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Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

FEBRUARY 2005

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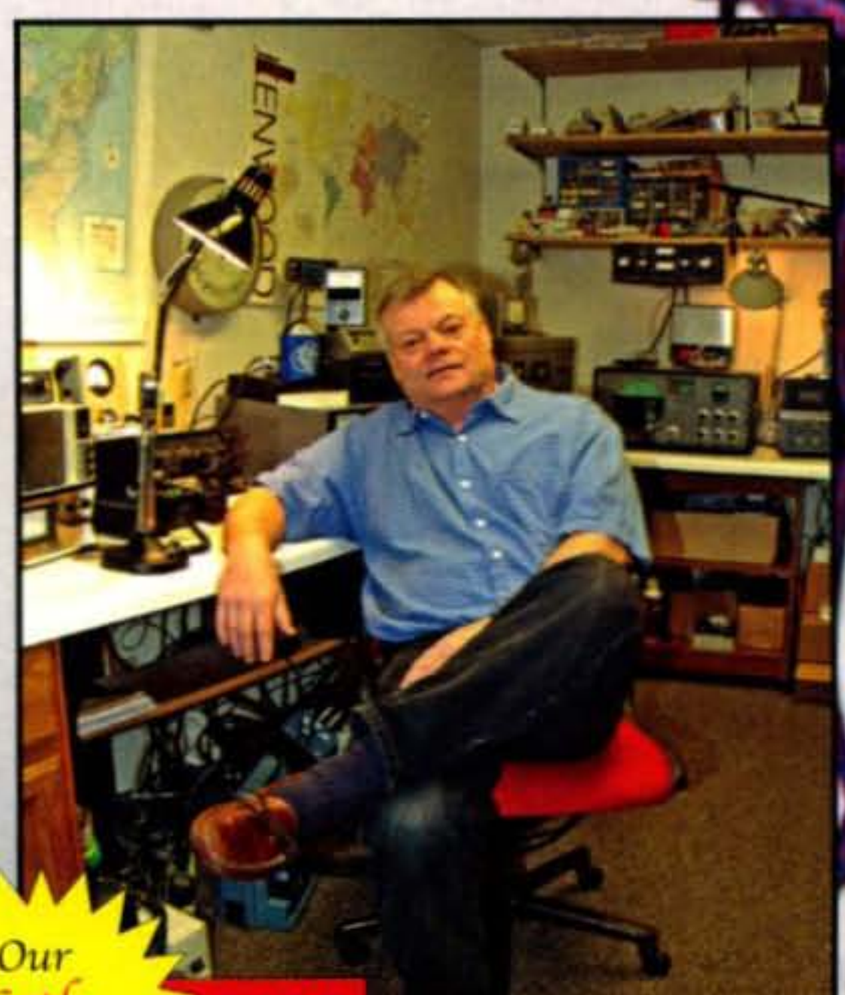

On the Cover: Gene Wicklund, W9ZOK, of Horace, North Dakota, works on his antenna during a snowstorm (is there any other time?). Details on page 107.

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TH-11DX, $1159.95. 11-element, 4.0 kW PEP, 10,12,15,17,20M

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

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7-Elements gives you the *highest average gain* of any Hy-Gain tri-bander!

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

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

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

TH-5MK2, $759.95. 5-element, 1.5 kW PEP, 10,15,20 Meters

The broadband *five element* TH5-MK2 gives you outstanding gain.

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

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

TH-3MK4, $469.95. 3-element, 1.5 kW PEP, 10,15,20 Meters

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

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

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

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

TH-2MK3, $369.95. 2-element, 1.5 kW PEP, 10,15,20 Meters

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

For just $339.95 you can greatly increase your effective radiated power and hear far better!

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

EXP-14, $599.95. 4-element, 1.5 kW PEP, 10,15,20 Meters

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

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

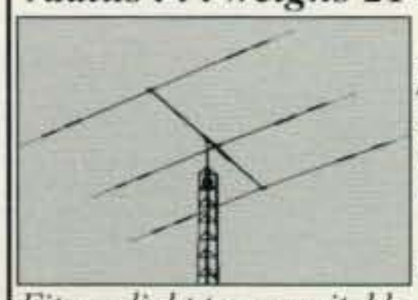
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

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

QK-710, $179.95. 30/40 Meter option kit for EXP-14.

Compact 3-element 10, 15, 20 Meter Tri-Bander

For limited space . . . Installs anywhere . . . 14.75 ft turning radius . . . weighs 21 lbs . . . Rotate with CD-45II, HAM-IV



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

TH-3JRS, $359.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design.

Excellent gain and F/B ratio let *you* compete with the "big guns".

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

Model No.	No. of elements	avg Gain	dBd avg F/B	dB MaxPwr	watts PEP Bands	Covered Wind	sq.ft. area Wind (mph)	Survival Boom	(feet) Longest	Elem. (ft) Turning	radius(ft) Weight	(lbs.) Mast dia	O.D.(in.) Recom.	Rotator Retail
TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1159.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$869.95**
TH-5MK2	5	• www.hy-gain.com		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$759.95
TH-3MK4	**3**	• Hy-Gain catalog		**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$469.95**
TH-3JRS	3	• Call toll-free		600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$359.95
TH-2MK3	**2**	800-973-6572		**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$369.95**
EXP-14	4			1500	10,15,20 opt. 30/40	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$599.95

Tooled Manufacturing . . . Highest Quality Materials

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

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

3. Thick-wall *swaged* aluminum tubing

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

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

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

Durable precision injection molded parts.

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

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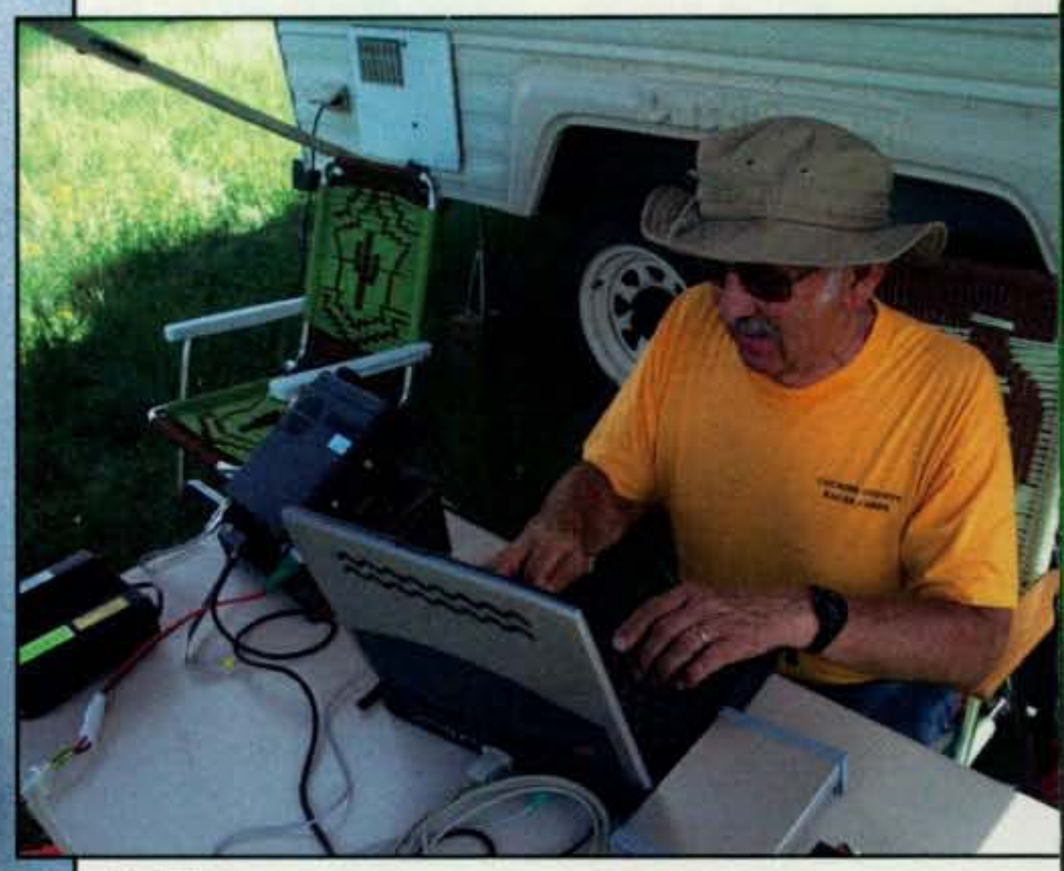

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departments

NEW IC-756PROIII

PORTABLE BIG GUN

The DX radio of choice. The success of the '756PRO Series incorporating '7800 breakthrough features.

The 756PRO series is legendary in DX circles – big enough in features to be the best in its field, but compact enough to fit in a Pelican® case and ship anywhere in the world. The first DX rig with 32-bit floating point IF-DSP. The first amateur rig with a large, TFT color LCD. The 756PROIII continues the legacy, advancing receiver performance with a +30dBm third order intercept (TOI) point and, to maximize sensitivity while minimizing distortion, 2 new 7800-style preamplifiers. See why '756PRO series rigs travel to all the hot spots. Visit your authorized Icom dealer today.

'756PROIII Specifications: • **TX**: HF + 6M • 100W, continually adjustable down to 5W • Adjustable SSB TX bandwidth • Digital voice recorder • Auto antenna tuner • **RX**: 30 kHz to 60 MHz • Quiet, triple-conversion receiver • 32 bit IF-DSP with 24-bit A/D D/A converters • 64 MHz roofing filter • 5" TFT color LCD • 8 Channel RTTY TX memory • Digital twin passband tuning • Auto or manual-adjust notch with 70 dB attenuation • 13.4" W x 4.4" H x 11.2" D • 21.1 lb • And much more

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ARRL Challenges California Regulator on BPL

After a member of California's Public Utilities Commission said it's "criminal" that her state is not hosting a major BPL trial or full-scale deployment, the ARRL Letter says the League's Executive Vice President Dave Sumner, K1ZZ, wrote to challenge what he called her "excessively optimistic" view of the technology and to offer the League's expertise on the matter.

In a letter to CPUC Commissioner Susan P. Kennedy, Sumner wrote *"(i)t has yet to be demonstrated that BPL systems can be deployed without polluting the radio spectrum," and suggested that "(u)ntil this issue is resolved, we respectfully suggest that public statements that paint an excessively optimistic picture of BPL are inadvisable."* Sumner also noted the ARRL's extensive experience in BPL matters and offered the League's assistance in answering any questions about the technology.

FCC Tells BPL Trial it Must Work With Hams

A company running a BPL (Broadband over Power Lines) trial in Arizona must "establish and maintain a liaison relationship" with a local amateur radio club. So says the FCC, according to the ARRL, as a "special condition" of Electric Broadband LLC's experimental license for the BPL trial in Cottonwood, Arizona. Verde Valley Amateur Radio Association BPL Committee Chair Robert Shipton, K8EQC, says he believes it's the first time the FCC has imposed such a requirement, but notes that efforts to eliminate BPL interference in the 60-meter band have been so far unsuccessful.

Meanwhile, internet service provider Earthlink has told the FCC it does not believe BPL presents "a commercially viable alternative" to cable or DSL broadband, "today or in the near future." According to the ARRL Letter, Earthlink feels the same way about wireless broadband, such as WiFi and WiMax, noting that none of these technologies is "likely to be competitive in cost and performance with cable and DSL over the last mile to the home."

FCC to Retest Over 200 Hams

More than 200 hams who passed Technician exams at four test sessions in 1999 and 2000 will be required to take their tests again. FCC Special Counsel Riley Hollingsworth, K4ZDH, says letters went out in November to 26 hams who got their Tech tickets at W5YI-VEC coordinated test sessions in Yucaipa, California, on July 31, August 28 and September 25, 1999, and February 26, 2000, and that approximately 190 additional letters would be sent out in the near future. Hollingsworth said the retest letters were being issued as a result of a review of the test sessions, but provided no additional details.

ARRL Toy Drive a Big Success

Hams across America responded to an ARRL-led effort to provide toys for Christmas for children in Florida left homeless by the summer's string of hurricanes. In central Florida alone, according to the League, over 22,000 homes were destroyed and 40,000 more were significantly damaged. ARRL Media and Public Relations Manager Allen Pitts, W1AGP, told CQ that well over 2000 toys had been delivered to the central receiving point, as well as more than $8,000 in cash contributions.

FCC Fines Truck Stop Chain $125,000

The FCC has proposed levying a $125,000 fine against Pilot Travel Centers for selling 10-meter ham rigs that can easily be converted to operate on the Citizens Band, and for continuing to sell the radios after being warned that they were illegal. According to the FCC, its rules require that all CB transceivers, as well as amateur transceivers capable of being easily converted for CB use, must receive Commission equipment authorization before being legally sold in the US. Under these rules, the various Galaxy transceivers sold at Pilot truck stops are considered by the FCC to be CB rigs that require authorization. Pilot disputed that conclusion and continued selling the radios, according to the FCC, which says the response shows "a pattern of intentional non-compliance with and apparent disregard for" its rules and justifies a $125,000 fine.

Dayton to Remain in Dayton At Least Through 2007

The Dayton Hamvention® will continue to be held at Hara Arena for at least the next three years, according to General Chairman Gary Des Combes, N8EMO. There have been persistent reports and rumors that the Hamvention was planning to move to another city. At last year's show, it was announced that the 2005 Hamvention would be held at Hara. Now, Des Combes says the Dayton Amateur Radio Association has signed a new three-year contract with Hara Arena, guaranteeing that the show will be held there at least through 2007, and, according to Des Combes, "we hope it will be much longer than that."

(Continued on page 93)

Congressman honored for help to hams. Representative Steve Israel (D-NY) was honored by the National Antenna Consortium (NAC) in December for his ongoing efforts to pass a bill preventing homeowners' associations from totally banning amateur radio antennas. Attending the presentation ceremony at the Congressman's Long Island office were (from left): CQ Publisher Dick Ross, K2MGA; Diane Ortiz, K2DO, immediate Past President of the Long Island Mobile Amateur Radio Club; Rep. Israel; NAC Executive Director Gerald Agliata, W2GLA; and ARRL NY City/Long Island Section Manager George Tranos, N2GA. (K2MGA Photo)

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.

hy-gain ROTATORS

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

HAM-IV

HAM-IV
$559.95

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.**

TAILTWISTER SERIES II

T-2X
$649.95

T-2XD
$1029.95
with DCU-1

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.**

CD-45II

CD-45II
$389.95

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.**

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.

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.**

HDR-300A

HDR-300A
$1379.95

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.**

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.

AR-35 Rotator/Controller

AR-35
$69.95

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

RBD-5
$29.95

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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cq editorial

BY RICH MOSESON,* W2VU

Outside the Box

The Earth is flat... The Earth is at the center of the universe... You can't send messages over wires! ... You can't send messages *without* wires! ... Wireless signals travel by causing vibrations in the aether ... A wave can't be a particle and a particle can't be a wave ... and so on and so on.

Throughout human history, there have been certain "facts" that were "known" to be true until someone came along to stand conventional theory on its head, first by suggesting that some "established truth" might not be true, and then by proving it. Often, even that was not enough to keep the so-called "heretic" from being imprisoned or executed. This goes back at least as far as Socrates, probably further.

We've advanced beyond that today. Now, in most cases, instead of executing such rabble-rousers, we merely ridicule them. For example, last November, we published an article by Walter Bain, W4LTU, on the possibility of someday sending radio signals without transmitted power, just as today we send AM voice signals without a carrier (we call it single sideband). One reader wrote in, questioning not only Mr. Bain's premise, but also his education, his intelligence and possibly even his parentage. On the other hand, we also heard from Bill Lawson, AE6HP, a plasma physicist, who wrote that developments subsequent to Walt's sources made it unlikely, if not impossible, that the specific mechanism he proposed would ever be workable. (See "Update" on page 111.)

Walt's first reaction after receiving Bill's e-mail was that he should apologize to the readers, but both Bill and I disagreed. Bill wrote, "Giving up on cherished theories is the hardest demand science makes of us —but then that is kind of the point of science. I also do not feel an apology is in order any more than scientists are expected to apologize for theories that do not pan out. ... I hope you won't stop looking into novel ideas. Most of them don't pan out, but there would be no progress if none of them panned out."

My response was similar: "Clearly, the way we transmit information now is reaching its limits in terms of ability to meet society's needs. Those needs will drive new discoveries and new ideas. Your article was intended to get people thinking, talking, sharing information—and in that it has succeeded. The fact that the specifics of what you propose look like they won't pan out is secondary."

Also in this issue, we have a further follow-up to W6BNB's article last fall on long-delayed echoes. Makoto "Mac" Obara, TZ6JA/ex-JA8SLU, has also been studying LDEs and coincidentally published a series of articles in the Japanese ham magazine *59* at the same time that Bob Shrader's article first appeared in *CQ*. Bob included some comments from Mac in his own follow-up article in October, and Mac has expanded on that in this month's issue (beginning on page 24), summarizing his three-part series in *59*. Mac's theory is that there is some sort of *interplanetary ionosphere* in the asteroid belt between Mars and Jupiter, and in the Kuiper Belt, outside the orbit of Neptune, in which some property of the multitude of small orbiting objects creates the ability to reflect radio waves back to Earth with very little signal loss. Now at first glance, this might seem impossible for a variety of reasons. On the other hand, no better explanation has yet been put forth and Mac makes a persuasive argument for his perspective. We have included with Mac's article a mini-debate among members of the *CQ* "family" who have read the article and come to very different conclusions.

Immense Parabolic Dishes?

CQ Publisher Dick Ross, K2MGA, added yet another perspective, too late to include with the article, but relevant enough for me to summarize here. In his article, Mac compares LDE signals with EME (Earth-Moon-Earth) and explains why he feels there is less loss on the LDE path than on an EME circuit. Dick points out that an EME signal originates from a point on the Earth and spreads out as it travels through space. Only part of that signal arrives at the surface of the moon, which absorbs more of it and—as a convex object—tends to reflect much of the remaining signal *away* from the Earth, so the portion of the signal actually returning to Earth is tiny. On the other hand, Earth's orbit is completely within the orbits of both the Asteroid Belt and the Kuiper Belt. And if Obara is correct about *mean motion resonance belts* within those orbits, a substantial portion of the signal originating on Earth along the *ecliptic*, or plane of the planets, reaches one or the other of these belts, except for the energy lost to path loss along the way. The belts, however, are *concave* from our perspective, and could act as immense parabolic dishes. Rather than further scattering the received signal, they could capture virtually all of it and focus it back into a much stronger return signal (consider the action of a dish antenna).

Dick also comments that LDEs may be more common than we think and may not return only to the point of origin—since we all tend to hear just one side of a QSO or a CQ that is returned to someone we can't hear. There is no way of knowing whether that station calling CQ who doesn't come back to us has just sent out his signals or if we're hearing echoes a day or more later from the far reaches of our solar system.

Who's Right?

