kingdom. "Mom" is Vivien, KL7YL, who got her call while the family was living in Alaska. She home-schools their four children and prefers to be the "support staff" during contests, although she also sometimes helps out with operating.

Moving from left to right among the kids, we start with 16-year-old Paul, WØPJ, who's finishing 10th grade. He's been licensed since age 9 and loves SSB and RTTY contesting. Behind Paul is Mark, NØMJ, age 18, who will be a freshman at the University of North Dakota in the fall. He was an operator on the A52A DXpedition and had the greatest number of contacts during a scheduled shift. Melissa, K1MJ, just finished her junior year at Bemidji State University, where she's in a pre-veterinary program. She was the first licensed YL in Bhutan, where she is A52YL. Melissa and Mark set a multi-single world record in the 2000 CQ/RJ World-Wide RTTY DX Contest. Holding the cat, Boo, is Carrie, NØCMJ, age 14, who's finishing 8th grade and loves SSB contesting. She also competes in rodeos in the summer and sled dog races in the winter. The family occasionally operates contests as N1JJ, the callsign of the six-member Johnson Joules Contest Club! *(Cover photo by Larry Mulvehill, WB2ZPI)*

21, 24, and 28 MHz count 1 point. Each contact on 1.8, 3.5, 7, and 10 MHz counts 2 points. If the same station has been worked on all HF bands, European stations may count 10 points and others 15 points for the required total. The same station may be worked once on each band in different modes.

Send GCR list and fee of 10 IRCs or $8US to: Reseau Luxembourgeois des Amateurs d'Ondes Courtes, The Awards Manager, P.O. Box 1352, L-1013 Luxembourg.

SARA On The Air Award

Hams are often interested in other technologies in addition to electronics. Astronomy is an example. The Society of Amateur Radio Astronomers (SARA) is the largest amateur radio astronomy organization in the U.S. It has very deep roots in the ham radio community, with over a hundred SARA members being licensed amateur radio operators.

This handsome certificate features a total solar eclipse. It is available at absolutely no charge, and there is no waiting weeks or months for the award. You should receive it in a few days or less via e-mail. The procedure is similar to the Italian Pharmacists award I covered a few months ago, where you

Contact members of the Society of Amateur Radio Astronomers to earn the SARA on the Air Award.

e-mail your award application, and if all is correct, the certificate is sent to you in a digital file format and you print the certificate on your printer.

You can earn the SARA On The Air (SOTA) Award by working ten SARA-Ham members using any mode and any amateur frequency. Make sure to get the contact's SARA membership number. For SWLs, this consists of receiving/logging ten SARA-Ham members. "Waterhole" frequencies of ±15 kHz from the well-published QRP frequencies will serve to collect SARA hams into a general area to help those chasing this award. Many SARA ham members are also QRP operators, so this could assist you in earning QRP awards at the same time.

Submit the required information via e-mail to <RWPP@ cbcag.edu> and your personalized certificate is prepared and sent to you by return e-mail. For more information go to: <http://www.K5DZE.net>.

Internet Site of the Month

The French REF has an extensive awards program and a system of volunteer award custodians who manage different awards. F5GSD manages two of the important awards, the DDFM for contacting French Departments and the DPF for contacting French Provinces. The DDFM is perhaps equivalent to USA-CA, and DPF is similar to Worked All States. F5GSD's site publishes the rules in both French and English, the list of needed entities, an award application, and a list of stations who have earned the awards. This is a good example of a complete awards site; go to: <http://membres.lycos.fr/ddfm>. *(Note: "membres is the correct spelling.)*

Wanted: Samples of your club or group's award for publication in the only amateur radio column dedicated to awards. 73, Ted, K1BV

to Herb, K2LNS, who skillfully operated the WA2FGK super station: "because (this is hard to believe) of the write-up from last year's contest, I was inspired to give this contest a go." Whew, he may need to seek therapy!

2004 CQ VHF Contest

The purpose of the CQRI meeting was not only to review the results from the past contest, but also to fire up the club members to participate in the 2004 CQ VHF Contest, July 17–18. A couple of new wrinkles: QRP Portable Hilltopper is official. Sponsored plaques will be offered for the first time. See the official announcement of the 2004 contest elsewhere in this issue.

Seeking divine intervention, the more pious members pledged to participate in a prayer vigil on the day before the contest at Our Lady of Perpetual Tropo. For now, though, the entire club retired to Capt'n Jack's for clam cakes and IBC birch beer and to map strategy for the upcoming CQ VHF Contest. See y'all then. 73, John, W1XX

What a Blast!

By Gene Zimmerman, W3ZZ

This is the W3ZZ/8 6- and 2-meter bus, a.k.a. the "Georgia Pacific" metro, located on Reddish Knob, WV, elevation 4399 feet in FM08jl. On the rear is a 32-foot tower with two C3I 5-element Yagis fixed northeast, above which are two more which are rotatable. You can select the bottom pair, the top pair, or all four. On the front are a pair of C3I FO12's also on a 32-foot tower. The bottom one is fixed northeast, with the top one rotatable. You can select top, bottom, or both.

Inside we had a DEM 6-meter transverter with a TS-850 IF driving an 8877 amplifier at 1.5 KW. On 2 meters we used our backup TS-2000 also driving an 8877. We had three operators: myself; Terry, K8ISK; and Chuck, W4XP. I spent most of Saturday on 6 meters, until I realized that KØHA in EN11 was a tropo contact at 0315Z on 6. I then moved to 2 meters and ran stations from Kansas eastward.

The outstanding 2-meter tropo opening was clearly the highlight of the contest, although we also had huge totals on 6. Perhaps the best 2-meter contact was Jon, NØJK, portable in rare grid EM08 running QRP. The massive tropo opening on 2 meters lasted until 1530Z Sunday. We were on the eastern edge of the duct and worked as far as EN10, 12 and EM08, 09 to the west.

We wound up with nearly 400 contacts in 90 grids on 2 meters—not a bad total for a contest not known for much 2-meter activity except in Europe. Working 789 Qs on 6 in 200 grids was not exactly chopped liver either. Thanks to all who called in.

The "Georgia Pacific Metro" of W3ZZ/8.

Soapbox

Running only 20 watts on 6 meters, and worked many new grids. Had lots of fun...**ABØSD.** Really enjoyed the CQ WW VHF 2003. I worked 48 of 76 provinces with nearly 500 QSOs in 24 hours. Thanks to *CQ* for support of the contest... **E21DKD.** Six meters was really good into California on Saturday evening. Great contest. See you next year...**KØUK.** Short opening to Europe helped grid totals...**K1TOL.** Took a break from packing for our move from MD to SC to operate from the car with an IC-706 MKIIG and a Hamstick on 6 meters and a quarter-wave vertical on 2 meter SSB. Look for me next year from EM93...**K3IXD.** Used my 40 meter beam. It worked!...**K4JRB.** Thunderstorms rolled in Saturday and shut me down. I'm not a big gun but it was fun...**K4RKN.** Low power 6 meters only. Great fun!...**K4WI.** Good activity this year. Six meters was great for the first 90 minutes. Had to miss Sunday due to other commitments...**K8CC.** Nice contest! I missed Saturday, but enjoyed making a few contacts on Sunday...**K8FK.** Good opening on 6 meters Sunday. Thanks...**K9HUY.** Operated with an FT-817 barefoot. Thanks to all who copied my puny signal...**K9JK.** Limited operating time, but wanted to show my participation...**K8KFJ.** Only got on for the last 40 minutes, but was able to give out that last-minute Q to some tired and grateful ops...**KB4NVD.** First time for this contest...**KG4RUL.**

I was glad the band was open. Had a great time...**KJ5RC.** Great contest. Some excellent band openings!...**N3NTN.** I missed the opening at the beginning of the contest. Conditions on 6 were very good...**N3RN.** Missed the big 6 meter opening Saturday afternoon; was out sailing. But 6 was open for long periods to Florida with good activity; worked 10 grids in FL. There was weak Au Saturday. Fun to work TG9 in EK44. So much was going on on 6 meters...**N3UM.** First hour on 6 meters was great. Some good stuff on 2 meters late Saturday night and early Sunday morning. Worked four new grids on 2...**N8BJQ.** Working VE9DX and finally snagging FN75 was the highlight. Great propagation Saturday...**N8PVT.** Many problems this year, but managed to make some QSOs. I called a KØ on 2 meter tropo. He did not hear me but K5SW called me instead. Nice haul for 5 watts...**N8XA.** Great band conditions for a change for a VHF contest. Had a good time for the limited time available. Highlights were working K5SW in EM25, N0DQS in EN22, and K4TO in EM77 on both 2 and 6...**N9TF.** Sunday some *E*-skip on 6. Long tropo on 2 meters. Lots more activity than last year...**NE8I.**

Many modes of propagation observed... **VA7MM.** Very nice contest. I operated 6 meters only which opened well here on Saturday for a flurry of contest activity...**VE1SKY.** Used the Alpha-6 to a full 1500 watts throughout. Worked great. First 2½ hours were the best. Thanks to those who went to the CW segment when conditions were marginal ...**WØRUN.** A lot of fun...**W1EL.** First CQ VHF Contest where the band was open both days...**W2ACY.** Thanks for the QRP class. It lets people compete where high power would be an RFI problem...**W2JEK.** Do we know how to schedule a contest or what? Good, solid *E*-skip opening on 6 to start things off, followed by an opening to Europe from the northeast...**W2VU** [Editor, *CQ*]. Fun contest. Used a homebrew 6 meter Moxon and 4-element 2 meter Yagi at 10 feet...**W3BBO.** Super opening from the southeast to Florida Sunday afternoon...**W4AME.** I operated as a rover with a Hamstick on 6 and 3-element Yagi on 2. Got some strange looks when raising the beams on a pole through the sunroof... **W4WNT.** First 6 meter contest since 1974 in Illinois...**W5GN.** Was still on the tower when the contest started. Great contest!...**W5PR.** I operated for a short while using an FT-817 and a "rubber duck" on 6 meters from a platform at 60 feet on an old AT&T microwave tower. Signals were amazingly strong. A bunch of us hams bought the tower for future VHF use...**W5RZ.**

First time rover. Had a great time ...**W6KA.** Ah, the magic of the magic 6 meter band. The EH8 was my sixth continent worked...**WA5KBH.** Only made three contacts but two were new grids! I'm now up to a total of 52 grids worked with QRP ...**WD6DX.** This is the only time I tried QRP on 6 meters. It does work!...**WO7GI.** Very short propagation on 6 meters...**XE2HWB.** My first entry in this contest. Next time I hope more EU stations will be on...**Z36W.** We experienced some of the best and strongest tropo that I've had the pleasure to operate. Some contacts in Ø-land were 20 over on 2 meters. What a great time...**AF4HX.**

Station Ops, Multi

AF4HX & N4OFA, KI4M, KF4TDY, KF4TDZ. **E20NGF** & E20PVF. **E20WIE** & E20KNM, E20RUZ, E20XBL, E20EHL, E20YNP. **E21CJN** & E20JGO. **F4ARM** & F4AJS. **F6IFR** & F6CWN, F6HMQ, F6GWV. **HS3NNE** & HS3NQQ, HS3NMK, HS3MTB, HS3JWC, HS3NEX, HS3OYM, HS4OLI, E20DKF. **HS4IVS/1** & E20TFV, E20WUE, HS5WIU, HS8KJW, HS8LWP, HS9HZV. **HS4NLW**: HS3OPN, HS3NWD, HS4OFE, HS7ZIR, HS7ZVF HS8LVN, HS8JXO, HS8KWC. **HS6MYW/1** & HS6TIM. **HS6RMY** & HS5VVP, HS6EZM, HS6NJH. **HS8HWD/1** & HS2YLL, HS8KAY, HS8KMM. **HS9LOW** & HS9CAK, HS9MAA, HS9LZE, HS9LCG. **K4SCH** & W4LJS. **K5BAT**: N5QJ, KD5QJQ. **N1NW**: W1AMF, KE1IU, KB1FUO. **N4DXY**: N4ION, N4JDB, K4IZN, KS4B.

W4VHF/Rover

By Ted, W4VHF, and Itice, K4LVV, Goldthorpe

Our first grid atop Roan Mountain in EM86 was a solid effort, good conditions on 6 meters and all the gear was working. However, as we were motoring down the mountain, things started to go haywire with complaints of our audio breaking up on 6 meters. Everything had worked perfectly just minutes before. For the duration of the contest we battled the problem. Only by decreasing the power to about 25 watts out did we have acceptable audio. Fortunately, we had a wonderful 2-meter opening Sunday. Using stacked Par omnis, calls from W1, 2, 3, 4, 8, 9, and Ø were in for most of the morning. We had very little time to spend on 6 meters, but when we did we ran mostly CW at full power. Results: Four grids activated and a personal best rover score.

What caused the audio problem? A new VW camper van with a *fiberglass* roof caused the RF to get back into the radio. Why not at our first stop? The stacked loops were mounted on the passenger side, farthest from the radio, only for that stop. Go figure. The VW is now rover history!

Ted, W4VHF, rover.

OK1KIM: OK1DTC, OK1HGM, OK1RI. **OK2KJT**: OK2PIN, OK2PMU, OK2PKX, OK2VSO, OK2POI, OK2FNG. **VO1NO/WØ** & K2LCT, KØGIE, KC9EMW. **W1QK** & KA1SYG. **W3SO**: W3BTX, W3TEF. **W3ZZ** & W4XP, K8ISK. **W4OH** & KE4IYH, KD4GCF. **W5LCC**: KC5OBX, KC5MVZ. **WØYC**: AGØI, WØIS, KCØOIA, NØYNT. **YMØKA**: TA1ZK(HB9DUR), TA1E, TA2DS.

Rover Stations: Ops and Grids Activated

N2GKM: FN02, FN12, FN13, FN03, FN11, FN22, FN21, FN10, FN20, FN31. **KC2EBH:** FN02, FN12, FN13, FN03. **KC2HIZ:** FN32, FN22. **K1DS:** FN21, FN11, FN10, FM29, FN20. **W4VHF &** K4LVV: EM86, EM85, EM95, EM96. **N4FV:** EM87, EM86. **W4WNT:** EM95, EM94, EL96. **AF5Q:** EM05, EM14, EM15, EM75 EM04. **N6DN:** DM14, DM13, DM03, DM04, DM05, DM06, CM95, CM96, CM97, CM98, CM88, CM87. **W6KA** (KG6KJN, KJ6NO): DM03, DM13, DM14. **NE8I:** EN82, EN72. **KØPG:** EN62, EN61, EN51, EN60, EN50. **K9ILT:** EN62, EN61, EN51, EN60, EN50. **WB8BZK:** EN53, EN54, EN64, EN63, EN62, EN52, EN51, EN61. **K9JK:** EN53, EN54, EN64, EN63, EN62, EN52, EN51, EN61. **KØNR** & WA6TTY: DN70, DN80, DM89, DM88, DM78, DM79. **NØKE:** DM69, DM79. **KIØSK:** DN70, DN61, DN60, DN50, DN51, DM79. **KG6GMT/Ø:** EN27, EN37, EN36. **HS9LPV:** OJ07, NJ96. **HS1CKC:** OK03, OK04.

Number groups after call letters denote the following: Class (A = all band, 6 = 6 meters, 2 = 2 meters, Q = QRP, R = rover, M = multi-operator), Final Score, Number of QSOs, Number of grids, State/Province (USA/Canada only), Grid Locator or Number of Grids Activated (rover only). Certificate winners are listed in boldface.