Is Mac's theory correct? Or full of hot helium gas from the sun? It doesn't matter. That's right. It doesn't matter. Does it matter that Walt's theory isn't quite right? No. Thomas Edison tried 10,000 different possibilities for light-bulb filaments before finding one that worked. What if he'd given up after number 9,999? Just one or two short of success? What matters is trying ... trying to solve a problem, trying to come up with the right answer. Coming up with the wrong one along the way is simply part of the process. As Edison famously said, "If I find 10,000 ways something won't work, I haven't failed. I am not discouraged, because every wrong attempt discarded is often a step forward."

Edison also said, "Just because something doesn't do what you planned it to do doesn't mean it's useless." Edison himself believed the primary use for his phonograph would be as a dictation device for business. He had no idea it would revolutionize popular music.

In the 1960s, Robert Wilson and Arno Penzias, two

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

radio astronomers at Bell Labs, were trying to use a huge dish antenna to research radio signals from space but were bothered by noise that just wouldn't go away. It didn't matter where they pointed the antenna or what time of year it was. The noise was always there, always at the same level. It made no sense to them. Then they shared their frustration with fellow astronomer Robert Dicke at Princeton, unaware that he had been working on a theory that the "big bang" at the birth of the universe should have left behind uniform low-level microwave radiation. As the three of them compared notes, they realized that what was frustrating Wilson and Penzias was actually the proof of Dicke's theory. It won Wilson and Penzias the Nobel Prize in Physics in 1978 and is now known as the "standard model" of the universe.

THINK!

The key is thinking—thinking differently—outside the box as we like to say today, trying out new ideas and sharing them with others. After all, one person's "failure" may be the key to another's major step forward.

Here at *CQ*, we have always encouraged this sort of thinking. It was here in *CQ* in the 1940s that hams were first recruited to take part in research on radio wave propagation, and contributed greatly to the base of knowledge on which today's understanding of propagation is built. It was in these pages in 1957 that the late Don Stoner, W6TNS, writing about the 100+ mile range of a microwatt transistor 2-meter transmitter, asked, "Does anybody have a spare rocket for orbiting purposes?" and unwittingly gave birth to the amateur satellite program. Forty years later, the January 1997 issue of our sister magazine, *CQ VHF*, featured a ham at MIT with a computer, ham rig and amateur television transmitter woven into his clothing. Boy, did we hear it about that one. "He has too much time on his hands," wrote one reader. Another suggested that he "must look like 4th of July fireworks after dark." Yet today, "wearable computing" is one of the hottest frontiers in the high-tech world.

Even our humor articles are ahead of their times—famous *CQ* April authors Dr. Jerzy Ostermond-Tor and Dr. Emil Heisseluft have accurately predicted the development of cell phones, stealth aircraft and yes, this one's real, too—an ionosphere on Mars (so why can't there be one in the Asteroid Belt?) Another Edison quote: "We don't know a millionth of one per cent about anything."

It is part of our 60-year tradition here at *CQ* to encourage thinking "outside the box" by publishing well-reasoned, well-written articles that push the limits of current knowledge and understanding, that seek to break new ground despite the risk to their authors of being called crackpots and worse. It is our hope to encourage others to think, and maybe use the information and ideas in one of these articles to spur their own ideas. So let's all try thinking outside the box. For that matter, why limit ourselves to a box? Today, let's think outside the egg as well. And let's not be too quick to dismiss the ideas of those who do, even if they're still at filament number 100 out of what turns out to be 10,000. To quote Thomas Edison one more time (with thanks to quotationspage.com), "Hell, there are no rules here—we're trying to accomplish something."

Looking at things in a way no one else has looked at them before—or looking farther than others have looked before—is the root of all progress. It is our privilege, and our responsibility as a magazine devoted to an activity based in science and technology, to promote progress by encouraging those who look at things in a different way. I'll close with one more quote, this one from Robert F. Kennedy: "Some people see things as they are and ask why; I dream things that never were and ask why not." —73, W2VU

our readers say

Telling Secrets...

The following letters were addressed to "Secrets of Top DXers" author Dee Logan, W1HEO:

Hi Dee,

Great article in October 2004 *CQ*. Really enjoyed all the various comments and noted quite a few who have been instrumental in DXing and the fun and sweat necessary to accomplish our goals. Many have been more than bystanders and have consistently contributed in various ways.There was one thing not mentioned and I think is of great importance to DXing. That is the help of friends who call us at 2 AM, at work, on vacation, and other times when we are not sitting in front of our rigs. They called because they knew it was important to us and we would appreciate their help. Others helped when help was needed to get that antenna ready when the time to perform was at hand. I am at the top of the Honor Roll and I can say with all sincerity that I would not be there without friends who helped me.

Again, your article was great and I will re-read to make sure I didn't miss anything, as there were a couple of things I read that were new to me and could be of help some time in the future.Thanks, Dee!

George Lee, KR5C
via e-mail

W1HEO responds:

Thanks, George, for your comments on my article, "Secrets of Top DXers." Glad you liked it. I appreciate your taking the time to share your comments with me. Most of all, sincere congratulations for your outstanding success as a top DXer.

The article didn't cover all aspects of DXing strategies, including the value of friends who will alert you to needed countries. I've been fortunate in that regard just as you have. The magazine article included most, but not all, of the survey details.

This is one reason I decided to put the complete results into a small book entitled Tips To The Top From DX Pros. It was another way to recover the costs of conducting the survey—postage out and back, printing, envelopes, etc. (Any extra monies will be donated to INDEXA and NCDXF.) I self-published the book and sell it for $9.00 plus $1.50 postage and handling. It's probably a good reference for the starting DXer just as the CQ article is.

By the way, the photo caption on page 12 that shows Scott Ginsburg misidentifies him as K1OS. His correct call-sign is K1OA, which is noted correctly in the text.

Dee,

I just read your article and twice there is a comment that two IRCs are necessary (for airmail postage). That is not correct. If you read the IRC, it specifically states that it "is exchangeable for the minimum postage for an unregistered priority item or an unregistered letter sent by AIR MAIL to a foreign country." Two is overkill.

IRCs are now better for EU countries, since it costs them more than a dollar to send airmail. The current price of the IRC is $1.85. You need to consider the cost of postage in each country, because a dollar doesn't cut it in a lot of countries.

You also neglected to point out that there are some countries where it is illegal to possess U.S. currency, so you don't want to send dollars. Also, there are some countries where IRCs are not accepted. Getting the QSL is the greatest challenge and expense of DXing. I speak from experience.

I have all but BS7 and VU on both modes, and have 452 IOTAs in hand. Add to that the fact that I go after each entity on both CW and SSB on each band. Calculate the cost of QSLing and weep.

Gary Young, K2AJY

W2VU responds:

Gary, you're right, but the rules must have changed fairly recently. I was always told (by the P.O. folks as well as fellow hams) that one IRC would purchase a single unit of international surface mail postage, and that two were required for airmail. I looked on the USPS website and as you say, one IRC is now good for one unit of airmail postage. However, it may take a while for the message to filter down to the local post office level.

Memories of Fred Terman

Editor, *CQ*:

The article about Dr. Terman (October *CQ*) really brought back memories. When I was going to college at the University of Washington I had a couple of professors who were so busy with their private government projects that they barely had time to teach their classes, let alone make them interesting. They had convinced me that technical classes had to be pretty boring.

Then one day it was announced that Dr. Terman would be giving a set of guest lectures. I think they were on transmission lines, but I don't really remember. I had heard so much about him I decided to go. They were the best engineering lectures I have ever heard. He took a complex subject and made it understandable, even to a Joe Average like me. Not only that, but he was upbeat and his presentation was very interesting. I wished at the time that he would transfer to the Uof W so I could learn more from him!

So when I got my EE degree and started working in the radar field, I always had the *Radio Engineers Handbook* by my side and the Rad Lab series was still our bible, even several years after the end of the war. He was a great man and a great ham.

Ken Claar, W7LAR
Nampa, ID

More on Ocracoke

Editor, *CQ*:

When I read your October editorial, it reminded me I had forgotten to send an e-mail to you after reading your previous month's editorial.

I live in Fayetteville, NC and try to make two or three trips a year over to Ocracoke. The ham you have been talking about who became a silent key was Sigma Willis, WB4SRH. He was by far the best ham friend I have had or will likely ever will. Sigma passed away on May 21, 2002 after a fight with cancer. Sigma never married and the closest relatives he had were two nephews, one of whom still resides on the island and works for the ferry service while also serving as the cable repair guy for the island. The other nephew is in the Air Force. Although I was not a blood relative, we were family and my wife and daughter thought of him as I did. When Sigma died, he left everything he owned to his two nephews and me. You can probably guess he left me his entire ham radio estate. There is not enough money in the world for me to part with the equipment he left me.

Sigma spent his life on Ocracoke except for about 22 years he spent in the US Army. He spent most of his time in Germany and one tour in Vietnam. As a result of his time in Germany he spoke fluent German. His ham amateur radio activities were county hunting and chasing islands with IOTA. You would have enjoyed talking with him. Sigma knew the history of Ocracoke and you could listen to him for hours.

I operate HF portable when we go over for our week-long stays. On shorter stays I pretty much stick to VHF and UHF. There is a repeater on the island on UHF that is linked into the 2-meter repeater over on Hatteras.

I could go on and on about my friend and the island but will spare you from my rambling on. I have often thought about writing an article about my friend and the island. The story of our friendship truly exemplifies the spirit of amateur radio.

David Cowart, KR4OE
Fayetteville, NC

W2VU replies:

David, many thanks for the great letter. Please do write that article someday!

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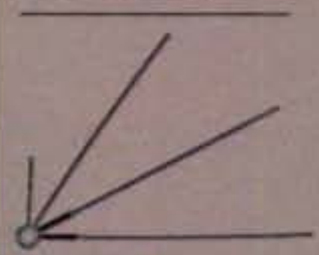

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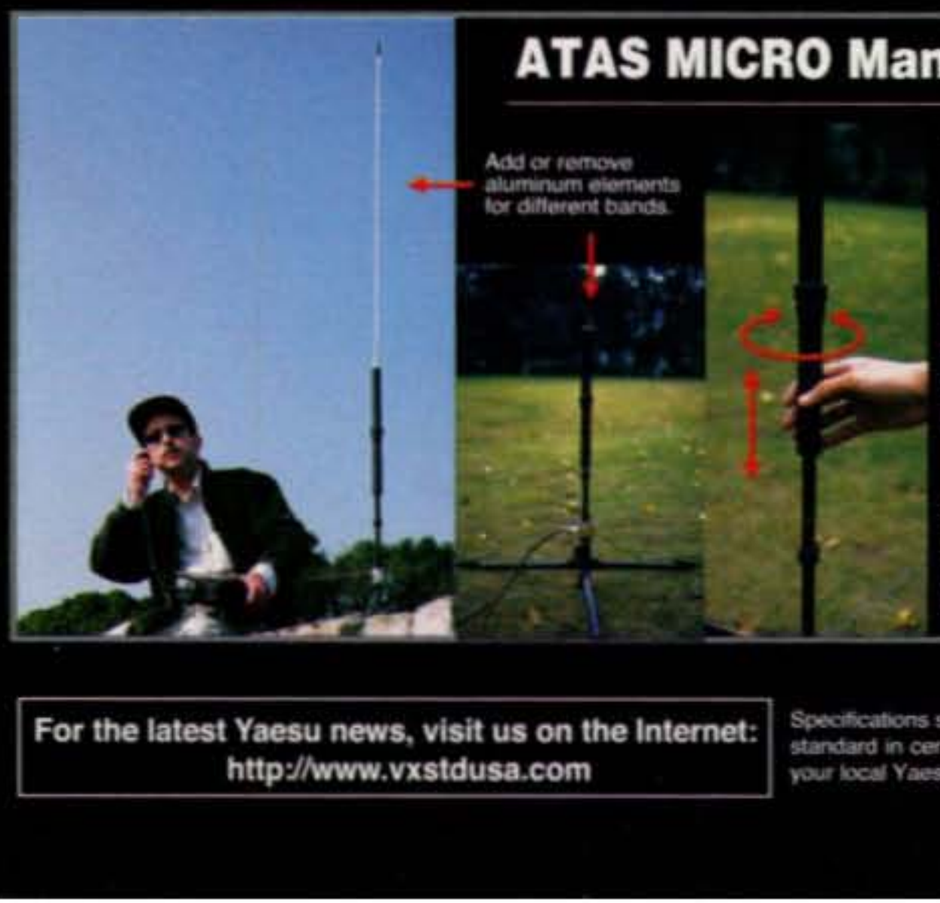

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announcements

Navy and Marine Corps Communicators – Via Marine Corps MARS, members of the U.S. Navy and Marine Corps communicators system are involved in a project "to locate those operators who are still with us and to learn about those who have been transferred to The Big Comm Shack in the Sky." A website has been established at <www.marinecorpsmars.com>. You are invited to visit the site and sign the visitors log. If you were one of the many MARS operators before, during, or after Vietnam, you may contact Dan Borgman, SSgt USMC, e-mail: <mcmars@marinecorpsmars.com>, or 11111 NE 105th Ave., Archer, FL 32618. The group would like to include stories of their comrades. A museum is being planned, and a reunion is under consideration for 2005.

Northern NY Section QSO Party – This event will take place 0000–2359Z February 5. It is open to all license classes, and all modes allowed. For details, go to: <http://www.arrl.org/sections/NNY.html>.

OMISS QSO Party – This QSO Party will be held from 1500Z February 12 to 1500Z February 13. Work OMISS members. OMISS members exchange OMISS numbers; all other state plus signal report. Reference frequencies: 14.290, 7.263.5, 21.360, 28.665, 3.940, ±25 kHz. For more information, go to: <www.omiss.net>. Logs go to K5DB.

• The following special events are scheduled for February:

W3C, from Washington County Sportsmen's Show, Washington, Pennsylvania; Washington Amateur Communications Club; 1600Z February 3 to 2000Z February 6 on 14.250, 7.260, 21.300, and 28.400 MHz. QSL with SASE for QSL to Edward Oelschlager, N3ZNI, 60 Carl Avenue B-2, Eighty Four, PA 15330.

W5NAC, from Space Shuttle Columbia recovery special event, Nacogdoches, Texas; Nacogdoches ARC; 1300Z February 5 to 0100Z February 6 on 14.250, 14.050, 7.250, and 7.050 MHz. QSL to NARC, 167 County Road 2093, Nacogdoches, TX 75965. More info: <http://www.w5nac.com>.

K8LOD, from 16th annual running of the U.P. 200 Sled Dog Championship, race headquarters, Michigan; from 0001Z February 19 to 2359Z February 21 on 7.285, 14.255, 21.370, and 28.370 MHz. For certificate send QSL and 9×12 SASE to Rich Schwenke, N8GBA, 21 Smith Lane, Marquette, MI 49855. For more information, contact Greg Hanson, KI8AF, e-mail: <ki8af@arrl.net>, or go to <www.qsl.net/k8lod>.

W8B, from 75th anniversary of the Dayton ARA, Dayton Ohio; 0000Z February 1 to 2400Z February 28 on all bands. QSL and certificate available. QSL to Lori Perrenboom, K8XTQ, P.O. Box 44, Dayton, OH 45401; <www.w8bi.org>.

W9CWA, from celebration of the 75th anniversary of the founding of the Centralia Wireless Assn., Centralia (Illinois) Area Historical Museum; 1600–2200Z February 25 & 26, each day; on 7.260, 14.260, 18.160, 21.360, and 2-meter FM on CWA repeater 147.27, tone 103.5 MHz. For certificate send 9×12 SASE with 60 cents postage to CWA, Inc., P.O. Box 1166, Centralia, IL 62801.

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

Feb. 5, **Hiawatha ARA Swap & Shop,** Negaunee Township Hall, Naugaunee, Michigan. Contact Bob, N8PKN, e-mail: <n8pkn@al.com>, 906-225-6773. (Talk-in 147.27)

Feb. 6, **Northern Ohio ARS,** Gargus Banquet Hall, Lorain, Ohio. Contact Tom Porter, W8KYZ, 440-930-9115; <http://www.geocities.com/k8krg/winterfe.htm>. (Talk-in 146.700)

Feb. 12, **Cherryland ARC Swap & Shop,** Immaculate Conception Elementary School, Traverse City, Michigan. Contact Joe Novak, W8TVT, e-mail: <jnovak@traverse.net>, 231-947-8555. (Talk-in 146.86; exams)

Feb. 13, **Mansfield Mid*Winter Hamfest & Computer Show,** Richland County Fairgrounds, Mansfield, Ohio. Contact Dean Wrasse, KB8MG, e-mail: <deanwrasse@yahoo.com>, 419-589-2415. (Talk-in 146.94, 71.9 tone; exams)

Feb. 18–20, **Yuma Hamfest,** Yuma County Fairgrounds, Yuma, Arizona. Information e-mail: <w7rfi@beamspeed.net> or k7yma@adelphia.net>; <www.yumahamfest.com>. (Talk-in 146.840– PL 88.5)

Feb. 19, **Algonquin ARC Fleamarket,** Marlboro Middle School, Marlboro, Massachusetts. Contact Ann Weldon, KA1PON, 508-481-4988 before 9 PM. (Talk-in 146.61 PL 146.2, 449.925 PL 88.5; exams 9 AM)

Feb. 20, **Frostfest 2005 & ARRL Virginia State Convention,** The Showplace, Richmond, Virginia. Information/reservations call 804-545-0544, option 4; <www.frostfest.com>. (Talk-in 146.88 PL 74.4)

Feb. 26, **Orange Hamfest,** VFW Hall, Orange, Texas. Contact Joan, WA5LFS, e-mail: <wa5lfs@pnx.com>, 409-886-1892; (Talk-in 147.180; exams 10 AM)

Feb. 26, **Northern Vermont Winter Hamfest & ARRL Vermont State Convention,** Milton High School, Milton, Vermont. Contact W1SJ, e-mail: <w1sj@arrl.net>, 802-879-6589; <http://www.ranv.org>. (Talk-in 145.15; exams 12 noon)

Feb. 26, **La Porte ARC Hamfest,** Civic Auditoriun, La Porte, Indiana. Contact John Rozinski, N9ROH, e-mail: <n9roh@K9JSI.org>, 219-363-8545; <www.k9sji.org>. (Talk-in 146.61 PL 131.8)

Feb. 26, **Cabin Fever Reliever Hamfest,** St. Cloud Armory, St. Cloud, Minnesota. Contact Fred Duke, WØDOM, 320-255-1410.

Feb. 26, **Central Dakota ARC Hamfest,** St. Mary's Grade School, Bismarck, North Dakota. Contact Dick Veal, KAØETO, 701-223-7481, e-mail: <georgerv@bis.midco.net>. (Talk-in 146.34/94; exams 9 AM)

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Boris Meshevtsev, RV3IZ, is a champion Russian ham radio contester and author of two books on ham radio for the visually-impaired. Blind himself since age 3, RV3IZ (best known on the air as UM8FZ) tells us how radio—"the invisible wave"—has sustained him through his school years, the Cold War, and into the present day.