2003 VHF RESULTS
NORTH AMERICA
UNITED STATES

K1TEO	**A**	**72,960**	**384**	**152**	**CT**	**FN31**
K1GX	A	29,298	208	114	CT	FN31
W1RZF	**A**	**9,800**	**112**	**70**	**MA**	**FN42**
WY1U	A	7,410	108	65	CT	FN31
K1TR	**A**	**3,772**	**86**	**41**	**NH**	**FN42**
KA1KOJ	A	1,400	40	25	CT	FN41
K1VU	A	150	15	10	MA	FN42
K1TOL	**6**	**53,818**	**379**	**142**	**ME**	**FN44**
N4CW/1	6	1,548	43	36	ME	FN53
W1EL	6	945	35	27	ME	FN43
K1JX	Q	348	20	12	CT	FN31
WG1Z	Q	119	10	7	MA	FN42
W1QK	**M**	**7,000**	**118**	**56**	**CT**	**FN31**
N1NW	**M**	**1,206**	**48**	**18**	**MA**	**FN32**
W1XX	**A**	**101,088**	**506**	**162**	**NY**	**FN32**
N2FKF	A	12,127	133	67	NY	FN30
WB2SIH	A	11,020	122	76	NY	FN31
KC2KGZ	**A**	**10,508**	**117**	**74**	**NJ**	**FM29**
N2YEV	A	5,520	87	60	NY	FN34
W2OO	A	4,914	80	54	NJ	FN20
N3EMF	A	3,071	61	37	NY	FN31
W2VU	A	1,914	55	29	NJ	FN20
K2CS	A	888	35	24	NY	FN13
W5KI	A	315	20	15	NJ	FM29
KB2NOW	A	112	13	7	NY	FN30
N2NRD	**6**	**30,613**	**253**	**121**	**NJ**	**FM29**
K2PS	6	22,360	215	104	NJ	FM29
WA2BKN	6	1,421	49	29	NJ	FN21
WB2DVU	**6**	**580**	**29**	**20**	**NY**	**FN13**
W2ACY	6	460	23	20	NJ	FM29
W2CVW	6	357	21	17	NJ	FN20
W2JEK	6	55	11	5	NJ	FN20
KV2M	6	4	2	2	NJ	FM29
KF2XF	2	462	21	11	NY	FN30
W2UDT	**Q**	**1,269**	**41**	**27**	**NJ**	**FN20**
N2GKM	**R**	**8,848**	**86**	**79**	**NY**	**10**
KC2EBH	R	2,226	44	42	NY	4
KC2HIZ	R	104	10	8	NY	2
WA2FGK	**A**	**123,876**	**536**	**186**	**PA**	**FN21**
					(Op. K2LNS)	
K3ZO	**A**	**99,528**	**508**	**174**	**MD**	**FM18**
K3DNE	A	79,212	418	161	MD	FM19
N3HBX	A	72,080	443	136	MD	FM19
KB3HJA	A	22,272	225	87	PA	FN20
W3MEL	A	11,151	149	59	PA	FN10
N3RN	A	5,005	84	55	PA	FN11
KB3JGS	A	3,168	71	36	PA	FN20
KB3JGT	A	2,967	60	43	PA	FN20
N3UM	A	2,964	70	38	MD	FM18
W3BBO	A	2,400	55	40	PA	FN02
N3NTN	A	1,768	51	34	PA	FN20
KA3PCX	A	684	26	19	PA	FN10
N3ZZU	A	663	32	13	PA	FN20
K3IXD	A	261	20	9	MD	FM19
KB3EXB	A	253	17	11	PA	FN10
W3PT	**6**	**8,568**	**136**	**63**	**PA**	**FN10**
N3II	6	777	37	21	MD	FM19
W3LL	6	345	23	15	MD	FM19
AB3AI	6	42	7	6	PA	FN20
W6AXX	**2**	**2,470**	**65**	**19**	**MD**	**FM19**
KB3GMV	Q	384	24	16	PA	FN10
K1DS	**R**	**57,236**	**278**	**164**	**PA**	**5**
W3SO	**M**	**128,760**	**538**	**185**	**PA**	**FN00**
K9HUY	**A**	**96,696**	**598**	**158**	**FL**	**EL86**
N4MM	**A**	**70,520**	**381**	**164**	**VA**	**FM09**
NJ2F	A	50,344	421	116	FL	EL96
N4GN	**A**	**44,488**	**259**	**134**	**KY**	**EM78**
KN4SM	A	36,580	243	124	VA	FM16
K4TO	A	20,022	154	94	KY	EM77
WN4M	**A**	**12,432**	**149**	**74**	**TN**	**EM66**
KD4EVB	A	11,700	123	65	KY	EM78
K4WYS	A	7,102	96	67	VA	FM16
K4FJW	A	4,592	91	41	VA	EM86
KE4SCY	**A**	**3,330**	**66**	**45**	**NC**	**FM06**
AE4BK	A	2,516	59	34	TN	EM75
K4FTO	A	1,428	40	28	VA	FM18
KG4QWC	A	1,377	40	27	VA	FM18
					(Op. W4HFH)	
K4MTS	A	968	36	22	VA	FM18
K8YC	A	840	33	20	NC	EM95
K4ZOO	A	740	29	20	VA	FM08
W4AME	A	684	37	18	TN	EM75
KD4K	A	682	30	22	GA	EM74
KG4QDZ	A	680	33	20	GA	EM73
AD4TJ	A	620	25	20	VA	FM08
KG4PXF	A	377	22	13	VA	FM18
KG4YUM	A	80	10	8	GA	EM73
KC4PX	**6**	**136,935**	**743**	**179**	**FL**	**EL98**
K4EA	**6**	**69,020**	**493**	**140**	**GA**	**EM74**
W4WRL	**6**	**50,715**	**345**	**147**	**SC**	**FM04**
NL7AU	6	34,410	370	93	FL	EL94
K6EID	6	11,284	182	62	GA	EM73
K4WI	**6**	**8,792**	**157**	**56**	**AL**	**EM62**
KU8E	6	6,413	121	53	GA	EM72
N4CAG	**6**	**5,640**	**94**	**60**	**TN**	**EM86**
KG4JSZ	6	5,400	100	54	FL	EL87
WR4K	6	4,653	99	47	FL	EM90
WB4VHF	6	4,374	81	54	AL	EM64
K4DD	6	4,257	99	43	FL	EM60
AB4GG	6	3,317	107	31	TN	EM75
K4BAI	6	2,860	65	44	GA	EM72
K4RKN	6	1,855	53	35	AL	EM50
KG4RUL	6	1,645	47	35	SC	EM93
K8FK	6	1,092	39	28	FL	EL88
W4AMP	6	336	24	14	GA	EM73
K2IUK	6	198	18	11	NC	EM85
N4NTO	6	20	5	4	NC	FM15
W4GRW	**2**	**40,880**	**280**	**73**	**NC**	**EM96**
KB4NVD	2	100	10	5	TN	EM86
KU4BP	2	24	4	3	NC	EM96
N3AWS	Q	78	13	6	FL	EM90
W4VHF	**R**	**135,286**	**494**	**173**	**NC**	**3**
N4FV	**R**	**5,500**	**100**	**55**	**TN**	**2**
W4WNT	R	300	17	15	NC	3
AF4HX	**M**	**94,360**	**429**	**140**	**NC**	**EM96**
K4SCH	M	57,969	346	113	NC	EM85
W4OH	M	31,724	229	103	NC	EM96
N4DXY	**M**	**15,150**	**200**	**75**	**AL**	**EM62**
AE5B	**A**	**22,230**	**210**	**95**	**TX**	**EM02**
W8FR	**A**	**11,289**	**143**	**71**	**MS**	**EM54**
NEØP	**A**	**4,416**	**83**	**46**	**OK**	**EM04**
KA5GLX	A	1,496	43	34	TX	EL29
NH6CJ	A	1,050	38	25	OK	EM04
W5NOS	A	567	24	21	TX	EM12
K9STH	A	462	28	14	TX	EM12
KA5EYH	A	414	21	18	TX	EL09
KM5NU	A	119	12	7	OK	EM04
KC5IMN	A	96	10	8	TX	EM23
KD5RQ	A	60	9	5	OK	EM04
N5PYU	A	40	12	2	OK	EM04
AD5NK	A	28	8	2	OK	EM04
KB5OJT	A	6	3	1	OK	EM04

W5PR	**6**	**32,155**	**295**	**109**	**TX**	**EL29**
WD5K	6	22,339	251	89	TX	EM12
W5GN	6	14,948	202	74	TX	EM12
KJ5RC	**6**	**5,978**	**122**	**49**	**MS**	**EM42**
NØRQ	6	2,688	84	32	TX	EM13
K5AM	**6**	**1,107**	**41**	**27**	**NM**	**DM62**
WA5LFD	6	837	31	27	TX	EM12
WA5KBH	6	754	29	26	LA	EM30
N5ITO	**2**	**1,224**	**51**	**12**	**TX**	**EM12**
NM5M	**Q**	**2,912**	**67**	**32**	**TX**	**EM13**
W5GAI	Q	1,485	45	33	TX	EM10
N6ZZ	Q	851	37	23	NM	DM73
WO7GI	Q	45	9	5	OK	EM04
KC5EIU	Q	22	6	2	OK	EM04
W5RZ	Q	4	2	2	AR	EM35
AF5Q	R	368	23	16	OK	5
W5LCC	**M**	**13,284**	**153**	**81**	**TX**	**DM93**
K5BAT	**M**	**5,712**	**102**	**56**	**AR**	**EM35**
KG6GIQ	**A**	**5,712**	**104**	**48**	**CA**	**DM04**
KF6CNV	A	1,386	46	22	CA	DM07
KF6MXK	A	1,206	50	18	CA	CM87
KD4IDR	A	832	36	16	CA	CM87
W6OMF	A	756	26	21	CA	CM98
WD6DX	6	9	3	3	CA	CM96
KG6HSQ	2	204	17	6	CA	DM13
N6MU	**Q**	**27,432**	**280**	**72**	**CA**	**DM05**
W8QZA	Q	264	19	12	CA	DM12
N6DN	**R**	**49,192**	**240**	**143**	**CA**	**12**
W6KA	R	1,638	44	26	CA	3
N7EPD	**A**	**9,856**	**163**	**44**	**WA**	**CN87**
N7DB	**A**	**1,216**	**45**	**19**	**OR**	**CN85**
KØJJ	A	629	35	17	OR	CN85
W7MEM	A	527	27	17	ID	DN17
K7PIG	2	2	1	1	AZ	DM41
KB8U	**A**	**47,864**	**303**	**124**	**MI**	**EN71**
KE8RO	**A**	**35,076**	**235**	**111**	**OH**	**EN81**
K8CC	A	25,389	231	91	MI	EN82
N8BJQ	A	17,630	176	82	OH	EN80
N8UUP	A	14,976	186	78	MI	EN82
W8PAT	A	11,550	111	77	OH	EN81
K8MR	A	4,738	83	46	OH	EN91
N8OC	A	4,700	74	50	MI	EN83
N8GX	A	1,820	37	28	MI	EN82
KB8UYZ	A	1,815	48	33	MI	EN72
KB8YJY	A	1,537	41	29	OH	EN91
W8KNO	A	896	32	28	OH	EN91
WA8WV	A	620	22	20	WV	EM98
W8RU	A	357	20	17	MI	EN82
N8II	**6**	**21,070**	**215**	**98**	**WV**	**FM19**
KC8KSK	6	494	26	19	WV	EM97
N8PVT	6	336	21	16	MI	EN64
AB8NI	6	180	15	12	OH	EN91
K8KFJ	6	165	15	11	WV	EM98
N8XA	**Q**	**989**	**35**	**23**	**OH**	**EM89**
NE8I	R	189	12	9	MI	2
W3ZZ	**M**	**459,650**	**1,187**	**290**	**WV**	**FM08**
K2DRH	**A**	**212,952**	**712**	**228**	**IL**	**EN41**
NV8V	A	51,120	322	120	IL	EN61
K9SM	A	25,344	202	96	IL	EM59
N2BJ	A	7,938	98	49	IL	EN61
N9TF	A	4,636	84	38	IL	EN52
KB9UMI	**A**	**4,324**	**92**	**46**	**IN**	**EN70**
KI9R	A	4,280	78	40	IL	EN52
KR8L	A	4,080	60	40	IL	EM57
K9GPS	A	3,741	60	43	IN	EM79
WO9S	A	3,700	100	37	IL	EN61
W8DQ	A	2,812	53	37	IN	EM79
K9VS	**A**	**1,680**	**46**	**28**	**WI**	**EN52**
W9SE	A	920	27	20	IL	EN50
K9TMS	A	656	30	16	IL	EN52
N9NDP	A	646	24	19	WI	EN62
K9PW	**6**	**11,210**	**190**	**59**	**IL**	**EN52**
KB9WQJ	2	144	9	8	IL	EM58
N9BX	**Q**	**3,420**	**74**	**45**	**IL**	**EN52**
KØPG	**R**	**29,256**	**208**	**106**	**IL**	**5**
K9ILT	R	28,980	205	105	IL	5
WB8BZK	R	17,430	116	105	IL	8
K9JK	R	15,960	116	95	IL	8
NØDQS	**A**	**23,180**	**168**	**76**	**IA**	**EN22**
KØAWU	**A**	**10,366**	**130**	**73**	**MN**	**EN37**
KØUK	**A**	**3,483**	**107**	**27**	**CO**	**DM59**
KØVSV	A	2,812	55	38	IA	EN41
WØEEA	A	2,204	51	29	CO	DM79
ABØSD	A	2,040	56	34	IA	EN30
NØPOH	A	1,300	44	20	CO	DM79
KØJJM	**A**	**1,275**	**31**	**25**	**KS**	**EM29**
WØRT	A	495	17	15	KS	EM27
W9BNO	A	408	25	12	CO	DM79
WØRUN	**6**	**10,721**	**151**	**71**	**CO**	**DN70**
WAØMHJ	6	759	33	23	MN	EN35
KØHW	6	96	12	8	SD	EN12
NØLD	**2**	**5,964**	**71**	**42**	**KS**	**EM17**
WØGC	2	182	13	7	SD	EN14
NØURW	**Q**	**33,245**	**231**	**109**	**IA**	**EN41**
NØLX	**Q**	**2,322**	**62**	**27**	**CO**	**DM79**
NØJK	**Q**	**1,298**	**30**	**22**	**KS**	**EM08**
KØNR	**R**	**1,980**	**41**	**33**	**CO**	**5**
NØKE	R	1,798	46	31	CO	2
KIØSK	R	1,008	30	24	CO	6
KG6GMT/Ø	R	364	18	14	MN	3
VO1NO/WØ	**M**	**9,699**	**134**	**61**	**CO**	**DM77**
WØYC	M	225	17	9	MN	EN35
CANADA						
VE2PIJ	**A**	**1,222**	**37**	**26**	**QC**	**FN35**
XM2AWR	A	1,188	41	27	QC (Op. VE2AWR)	FN46
XL2IC	A	378	32	7	QC (Op. VA2IC)	FN46
VE3BNO	A	456	22	19	ON	FN25
VE1YX	**6**	**36,848**	**329**	**112**	**NS**	**FN74**
VE1SKY	6	3,588	92	39	NS	FN74
VA3OR	6	476	28	17	ON	FN14
VA7MM	Q	671	41	11	BC	CN89
MEXICO						
XE2MX	**6**	**1,056**	**44**	**24**		**DM11**
XE2HWB	**Q**	**324**	**21**	**9**		**DL44**
PUERTO RICO						
WP4LNY	**A**	**115**	**16**	**5**		**FK68**
AFRICA						
CANARY ISLANDS						
EH8BPX	**6**	**35,584**	**256**	**139**		**IL18**

EUROPE

CZECH REPUBLIC

OK1CZ	**A**	**4,554**	**81**	**33**	**JO70**
OK1SRD	**A**	**1,886**	**55**	**23**	**JO80**
OK2KJT	**M**	**122,914**	**566**	**151**	**JN99**
OK1KIM	**M**	**69,454**	**451**	**77**	**JO60**

FINLAND

OH1BOI	**6**	**9**	**3**	**3**	**KP10**

FRANCE

F6IFR	**M**	**62,496**	**434**	**72**	**JN09**
F4ARM	**M**	**17,510**	**170**	**103**	**JN16**

GERMANY

DL2OM	**A**	**76,942**	**325**	**146**	**JO30**
DK5DQ	**2**	**34,320**	**264**	**65**	**JO31**

LITHUANIA

LY2TA	**2**	**324**	**18**	**9**	**KO16**

MACEDONIA

Z36W	**6**	**1,914**	**58**	**33**	**KN11**

NETHERLANDS

PAØJNH	**6**	**2,279**	**53**	**43**	**JO22**

POLAND

SQ6ELV	**A**	**13,464**	**140**	**68**	**JO80**
SP6MLK	**6**	**1,404**	**39**	**36**	**JO80**

PORTUGAL

CT1DHM	**A**	**49,206**	**340**	**139**	**IN61**

ROMANIA

YO5CBX	**6**	**962**	**37**	**26**	**KN27**

SERBIA & MONTENEGRO

YU1QT	**6**	**9,520**	**136**	**70**	**KN04**
YZ1EW	**6**	**8,505**	**135**	**63**	**JN94**

SLOVAKIA

OM5CW	**6**	**8,362**	**113**	**74**	**JN97**

SWITZERLAND

HB9FAP	**A**	**46,368**	**262**	**112**	**JN46**

SPAIN

EH3FHP	**2**	**49**	**7**	**7**	**JN11**
EA2AP/p	**2**	**24**	**14**	**672**	**IN62**
EB5HOY	2	2	1	1	IM98

TURKEY

TA2RC/P	**6**	**65,758**	**427**	**154**	**KN50**
YMØKA	**M**	**69,738**	**377**	**177**	**KM39**

UKRAINE

UW5U	**6**	**47,265**	**345**	**137**	**KO50 (Op. UY2UA)**
UR5QU	**6**	**26,329**	**233**	**113**	**KN77**
UXØFF	**6**	**9,648**	**134**	**72**	**KN45**

ASIA

THAILAND

E21DKD	**2**	**22,310**	**485**	**23**	**OK04**
E20YGG	**2**	**6,510**	**465**	**7**	**OK03**
HS8GLR/9	**2**	**5,526**	**307**	**9**	**OJ07**
E20MXA	2	4,016	251	8	OK03
HS5AYO	**2**	**3,102**	**141**	**11**	**NK98**
HS2JFW	2	1,834	131	7	OK03
E21EIC	2	1,680	120	7	OK03
HS0XNO	2	1,428	102	7	OK03
E21RC	2	216	27	4	OK03
HS9LPV	**R**	**924**	**77**	**6**	**2**
HS1CKC	R	56	7	4	2
HS3NNE	**M**	**19,840**	**496**	**20**	**OK14**
HS4NLW	**M**	**12,336**	**514**	**12**	**OK03**
HS6RMY	**M**	**11,988**	**333**	**18**	**OK06**
HS4IVS/1	M	11,492	442	13	OK03
HS8HWD/1	M	6,336	352	9	OK03
E21CJN	M	4,528	283	8	OK03
E20WIE	M	4,400	275	8	OK03
HS6MYW/1	M	2,592	144	9	OK03
E20NGF	M	2,460	246	5	OK03
HS9LOW	**M**	**944**	**118**	**4**	**OJ07**

Check Logs: K4JRB, KB9WZJ, N1SXL.

propagation

BY TOMAS HOOD,* NW7US

June and Time for Field Day!

A Quick Look at Current Cycle 23 Conditions

(Data is rounded to nearest whole number)

Sunspots
Observed Monthly, March 2044: 49
Twelve-month smoothed, September 2003: 60

10.7 cm Flux
Observed Monthly, March 2004: 112
Twelve-month smoothed, September 2003: 126

***Ap* Index**
Observed Monthly, March: 12
Twelve-month smoothed, September 2003: 22

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for June 2004

	Expected Signal Quality			
Propagation Index.....	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 1, 4-5, 7-9, 11, 13-15, 21-23, 28	**A**	**A**	**B**	**C**
High Normal: 2-3, 6, 10, 12, 16-20, 25-26, 29-30	**A**	**B**	**C**	**C-D**
Low Normal: 24, 27	**B**	**C-B**	**C-D**	**D-E**
Below Normal: none	**C**	**C-D**	**D-E**	**E**
Disturbed: none	**C-D**	**D**	**E**	**E**

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.
B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.
2. With the *propagation index,* use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be excellent (A) on the 1st, good (B) on the 2nd and 3rd, excellent (A) on the 4th and 5th, etc.