Still Chasing the Invisible Wave

(My Personal Story in Amateur Radio)

BY BORIS MESHEVTSEV,* RV3IZ (ex UM8FZ & EX5T)

The world of ham radio has been an important and exciting aspect of my life for over half a century. It has been the backbone of my existence through sleepless nights of DX chasing, marathon competitions with ambitious hopes for victory, constant reaching for challenging goals, a permanent longing to improve my equipment, and frequent participation in club meetings and hamfests. These have filled my life with a hectic sense of activity and a permanent shortage of time. It is difficult for me to describe my feelings of extreme satisfaction when successful in contesting and DXing, or the unforgettable feeling of achievement when I completed a home-brew amateur radio project and brought it to life.

Yet I must admit that for the last five years or so, computers replaced my ham radio interests, until in a recent issue of *Braille Mirror* I found an article by Gayle Sabonaitis, WA1OPN, describing her interest and activity in ham radio. It was a remarkable article by a remarkable individual. Despite living with a visual and a hearing impairment plus an additional handicap of neuropathy, she demonstrated a keen interest in radio communication technology and a mastery of amateur radio techniques. She discussed her amazing ability to read Morse code by feeling the vibrations of a loudspeaker with her fingertips and revealed the level of her technical proficiency when she disclosed her success in obtaining an Extra class license. She did it all and she did it well! I must fervently applaud her willpower, stamina, and achievements. Bravo, Ms. Sabonaitis! I salute you, your skills, and your success!

This unique article by this unique person inspired me beyond belief. It awakened my latent interest in amateur radio and reminded me of the significant levels of enjoyment I had set aside. The article also had one other effect: If she could awaken *my* dormant hobby interest, then could I, by relaying my life experiences, inspire others to join our radio fraternity or resurrect a sleeping interest? Since I was unfortunate enough to have lost my sight at an early age, perhaps I could also demonstrate, as has Ms. Sabonaitis, that this hobby is available for all to enjoy, even those with handicaps.

Boris Meshevtsev, RV3IZ, has been a ham for nearly 50 years. The radio hobby helped him through school and the Cold War. (Photos courtesy of the author)

Amateur Radio Brotherhood

The common love of amateur radio unites enthusiasts from various countries and ethnic communities into a single society of international brotherhood and equality, with no distinction accorded to different races, different social positions, or varying levels of physical capability. Communication with other amateurs is open to all, and the actual contacts made are directly related to one's skill and the "luck of the draw." In addition, as an amateur, you have the opportunity to speak directly with individuals who, in all probability, you would never encounter in person. An example in my own experience occurred one lovely morning years back when I worked all six continents with a unique diversity of contacts. The top contact in my log was King Hussein of Jordan, JY1 (SK), and his then-wife, Princess Muna, also a ham. A few minutes later, I made contact with a U.S. Navy operator on an aircraft carrier near Bermuda. This was followed by a contact with a baker from Auckland, New Zealand, an amateur renowned for fantastic signals. Just imagine sitting in your own home for half an hour and having a conversation with a King (whom I addressed as "Your Majesty" and he replied in a familiar way with "My friend Boris"), an American Navy operator sailing in or near the notorious Bermuda triangle, and someone who baked bread for his customers

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in New Zealand. An unusual group of interlocutors, to put it mildly.

Opening Doors

Visually disabled people are often limited in their opportunities to socialize with other individuals, and yet I personally never lacked social contacts nor sighted friends with whom I could interact. Amateur radio opened doors for me in this respect that may not have been opened otherwise. Communication, by radio or otherwise, in itself is an important means of social intercourse. Moreover, with a license and callsign in hand, it is a simple matter to find like-minded individuals and potential friends by joining a local ham radio club. I can truly say that ham radio has changed my life and allowed me to grow to my maximum.

One thing that may not be very well known is that the hearing of a blind person is, as a rule, much better developed and hence much more sensitive and selective than that of a sighted person. This is probably driven by a powerful instinct of the human brain to maximize that individual's capabilities. It manifests itself by providing the radio operator (after proper training) with an ability to distinguish barely audible signals and to extract them from noise and other interference.

Although an average blind person may feel like a fish out of water in the everyday world of sounds, he or she can function in that environment much better than a sighted person in certain respects. For instance, many blind people can detect stationary, inanimate objects located from a few inches to dozens of feet away, something those with sight cannot do if the object is not "seen." Another sense that may be enhanced is memory, since it is not easy to refer to a document as a refresher or impossible to look at an object to recall a detail. I found that as an operator I developed a capability of "reading" two or even three messages simultaneously, recording the primary message and retaining the other messages in my mind. Whatever the case, blindness is a severe handicap in most activities but not in radio operation, where improved senses provide a considerable advantage.

I would even dare to say that for a blind person, radio waves are a substitute for the light waves that were removed with the loss of sight. The physical nature of both is the same, since they are electromagnetic oscillations with only a difference in wavelength. The analogy reminds me of the wisdom in the words of Helen Keller, who said, "Whenever your destiny closes one door before you, God always opens another one."

My Introduction to Radio and English

At the age of 12, my parents bought me a "household" radio. It was my introduction to the world of radio (but not ham radio) and to other languages in use in the world. In primary school, my second language was German, but the language that fascinated me, once I heard it, was English. I was attracted by its musical sounds and by its pre-eminence in international radio-communication. To this day I retain enough German to get by in an emergency, but I have developed a significant capability in English. Once I was introduced to shortwave radio, I found that I had to learn English in order to be able to understand what was being said and to communicate with others. Apparently, radio was the "door" (referred to by Helen Keller) that opened a path to English for me and, ultimately, to a partial mastery of the language despite the fact that I never had any formal schooling in it. I started by listening to occasional English language broadcasts on my "home" radio, then gravitated to educational broadcasts on shortwave, added Braille as a means of self-study, and ultimately listened to audio recordings of magazines and books. My understanding gradually increased, and eventually I honed my capability by speaking to many "friends" around the world via ham radio.

Shortwaves and radio not only helped me to fight blindness but also to solve my need for information. During the years of the Iron Curtain and the Cold War, shortwave radio was an irreplaceable medium for obtaining a multilateral balance of information. At the very least, it provided me with access to outside opinions and to important news, even if the event in question (e.g., launching of a space ship or the explosion in Chernobyl) took place in my own country. Because we lived in a self-isolated society, our transcontinental contacts were especially valuable and extraordinary. Through personal radio contact we found that our counterparts abroad were ordinary people, no different than we were. They were not enemies and spies as we had been led to believe. Perhaps because of access to this knowledge, we were strictly prohibited from disclosing our home addresses over the air. In fact, in the early 1950s USSR citizens were banned from making radio contact with operators in the Western Hemisphere. Thankfully, that ban was lifted because leading Soviet amateurs stopped operating and, in effect, cancelled their licenses. It was not very exciting to make a "DX contact" with an individual who lived a few houses away.

English was also very helpful in my learning "radio." For many years, I received the *Braille Technical Press,* a wonderful magazine with fundamental electronics supplements. It was then my single source of Braille education in the field of radio-electronics. When that magazine ceased publication, I switched to the *Smith-Kettlewell Technical File,* a Braille periodical published by Rehabilitation Engineering Research Center in California. Bill Gerrey, its Editor-in-Chief, kindly sent me this unique digest free of charge. Unfortunately, this periodical has also stopped being published.

My Introduction to Ham Radio

I attended a residential school for the blind in Fronze, Kirghizstan. At the start of the seventh grade, an older man dressed in very simple clothes, typical of any low-income individual, visited my school. Under his arm he carried a large 60-volt battery with a telegraph key and large earphones attached. The earphones (about 3 inches in diameter) had been converted into a buzzer that produced a sharp, loud tone whenever the key was closed. All of the older students were summoned to a campus patio, where the man gave us a short lecture. He introduced himself as Nikolai Petrovich Shelpyakov, an instructor from the local Pioneer Palace (a kind of teenagers' club with a wide choice of free educational and entertainment programs), where he taught radio-communication theory and radio-operating skills. His manner of speaking was simple, vivid, and easy to understand. He had a gift of igniting interest in almost every listener and impressed him or her with the keen enthusiasm and sincere dedication he obviously applied to his subject.

The lecture gradually gravitated into a Morse code lesson with the instructor using his key and buzzer. Some of us were familiar with the code, but we needed significant time to identify each letter being transmitted. When he explained that we did not have to count the number of dots and dashes to record a character, but should use its

The author in his shack, listening on his receiver. His interest in ham radio was reawakened after reading an article by a blind and deaf ham in the United States.

rhythmic melody for identification, our recognition rate began to quickly speed up. His "lectures" continued, and in a few months those of us most interested in this subject were able to receive and copy up to 12 words per minute in Braille. Those who achieved this level of proficiency were formed into a study group and began to attend Pioneer Palace classes. Our code training continued and our proficiency increased significantly. In addition, our study group learned how to solder and assemble simple electronic circuits. My introduction and involvement in ham radio activity was now well started.

However, the slate and stylus Braille technique restricted any significant increase in code speed, and some of us started training with simple mechanical Braille devices, which were available in our school, and taking typing lessons (using ordinary typewriters). In a short while, this technique allowed me to copy 24 to 30 words per minute with no difficulty. I could actually read 36 words per minute, but could not type or record at that speed.

We were happy to visit the Pioneer Palace and did so at least twice a week. There we met many sighted peers who came from other schools, and as a result we made lots of new friends. The ham shack attracted us like a magnet attracts iron filings. Although Soviet industry did not produce any amateur radio transmitters, the shack was full of obsolete military communications equipment, including surface, naval, and aviation types of U.S.-built receivers: BC-312, BC-348, H.R.O., BC-1004, and the CW/AM transceiver MK19. All of these radios were leftovers from the stockpile provided by American aid given to the USSR via lend-lease. We did not have any of our national contemporary communication equipment in the school because those items were regarded by our government as secret. There were also piles of vacuum tubes and miscellaneous components that provided a good stockpile of parts and equipment for any potential and actual radio amateurs.

Advanced operators were permitted to work with the equipment, first in the receiving mode, and then after obtaining a license and accumulating a significant number of training hours, by operating the club station (UM8KAB) and making actual contacts on the air. The most advanced students (I was included in this number, because I already had my first-class operator certificate) were encouraged to participate in ham radio contests that, of course, occurred during the night as well as the day. It frequently seemed that after a sleepless night of radio contesting, I returned home still hearing Morse characters in my ears. My brain inadvertently went out looking for Morse signals in the sounds of birds or in street traffic.

My Early Mentors and Instructors

Our teacher, Nikolai Petrovitch, whom I already mentioned, was a radioman from the old school. He started his career at the dawn of radio communications, working with spark-gap transmitters operating in the long- and medium-wave bands. He was an expert in radio operation and worked with the major Soviet radio station on Shabolovka Street in Moscow. His oldest and most advanced students, including me, grew up as his disciples and assistants. Our relationships were very close, almost family-like, and for us he was not only our mentor, but was also like a father or perhaps a favorite grandfather. He used to pamper us by allowing us to bake potatoes in his firewood-stoked stove or by treating us to his cigarettes (which was a strict taboo of the school administration). Whenever the need arose for a special component for one of our projects, he never hesitated to give his last bit of money to one of us for an urgent trip to the flea-market. His salary was meager, but he never hesitated to sacrifice his dinner for a day or two so that we could obtain the parts we needed to complete a new construction project.

One day he disclosed to us his very sad life story. As a young man he fell in love with an attractive young woman from a noble family, and after their wedding, Nikolai Petrovitch opened a tannery and saddler's shop to manufacture leather goods such as harnesses and saddles for horses. He was very industrious and inventive, and as a result, his business prospered.

However, as he approached a peak in his business prosperity, the Soviet government changed its attitude towards private business and a high-ranking party member accused him of "betraying Communist moral principles." He was offered a choice: either give up his business and divorce his wife, who was referred to as "a representative of the oppressive class," or hand in his party membership card. He elected to stand by his wife, so he resigned from the party and turned in his card. Charges were immediately fabricated, and he was convicted of crimes against the state and given a 10-year prison term. He actually spent a total of 15 years in prison.

When he returned to life outside of prison, he found many changes: His wife had remarried, Stalin had died, and the political environment was now a little friendlier. In reality, he found that he had been thrown out onto the street, so to speak, with no friends or relatives to help him and without a place to sleep or a way to earn a living. Fortunately, the principal of the Pioneer Palace personally took on the responsibility of employing him as an instructor there. This was not only a job that would provide some income, but a place to live as well. It was a tiny room, with the barest of essentials and conveniences, which could only be classified as sub-standard, but Petrovitch was grateful for an opportunity to return to his favorite occupation, teaching students.

In order to maintain all of the electronic equipment we had available, the Palace employed another senior man. His name was Hans Frantzovich Schwartz, an Austrian Jew who came to the USSR in 1938 as a tourist. He believed in

A somewhat grainy photo of the unique antenna designed, built, and installed by Boris (see text) from an article he wrote about it in the January 1978 issue of Radio, the only Russian ham magazine during the Soviet era. That's Boris on the tower, by the way...more proof that blindness is no handicap for him.

Marxism and in socialist theories, so he decided to stay in Russia and settled down to a new life. Very soon afterwards, though, he was arrested, prosecuted as a German spy, and sentenced to a term in prison. He was very skillful technically and was experienced in electronics and engineering. After his release from prison, his technical proficiency came to the attention of the Palace and he was invited to join the teaching staff. About 50% of our transmitting equipment was home-brewed and was a tribute to the technical skill of Mr. Schwartz.

Some Ham Radio Adventures

My first ham radio contact occurred in 1952 when I operated the central club station (UM8KAA). I was offered a chance to use this station, but when I took my seat at the console for the first time, my fist trembled on the Morse code key. The chief operator was there to guide me in following the proper exchange procedures that suddenly were all mixed up in my brain. Fortunately, I overcame my anxiety and with his help successfully completed my contact, which incidentally was with an operator in an airplane celebrating a historical anniversary.

Once on night duty at the Palace Station I heard a telegraphic SOS signal. It came from an amateur in Czechoslovakia who was looking for special medicine required by a young mother with cancer. The Czech amateur believed in international cooperation and the reliability of the ham radio brotherhood. He was not mistaken, because we were able to contact the Russian Public Health Ministry at 3:30 AM, and the medicine was immediately dispatched by plane. We were happy to learn that the delivery was safely made and that the patient recovered successfully. Needless to say, ham radio and the Palace received significant publicity and plenty of commendations.

Another SOS adventure occurred some years later, in 1957. Late one night, on 7 MHz, I heard a very weak signal calling SOS. It only lasted for a minute or so and then faded away, but I remember the callsign to this day—GPXK. I reported the contact to our local Radio-Bureau, but had no details to report other than the fact that I heard the message. The Bureau did not know of any problems, but a few days later I heard a newscast that reported that a British trawler had recently been icebound but had been able to break free. This time, unfortunately, I was unable to be helpful.

Advanced Schooling

My public schooling ended with the completion of the 11th grade, and it was then time to make plans for my further education. I had no opportunity to enroll in a technical college because of my visual impairment, so when I got my diploma, I decided to try my lot in music. I was a good student and learned to play the accordion fairly well. However, the local college principal denied my application because of my lack of sight. I then decided to go back to Russia to determine if I could change my luck and gain entrance into an advanced school. This time fortune smiled on me, and I became a student at a unique college in the Russian town of Kursk. It was the only college in the USSR that taught only visually-impaired students. I had the opportunity to continue my technical studies, and I obtained my first license with the personal callsign UA3XB. Soon I found a like-minded confederate among the students, Vladimir Suslin, UA3XA. We installed a station in our college dormitory room despite the fact that we shared the room with four other individuals.

Our first piece of equipment was a portable CW transceiver operating on 80 meters and producing 1 1/2 watts of output power. The most remote locations we could reach were Yugoslavia and central Kazakhstan. We later built a 10-watt rig, a crystal-controlled transceiver operating in the 20-meter band. One of our crystals happened to be on the frequency being used by scientific research teams located at the North and South Poles. It may be difficult to believe, but we successfully worked both teams with our ridiculous 10-watt output. Here I must emphasize that propagation conditions were very favorable in 1957 and 1958. A little while later, our local club team loaned us a very good Navy shortwave receiver and a 40-watt CW/AM transceiver, which significantly increased the range of our contacts.

Up on the Roof

I successfully graduated from the Kursk college, receiving a Red Diploma with a commendation. I returned to Kirghizstan and obtained the callsign UM8FZ. I used that call for over 30 years, until 1991, when Kirghizstan declared its independence and I was given the new callsign EX5T.

My number one objective, once I settled down as an active radio amateur, was to erect suitable antennas. I started with simple types lsuch as dipoles and ground planes. I obtained an antenna noise bridge, an SWR meter, and a field-intensity indicator. I then assembled two cubical quads in sequence and those performed very satisfactorily but were not durable enough to withstand heavy wind loading. As a result, I was very eager to build a strong multiband Yagi beam that could withstand the heavy winds in my area. I purchased aluminum poles used by vaulters for the radiating elements and stainless-steel rods for the support elements. I decided to try something new, since the old idea of stacked beams seemed to be cumbersome and inconvenient. My final design was a combination of three different Yagi arrays mounted on a single boom and oriented in different directions to minimize the interactions between the various bands (see photo). An article I wrote on the antenna was published in the Russian magazine *Radio* in 1978.

A radio tower that had been discarded by the armed forces as obsolete was installed on the roof of my home. It was still in excellent condition and had outstanding features such as a hand windlass that permitted antennas to be easily raised and lowered. This capability enabled me to achieve perfect tuning of my antennas by trial and error. I must

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admit that it took a long, long time to mount my tri-bander on this tower and to tune it properly. It seemed as if I spent most of my leisure time on the roof, regardless of the weather, working on this project. However, the tower location on the roof of a four-story building turned out to be outstanding. The antenna, at a height of 80 ft. above ground, overlooked all nearby buildings and provided a clear path in all directions. With that location and a 46-ft. boom length, my ability to communicate over long distances was no longer a problem. Communication with stations in the Antarctic was commonplace using the long path over the North Pole and my signal reports were fantastic. Under favorable conditions I could sometimes hear my own signals' echo returning around the globe with about a 0.22-second delay. To observe this phenomenon, I operated in a semi-duplex mode.

In 1977, I was able to maintain a regular schedule with the legendary expedition of Thor Heyerdahl in his "rush" sailing craft *Tigris*. Contacts on that vessel were with the crew's Russian Doctor, Yuri Senkevitch, and American radio man, Norman Baker.

This antenna helped me to win the USSR championship in 1973. The victory was significant, because I competed against the best radio operators in the country. For this achievement, the Sports and Physical Culture Committee of the Supreme Soviet awarded me two gold medals and a first-grade diploma. In 1974, I broke my previous record and won the championship again. For this, I was awarded another set of medals and another diploma. I also was awarded the championship Cup from the Central Committee of the Volunteer Society of Assistance to the Army, Aviation and Fleet, a popular paramilitary organization that sponsored all technical sports contests in the USSR. In 1975, I reached the top position in one of the subgroups during the USSR's international "CQM" DX contest. Finally, in 1996, I became the champion of all Middle Asian Republics and Kazakhstan, both in voice and code.

Publications

I am happy to say that I had an opportunity to have two of my books published in Russian Braille. These were based upon my life experiences and those of sighted and non-sighted friends, and were aimed at promoting the attractiveness of ham radio. The first one, entitled *In The Invisible Waves' Ocean,* was printed in 1985 and discussed the physical nature of electromagnetic waves, including short waves, microwaves, and light waves. It also covered the propagation properties of such waves and the ways that they were used. In addition, I described the pioneers in this field and their contributions to the art of communication. It also introduced the reader to amateur radio and the beauty of our hobby and included electronic circuit descriptions and explanations. This book was very well received.

My second book, *Chasing the Invisible Wave,* was issued in 1987 and provided more detail of radio-wave propagation with emphasis on VHF and UHF radiation. It also discussed antenna types and provided detailed descriptions of easy-to-build antennas suitable for amateur radio use. It included sections on special test instruments that provided audible signals for non-sighted amateurs and highlighted methods of assembling and soldering electronic circuits without any visual monitoring. My major objective was to introduce a blind individual to ham radio and to give enough instruction on how to become an amateur and how to select, build, and test equipment. Among the features I included were details of transceivers embossed by means of the Braille code invented by Andrey Golubchikov, a blind mathematics professor. The code enabled the use of Braille to describe complicated electronic circuitry. After publication of my books, I am happy to say that the number of blind operators in the former USSR increased from a dozen or so to several hundred.

Conclusion

I recently left Kirghizstan and moved back to Russia, to the city of Tver, located about 100 miles northwest of Moscow, along the railway to St. Petersburg. My new callsign (the fourth in my life) is now RV3IZ. I am still very active on the amateur bands. I encourage any hams, sighted or non-sighted, to listen for my signal, I will be delighted to say hello to all of you in person. See you on the air! ■

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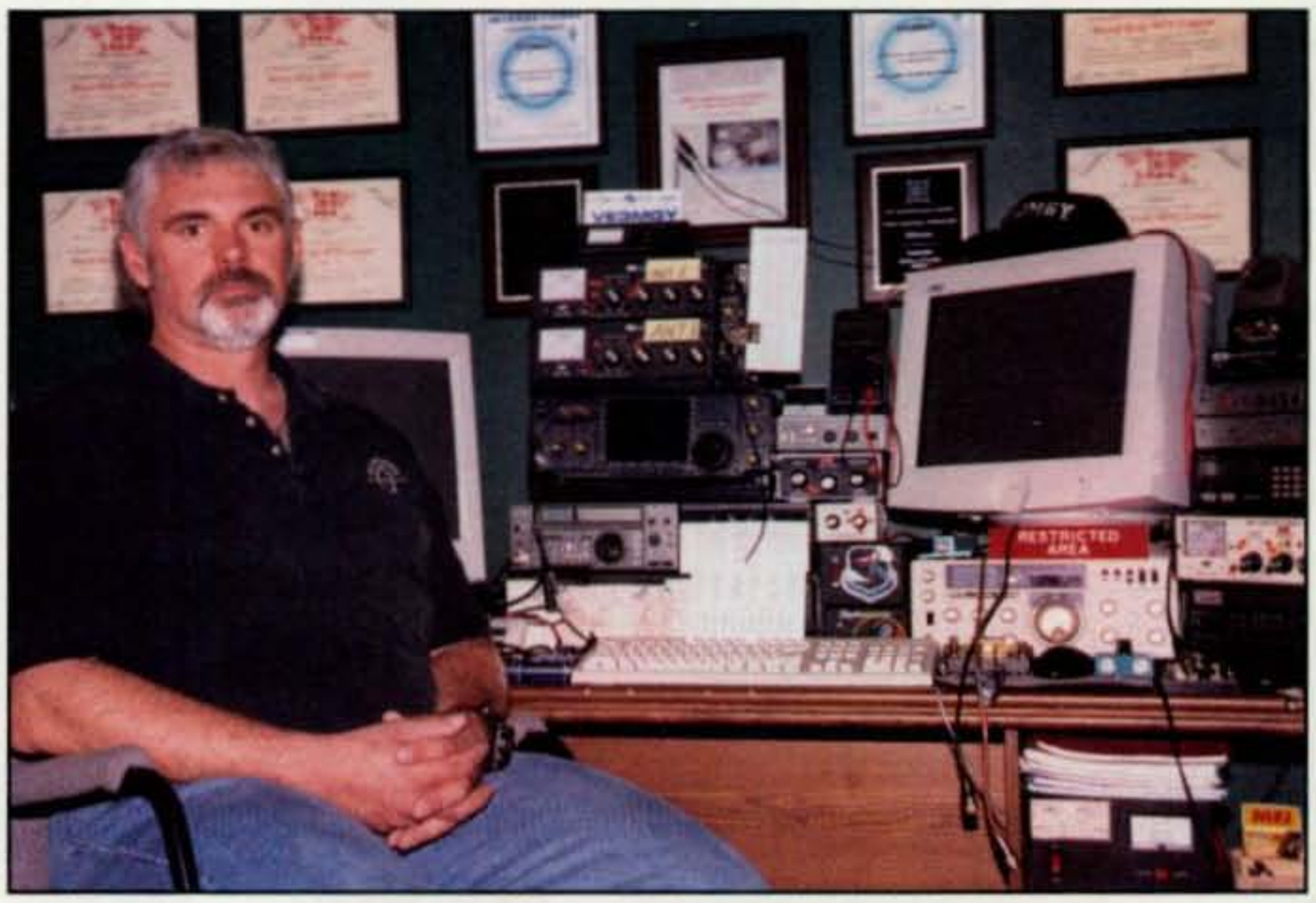
February is Heart Month, and while the following story deals with radio contesting and DXing, which by any definition is an armchair hobby, the benefits of this article can apply to anyone of any age with any hobby. In fact, they will apply to your work life, social life, family life, and ultimately the quality, as well as quantity, of your life itself!

Putting Your Heart Into Your Hobby

BY BRIAN CAMPBELL,* VE3MGY/VY2MGY/VE3

It's 3:30 AM and you're on the air. Perhaps you're in the middle of your favorite contest, running a special event station, or chasing that navigational hazard known as a very rare DXCC entity that has just been activated and you know your best shot at working it is in the early hours of the morning. Maybe you are operating on an emergency communications net. Unfortunate for you, however, and for the station you're trying to work, is the fact that you just cannot seem to stay awake or focused. Did he get my call and report correctly? You can't seem to copy the CW, even though it's at a slower speed than you're used to. You feel completely drained and have absolutely no energy. It's exhausting even thinking about how tired you feel. What's the problem? You had a solid eight hours in the rack just the night before. Even more important, what's the solution? It could be simpler than you may think.



Author VE3MGY shows off "the new me," noting that he's lost an additional 15 to 20 pounds since this photo was taken. Good going, Brian!

Most of us will spend as much money as we can afford on our hobby, and we certainly will spend countless hours building and upgrading our shacks, not to mention designing, building, and erecting new antennas so that we can try to improve our signals to counter periods of unfavorable propagation or exploit periods of favorable propagation. However, we may forget the two related factors over which we may have the most control: our health and our energy level.

Who hasn't heard people say at one time or another how they wish they could stay up all night to compete in a contest or work DX on the lower bands, or how they would like to be on the air more but are usually too tired after work? Would you be happy or content if your amplifier was only running at 500 watts when it is rated for a KW? I don't think so. Well, there may be something you can do that will not only give you more energy when you do operate, but increase the amount of time you are able to spend on the air, and may even extend your overall longevity so you can see the next solar cycle and the one after that! The best part is it's free and easy, and the benefits are almost instantaneous.

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My Experience

It all started for me in the fall/winter of 2003. At that time I had been contesting for eight years and DXing for 14. I do most of my contesting and DXing on the low bands (40/80/160 meters) and that entails staying up most, if not all, of the night waiting for those favorable propagation openings to occur. Now as we all know, this goes against the body's natural tendency to want to rest during the hours of darkness (anyone working shift work, as I have myself, can also attest to this phenomenon).

While going through my logs from past years—as I do before every contest, looking for trends such as when the

rates were the highest and when which band opened to where, etc.—I started noticing a trend I hadn't seen before. Most of my logs ended around 3 or 4 AM, which meant that I was usually losing about three to four hours per night of operating, not to mention those all-important sunrise peaks which can enhance low-band signals. As I thought about it more, I remembered that I usually seem to "hit the wall" around that time and can talk myself (rather easily, I might add) into going QRT for the night.

I can remember the CQ 160 Meter CW Contest a couple of years ago when I was "resting my eyes" and listening to the staccato bursts of QRN on the band and the gentle humming of the fans in my computers in the background. As I reached over to my iambic keyer, I literally fell asleep in the middle of sending a CQ. I can remember having a dream that a station responded. I remember answering him with his call and a report and then hearing him say, "TU GL . . ." and sending "TU QRZ TEST DE VE3MGY." At that point, I bolted up in the chair, fully awake, and realized that I was not dreaming at all and that I had no idea whom I had just worked! A lost QSO!

Then there was the time my grandmother walked into the shack at around 4 AM to see how I was doing. "Fine, Grandma," I said. "Thanks for asking." Grandma smiled at me, nodded, and walked out. This was perfectly fine . . . except that my grandmother had died 30 years ago! I jumped out of the chair again. . . . Holy hallucination, Batman!

Now while these stories are true and actually sort of funny, they are not the kind of thing you want to make a habit of (for a number of reasons I won't get into here).

Like most people, I usually work on the Friday preceding a contest, so I naturally expect to be tired on Friday night. However, even on the rare occasions when I was off from work before the contest, it seemed to make no difference what time I hit the so-called wall on Friday night. Therefore, the problem wasn't related, directly anyway, to work. Even staying up late a night or two before a contest to push my circadian rhythms (the body's natural sleep cycle) ahead seemed to make made no difference at all. There had to be a solution somewhere.

I had heard a number times over the years that daily exercise and proper eating, in addition to extending your life expectancy, can and will give you more energy. Thus, at the beginning of 2004, after a checkup, consultation, and sub-

sequent approval from my family physician—***which I very strongly suggest you do as well before trying any diet or exercise plan***—I started a regimen of eating more healthy foods, such as fruits and vegetables, and started exercising, all in the name of science (or radio, as the case may be), as I was hoping to be able to stay awake longer, have more energy, and be more focused when I competed.

After just one month of walking and hiking five days a week and eating more fruit and vegetables and fewer fats and so-called fast foods, the CQ WW 160 SSB Contest was the first test—sort of a test within a test of the theory, if you will. I found that not only was I able to stay awake and be more focused for the entire contest, but I achieved a personal best in the process. I thought maybe I was on to something here. I actually did feel that I had more energy than before.

My work keeps me on the road a lot, and I found that eating healthy could be a bit of a challenge at times. Therefore, when I could, I tried to pack a lunch full of fruits, nuts, vegetables, and a protein bar to munch on, and if I (or my XYL) didn't have time to pack me a lunch, I would try to buy a salad or a healthy low-fat sub. I kept up with the regime, and by the end of March, after the CQ WW WPX SSB Contest ended, instead of going to bed, I went for a walk in the woods with my faithful companion Sarge (Sarge is our dog, who sleeps at my feet during the contests; I swear she can copy CW). I found that I was still full of energy, and not even a bit tired, this after working all day Friday, being on the radio all Friday night, working around the house all day Saturday, and being back on the radio all of Saturday night! In fact, I didn't sleep until Sunday night.

Now I knew I was on to something. This had never happened before. However, if I wanted to be sure, I decided that I would have to continue with the experiment, because as long as I ate right and exercised, I should almost always have more energy than I used to. Besides, I was experiencing another side effect of healthy eating and exercise: I was losing the extra pounds I had put on over the last few years.

I kept at the exercise through the summer and found that, not surprisingly, my resting heart rate had dropped from 70 to 50 beats per minute, and as a result I had to push myself faster and further in my workouts to get my exercising heart rate up to where it had been in the beginning months.

As the summer rolled along I followed my routine and waited for the dreaded "plateau" that often accompanies diet and exercise. While eating the same kind of healthy foods and exercising as you have been for a while, your body will eventually "adjust" to your new weight, and you will find that for a while you will not lose a pound (every individual is different in how his/her body reacts). Sure enough, I didn't lose a single pound for about five to six weeks in the summer. However, I didn't gain weight either and my energy level remained very high.

If you're like me, you enjoy BBQs, softdrinks, and the odd 807 during the summer holiday months. This is fine, as I try to have one "bad" day per week, and so should you, when you can have any meal you wish, one which you would normally not have during the week. Personally I try to schedule this day around social functions, holidays, or family gatherings if possible, so I always end up with only one "bad" day per week.

By the first of September I was starting to lose weight again and my energy level kept increasing. By now my workouts were a normal part of my daily routine, and I felt as if something was missing if I couldn't do something physical during the day. In fact, I was feeling so good that I found myself on the radio, at the telescope (another one of my hobbies that entails being up most, if not all, of the night), and on the lake boating more than ever just because I had so much excess energy. Not carrying around the extra weight also added to my overall fitness, I'm sure. Now at 6'4", with big bones and a large-frame body, I look more like a football player than a jockey and I wasn't expecting to fade away to a shadow of my former self, but relatives and friends did notice a big difference in my appearance and I found myself wearing clothes (and clothes sizes) I hadn't worn in years.

More Evidence

Still not convinced? Fast-forward to the end of November 2004. I now have lost more than 60 pounds and exercise for an hour a day, five to six days a week, on an elliptical trainer; have run 530 km so far this year (and just so you know, I have always detested running, but found it very easy to do after being on the program a while); and have been able to set personal bests in the CQ 160 SSB, CQ 160 CW, WPX SSB, WPX CW, and CQ WW SSB—five major contests. Sure the solar cycle is currently favoring the low bands, but you have to be there, and be able to stay there (in front of the radio), to be able to enjoy them.

My cholesterol is down, my blood pressure is lower (it was normal to start with, but this is another added benefit of diet and exercise, and I have more energy now than I did 20 years ago and don't need as much sleep as I did this time last year. The only thing that I have done differently this year, compared with any other, is the exercising and dieting, and I noticed a difference within the first week after I started. You should as well. Even if you don't want to or can't do as much exercise as I do, remember that even a modest amount of light exercise, such as a couple of walks a week, and a small change in your diet will do wonders for you. However, you have to be willing to try it and stick with it for at least a couple of months.

Now what I do before a contest is kick it up a notch, so to speak. I will go a bit farther and a bit faster during my workouts, train every day (if work permits), and try to eat a salad with fish or chicken for supper through the week leading up to the contest. On the day of the contest I will not work out at all to save my energy, but I still eat healthy. You should always try to avoid a big meal, of any description, before a contest or any radio event you will be involved with, as you will become tired and lethargic. During the contest, I drink tea but try to stay away from coffee, which in terms of staying awake never worked for me anyway. I will have a light snack during the night if I'm hungry, but I try only to nibble and not have a normal meal outside of the usual times.

On the weekends when I'm competing, during the day I try not to do too much around the house, if I can help it, so that I will be fresh for the night shifts. Even if I end up working outside for a while on Saturday, I usually still seem to have abundant energy left for Saturday night. I have found that even a short walk will do wonders to clear any cobwebs I might have and make me more relaxed. I mean it's just a walk, but remember, you're still exercising, losing weight, and increasing your energy level all at the same time!

Do I still get tired when I compete? Sometimes I do. However, I never come close the exhaustion I used to feel and now even thinking of going QRT is not an option. Plus, I still have lots of energy left over to spend on the family so they don't feel neglected. Finally, the usual Monday morning jet lag after the contest has all but disappeared.

Recipe for Healthy Eating

Even if your doctor doesn't think exercising is right for you (although it's very rare today that you'll be told not to exercise at all), you can still benefit greatly from just eating better (if you are not already) and your energy level will increase. For help in planning your diet and exercise regimen, in addition to consulting your doctor, I recommend the books listed at the end of this article. They offer different ideas for meals and exercise plans so that you can use what suits you the best. I have tried both of the methods suggested and now combine what works for me from both plans.

I usually start my day with a glass of juice, eat fruit through the morning, and have a light lunch (soup and/or salad) and then a healthy meal at supper. Remember that "portion control" is just as important as "content control"! You should eat until you are not hungry, not until you are full, as most people do. Also remember that eating six small meals during the day is much better and healthier than having one giant feast at the end of the day. Your body needs energy to burn calories (hence, always having a little food in your stomach is useful), and when your stomach is empty, your body automatically goes into "survival mode" and will not burn those calories or fat and your metabolism actually slows down. Then when you do eat, your body immediately starts storing as much fat as it can for the next famine. Remember the saying "crash it off, crash it on"? It takes time to put on weight and it takes time to take it off. I have lost an average of 2.5 lbs per week through the year and have had no trouble keeping it off.

If maybe you're not eating the best and could shed a few pounds, or you just don't find that you have the energy levels you used to, why not try an experiment like I did? If after having a healthier diet and exercising you still believe that I'm wrong in my conclusions, the worst thing that could happen to you is that you probably will lose some weight and be healthier. Sounds like a win - win situation. For me? My doctor says if I lose another 20 pounds I will be at my "ideal" weight for my body size, and after 11 months of a healthy diet and exercise, it has become my new lifestyle. I hope it becomes yours as well.

Note

1. For more information on healthy operating, I recommend: *Fit For Life,* by Harvey and Marilyn Diamond: and *Body For Life,* by Bill Phillips.

W6BNB's June article on Long-Delayed Echoes has generated quite a bit of reader response. Coincidentally, at the same time, the Japanese amateur radio magazine Five-Nine *was publishing the beginning of a three-part series on LDEs by Makoto "Mac" Obara, TZ6JA. In that series Mac proposes the existence of one or more ionospheres in interplanetary space. This intriguing concept is summarized here by Mac, with the kind permission of* Five-Nine *magazine.*

Long-Delayed Echoes
Reflections from an Ionosphere in Space?

BY MAC OBARA,* TZ6JA, ex-JA8SLU

Note: CQ is neither endorsing nor promoting the hypothesis presented in this article. Our purpose in publishing it is to continue to encourage thinking "outside the box" and to promote continued discussion and research on a thus-far unexplained phenomenon. — W2VU

This is a summary of a series of articles written in Japanese for the monthly DX magazine *Five Nine* and published in the June, August, and September 2004 editions.[1] The main points are as follows: Long-Delayed Echoes (LDEs) actually exist. They are neither a hoax nor a mystery, but rather a physical phenomenon, regardless of how unusual the length of the time delay may be between transmission and reception. Also, it would be reasonable to consider the existence of a hypothetical ionosphere in space.

Focus on Very Long LDEs

Various types of LDEs have been recognized. This study has focused on the very long LDEs occurring on the 1.8 and 3.5 MHz bands which have been reported by several Japanese radio amateurs during the period between 1989 and 2004.The details are in Table I.

Those who reported their own experience of LDEs over the last 30 years are the following well-known top-banders and/or low-banders: H. Kanamori, JA7SN; S. Sakairi, JA1HQT; H. Ogishima, JA1CGM; Y. Saito, JA8DNV; and Y. Nakanishi, JA3ONB. All of them except JA8DNV received LDEs several times. JA3ONB received double echoes for one transmission, with the very long interval of 48 hours between the two echoes (the first echo was 34 hours after his original transmission). The echoed signals had QSB, distortion, and Doppler shift of +300 to –200 Hz—on 1822.0 kHz!