It is that time again when we grab tents, tables, batteries, generators, and if we are not very forgetful, some radio gear, and we head out to a park or other remote location to practice our emergency communications skills. We pick some trees, or perhaps raise a small tower or mast kit, and start stringing wire and cable to create some workable antenna system. Those living in the eastern United States try to angle their wires in such a way as to favor the Midwest and Southwest, while those located in the western states aim east and south. Midwest operators engineer their antenna systems to be omni-directional. Somewhere scattered about the many Field Day sites are the small, lightweight beams, too.

If you wish to maximize your on-the-air efforts, you'll want to check out the Last-Minute Forecast and the DX Propagation Charts in this column. In addition, I have prepared charts based on locations in each region of the United States, from WØ to W9. These are rough guides that might help you plan your operation. Refer to the Short-Skip Charts in last month's issue and this month's DX Propagation Charts for more detailed forecasts, using the Last-Minute Forecast if you wish to get specific details of possible openings.

Field Day is always the fourth full weekend of June, beginning at 1800 UTC Saturday and ending at 2100 UTC Sunday. Field Day 2004 will be held June 26–27, and we should see fair to good conditions, with little geomagnetic activity. Of course, this outlook is based on the 27-day cycle of the sun's rotation. You will want to check conditions 27 days before Field Day to see how conditions will be closer to the event.

Last year the ARRL reported that the participation level in Field Day 2003 compared favorably to Field Day 2002. However, the number of contacts made on the air in FD 2003 was down about 300,000 (from 1.4 million to 1.1 million). This was due to the lack of good propagation.

The smoothed sunspot number for FD 2002 was 106, while the smoothed sunspot number for FD 2003 was a mere 65. This year it is predicted to be 33! That's a pretty big decline from last year to this year, and it significantly reduces the probabilities of the higher bands (15 and 10 meters) opening for Field Day contacts. Even 20 meters will be degraded.

The geomagnetic conditions during Field Day 2003 were horrible due to a large coronal hole. This produced active to major storm levels on June 27 and 28 and minor storm levels on June 29, causing reduced ionization at *F*-region altitudes. This knocked out the higher bands, and certainly did not support great lower-band propagation across the northern tier states. This year, however, we should not have such major geomagnetic activity. However, looking at the 27-day rotation cycle, we can expect fair to good conditions, starting with good conditions on June 26 and ending with fair conditions on June 27.

Sporadic-*E* (*Es*) was non-existent for the most part during FD 2003. The summer months have the highest probability of *Es,* and this could somewhat have helped offset the dismal propagation on the higher bands. Will we have greater *Es* activity this year? Predictions on wind shearing and weather patterns indicate possibly favorable conditions for *Es* this year. Let's hope!

The Field Day chart shows that the lower bands will be the backbone of operations this year. Twenty meters might hold some promise, but take those times with a grain of salt. I expect 20 to be a poor band this time around. I'd suggest that a lot of energy be given to creating high-gain antennas for the low bands, as well as for 20 meters. Every ounce of gain you can add will increase your

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chance of making Field Day a success. Look to CW and the digital modes, too, to maximize the signal's usefulness. During poor propagation, voice is much less efficient than CW and digital modes.

June Propagation

June marks the changeover from equinoctial to summertime propagation conditions on the shortwave (HF) bands. Solar absorption is expected to be at seasonally high levels, resulting in generally weaker signals during the hours of daylight when compared to reception during the winter and spring months.

Ten-meter propagation to DX locations east and west are a rare event during the peak of summer. With the lower solar flux and decline of the cycle, I don't expect to see much on 10, unless sporadic-*E* openings occur. The flux just won't support a high enough maximum usable frequency (MUF) on most DX paths. North and south paths on 10 meters may still present DX, especially around sunrise and sunset, but these openings will be short.

Seventeen and 15 meters will be just a bit more reliable than 10, holding some promise. However, these will still be a challenge with the decreased solar activity. I have been watching 15-meter propagation all of this year so far. It has had some activity, but nothing like a year ago. I don't expect a lot from this band during Field Day 2004. In general, watch for days when the flux peaks high. During those peaks, 15 meters may support excellent EU/USSR openings at night and during much of the day.

Twenty meters is poor to fair during the hours of darkness, and fair during daylight hours. The best openings on 20 will be the hours around sunrise. MUFs during the daytime hours are considerably lower during June and the summer months than during the other seasons. They are considerably higher during the hours of darkness in June than during the same hours of darkness in the winter. This changeover should have its greatest impact on 20 meters.

Thunderstorm noise and other natural static increases considerably during June and the summer months. These higher static levels should be noticeable on all HF bands, especially on 40, 80, and 160 meters.

The 30- and 40-meter bands should offer good DX conditions during the night, despite higher static. Look for Europe and Africa as early as sunset. After midnight, start looking south and west for Pacific, South America, and Asia. Short-skip should be possible out to about 750 miles during the daytime.

Expect some openings on 80, similar to how 40 meters will be acting. Fairly frequent short-skip openings up to 1000 miles are possible during darkness, but expect very few daytime openings with all the static and absorption.

Sporadic-*E* propagation peaks during June and the summer months. Expect an increase in the number of short-skip openings on HF, and often on 6 and 2

About the Table and How to Use It

These charts are based on a smoothed sunspot number of 33, predicted for June 2004. They were calculated with a SNR >= 24, with a required reliability of 90%. The power level used was 100 watts, with an isotropic antenna. All times are the local times in the zone of each area as follows:

W1 - Eastern
W2 - Eastern
W3 - Eastern
W4 - Eastern
W5 - Central
W6 - Pacific
W7 - Pacific
W8 - Eastern
W9 - Central
WØ - Mountain

The charts are estimates. In the real world, conditions might be better, or they might be very bad. It is my prediction that the 20-meter predictions are too optimistic. I expect 20 meters to be a poor band this year. The 15- and 10-meter bands were not included due to the predicted decline in the smoothed sunspot number and thus the reduced probability of these bands being open for Field Day contacts.

By selecting your region at the top of the chart (if you are in Seattle, choose W7; if you are in Arizona, use the W6 area) and band, you can see what times you might be successful in working into the region listed on the left. Check the Short-Skip charts in the May issue and the Last-Minute Forecast this month for additional help in scheduling your Field Day operation.

80 Meters SSB

From:	W1	W2	W3	W4	W5	W6	W7	W8	W9	WØ
To:										
WØ	N/A	N/A	N/A	N/A	02-12	03-13	05-12	08-10	06-11	00-23
W1	00-23	00-12, 22-23	00-12, 23	02-04, 07-09	N/A	N/A	N/A	00-11 22-23	01-10	N/A
W2	00-12, 21-23	00-23	00-23	00-11, 23	09	N/A	N/A	00-13, 22-23	00-11	N/A
W3	00-11, 23	00-23	00-23	01-03, 06-10	09	N/A	N/A	00-15, 19-23	00-12, 23	09
W4	N/A	02, 06-09	01-02, 05-10	00-23	06-10	N/A	N/A	02, 05-10	07-09	N/A
W5	N/A	08-09	06-09	02-10	00-23	04-11	N/A	04-10	03-10	02-12
W6	N/A	N/A	N/A	N/A	03-11	00-23	04-12	N/A	07-09	02-13
W7	N/A	N/A	N/A	N/A	08-09	04-12	00-23	N/A	09	04-12
W8	00-11	00-13, 22-23	00-15, 19-23	02, 08-10	09-10	N/A	N/A	00-23	00-14, 21-23	09-10
W9	06-10	01-11	00-12	N/A	09-10	N/A	N/A	00-14, 21-23	00-23	07-11

40 Meters SSB

From:	W1	W2	W3	W4	W5	W6	W7	W8	W9	WØ
To:										
WØ	10	03-11	02-11	02-11	00-14	00-15	02-14	02-12	01-13	00-03, 16, 18-23
W1	00, 22-23	00-03, 11-23	00-05, 10-23	00-10	01, 08-10	09	08-09	00-07, 09-13, 21-23	00-12, 23	10
W2	00-03, 11-23	00-01, 22-23	00-01, 22-23	00-11, 23	01-11	N/A	09-10	00-04, 12-23	00-13, 22-23	02-11

meters, with paths open between 50 and 2300 miles.

VHF Conditions

The summertime sporadic-*E* (*Es*) season for the Northern Hemisphere begins in force in May. Within the normal *E*-layer region of the ionosphere, regions of abnormally intense ionization are formed. We do not yet understand why these form, but we do know a lot about how they behave.