JA7SN received three separate LDEs twice on 3.5 MHz CW, and he managed to tape-record one of them. Being able to repeat such an experience is an indispensable step toward distinguishing reality from human illusion.

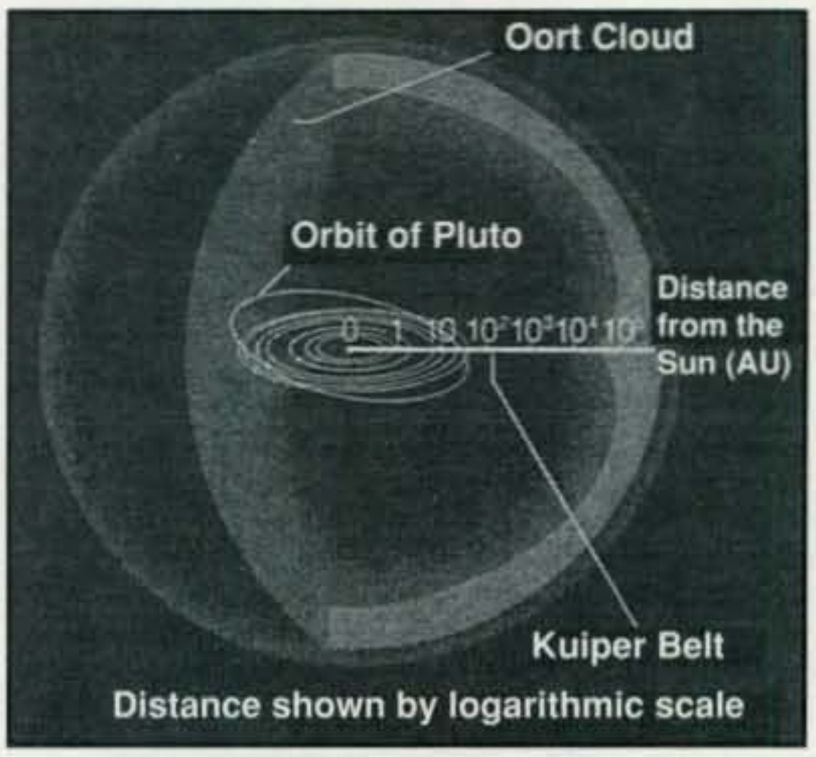

Fig. 1– Relationship of the solar system's planetary orbits, the Kuiper Belt (see text), and the Oort Cloud. The author hypothesizes that the Kuiper Belt as well as the asteroid belt may create interplanetary ionospheres responsible for reflecting signals that return as very long-delayed echoes. (Illustrations courtesy 59 *magazine)*

Interplanetary Ionospheres?

All of these records (except UL7GW) indicate very long delay times ranging from 20 minutes to 82 hours. Converting these times to distances—remember, radio waves travel at the speed of light —corresponds to round trips of 1.8 ~ 297 AU (Astronomical Unit, 1 AU = 150 million kilometers, or about 93 million miles, the distance between the Earth and the Sun). These delay times suggest the existence of two hypothetical *interplanetary ionospheres,* composed of numerous magnetic and plasma tails of small planets and debris, located mainly at the minor planet belt (asteroid belt) and the Kuiper belt (a region beyond the orbit of Neptune containing thousands of small bodies orbiting the sun that is believed to be the spawning ground of many short-period comets). See fig. 1.

Limited Time Phenomenon

Based on the experiences reported, the timing of LDEs on the bands in question is not random. They appear to be concentrated in specific periods and times of day, and during spe-

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Records of 1.8- and 3.5-MHz LDEs

TYPE	MODE	STATION	DATE (D-M-Y)	TIME (Local Time) TRANSMISSION	TIME (Local Time) RECEPTION	DELAY TIME	DISTANCE AU EARTH	DISTANCE AU SUN	POSSIBLE REFLECTOR
I	3.5 CW	UL7GW	14-12-72	20:05	20:05	10–15 sec.	—	—	Plasmoid-Geotail
II	3.5 CW	W6WYW	11-10-01	20:00	20:30	30 min.	1–8	2–8	Minor Planet
		JA7SN (1)	24-2-98	21:10	22:00	50 min.	3.0	4.0	
III	3.5 CW	JA7SN (2)	26-12-93	22:05	16:02*	17 hr. 57 min.	65	66	EKBO N
		JA7SN (3)	16-1-98	21:50	21:40*	20 hr. 50 min.	86	87	EKBO N
		JA1HQT	10-89	19:30	19:30*	24 hr.	86	87	
		JA1CGM	2-93	21:30	21:30*	24 hr. 10 min.	86	87	
		JA8DNV	27-12-02	21:00	23:10*	26 hr. 10 min.	94	95	EKBO N
	1.8 CW	JA3ONB (1)	18-1-04	19:54	06:13**	34hr. 19 min.	124	125	EKBO
		JA3ONB (2)	18-1-04	19:54	06:25***	82 hr. 32 min.	297	298	

**Next day*
***2 days after*
****4 days after*
EKBO: Edgeworth Kuiper Belt object
N: Mean motion resonance belt beyond Neptune

Table I– Long-Delayed Echo experiences of seven amateurs—five Japanese, one American, and one Russian—on which the author's research is based. See text for description of possible reflectors.

cific parts of the sunspot cycle. The season during which we can receive LDEs on the low bands is limited to from October to February, with times of the transmissions also limited to a two-hour period between 2000 and 2200 Local Time (LT). Time of reception is always at night, between 1600 and 0600 LT. Duration of the received signals appears to be a maximum of 20 minutes. The signal strength of LDEs is stable—RST 559 on average—but not strong enough to swing the needle of an S-meter. Sometimes (as noted above) LDEs have shown signal distortion, Doppler shift, and double echoes.

LDEs have occurred during the period from one to two years after the sunspot peak, through the bottom of the cycle, and again one to two years before the peak of the next cycle.

The occurrence of LDEs corresponds to the recurrent geomagnetic double peak, and also to one sixth of the coronal mass ejection (CME) of the Sun. Even though the remaining five sixths of the CMEs do not directly influence the Earth, they contribute to the formation of the interplanetary ionosphere as a reflector.

Finding the Ionosphere in Space

It seems the locations of these reflectors are to be designated astronomically. Wherever you calculate the distance to be, the specified belt and/or planets are there (see "Calculating the Distance"). As shown in the table, what I call the type II and III reflectors are located at specified belts called *mean motion resonance belts* where there are many minor planets—prototypes of comets—and planetary fragments (see fig. 2). These reflectors are thought to be perpendicular to the ecliptic disc (the plane on which the planets orbit the sun), forming sort of a wall, and should be called *interplanetary ionospheres.*

There is currently no term such as interplanetary ionosphere, because no such concept has been required until now. Without this term and concept, however, nobody can explain this type of LDE. I believe this type of ionosphere does exist

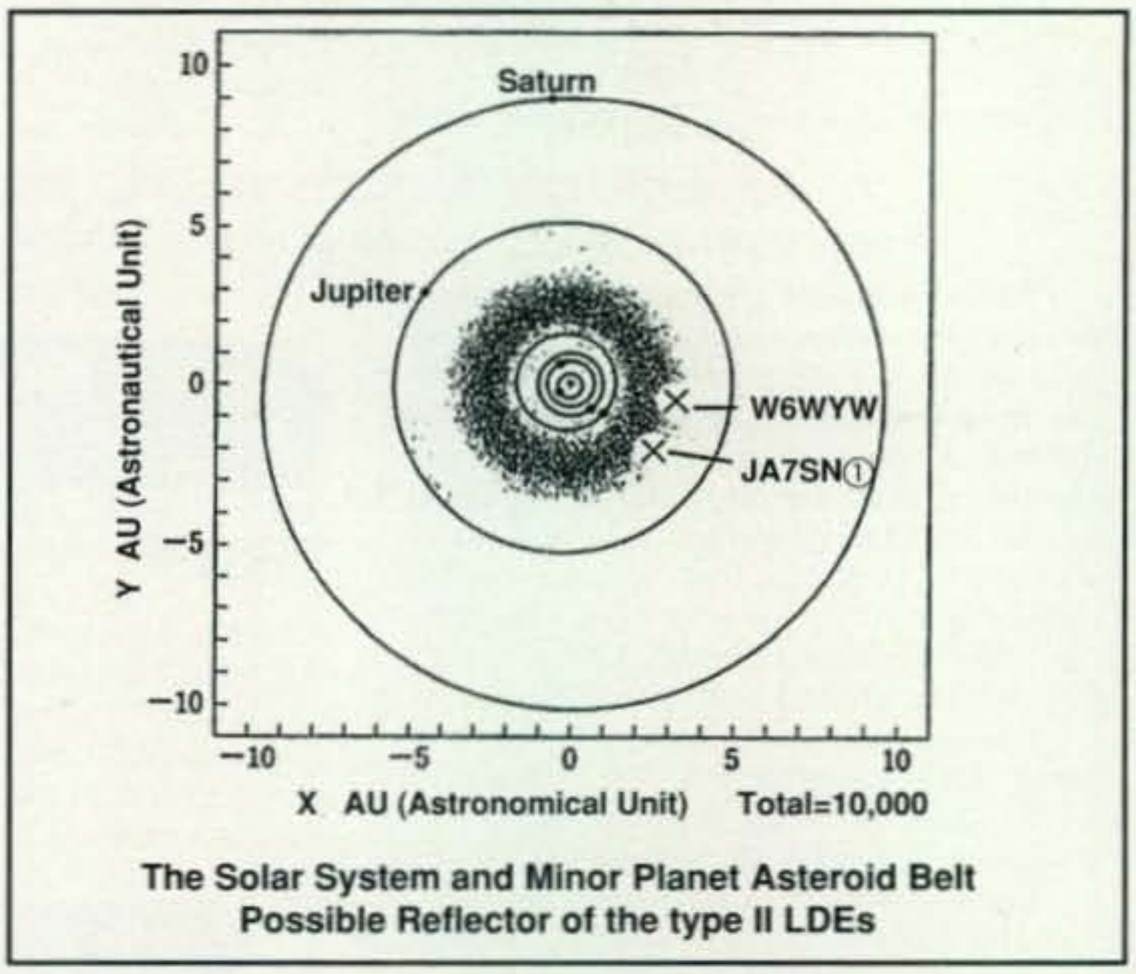

Fig. 2– Calculated distances from Earth to the Minor Planet Belt, or Asteroid Belt, which may account for at least two reported "Type II" instances of LDEs.

in space. There is so much circumstantial evidence and the plasma tail of a comet may offer key evidence.

Required Conditions

As I mentioned before, LDEs do not occur anytime. When they do occur, they have a certain pattern and are concentrated in specified time periods. The key to generating LDEs probably is linked to CMEs and solar flares.

The fact that the best time of the transmission is around 2100 LT means that at this time and at the right season, the ecliptic line, the center of a radio window, and the center of

a geomagnetic tail all concentrate together at the zenith high above the sky.

In case of transmission and reception of LDEs, the following dependences have been recognized through experience:

- Local time dependence
- Radio window dependence
- Seasonal dependence
- Solar cycle dependence

Those who have experienced LDEs know there is little path loss despite the time delay and apparently very long path of propagation. In the report of Y. Nakanishi, JA3ONB, we can find some evidence of LDEs as physical phenomena, which can be formed only in space, being imposed on his received signals. The Doppler shift, measured at +300 to –200 Hz on 1.8 MHz, is a rate of flutter at an apparent speed to the Earth of +25 to –17 kilometers per second—something that can occur only in space. *(Signals traveling significant distances with little to no path loss is a regular, if unusual occurrence at VHF and UHF, when conditions are right for the formation of "ducts" in the troposphere. For example, one of these regular ducts permits hams with handhelds in California to access repeaters in Hawaii—2500 miles away—with full-quieting signals. Is it possible that some sort of ducting in space accounts for these very long LDEs?—ed.)*

LDE/EME Similarity

The basis of my theory on 1.8/3.5-MHz type LDEs is found in a radar equation (see sidebar, "EME vs. LDEs: Doing the Math"). I deemed both LDEs and EME (moon-bounce communication) to be in the same category as radar—reflecting signals off distant objects in space—and studied both theoretically, comparing them to one another.

Is This Good Science? A Healthy Discussion

TZ6JA's article touched off quite a discussion even before it was published, as various CQ experts have weighed in with greatly differing opinions. Three people who have read the article prior to publication are author Bob Shrader, W6BNB, whose June CQ article on long-delayed echoes prompted "Mac's" response and accompanying article; The NEW Shortwave Propagation Handbook *co-author Ted Cohen, N4XX, a valued behind-the-scenes advisor on all sorts of things; and CQ Propagation Editor Tomas Hood, NW7US. Here are some of their comments, followed by mine.—W2VU*

W6BNB: I personally do not believe there is enough material in the Kuiper Belt to produce an ionosphere there, and assuming there was, the ionosphere should be reasonably equidistant and should return echoes of approximately the same times. This is not what has been reported by any means. What about the 3 minutes, 7 minutes, 17 minutes, one or more hours, and even several days at times? It might be possible that there are some kinds of ionospheres around other planets, but who is going to compute travel and return times? And why only returns to the transmitting site? These are all weird happenings, to say the least.

N4XX: (It appears that) there actually *is* an ionosphere on Mars and it will support HF propagation. There are several papers in the scientific literature that demonstrate this is a possibility . . . (but) think about the wavelengths involved and the ionization that would be required to reflect such a signal back to Earth. Even assuming that there were an ionization belt out there, one might ask the author what the reduction in signal strength would be for a signal that traveled the two-way path. . . . For free space, the loss is (wavelength/2 $\times \pi \times R)^2$. Thus, we are on 160m wavelength and the distance we'll use (just to look at the "best case" scenario) is the distance that light travels in 10 minutes. Ten minutes times 60 seconds per minute yields 600 seconds. For light traveling 300,000,000 meters per second, and the wavelength involved, the *two-way* path loss is:

20log (base 10)(wavelength/4 $\times \pi \times$ R)

This yields:

20log(160/4 $\times \pi \times 2 \times 600 \times 300{,}000{,}000$) = 20log($40/108 \times 10^{12}$) or, roughly, 20log($40/10^{14}$)

I'm a little rusty on my logs, but I believe this is roughly –248 dB. At that wavelength, the scatter (vice reflection) from whatever is out there probably would take the signal down another 20 dB (1% efficiency) before the return trip, so even under the best conditions on 160m, the path loss alone is more than –268 dB.

There's also no assurance that wavelengths of 160m would even "see" any reflector/scatterer out there (in the physical sense). . . . Signals certainly can rattle around our own ionosphere if they are trapped between layers and subsequently dumped out by irregularities. . . . Based on my calculations, I categorically reject the hypothesis.

NW7US: New science always gets the entrenched in a tizzy. We cannot explore the new if we are afraid of making hypotheses and speculation. (Hopefully) the article . . . can fuel possible interest in doing real research. I have a whole line of thought started on how to conduct research. This is fascinating.

We amateurs are supposed to be on the cutting edge. Did not Marconi get laughed at? We owe him many thanks.

I agree that (Obara's theory) does not answer everything.

I agree that the numbers don't perfectly add up.

I can think of some other possibilities.

However, I think that it is a possible beginning to an exploration to find answers, and it could hold some potential answers. It is not totally unthinkable. Neither are the ideas that radio waves become trapped in our own magnetosphere. Or other theories. I think all of these need to be aired and explored.

A hypothesis has to be made in order to test ideas. There has to be a starting point. The fact that they have a body of evidence and have given some thought to that should be reported. The ideas might be debunked later, but that is what we see in any science: ideas being postulated and tested and either expanded or rejected.

Thus, I hope to see this move forward in some fashion where the imagination and passion of inquisitive readers are engaged toward the end of finding the answer(s) to this interesting reality.

I think that *CQ* should not just be about reporting the news and current events, with a small touch on science, but should from time to time dangle carrots in front of amateur scientists (or potential amateur scientists) who could be mobilized into forging into new territory that is oft left to the professional scientists of the world.

W2VU: Hams helping with scientific research is nothing new, and encouraging this is nothing new for *CQ*. As far back as the late 1940s, *CQ*'s first Propagation Editor, Oliver "Perry" Ferrell, recruited readers to help study ionospheric phenomena. To quote *CQ*'s second Propagation Editor, George Jacobs, W3ASK, in his article in the 50th anniversary issue of *CQ* a decade ago, "Perry Ferrell also brought *CQ* and its readers into the front line of VHF ionospheric research with the Radio Amateur Scientific Observations project, which was funded with a government grant. Much of what we know about propagation above 50 MHz originated with this project, based entirely upon radio amateur participation."

I agree with our third Propagation Editor, NW7US, who believes we should not dismiss this thinking out of hand but rather should use it as a springboard to encourage further documentation and discussion of this phenomenon. Propagation is an area in which hams still have the opportunity to make important contributions to serious scientific research. Our publication of this article is neither an endorsement nor an acceptance of the hypothesis proposed. Rather, it is our goal to encourage further research, beginning by encouraging discussion on the LDE phenomenon and the merits of this proposal . . . a discussion that I'm pleased to say is already well under way. Your contributions are invited.

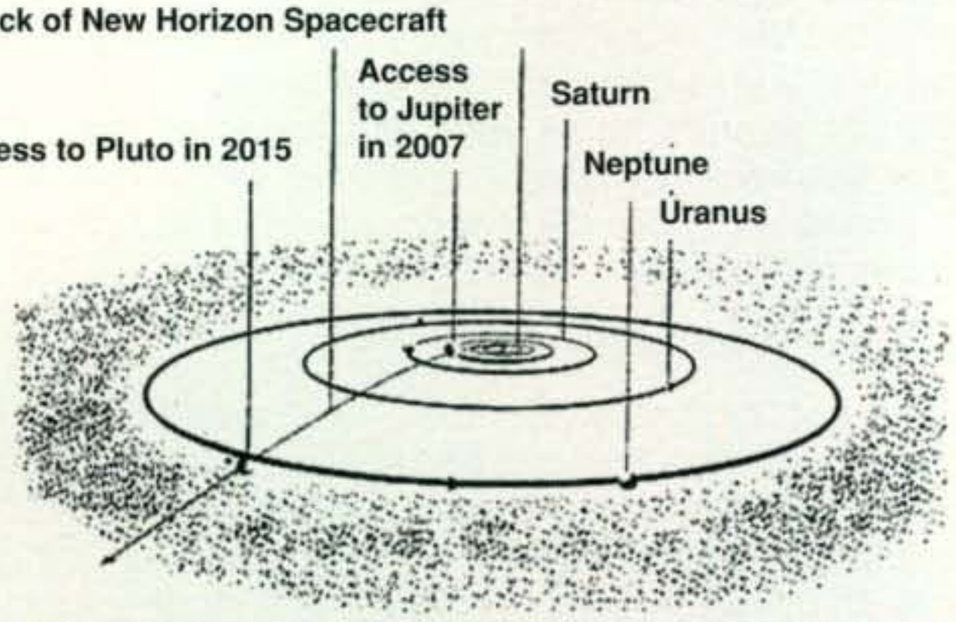

Fig. 3– Planned course of the New Horizons spacecraft scheduled to be launched in 2006 and to reach the Kuiper Belt in 2015.

As a consequence of this study, I have seen that it is realistic for LDEs to occur and that LDEs at a distance of 45 billion kilometers (27.9 billion miles, or 300 AU) have a propagation advantage compared with EME signals, at a distance of 380,000 kilometers (236,000 miles), in spite of the remarkable difference in distances.

The main reason for the difference in path loss is that in the case of EME, path loss is proportional to the fourth power of the distance (r^4), while LDEs, on the other hand, have path loss that is proportional to only the square of the distance (r^2). This is because, as shown in fig. 4, a returning EME signal is a one-spot reflection off a solid and conductive ball,

EME vs. LDEs: Doing the Math

For comparing path losses between EME signals and LDEs coming from a hypothetical interplanetary ionosphere, the following formulas and calculations were used.

First, we must treat both EME and LDE signals as reflective radar waves, in which a signal is sent into space, reflected off some object, and then received back at the transmitting site at a specified time delay based on the distance to the reflecting point. The differences come from the nature of the two targets:

Target 1: A solid, conductive ball (the moon)

$$Pr = \frac{Pt\ Gt\ Ae\ L}{(4\pi)^2\ \gamma^4} \times \delta$$

where: Pr = receiving power
Pt = transmission power
Gt = power intensity ratio of transmitting antenna
Ae = aperture efficiency of the antenna
L = system efficiency (≤ 1)
γ = the distance from the transmitter to the target
δ = bistatic radar cross-section
(Source: Eq. 2.39, Reference 59 in original 59 magazine article, 2000)

Target 2: A plasma cloud, distributed widely and uniformly (interplanetary ionosphere), which is not flat but concentric

$$Pr = \frac{Pt\ Ae\ \pi\ a^2\ \Delta\gamma\ L}{64\ \gamma^2} \times \eta$$

where: a = a constant of antenna aperture, $a \cong L$
η = a constant of reflection, $\eta > \delta$
$\Delta\gamma$ = resolving efficiency of the distance
(Source: Eq. 2.46, Reference 59 in original 59 magazine article, 2000)

Case 3: One-way path loss between a ground station and a spacecraft

$$Pr = \frac{Pt\ Gt}{4\pi\ \gamma^2} \times Ar$$

where: Ar = aperture size of a receiving antenna
(Source: Eq. 2.20, Reference 66 in original 59 magazine article, 2001)

For our purposes, instead of a spacecraft, insert:

$Ar = 4\pi\gamma^2 \times {}^1/_2\eta$
(η: 1.0 ~ 0.1, the size of the interplanetary ionosphere),
$\therefore Pr = Pt \times Gt \times {}^1/_2\eta$ = no distance loss!

Calculating the Distance

Here is how JA3ONB's 82-hour, 32-minute LDE was calculated to show a distance traveled of approximately 297 AU (Astronomical Units), a location that corresponds with current thinking on the location of the Kuiper Belt:

1) 1 AU = approximately 150,000,000 kilometers (149,598,000)
2) C (speed of light) = Approximately 300,000 kilometers/second (299,792)
3) 1 AU/C = Approximately 500/minutes one-way per AU (499.0)
4) 500/60 (minutes per hour) = 8.333 hours per one-way AU
5) JA3ONB's LDE = 82 hrs., 32 min. / 2 (round trip) = 297.1 AU

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while the Kuiper Belt's *interplanetary ionosphere* provides a total reflection of signals from a concentric plasma. This is the same phenomenon found in optical fibers and in "ducts" in the Earth's ionosphere. This total reflection on the ecliptic disc effectively cancels out the distance loss, while some portion of an EME signal is absorbed by the moon and other parts are reflected away from the Earth.

In conclusion, long-delayed echoes (LDEs) are neither a hoax nor a mystery, but a physical phenomenon. We hope to learn more about the far reaches of our solar system over the next ten years, with the launch of the New Horizons spacecraft (see fig. 3) scheduled for early 2006. Until then, LDEs enable us to present a new concept and a new means to observe and study the deeper parts of our solar system in real time.

Notes

1. For additional details and background information in English, see <http://www.fivenine.com> and/or <http://park1.wakwak.com/~ja7ao/lde/ldese.htm>. To hear an LDE recording, click on the file, <ja7sn.wma>.

2. For more information on the Kuiper Belt, see <http://www.ifa.hawaii.edu faculty/jewitt/kb.html>. ■

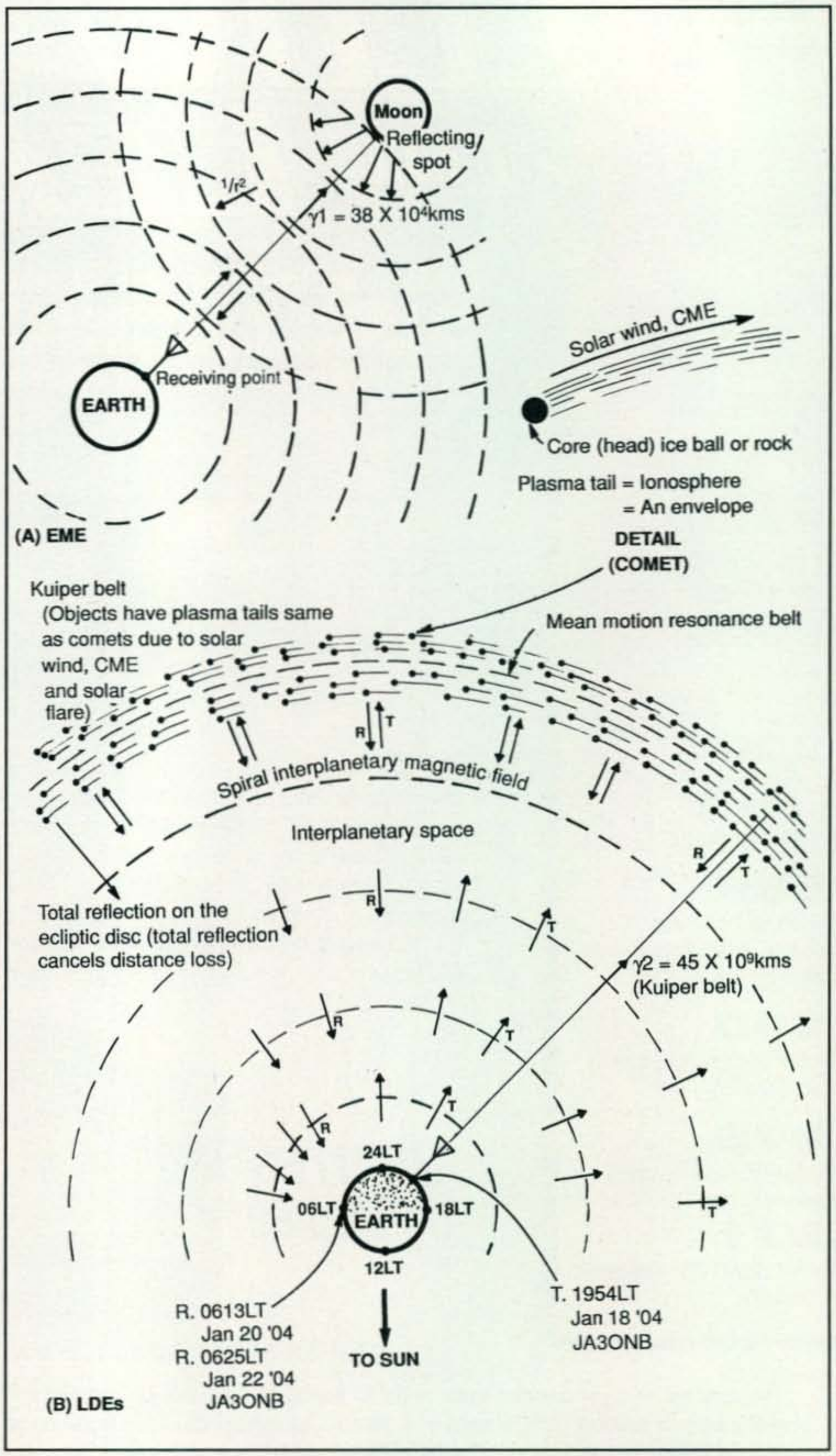

Fig. 4– Schematic view comparing EME (Earth-Moon-Earth) and LDE (Long-Delayed Echo) signals, as seen from the zenith, the point directly above observer. Because EME signals reflect off a single spot on a solid and conductive surface (the moon), and not all reflected signals return to Earth, while LDE signals—in the author's theory— are reflected completely, or re-radiated, by the ionized plasma, the path-loss formulas are very different. The formula for EME path loss is γ^4 while the author's formula for LDE path loss is γ^2. See the sidebar "EME vs. LDEs: Doing the Math" to see his calculations.

Announcing:

The 2005 CQ World-Wide WPX Contest

SSB: March 26–27, 2005 CW: May 28–29, 2005

Starts: 0000 GMT Saturday Ends: 2359 GMT Sunday

I. Period of Operation: 48 hours. Single Operator stations may operate 36 of the 48 hours. Off times must be a minimum of 60 minutes in length and clearly marked in the log. Listening time counts as operating time. Multi-Operator stations may operate the full 48 hours.

II. Objective: The object of the contest is for amateurs around the world to contact as many amateurs in other parts of the world as possible during the contest period.

III. Bands: The 1.8, 3.5, 7, 14, 21, and 28 MHz bands may be used. No WARC bands allowed. ***Observance of established band plans is strongly encouraged.***

IV. Terms of Competition (for all categories): All entrants must operate within the limits of their chosen category when performing any activity that could impact their submitted score. Only the entrant's callsign may be used to aid the entrant's score. A different callsign must be used for each entry. Transmitters and receivers must be located within a 500-meter diameter circle or within the property limits of the station licensee, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers used by the entrant. All high power categories must not exceed 1500 watts total output power on any band. No self-spotting of any form on DX spotting nets is permitted for any category. Self-spotting is defined as generating packet spots for your contest callsign by: (a) using your own callsign; (b) spotting your call while using another callsign; or (c) spotting of your callsign by other stations as a result of prearranged solicitation.

Categories: *Note*—CATEGORY and CATEGORY-OVERLAY** names for use in the CABRILLO file header are shown in (*italics*).

1. Single Operator (Single Band and All Band) *(SINGLE-OP ALL HIGH or SINGLE-OP [BAND] HIGH)*

(a) One person performs all of the operating, logging, and, for the Assisted category only, spotting functions. Only one transmitted signal is allowed at any time. **Maximum power allowed is 1500 watts total output**.

(b) Low Power: *(SINGLE-OP LOW or SINGLE-OP [BAND] LOW)*: Same as 1(a) except that output power shall not exceed **100 watts**. Stations in this category will compete only with other low power stations.

(c) QRP *(SINGLE-OP ALL QRP or SINGLE-OP [BAND] QRP)*: Same as 1(a) except that output power shall not exceed **5 watts**. Stations in this category will compete only with other QRP stations.

(d) Assisted/with Packet *(SINGLE-OP-ASSISTED ALL HIGH or SINGLE-OP-ASSISTED ALL LOW)*: Same as 1(a) except the passive use (no self-spotting) of DX spotting nets or other forms of DX alerting is permitted. Stations in this category will compete only with other Assisted stations.

*****The next three categories shown below require an additional line in your Cabrillo logfile header called CATEGORY-OVERLAY. See paragraph XIV(d).***

(e) Tribander/Single Element *(TB-WIRES)***: Tribander (any type) for the high bands with a single feedline from the transmitter to the antenna, and single-element low-band antennas (wires) category. During the contest an entrant shall use **only one (1) tribander** for 10, 15, 20 meters and single-element antennas on 40, 80, and 160.

(f) Band Restricted *(BAND-LIMITED)***: An eligible entrant must hold a license restricting operation to less than the six (6) contest bands (160, 80, 40, 20, 15, 10) on both modes. Examples of such licenses in the USA are: Novice, Technician, 4 class license, etc. Since frequency privileges differ from country to country, competition is between stations within one's own country.

(g) Rookie *(ROOKIE)***: To enter this category you must have been licensed as a radio amateur three (3) years or less on the date of the contest.

2. Multi-Operator (All band operation only, high power only)

(a) Single-Transmitter *(MULTI-ONE)*: Only one transmitter and one band permitted during the same time period (defined as 10 minutes). **Exception: One other band may be used during any 10-minute period if the station worked is a new multiplier. Use separate serial numbers for the multiplier station. Logs found in violation of the 10-minute rule will be automatically reclassified as multi-multi. Maximum power allowed is 1500 watts total output. Your log MUST show the correct serial number sent and received for each contact.**

(b) Multi-Two *(MULTI-TWO)*: A maximum of two transmitted signals at any time on different bands. Both transmitters may work any and all stations. A station may be worked only once per band regardless of which transmitter is used. **Each transmitter must keep a chronological log containing its own serial numbers and unique transmitter identifier.** Each of the two stations may make a maximum of 8 band changes in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes. **Maximum power allowed is 1500 watts total output.**

(c) Multi-Transmitter *(MULTI-MULTI)*: No limit to transmitters, but only one signal (and running station) allowed per band at any time. *Note:* All transmitters and receivers must be located within a 500-meter diameter area or within property limits of the station licensee, whichever is greater. All operation must take place from the same operating site. **Maximum power allowed is 1500 watts total output**.

V. Exchange: RS(T) report plus a progressive contact three-digit serial number starting with 001 for the first contact. (Continue to four digits if past 999 and five if past 9999.) **Multi-operator, multi-transmitter stations use separate serial numbers for each band. Your log MUST show the correct serial number sent and received for each contact.**

VI. Contact Points:

(a) Contacts between stations on different continents are worth three (3) points on 28, 21, and 14 MHz and six (6) points on 7, 3.5, and 1.8 MHz.

(b) Contacts between stations on the same continent, but different countries, are worth one (1) point on 28, 21, and 14 MHz and two (2) points on 7, 3.5, and 1.8 MHz. **Exception**: For North American stations only—contacts between stations within the North American boundaries (both stations must be located in North America) are worth two (2) points on 28, 21, and 14 MHz and four (4) points on 7, 3.5, and 1.8 MHz.

(c) Contacts between stations in the same country are worth 1 point regardless of band.

VII. Prefix Multipliers: The prefix multiplier is the number of valid prefixes worked. A PREFIX is counted only once regardless of the number of times the same prefix is worked.

(a) A PREFIX is the letter/numeral combination which forms the first part of the amateur call. Examples: N8, W8, WD8, HG1, HG19, KC2, OE2, OE25, etc. Any difference in the numbering, lettering, or order of same shall constitute a separate prefix. A station operating from a DXCC country different from that indicated by its callsign is required to sign portable. The portable prefix must be an authorized prefix of the country/call area of operation. In cases of portable operation, the portable designator will then become the prefix. *Example:* N8BJQ operating from Wake Island would sign N8BJQ/KH9 or N8BJQ/NH9. KH6XXX operating from Ohio must use an authorized prefix for the U.S. 8th district (W8, K8, etc.). Portable designators without numbers will be assigned a zero (Ø) after the second letter of the portable designator to form the prefix. *Example:* PA/N8BJQ would become PAØ. All calls without numbers will be assigned a zero (Ø) after the first two letters to form the prefix. *Example:* XEFTJW would count as XEØ. Maritime mobile, mobile, /A, /E, /J, /P, or interim license class identifiers do not count as prefixes. **You may not make up your own prefix.**

(b) Special event, commemorative, and other unique prefix stations are encouraged to participate. Prefixes must be assigned by the licensing authority of the country of operation.

VIII. Scoring (QSO Points):

1. Single Operator: (a) All Band score = total contact points from all bands multiplied by the number of different prefixes worked (prefix multiplier; prefixes are counted only once). (b) Single Band score = total contact points on the band entered multiplied by the number of different prefixes worked (prefix multiplier).

2. Multi Operator: Scoring is the same as Single Operator, All Band.

3. A station may be worked once on each band for QSO point credit. Prefix credit may be taken only once.

IX. QRP Section: Single Operator only. **Output power must not exceed 5 watts**. You must note QRP in the header of your Cabrillo file, or in the case of non-Cabrillo logs, on the summary sheet and state the actual maximum output power used for all claimed contacts. Results will be listed in a separate QRP section and certificates will be awarded to each top-scoring QRP station in the order indicated in Section XI.

X. Low Power Section: Single Operator only. **Output power must not exceed 100 watts**. You must indicate low power in the header of your Cabrillo file, or in the case of non-Cabrillo logs, on the summary sheet and state the actual maximum output power used for all claimed contacts. Results will be

listed in a separate low power section and certificates will be awarded to each top-scoring low power station in the order indicated in Section XI.

XI Awards: Certificates will be awarded to the highest scoring station in each category listed under Section IV . . .

1. In every participating country.

2. In each call area of the United States, Canada, Australia, and Asiatic Russia.

All scores will be published. To be eligible for an award, a single operator station must show a minimum of 12 hours of operation and multi-operator stations must show a minimum of 24 hours of operation.

A single-band log will be eligible for a single-band award only. If a log contains more than one band, it will be judged as an all-band entry unless specified otherwise.

In countries or sections where entries justify, second- and third-place awards will be made.

XII. Trophies, Plaques, and Donors:

SSB

Single Operator, All Band

WORLD – Stanley Cohen, W8QDQ
USA – Atilano de Oms, PY5EG
EUROPE – Jim Hoffman, N5FA
SOUTH AMERICA – Ron Moorefield, W8ILC
OCEANIA – Phillip Fraizer, K6ZM Memorial
AFRICA – Peter Sprengel, PY5CC
JAPAN – The DX Family Foundation
WORLD Low Power – Caribbean Contesting Consortium
USA Low Power – Terry Zivney, N4TZ
USA QRP/p – Doug Zwiebel, KR2Q
USA ZONE 4 HIGH POWER - Society of Midwest Contesters
USA ZONE 4 LOW POWER - Society of Midwest Contesters

Single Operator, Single Band

WORLD – Steve Merchant, K6AW
WORLD 28 MHz – Alan Dorhoffer, K2EEK Memorial
WORLD 7 MHz – William D. Johnson, KVØQ
USA 21 MHz – Bernie Welch, W8IMZ Memorial
USA 3.7 MHz – Lance Johnson Digital Graphics
USA 14 MHz Low Power – Boomer Contest Club

Multi-Operator, Single Transmitter

USA – Steve Bolia, N8BJQ
USA ZONE 4 – Society of Midwest Contesters
ASIA – W2MIG Memorial (NT4TT Sponsor)

Multi-Operator, Two Transmitter

WORLD – Doris Wong, AG1RL

Multi-Operator, Multi-Transmitter

WORLD – Gail Schieber, K2RED

Contest Expedition

WORLD – Kansas City DX Club

CW

Single Operator, All Band

WORLD – Steve Bolia, N8BJQ
USA – Dennis Motschenbacher, K7BV
EUROPE – Ivo Pezer, 5B4ADA/9A3A
OCEANIA – Tom Morton, K6CT
CANADA – Radio Amateurs of Canada (RAC)
JAPAN – The DX Family Foundation
WORLD LOW POWER – Caribbean Contesting Consortium
CANADA LOW POWER – Contest Club Ontario
USA LOW POWER – Terry Zivney, N4TZ
USA ZONE 3 HIGH POWER – Jim Pratt, N6IG
USA ZONE 4 HIGH POWER – Society of Midwest Contesters
USA ZONE 4 LOW POWER – Society of Midwest Contesters

Single Operator, Single Band

WORLD 7 MHz – William D. Johnson, KVØQ
WORLD 3.5 MHz – Lance Johnson Digital Graphics
USA – Kansas City DX Club
USA 28 MHz – Bernie Welch, W8IMZ Memorial
USA 21 MHz – Wayne Carroll, W4MPY

Multi-Operator, Single Transmitter

WORLD – Ron Blake, N4KE
ASIA – W2MIG Memorial (NT4TT Sponsor)
USA ZONE 4 – Society of Midwest Contesters

Multi-Operator, Multi-Transmitter

WORLD, Steve Merchant, K6AW

Contest Expedition

WORLD – Steve Bolia, N8BJQ

Combined SSB/CW

Single Operator, All Band

WORLD – Al Slater, G3FXB Memorial

Club (SSB & CW)

WORLD – CQ Magazine

A station winning a World trophy will not be considered for a sub-area award. That trophy will be awarded to the runner-up for that area if the returns justify the award.