40 Meters SSB *(continued)*

W3	00-05, 10-23	00-01, 22-23	00-01, 22-23	00-12, 23	00-11	N/A	09-10	00-02, 17-23	00-06, 11-23	02-11
W4	00-10	00-11, 23	00-12, 23	00-03, 13-23	00-12	N/A	N/A	00-12, 23	00-12, 23	02-11
W5	08-10	01-11	00-11	00-12	00-04, 14-23	01-14	03-12	00-12	00-12	00-14
W6	08-09	07-10	07-10	05-10	01-14	00-04, 15-23	02-14	N/A	02-12	00-15
W7	08-09	08-10	07-10	N/A	03-12	02-14	N/A	11	03-11	01-14
W8	00-07. 09-13, 21-23	00-04, 12-23	00-02, 17-23	00-12, 23	00-12	N/A	N/A	00-01, 23	00-03, 13-23	02-12
W9	00-12, 23	00-13, 22-23	00-06, 11-23	00-12, 23	00-12	04-12	09-11	00-14, 21-23	00-01, 23	01-13

20 Meters SSB

From:	**W1**	**W2**	**W3**	**W4**	**W5**	**W6**	**W7**	**W8**	**W9**	**WØ**
To:										
WØ	04-05, 12-13, 22-23	00-05, 12-15, 21-23	00-05, 13-23	00-06, 11-14, 22-23	00-02, 16-21	18-21	02-03, 16-23	00-04, 13-23	00-03, 15-22	N/A
W1	N/A	N/A	N/A	00-04, 11-23	03-05, 11-13, 22-23	02-03	N/A	N/A	00-01, 14-21	04-05, 12-15, 22-23
W2	N/A	N/A	N/A	00-03, 12-23	00-05, 12-23	01-03	N/A	N/A	16-18	00-05, 12-15, 21-23
W3	N/A	N/A	N/A	00-03, 13-23	00-05, 12-23	01-02	N/A	N/A	N/A	00-05, 13-23
W4	00-04, 11-23	00-03, 12-23	00-03, 13-23	N/A	00-05, 12-23	01-03, 08-10	03	00-03, 13-23	00-04, 12,23	00-06, 12-14, 22-23
W5	03-05, 11-13, 22-23	00-05, 12-23	00-05, 12-23	00-05, 12-23	N/A	00-06, 14-23	00-07, 13-15, 23	00-04, 13-23	00-03, 14,23	00-02, 16-21
W6	N/A	N/A	N/A	00-03, 08-10	00-06, 14-23	N/A	00-05, 15-23	06-07, 12-14	00-06, 13-15, 22-23	18-21
W7	N/A	N/A	N/A	03	00-07, 13-15, 23	00-05, 15-23	N/A	06, 03-14, 23	00-06, 14-23	02-03, 16-23
W8	N/A	N/A	N/A	00-03, 13-23	00-04, 13-23	06-07, 12-14	06, 13-14, 23	N/A	N/A	00-04, 13-23
W9	00-01, 14-20	16-18	N/A	00-04, 12-23	00-03, 14-23	00-06, 13-15, 22-23	00-06, 14-18, 23	N/A	N/A	00-03, 15-22

During the late spring and summer months, a sharp increase in *Es* propagation occurs at mid-latitude. Through June, you can expect to see 20 to 24 days with some *Es* activity. Usually these openings are single-hop events with paths up to 1000 miles, but June's *Es* is often double-hop. Europe can generally be worked from the east coast throughout June. Signals will be weaker than *F2* signals, but with so many more stations on the air, these *Es* openings will be more utilized.

During the daylight hours, monitor 6 meters for transcontinental openings, as well as between Hawaii and the western states, and the Caribbean and Central and South America. The best time to look for these openings are during the afternoon hours, especially when conditions are High Normal or better.

There is usually a seasonal decline in transequatorial (TE) propagation during the summer months, but some 6-meter openings may still be possible during June. The best time to catch an opening across the geomagnetic equator is between 8 and 11 PM local daylight time.

I don't expect aurora activity. Don't forget that you can also visit my propagation page, <http://prop.hfradio.org/>, to view current conditions, including aurora activity.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for March 2004 is 49, up from February 2004's 46. The 12-month running smoothed sunspot number centered on September 2003 is 60, the same as for August. The lowest daily sunspot value during March 2004 was recorded on March 4, with a count of 23. The highest daily sunspot count for March was 88 , recorded on March 27. A smoothed sunspot count of 33 is expected for June 2004.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 112 for March 2004, up from 107 for February 2004. The 12-month smoothed 10.7-cm flux centered on September 2003 is 126, just down from August 2003, continuing the downward trend. The predicted smoothed 10.7-cm solar flux for June 2004 is about 92, give or take about 17 points.

The observed monthly mean planetary *A*-index (*Ap*) for March 2004 is 12, down a point from February. The 12-month smoothed *Ap*-index centered on September 2003 is 22, the same as for August. Expect overall geomagnetic activity to be quiet to disturbed during most days in June.

You may e-mail me, write me a letter, or catch me on the HF amateur bands. I also have an EchoLink node where you might catch me; look for node number 152783, NW7US-L. Please come and participate in my online propagation discussion forum at <http://hfradio. org/forums/>. I look forward to hearing from you. Happy DXing!

73, Tomas, NW7US/AAMØEWA

June 15 - August 15, 2004
Time Zone: EDT (24-Hour Time)
EASTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western Europe & North Africa	*Nil*	11-16 (1) 16-18 (2) 18-19 (1)	06-09 (2) 09-13 (1) 13-15 (2) 15-17 (3) 17-22 (4) 22-00 (3) 00-03 (2) 03-06 (1)	20-22 (1) 22-23 (2) 23-01 (3) 01-02 (2) 02-03 (1) 22-00 (1)* 00-01 (2)* 01-02 (1)*
Northern Europe & European CIS	*Nil*	14-18 (1)	09-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-23 (3) 23-02 (2) 02-07 (1) 07-09 (2)	21-22 (1) 22-00 (2) 00-02 (1) 21-00 (1)*
Eastern Mediterranean & Middle East	*Nil*	11-16 (1) 16-18 (2) 18-19 (1)	12-14 (1) 14-17 (2) 17-19 (3) 19-23 (4) 23-01 (3) 01-03 (2) 03-06 (1) 06-08 (2) 08-09 (1)	20-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Western Africa	16-18 (1)	10-12 (1) 12-14 (2) 14-15 (3) 15-17 (4) 17-19 (3) 19-20 (2) 20-22 (1)	03-07 (1) 07-09 (2) 09-15 (1) 15-16 (2) 16-17 (3) 17-23 (4) 23-01 (3) 01-03 (2)	20-22 (1) 22-02 (2) 00-02 (1) 22-00 (1)*
Eastern & Central Africa	16-17 (1)	11-14 (1) 14-15 (2) 15-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-21 (4) 21-23 (3) 23-02 (2) 02-06 (1)	21-00 (1)
Southern Africa	10-13 (1)	09-11 (1) 11-12 (2) 12-13 (3) 13-14 (2) 14-15 (1)	00-01 (1) 01-05 (2) 05-07 (1) 15-16 (1) 16-18 (2) 18-19 (1)	21-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)*
Central & South Asia	*Nil*	10-12 (1) 19-22 (1)	17-20 (1) 20-23 (2) 23-03 (1) 06-09 (1)	19-21 (1)
Southeast Asia	*Nil*	10-12 (1) 19-21 (1)	19-21 (2) 21-23 (1) 23-01 (2) 01-02 (1) 06-07 (1) 07-09 (2) 09-11 (1)	*Nil*
Far East	*Nil*	10-12 (1) 17-18 (1) 18-20 (2) 20-21 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-12 (1) 19-20 (1) 20-23 (2) 23-00 (1)	*Nil*
South Pacific & New Zealand	18-21 (1)	15-17 (1) 17-19 (2) 19-21 (3) 21-22 (2)	18-21 (1) 21-23 (2) 23-01 (3) 01-03 (4)	01-03 (1) 03-06 (2) 06-08 (1) 04-06 (1)*
South Pacific & New Zealand		22-23 (1)	03-04 (3) 04-07 (2) 07-09 (3) 09-10 (2) 10-12 (1)	
Australasia	18-20 (1)	10-12 (1) 18-19 (1) 19-20 (2) 20-21 (3) 21-22 (2) 22-23 (1)	23-01 (1) 01-02 (2) 02-04 (3) 04-05 (2) 05-07 (1) 07-09 (2) 09-10 (1) 16-18 (1)	03-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)*
Caribbean, Central America & Northern Countries of South America	09-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	08-09 (1) 09-11 (2) 11-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	07-10 (4) 10-16 (3) 16-00 (4) 00-03 (3) 03-06 (2) 06-07 (3)	19-21 (1) 21-23 (2) 23-03 (3) 03-05 (2) 05-06 (1) 22-23 (1)* 23-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-14 (1) 14-16 (2) 16-18 (3) 18-19 (1)	08-09 (1) 09-11 (2) 11-15 (1) 15-16 (2) 16-17 (3) 17-20 (4) 20-22 (3) 22-23 (2)	11-16 (1) 16-17 (2) 17-18 (3) 18-02 (4) 02-04 (3) 04-07 (2) 07-09 (3) 09-11 (2)	20-21 (1) 21-22 (2) 22-02 (3) 02-04 (2) 04-05 (1) 22-03 (1)*
McMurdo Sound, Antarctica	*Nil*	16-20 (1)	17-19 (1) 19-23 (2) 23-01 (3) 01-03 (2) 03-05 (1) 07-09 (1)	02-05 (1)