XIII. Club Competition: A trophy will be awarded each year to the club that has the highest aggregate scores from logs submitted by members. The club must be a local group and not a national organization. Participation is limited to members operating within a local geographical area (exception: DXpeditions specially organized for operation in the contest and manned by members). Indicate your club affiliation on the summary sheet or in the CABRILLO file. To be eligible for an award, a minimum of three logs must be received from a club.

XIV. Instructions for Submission of Logs:

(a) All times must be in GMT. All breaks must be clearly marked (not required for CABRILLO logs). Single operator and multi-single logs must be submitted in chronological order. Multi-Two logs must be submitted chronologically by station. Multi-multi logs must be submitted chronologically by band.

(b) All sent and received exchanges are to be logged. Logs without sent and received serial numbers will be reclassified as checklogs.

(c) Electronic submission of logs is the expected method for all participants. It is *required* for all top-scoring entrants, for anyone wishing to compete for an award, and for all who use a computer to log the contest or prepare contest logs.

(d) Instructions for CABRILLO logs—IMPORTANT CHANGES FOR 2005: Please put *only* your callsign in the Subject: field of the e-mail used to send your CABRILLO log. For U.S. stations, please also indicate your ARRL Section in the CABRILLO header. The CABRILLO file format is the standard. Do not rely on your logging program; use a text editor (Wordpad, Notepad, DOS Edit—**no word processors**) to make sure all of the CABRILLO header information is there, including the extra line in the header for CATEGORY-OVERLAY if you are entering the TB-WIRES, BAND-RESTRICTED, or ROOKIE categories. Also be sure to indicate your club affiliation. For detailed instructions on filling out the CABRILLO file header, see the WPX Contest website (http://www.cqwpx.com). Failure to fill out the header correctly can result in your entry being placed in the wrong category or reclassified as a checklog. Please do not mail printed copies of CABRILLO logs, as these are of no use to anyone.

(e) E-mail is the expected method of log submission. SSB CABRILLO logs should be sent to <**ssb@cqwpx.com**> and CW CABRILLO logs should be sent to <**cw@cqwpx.com**>. All logs received via e-mail will be confirmed via e-mail. A listing of logs received can be found on the CQ WPX website at <**http://www.cqwpx.com**> and will be updated frequently.

(f) Instructions for NON-CABRILLO logs: If you are not able to submit a CABRILLO log, you may submit the ASCII output from most of the popular logging programs such as TR, CT, NA, Writelog, and SuperDuper. You may also submit the *.BIN, *.DAT, *.QDF files from CT, TR, or NA. If your log is not in CABRILLO format, a separate summary sheet is required. Please name your files with your call and the file type. *Example:* N8BJQ submits a CABRILLO file. It should be named N8BJQ.LOG. If N8BJQ chose to submit a non-CABRILLO file such as TR's .Dat file, he should name the log file N8BJQ.DAT and the summary file should be N8BJQ.SUM. See <www.cqwpx.com> for more information on e-mail log formats. Any logs sent on floppy disk should be on 3.5" diskettes and **sent in a proper mailer to prevent damage**. Non-CABRILLO Logs must be checked for duplicate contacts, correct QSO points, and prefix multipliers. Duplicate contacts must be clearly marked. An alpha/numeric check list of claimed PREFIX multipliers must be submitted with your log. Each non-CABRILLO entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the entrant's name and mailing address in BLOCK LETTERS. Also submit a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

(g) Official log and summary sheets are available from CQ Communications, Inc., 25 Newbridge Road, Hicksville, NY 11801 USA; fax (+1) 516-681-2926); or e-mail your request to CQ at <cq@cq-amateur-radio.com>. You may make your own forms as long as all required information is present.

XV. Disqualification: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest, unsportsmanlike conduct, taking credit for excessive duplicate contacts, unverifiable QSOs or multipliers will be deemed sufficient cause for disqualification. An entrant whose log is judged by the WPX Contest Committee to contain an excessive number of discrepancies may be disqualified as a participant operator or station for a period of one year. If within a five-year period the operator is disqualified a second time, he or she will be ineligible for any CQ contest awards for three years.

Declaration: By submitting an entry in the CQ WPX Contest you agree that you have read and understood the rules of the contest and agree to be bound by them, as well as all rules and regulations of your country which pertain to amateur radio. All actions and decisions of the WPX Contest Committee are official and final.

XIII. Deadline: All entries must be postmarked **NO LATER than May 1, 2005** for the SSB section and **NO LATER than July 1, 2005** for the CW section. **All logs, including e-mail entries, are subject to these deadlines. Indicate SSB or CW on your envelope**. Logs postmarked after the deadline may be listed in the results, but will be ineligible for any awards.

Check the WPX website <**http://www.cqwpx.com**> for instructions on mailing WPX logs. Questions pertaining to the WPX Contest may be mailed to WPX Contest Director, Steve Merchant, K6AW, 441 Palo Alto Ave., Mountain View, CA 94041 or via e-mail to <k6aw@cqwpx.com>.

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The Autek RF Analyst™ Model RF-1 antenna analyzer is a good example of the current trend in electronics—increasingly sophisticated circuitry housed in ever-smaller packages and tagged with surprisingly modest prices.

CQ Reviews:

The Autek RF-1 RF Analyst™

BY JACK NAJORK,* W5FG/XE1

The Autek RF-1 is a very compact, low-cost antenna analyzer about the size of an old-fashioned kitchen matchbox. It measures antenna SWR and impedance over a frequency range of 1.2 to 35 MHz in five bands. In addition, the unit measures capacity and inductance, a useful feature because some antenna systems use these elements in their design and construction.

The small size is both good and bad. It's good because the unit can be slipped into a shirt pocket, leaving both hands free for tower climbing. The bad part is that it can also easily slip out of the pocket, so some sort of restraining lanyard is called for.

A four-digit LCD screen displays all functions. The functions are selected by small push buttons with self-explanatory labels. Two knobs control frequency selection within each band. The Tune control produces rapid excursions in frequency, while the Fine control, with a slower tuning rate, allows zeroing to an exact frequency.

Although the unit contains sophisticated microprocessor-controlled circuitry, operation is simple and intuitive. *Menu,* sometimes a rather unpopular term with today's radios, does not apply to the RF-1. Several minutes spent with the well-written and comprehensive instructions are enough to master basic operations.

The Autek RF Analyst™ Model RF-1 antenna analyzer.

Operation

Here's how it works. You've just strung up a 40-meter dipole. What is the SWR at 7.100 MHz?

1. Connect the antenna transmission line and press "On-Off."
2. Tap the "Band" button. Each tap cycles to one of the five bands, from low to high. Select the band encompassing 7 MHz.
3. Tap "Frequency" and tune for a readout of 7.1 MHz.
4. Tap "SWR" to read the SWR ratio at 7.1 MHz.

To find where the SWR is lowest, tap "SWR" and tune for the lowest reading. Tap "Frequency" to read the frequency of lowest SWR.

To make impedance measurements, follow the same sequence, except tap "Z" to read impedance directly in ohms.

Optional: *The RF-1 can eliminate the usual cut and try needed to arrive at the correct length for a resonant antenna. Assume you intentionally cut the wire a little long, to 70 feet. You measure for lowest SWR and find it is 6.521 MHz. What should the length be for 7.1 MHz?*

Using a bit of math, find the percentage difference between the actual and desired frequency: 6.521 ÷ 7.100 = .918%. Applying this figure to our 70 feet: .918 × 70 = 64.26 ft.

This final figure is shorter than that yielded by the standard formula 468 ÷ F(MHz), but this is not unusual when the antenna is close to the ground or in proximity to other objects.

Here's another operation example: You have erected a loop antenna with total wire length to resonate at 3.7 MHz. What is the actual resonant frequency?

Connect the *loop ends* (not the transmission line) to the RF-1. Tap "Band" to bring up the band encompassing 3.7 MHz. Tap "Z" and adjust the tuning controls for the lowest reading. Tap "Frequency" to read the resonant frequency of the loop.

Optional: *In addition to these basic measurements, detailed instructions describe more than a dozen other appli-*

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cations devoted to antenna work. These include tuning quad and Yagi elements, making 1/4- and 1/2-wavelength transmission lines, measuring cable loss, determining cable impedance, checking baluns and other transformers, measuring SWR on lines other than 50 ohms, checking the effect of adding radials to a vertical, SWL applications, and determining R + JX, along with C (capacitance) and L (inductance) measurements.

Specifications

SWR measuring range is quoted to be about 15 to 1, and impedance range about 10 to 2000 ohms. SWR accuracy is specified at 10% or better below 3:1 and 20% up to 6:1.

Capacitance measuring limits are 10 to 1000 pF, and inductance limits are .04 to 300 µH. Because C and L measurements are a function of impedance, the exact measuring limits are governed by the frequency at which measurements are made. These are detailed in the instructions.

Optional: *SWR measurement accuracy in an analyzer depends on the tolerance of the components in the bridge circuit, together with the purity (low harmonic content) of the signal source driving the bridge. If the bridge is designed to measure SWR relative to 50 ohms (the usual standard), accuracy can be verified with a precision non-inductive 50-ohm resistor at the bridge terminals.*

Many analyzer instructions do not mention that the diodes used in bridge circuits are not perfect. They stop conducting at very low voltages. When this occurs at low SWR ratios, the 1:1 reading that brings joy to our hearts actually may be 1.2:1. Since this represents reflected power of less than 1%, it is of no practical concern unless you are running megawatts into a mile-long transmission line.

For the purist, the true SWR at or below 1.2:1 can be determined with the RF-1 by use of the "Z" function described in detail in the instructions.

Impedance measuring accuracy is within 5% from about 30 to 600 ohms, falling to 10% at the outer limits of 10 to 2000 ohms. Most antennas, except short verticals and small loops, fall in the high-accuracy range.

Several precision resistors including 50 ohms are supplied, enabling verification of SWR and impedance accuracy at various SWR ratios and impedance levels. My unit fell well within the measurement specifications for the various SWR and impedance ranges enabled by these resistors.

I measured the accuracy of the frequency readout and found it ran within 3 kHz throughout all the bands. The oscillator exhibited the usual slow, downward frequency drift of an uncompensated, self-excited circuit, drift accelerating at the higher frequencies. Since the four-digit readout limits frequency resolution to 10 kHz above 10 MHz, and since most antennas do not have bandwidths limited to kHz, this characteristic is not important.

Battery Considerations

Power is supplied by a 9-volt alkaline battery. Drain is specified as 35 to 60 ma, but my unit drew almost 70 ma on the higher frequency bands. This is a rather hefty drain for a 9-volt battery, so the quoted battery life of 12 hours of intermittent operation may be somewhat optimistic, more so because the duty cycle is not specified.

Alkaline batteries are very expensive in Mexico, so I power the unit with a 9-volt DC "wall wart" supply when in reach of 115 VAC. The RF-1 is totally voltage regulated, so it can be operated from any DC source from 6 1/2 to 15 volts.

There is a "battery saver" feature that automatically shuts down the unit after about 20 minutes of no use. This feature can be disabled if desired.

A Short Wish List

As mentioned earlier, some form of lanyard similar to those often supplied with handie-talkies would be good insurance against sudden death of the unit from a tower fall.

A tuning range extended to 60 MHz to include 6 meters would be a big plus.

At the cost of a slightly larger and heavier housing, the use of six AAA cells rather than the 9-volt battery would more than double battery life.

Bottom Line

If you value your time at, say, $50/hour, the RF-1 will pay for itself over the first several weekends of wire stringing by eliminating the usual time-consuming empirical engineering (a fancy word for cut and try) needed to get an antenna pruned and on frequency. I rate the RF-1 as a "best buy."

The RF-1 Analyst™ is priced at $139.95 plus $8.00 s/h and can be ordered direct from Autek Research, P.O. Box 7556, Wesley Chapel, FL 33544 (telephone 813-994-2199; <www.autekresearch.com>). ■

"License Plates" on the Radio Highway

A Short History of Station Identification, Callsigns, and Distress Calling

BY FREDERICK O. MAIA,* W5YI

Radio callsigns are the "license plates" that identify communications traffic on the radio highway. With millions of radio stations furnishing a variety of communication services throughout the world, it is necessary that their transmissions carry distinguishing callsigns. These callsigns have a three-fold purpose: They identify the nationality of the station, they identify the type of station, and they identify the individual station.

The single most important role of station call signs, however, is that they are an aid to enforcement of radio regulations, and most transmitting stations in the world are required to periodically identify themselves when they are in operation.

The United States leads all other countries in the use of radio, with millions of licensed transmitters providing land, sea, air, and space communication services. Some types of radio stations and equipment, such as radar stations and diathermy equipment, operate on an unlicensed basis and are exempt from having an identifying callsign. Also, some communication systems are licensed on a "blanket basis" (such as CB radio and two-way radios aboard recreational boats) and do not receive callsigns. Instead they self-assign their station a unique station identifier.

Callsigns Standardized

Since the early days of wireless telegraphy—starting with marine use—as a general rule, radio stations have had distinctive identification. Under international agreement since 1927, the alphabet has been apportioned among the nations for basic callsign use.

The United States is assigned three letters—N, K, and W—to serve as initial call letters for the exclusive use of its radio stations. It also shares the initial letter A with some other countries. Initially, the letter A was assigned to the Army and Air Force, N to the Navy and Coast Guard, and K and W to domestic stations, both government and non-government. However, the system has been modified several times over the years.

Today the United States Army uses fixed callsigns for Army stations, many of which begin with W, such as WAR, used by U.S. Army Headquarters. The United States Air Force uses callsigns consisting of a name followed by a number and these callsigns follow no set allocations or rules, such as "Demon-24." The most recognizable callsign of this type is Air Force One, used when any plane is carrying the U.S. President, or Marine One, used to identify any helicopter doing the same thing. Fixed callsigns for USAF stations begin with A, such as AIR, used by USAF Headquarters.

The United States Navy and United States Coast Guard use a mixture of tactical callsigns and formal callsigns beginning with the letter N. For example, the carrier *USS John F. Kennedy* has the callsign NJFK.

ITU Prefix Blocks

The Bureau of Navigation, a division of the Department of Commerce, regulated United States radio until the 1927 formation of the Federal Radio Commission. As a result of the 1927 international conference held in Washington, D.C., all member countries had to revise their callsigns by adding an agreed-upon national prefix. In 1934 the Federal Communications Commission succeeded the FRC.

Blocks of up to three prefix characters were allocated to each country. The international callsign prefixes for the United States include station callsigns beginning with NAA–NZZ, KAA–KZZ, WAA–WZZ, and AAA–ALZ. The other countries sharing the prefix letter A are: AMA–AOZ Spain, APA–ASZ India, ATA–AXZ Australia, and AYA–AZZ Argentina. Thus, for example, if you hear a radio station with the callsign beginning with the letters AW, it is in Australia. Canada uses the prefix letters: CFA–CKZ, CYA–CZZ, VAA–VGZ, VOA–VZZ, VXA–VYZ, and XJA–XOZ. Amateur radio callsigns contain only one or two prefix characters, but some radio services use more.

The first three letters that make up a radio station's callsign are all allocated by the International Telecommunication Union, the (now) United Nations organization that oversees worldwide radio. The emergence of new countries, or countries that needed additional callsigns, necessitated the allocation of prefix blocks that contained a number. For example, Japan is assigned the 7JA–7NZ and 8JA–8NZ prefix blocks in addition to its JAA–JSZ block. Mexico has 4AA–4CZ and 6DA–6JZ, in addition to its XAA–XIZ block. Today there are as many international callsign prefix blocks that contain a numeral as those which don't and you need a scorecard to determine where a radio signal is coming from. Interestingly, the U.S. is one of the few that does not have an internationally assigned prefix containing a number. (The numerals in amateur and other U.S. callsigns are assigned nationally, rather than internationally.)

Each nation's radio telecommunications agency determines the additional characters (beyond the international prefix) that make up an individual radio station's callsign. Within a country, the format of the callsign usually indicates the type of station identified and sometimes its location.

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For example, in the United States today, callsigns containing only the three letters KAA–KZZ or WAA–WZZ are assigned to coastal maritime stations. The four-letter KAAA–KZZZ and WAAA–WZZZ blocks go to broadcast stations. There are a few exceptions that continue the use of a callsign assigned during the early days of radio. For example, WBZ is a Boston broadcast station; WWV is a time and frequency standard.

Broadcast Station Callsigns

Initially, broadcast stations were issued three-letter callsigns, but as broadcasters rushed to get on the air, three-letter combinations became increasingly scarce. On April 4, 1922 the government began issuing K or W prefixed four-letter broadcast callsigns.

Since the start of broadcasting, stations have always had the privilege of requesting specific callsigns. Many were initials of names, companies, places, or slogans. Among them are WGN, owned by the *Chicago Tribune,* the "World's Greatest Newspaper"; WLS, owned by Sears, Roebuck, which promoted itself as the "World's Largest Store"; WNYC (New York City municipal station); KAGH Crossett, Arkansas ("Keep Arkansas Green"); WIOD Miami ("Wonderful Isle of Dreams"); WTOP Washington, D.C. ("Top of the Dial"); KFDR Grand Coulee, WA (for Franklin D. Roosevelt). WACO is in Waco, Texas, and KABL, Oakland, California, selected its letters to represent San Francisco's famous cable cars.

The procedure now is to only issue U.S. broadcast stations a callsign beginning with K, if they are located west of the Mississippi River. Broadcast stations east of the river get callsigns beginning with W. Older broadcast stations that had three-letter callsigns, or stations with a K east of the Mississippi or W on the west side, were "grandfathered" and allowed to keep their circa-1920s callsign. (A grandfather clause is an exception that allows a pre-existing condition to remain as it is, despite a rule change to the contrary applying to newer situations.)