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.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

Time Zones: CDT & MDT
(24-Hour Time)
CENTRAL USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western Europe & North Africa	*Nil*	15-18 (1)	05-06 (1) 06-08 (2) 08-15 (1) 15-17 (2) 17-18 (3)	20-23 (1) 23-01 (2) 01-02 (1) 22-00 (1)*

Europe & North Africa			18-20 (4) 20-22 (3) 22-00 (2) 00-02 (1)	
Northern Europe & European CIS	*Nil*	13-17 (1)	05-06 (1) 06-09 (2) 09-15 (1) 15-18 (2) 18-21 (3) 21-00 (2) 00-01 (1)	20-00 (1)
Eastern Mediter-ranean & Middle East	*Nil*	15-18 (1)	13-16 (1) 16-18 (2) 18-22 (3) 22-00 (2) 00-01 (1) 07-09 (1)	21-23 (1)
Western Africa	16-18 (1)	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	14-15 (1) 15-16 (2) 16-18 (3) 18-21 (4) 21-23 (3) 23-01 (2) 01-03 (1)	20-00 (1) 22-00 (1)*
Eastern & Central Africa	16-18 (1)	13-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	15-17 (1) 17-18 (2) 18-21 (3) 21-23 (2) 23-01 (1)	20-23 (1)
Southern Africa	10-12 (1)	09-10 (1) 10-12 (2) 12-13 (1)	22-00 (1) 00-03 (2) 03-07 (1) 13-15 (1) 15-17 (2) 17-19 (1)	21-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Central & South Asia	*Nil*	10-12 (1) 18-21 (1)	17-19 (1) 19-22 (2) 22-03 (1) 05-07 (1) 07-09 (2) 09-10 (1)	*Nil*
Southeast Asia	*Nil*	10-12 (1) 19-22 (1)	04-07 (1) 07-09 (2) 09-10 (1) 22-23 (1) 23-01 (2) 01-02 (1)	03-05 (1)
Far East	*Nil*	10-15 (1) 18-20 (1) 20-22 (2) 22-23 (1)	05-07 (2) 07-09 (3) 09-10 (2) 10-12 (1) 20-22 (1) 22-00 (2) 00-02 (3) 02-03 (2) 03-05 (1)	04-05 (1) 05-06 (2) 06-07 (1) 04-06 (1)*
South Pacific & New Zealand	18-20 (1)	13-16 (1) 16-18 (2) 18-20 (3) 20-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	17-19 (1) 19-23 (2) 23-01 (4) 01-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-13 (1)	23-01 (1) 01-03 (2) 03-05 (3) 05-07 (2) 07-08 (1) 01-04 (1)* 04-06 (2)* 06-07 (1)*
Austral-Asia	17-20 (1)	14-15 (1) 15-17 (2) 17-19 (1) 19-20 (2) 20-21 (3) 21-22 (2) 22-23 (1)	22-00 (1) 00-01 (2) 01-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-12 (1)	01-03 (1) 03-07 (2) 07-08 (1) 03-06 (1)*
Caribbean, Central America & Northern Countries of South America	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-09 (1) 09-10 (2) 10-11 (3) 11-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	02-05 (2) 05-07 (3) 07-10 (4) 10-11 (3) 11-13 (2) 13-16 (3) 16-22 (4) 22-02 (3)	19-20 (1) 20-23 (4) 23-00 (3) 00-03 (2) 03-05 (3) 05-06 (1) 20-21 (1)* 21-23 (2)* 23-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-14 (1) 14-16 (2) 16-19 (4) 19-20 (3) 20-22 (2) 22-23 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-23 (4) 23-02 (3) 02-05 (1) 05-07 (2) 07-10 (1)	20-21 (1) 21-22 (2) 22-02 (3) 02-03 (2) 03-05 (1) 20-03 (1)*
McMurdo Sound	*Nil*	15-16 (1) 16-19 (2) 19-21 (1)	17-19 (1) 19-23 (2) 23-01 (3) 01-03 (2) 03-05 (1) 07-09 (1)	03-06 (1)

Time Zone: PDT (24-Hour Time) WESTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western Europe & North Africa	*Nil*	09-11 (1) 15-17 (1)	05-06 (1) 06-08 (2) 08-15 (1) 15-21 (3) 21-23 (2) 23-03 (1)	20-23 (1)
Northern Europe & European CIS	*Nil*	14-16 (1)	00-06 (1) 06-08 (2) 08-10 (1) 13-16 (1) 16-20 (2) 20-22 (3) 22-00 (2)	20-22 (1)
Eastern Mediter-ranean & Middle East	*Nil*	13-15 (1)	14-16 (1) 16-20 (2) 20-22 (3) 22-23 (2) 23-00 (1) 06-08 (1)	20-21 (1)
Western & Central Africa	14-16 (1)	07-09 (1) 11-13 (1) 13-17 (2) 17-18 (1)	14-16 (1) 16-18 (2) 18-20 (3) 20-21 (4) 21-23 (3) 23-03 (2) 03-04 (1) 07-09 (1)	20-22 (1)
Eastern Africa	*Nil*	13-16 (1)	16-19 (1) 19-22 (2) 22-00 (1)	*Nil*
Southern Africa	09-11 (1)	09-10 (1) 10-12 (2) 12-13 (1)	15-17 (1) 22-23 (1) 23-01 (2) 01-03 (1) 06-08 (1)	20-23 (1)
Central & South Asia	*Nil*	10-12 (1) 19-21 (1)	05-07 (1) 07-09 (2) 09-11 (1) 16-19 (1) 21-23 (1) 23-01 (2) 01-02 (1)	05-07 (1) 19-20 (1)
Southeast Asia	*Nil*	10-12 (1) 19-21 (1)	23-01 (1) 01-03 (2) 03-06 (3) 06-07 (2) 07-10 (1) 16-19 (1)	02-06 (1)
Far East	*Nil*	13-15 (1) 15-17 (2)	19-21 (1) 21-23 (2)	01-02 (1) 02-03 (2)
Far East		17-18 (3) 18-19 (2) 19-20 (1)	23-02 (3) 02-04 (4) 04-07 (2) 07-09 (3) 09-11 (2) 11-13 (1)	03-05 (3) 05-06 (2) 06-07 (1) 03-05 (1)*
South Pacific & New Zealand	13-15 (1) 15-18 (2) 18-20 (1)	10-12 (1) 12-15 (2) 15-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	17-19 (1) 19-21 (2) 21-02 (4) 02-06 (2) 06-08 (4) 08-10 (3) 10-11 (2) 11-12 (1)	22-23 (1) 23-01 (2) 01-06 (3) 06-07 (2) 07-08 (1) 23-02 (1)* 02-05 (2)* 05-06 (1)*
Austral-Asia	15-17 (1) 17-20 (2) 20-21 (1)	13-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	20-22 (1) 22-23 (2) 23-00 (3) 00-03 (4) 03-05 (3) 05-06 (2) 06-08 (3) 08-09 (2) 09-13 (1) 13-15 (2) 15-17 (1)	22-00 (1) 00-01 (2) 01-05 (3) 05-06 (2) 06-08 (1) 01-04 (1)*
Caribbean, Central America & Northern Countries of South America	09-11 (1) 11-13 (2) 13-15 (1) 15-17 (2) 17-18 (1)	09-11 (1) 11-14 (2) 14-16 (3) 16-19 (4) 19-20 (2) 20-21 (1)	18-01 (4) 01-03 (3) 03-05 (2) 05-08 (3) 08-11 (2) 11-14 (1) 14-16 (2) 16-18 (3)	19-21 (1) 21-23 (3) 23-04 (2) 04-05 (1) 20-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	13-15 (1) 15-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	08-11 (1) 11-16 (2) 16-17 (3) 17-19 (4) 19-20 (2) 20-21 (1)	14-16 (1) 16-18 (2) 18-19 (3) 19-23 (4) 23-01 (3) 01-02 (2) 02-05 (1) 05-07 (2) 07-10 (1)	20-21 (1) 21-00 (2) 00-02 (1) 02-03 (3) 03-04 (2) 04-05 (1) 02-04 (1)*
McMurdo Sound, Antarctica	*Nil*	17-21 (1)	16-18 (1) 18-19 (2) 19-24 (3) 24-03 (2) 03-07 (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.

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Advertiser's Index

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AOR	51	www.aorusa.com
Advanced Specialties, Inc.	34	www.advancedspecialties.net
Alinco	43	www.alinco.com
Alpha Delta Communications	35	www.alphadeltacom.com
Aluma Towers	112	www.alumatower.com
Amateur Electronic Supply	58,59	www.aesham.com
Ameritron	9	www.ameritron.com
Amidon Associates	73	www.amidon-inductive.com
Antique Radio Classified	83	www.antiqueradio.com
Astron Corp.	71	www.astroncorp.com
Atomic Time, Inc.	53	www.atomictime.com
Batteries America/E.H.Yost	115	www.batteriesamerica.com
Bilal Co./Isotron Ants	112	www.isotronantennas.com
Buckmaster	112	www.hamcall.net
Buffalo Woodworks	106	www.buffalowoodworks.com
Burghardt Amateur Center	97	www.burghardt-amateur.com
Butternut Antennas/Bencher	93	www.bencher.com
C.A.T.S.	109	www.rotators.info
Cable X-Perts	50	www.cablexperts.com
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Command Technologies	106	www.command1.com
Communication Concepts Inc	111	www.communication-concepts.com
CQ Books/Videos	65,79	www.cq-amateur-radio.com
Cubex Quad Antennas.	66	www.cubex.com
Cutting Edge Ent.	34,106,109	www.powerportstore.com
DX Engineering	89	www.dxengineering.com
DX4WIN (Rapidan Data Systems)	98	www.dx4win.com
Degen Designs	113	www.degendesigns.com
EQF Software	67	www.eqf-software.com
Elecraft	34	www.elecraft.com
Electric Radio Magazine	111	www.ermag.com
G4ZPY Paddle Keys	111	www.g4zpy.go-plus.net
GigaParts	46,47,48,49	www.gigaparts.com
Ham-Com 2004	57	www.hamcom.org
HamRadioManuals	88	www.hamradiomanuals.com
Ham Radio Outlet	10,116	www.hamradio.com
Heil Sound	77	www.heilsound.com
High Sierra Antennas	94	www.cq73.com
Hy-Gain	1,5	www.hy-gain.com
ICOM America, Inc	7,21,23,Cov 4	www.icomamerica.com
K2AW's "Silicon Alley"	112	
Kanga US	83	www.bright.net/~kanga/kanga/
Kenwood, USA	Cov 2, 3,33	www.kenwood.net
KK7TV Communications	112	www.kk7tv.com

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"Breaking the Language Barrier," by KD5HTB
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Advertiser's Index

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Log Window by SCO	112	www.logwindow.com
M² Antennas	103	www.m2inc.com
MFJ Enterprises	19,45	www.mfjenterprises.com
MicroHAM	34	www.microham.com
National Antenna Consortium	87	www.antenna-consortium.org
Nemal Electronics	56	www.nemal.com
New Communications Solutions	90	www.ncsradio.com
Palomar Engineers	67	www.palomar-engineers.com
Personal Database Applications	66	www.hosenose.com
Peter Dahl Co.	63	www.pwdahl.com
Popular Communications	96	www.popular-communications.com
Powerwerx	39	www.powerwerx.com
PowerPort	34,106,109	www.powerportstore.com
QSLs by W4MPY	97	www.w4mpy.com
Radcomm Radio	70	www.radcomm.bizland.com/rad-comm
Radio Club of JHS 22	84	www.wb2jkj.org
Radio Daze	113	www.radiodaze.com
Radio Works	53	www.radioworks.com
Rapidan Data Systems (DX4WIN)	98	www.dx4win.com
RF Connection	98	www.therfc.com
RF Parts	38,87	www.rfparts.com
RT Systems	67	www.cloningsoftware.com
SGC, Inc.	81	www.sgcworld.com
Saratoga Amateur Radio Products	13	www.saratogaham.com
Surplus Sales of Nebraska	109	www.surplussales.com
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Taylor Tubes	87	www.rfparts.com
Ten Tec	61,97	www.tentec.com
Texas Towers	26,27	www.texastowers.com
T.G.M. Communications	83	www3.sympatico.ca/tgmc/index.html
Tom's Tubes	113	www.tomstubes.com
Universal Radio, Inc.	81	www.universal-radio.com
Vibroplex	50	www.vibroplex.com
W3FF Antennas	57	www.buddipole.com
W5YI Marketing	29	www.w5yi.org
W9INN Antennas	113	
Watts Unlimited	83	www.wattsunlimited.com
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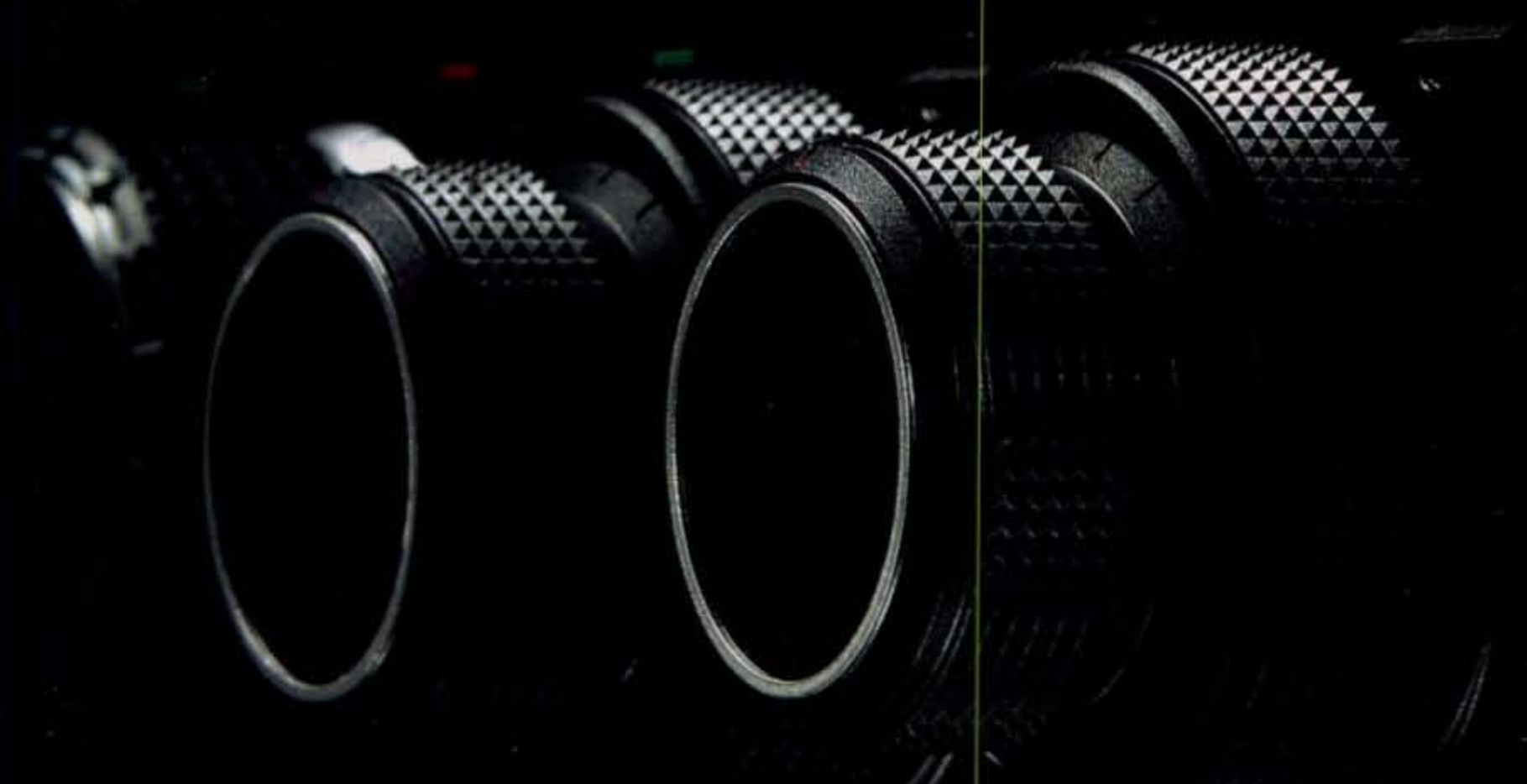

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val•ue (văl´yo͞o) n from L valuta, worthy

1. a fair return in money or another medium of exchange for something. *"My Icom dual band mobile radio was well worth the money, a great value."*

2. the exact monetary worth of something. *"My Icom dual band amateur radio is a great value especially since the remote head cable comes standard; a savings of over $50.00".*


Fig. 1
IC-2720H

3. the relative worth, importance, or usefulness of something to somebody. *"My Icom dual band radio is invaluable to our local emergency communications preparedness".* **<positive value for the money> <the value of unimpaired communications during an emergency>**

4. a. a numerical quantity that is assigned or is determined by calculation or measurement **<the value of x>** *"If I have ten Icom dual band mobile radios, and I take away four, I am in extreme sorrow, and I am left with a value of six Icoms – which is still a hundred times better than any other radio, let me tell you!"* **b.** precise signification **<the word value of something>** *"My Icom dual band mobile radio is beyond measurable value when it comes to emergency preparedness."*

5. a. the real or perceived duration of time a musical note is held. *"The clarity of sound my Icom dual band mobile gives is music to my ears."*


Fig. 2
IC-208H

b. the written representation of the quality of tone or a spoken sound. *"My Icom IC-208H has 2 Watts of audio output."*

6. a. the lightness or darkness of a color: LUMINOSITY **b.** the relation of one part in a picture to another with respect to lightness and darkness *"The amber value of my Icom's LCD display is adjustable to the environmental needs, and is perfect to see day or night."*

7. something (as a principle or quality) intrinsically valuable or desirable **<sought material values instead of human values>** *"I value my Icom dual band mobile radios above any other."* value verb

Inflected Form(s):

val·ued; val·u·ing; got to have one

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