An unusual example of a non-conforming broadcast station callsign assignment is in Minneapolis, where the Mississippi flows through the city; KSTP is east of the river and WCCO is west of the river.

With the advent of FM and TV in 1941, new callsigns for all such stations were not assigned. Rather, since many FM and TV stations were operated by the same AM licensee at the same license area, the general practice was for the associated FM or TV station to simply add "-FM" or "-TV" to the callsign of the co-owned AM station.

International Radio Regulations do not require the use of callsigns by broadcast stations if some other suitable means of identification is employed. For example, many foreign broadcast stations identify by announcing, "The Voice of ..." or "Radio...."

In Canada broadcast stations are assigned a four-letter callsign beginning with C, while Mexican broadcast stations get a four-letter callsign beginning with X.

Formation of Amateur Callsigns

Amateur radio callsigns throughout the world normally consist of a one- or two-character prefix, a number (which sometimes corresponds to a geographic area within the country), and a one-, two-, or three-character suffix. The number following the prefix is normally (but not always) a single number (Ø to 9).

The use of ham radio identifying letters is as old as radio itself. All early radio work was done in telegraphic

Station Callsigns Available to Amateurs Holding Certain License Classes in Various Locations

Callsign Block	Prefix Exceptions	Location	Group	Eligible Classes
K1A–KØZ, N1A–NØZ, W1A–WØZ	Letter "X" may not follow the numeral.	All	Special Event	All
K1AA–KØAA, N1AA–NØZZ, W1AA–WØZZ	—	All	A	Extra Class
AA1A–AKØA, KA1A–KZØZ, NA1A–NZØZ, WA1A–WZØZ, AA1AA–AKØZZ	AH, AL, KH, KL, KP, NH, NL, NP, WH, WL, WP	All	A	Extra Class
AH, KH, NH, WH (by one)	—	Pacific	A	Extra Class
AL, KL, NL, WL (by one)	—	Alaska	A	Extra Class
KP, NP, WP (by one)	—	Atlantic	A	Extra Class
KA1AA–KZØZZ, NA1ZZ–NZØZZ, WA1AA–WZØZZ	KH, KL, KP, NH, NL, NP, WH, WL, WP, KC6, KG4, KG6H, KG6S, KR6, KX6, KZ5	All	B	Advanced, Extra
AH (by two)	—	Pacific	B	Advanced, Extra
AL (by two)	—	Alaska	B	Advanced, Extra
KP (by two)	—	Atlantic	B	Advanced, Extra
K1AAA–KØZZZ, N1AAA–NØZZZ, W1AAA–WØZZZ	—	All	C	Technician, General Advanced, Extra
KH, NH, WH (by two)	—	Pacific	C	Technician, General Advanced, Extra
KL, NL, WL (by two)	—	Alaska	C	Tech., General, Advanced, Extra
NP, WP (by two)	—	Atlantic	C	Tech., General, Advanced, Extra
KA1AAA–KZØZZZ, WA1AAA–WZØZZZ	KH, KL, KP, WC, WH, WK, WL, WM, WP, WR, WT, KC4AAA–KC4AAF, KC4USA–KC4USZ, Letter "X" may not follow the numeral.	All	D	Novice, Technician, General, Advanced Extra
NA1AAA–NZØZZZ, AA1AAA–ALØZZZ	—	None	N/A	Not allocated to any class.

Table I– FCC Rules, Part 2 Section 302 (§ 2.302) indicates the composition and blocks of international callsigns available for assignment to U.S. amateur radio stations. The above blocks of station callsigns are available to amateurs holding certain classes of license located in the above geographic areas. The Atlantic area covers Puerto Rico, U.S. Virgin Islands, and various Caribbean island possessions. The Pacific area includes Hawaii and various South Pacific island possessions. Any licensee may request a new callsign when upgrading operator privileges or changing mailing address to a new callsign area. When all callsigns are assigned in a specific group, call igns are then selected from the next lowest group. Some three-letter suffix combinations are not used, such as common Q-signals (QRA–QUZ) and the distress symbol SOS. Any 2-by-3 format callsign having the letters AF, KF, NF, or WF as the prefix and the letters EMA as the suffix are also unavailable. These have been allocated to (U.S Government) Federal Emergency Management Agency (FEMA) stations for use in emergencies.

code, and spelling out an operator's name or location was awkward. Therefore, self-assigned abbreviations of one to three characters signifying a geographic location or name were informally adopted before 1915.

The Radio Act of 1912 sought to regulate radio, and call-letter assignments were enacted under federal authority. The first callsigns were all three characters.

Amateur radio stations did not qualify for international calls and were initially identified under a different callsign scheme. In the 1920s, the United States was divided into nine Radio Inspection Districts, and amateur stations received calls consisting of their district number followed by a two or three letters—for example, 8MK.

Some special groups were identified by a letter after the numeral. For example, X was reserved for stations holding Experimental licenses, a policy which holds to this day. The callsign blocks KA2XAA–KZ9XZZ and WA2XAA–WZ9XZZ may look like amateur callsigns, but they are only issued to experimental (usually commercial) stations. See Table I for the U.S. amateur station callsign scheme.

One amateur pioneer with an experimental license was Westinghouse engineer Dr. Frank Conrad of Wilkinsburg, Pennsylvania. He had been licensed in 1916 as 8XK. Operating with 75 watts from his garage, Conrad is credited with being the first U.S. radio station to conduct regularly scheduled broadcasts—phonograph music and chats with other amateurs

In October 1920, Conrad applied to the Commerce Department for a commercial broadcasting license and the Westinghouse Broadcasting System was born. All broadcasters up to this point were operating as amateur stations. On October 27th, Westinghouse was assigned the first commercial broadcasting license with the callsign KDKA and authorized to broadcast news on 360 meters (833 kHz). Commercial broadcasting with the new call began a week later with Harding-

Cox election-night coverage. However, except for wireless amateurs who had built their own receivers, few people heard it,

It wasn't until 1922 and the availability of ready-made receiving equipment that broadcast radio took hold. RCA named its set the "Radio Music Box." Westinghouse called its receiver the "Aerola," and General Electric introduced a "Radiola." Millions were sold.

Technical schools were issued licenses that had the letter Y after the numeral. For example, 5YI was issued to Rice Institute in Texas, now Rice University. Many colleges and universities still hold two-letter calls beginning with the letter Y dating back to the 1920s. Among them are W1YA University of Maine Amateur Radio Club, W1YK Worcester Polytechnic Institute Wireless Association, W1YU Yale University ARC, W3YA Nittany (Penn State College) ARC, W3YP Villanova University ARC, W5YD Mississippi State University ARC, W5YJ Oklahoma State University ARC, W5YM ARC of University of Arkansas, W5YW Amateur Radio Society at LSU, W6YL San Jose State University ARC, W6YU College of San Mateo ARC, W7YB Montana State University ARC, W7YD University of Washington ARC, W8YX University of Cincinnati ARC, W9YB Purdue ARC, W9YJ De Pauw University ARC, W9YT Badger (University of Wisconsin) ARS, WØYI (Iowa State University) Campus Radio Club, and many more.

Z callsigns went to stations operating with special Amateur licenses (for example, 8ZZ).

When the number radioamateurs exceeded available callsigns, more letters and numbers were added. When the range of amateur signals increased it became necessary to internationalize their calls. Beginning October 1, 1928 W and K prefixes were added.

Today, all initial amateur radio station callsigns are assigned by an automatic computer program that selects the callsign from an alphabetical listing depending upon the operator's license class and mailing address. New and upgrading applicants for amateur radio licenses are assigned station callsigns in strict sequence rather than on a request basis.

Two-letter suffix callsigns, originally the mark of an old-timer, were, however, made available during the mid-1970s if the licensee had 25 years experience and held the highest level operator license—the Amateur Extra Class. It was under that program that I got W5YI, the call that had been relinquished by Rice University's engineering department.

In the mid-1990s the FCC began allowing all radio amateurs to choose their own callsigns according to certain parameters under the "Vanity callsign" program, somewhat patterned after vanity automobile license plates. As a general rule, no callsign may be chosen unless it has been inactive for two years or more.

Distress Calls

Records indicate that a British ship used radio to summon aid as early as 1899. The first radio distress call from an American vessel has been traced back to 1905. Radio operator Jack Binns made headlines in 1909 when he stuck to his post on the stricken steamship *Republic* to send out the distress signal then in use, CQD.

Before the turn of the century, there was no special radiotelegraph call for an emergency at sea. One pioneer operator simply sent the letters HELP in code. In 1903 Italy suggested SSS-DDD as an international radio emergency call.

By 1904 a number of ships engaged in the Atlantic trade were equipped with

"wireless," as radio was then known, and they recruited land telegraph operators for sea duty. These operators resorted to the landline general call CQ, meaning attention all stations. That same year the British Marconi company added the letter D to signify distress.

Meanwhile, German ships had been using SOE, and in 1905 that country recommended those letters as an international distress call. That combination was deemed unsatisfactory for radiotelegraphy, however, because the final dot was often obliterated by static and other interference. The American delegation to an international conference suggested NC, which is the call for help in flag signaling.

A suggestion that the E in SOE be replaced with S—repeating the small dot three times—was finally adopted through an agreement made between the British Marconi Society and the German Telefunk organization at the Berlin Radio Convention in October 1906. SOS became the official distress signal. However, Marconi operators were slow to conform, and CQD continued to be used by British ships for many years thereafter.

SOS does not mean "Save Our Souls" or "Save Our Ship," as it is sometimes claimed, any more than CQD meant "Come Quick Danger." These calls are based upon the speed and clarity with which they can be transmitted in Morse code.

On April 14, 1912 the ill-fated British steamship *Titanic* flashed both the CQD and SOS distress signals during its maiden voyage from Southampton, England, headed to New York. The two radio operators on board were 25-year-old Jack Phillips and his assistant, 22-year-old Harold Bride. The *Titanic*'s "wireless" equipment was the most powerful in use at the time. The main transmitter was a 5-KW rotary spark design; the four-wire antenna was suspended between the ship's masts some 250 feet above the sea. The equipment had a range of up to 400 miles during daylight and up to 2000 miles at night.

Just before midnight on April 14, the *Titanic* hit an iceberg in the North Atlantic, causing a massive gash in its starboard (right) side. The radio operators remained at their posts until about three minutes before the vessel sank. Its final message was: "CQD CQD SOS SOS DE MGY MGY (Titanic) Position 41.44 N 50.24 W." The *Carpathia,* southeast of the *Titanic* by about 58 miles, did pick up the distress call and immediately headed full speed to the rescue.

A closer ship (only ten miles away), the *California,* thought the flares sent up by the *Titanic* were a fireworks display to entertain the passengers. The ship's radioman had gone to bed at midnight and never received any of the distress messages from the *Titanic.* That was one of the critical lessons learned from the catastrophe—the need for 24-hour radio operators on all passenger liners. Only 705 of the 2,227 passengers survived.

The *Titanic* disaster brought about a number of fundamental changes to maritime radio. Carriage requirements, radio watchkeeping hours, distress frequencies, message priorities were standardized—that is, distress and safety traffic always has priority over commercial traffic. Radio silence periods were introduced. The main maritime radio distress frequency of 500 kHz remained unchanged for the next 80 years. The *Titanic* disaster also served as the catalyst for the introduction of the International Convention for the Safety of Life At Sea, covering all aspects of maritime safety.

For radiotelephone purposes—that is, voice transmission—the international distress call is MAYDAY. This corresponds to the French phrase *m'aider* meaning "help me." It was adopted from a British proposal approved at the 1927 international radio convention. It has since been used by military as well as civilian ships and aircraft.

An international telecommunications conference in 1963 agreed that the distress signals SOS (radiotelegraphy) and MAYDAY (radiotelephone) also should be used in space communication.

73, Fred, W5YI

What You've Told Us...

Our October survey asked about your interest in and feelings about contesting. Only 29% of those responding to the survey said they consider themselves to be contesters, but the vast majority have either positive or neutral feelings about contests, with 31% saying "They're OK and I enjoy dabbling in them," 30% saying "They're fun and I enjoy operating in them," and 25% saying "They're OK for some people but not for me." One respondent in ten feels that contests get in the way of other on-air activities, while 3% feel they should be banned and 1% don't know enough about them to have an opinion.

Asked about the main values of contesting, 67% feel they sharpen operator skills, 54% say they provide a ham radio outlet for competitive spirit, 48% say they help keep your station in top shape, 47% say they're fun, and 42% say they help keep band occupancy high. In addition, 18% had "other" positive feelings about contests, while 5% feel they scare away newcomers, 4% each had no opinion or "other" negative feelings, 2% each feel they help improve propagation and that they interfere with more important activities, while only 1% says they're useless.

When there's a contest on in which you are *not* participating, most of you (52%) at least sometimes take advantage of the activity to try to contact operators in places you need to work for awards. The second most common response (45%) is to move to a band without contest activity, while 26% would shift to a *mode* without contest activity and 19% would stay off the air. Only 2% each would try to defend "their" frequency or spend the weekend on the internet, griping about the contest, while 0% (1 person) admitted a preference for QRMing as many contesters as possible.

Finally, most of you (62%) feel *CQ*'s contesting coverage is just right, while 19% think we have too much, 5% feel it's too little, and 15% don't care.

This month's free subscription winner is John Cline, K7ESQ, of Gilbert, Arizona.

Reader Survey February 2005

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

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

This month, we'd like to get your views on DX and DXing.

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

1. Approximately how many other countries other than your own have you contacted via ham radio?
None 29
1–50 30
51–150 31
151–250 32
Over 250 33
Don't know 34

2. Do you consider yourself to be a DXer?
Yes 35
No 36

3. Do you have QSL cards that you send out?
Yes 37
No 38

4. Do you use electronic/online confirmation systems, such as the ARRL's Logbook of the World (LoTW) or eQSL.cc? (Circle all that apply)
Yes, LoTW 39
Yes, eQSL 40
Yes, other 41
No 42

5. Please tell us which, if any, of the following operating awards you hold.
CQ DX Award 43
CQ DX Honor Roll 44
ARRL DXCC Award 45
DXCC Honor Roll 46
CQ Worked All Zones Award 47
CQ 5-Band WAZ 48
IARU Worked All Continents (WAC) Award 49
None 50

6. What is your perception of current levels of DXing activity?
More than in the past 51
About the same as in the past 52
Less than in the past 53
Don't know 54

7. Do you use packet/internet spotting networks (e.g., DX Cluster)?
Yes 55
No 56

8. How do you think packet/internet spotting networks have affected DXing?
Improved it 57
No significant impact 58
Harmed it 59
Don't know 60

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

How do you install in your car a rig with no mobile mounting holes? Ham ingenuity, of course. AD5X shares his solution for his SGC SG-2020, which can no doubt be adapted for other radios as well.

A Mobile Mount for Your SGC SG-2020

BY PHIL SALAS,* AD5X

The SG-2020 is a rugged little transceiver. It's great for portable use because its 20-watt power level is a good compromise between the standard 100-watt rig (which is about one S-unit higher) and QRP (about one-S-unit lower). I've been wanting to install this rig in my car, but SGC didn't provide mounting holes in the radio for mobile operation. Therefore, my goal was to develop a mobile mount, yet not have to do anything surgical to the SG-2020 case.

I started considering a mount when I found an "Adjustable Underneath Mounting Bracket" at RadioShack (RS270-011, for $3.99). This is very flexible and is designed to support almost anything under your dash up to nine inches in width. This was great, but how could I attach it to the SG-2020?

While wandering around the "Deck Center" in my local ACE Hardware Store, I happened to come across some steel brackets normally used for supporting wooden posts. I bought two 4.5" × 4.5" angle clips for $1.19 each, and two 5" × 2" mending plates for $0.49 each (see photo 1).

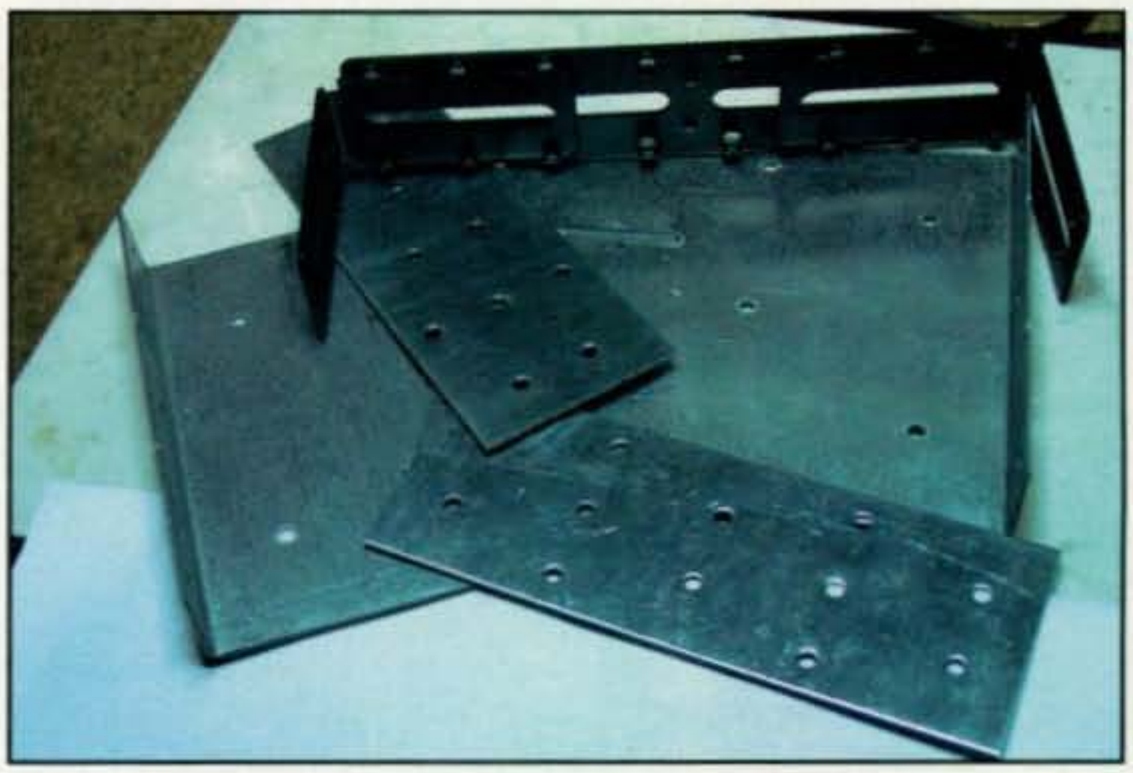

Photo 1– Steel brackets designed for supporting wooden posts became the building blocks of the SG-2020 mobile mount.

Assembly

Your first assembly step is to center the 5-inch mending plates on the 4.5" × 4.5" angle clips, drill mounting holes, and assemble using #6 × 1/4-inch machine screws.

Next you need to mount the two angle-clip assemblies to the bottom of the SG-2020. I was able to do this by using the three bottom SG-2020 mounting holes as shown in photo 2. I adjusted the spacing so that there is about 1/4-inch clearance between the mending plates and the sides of the SG-

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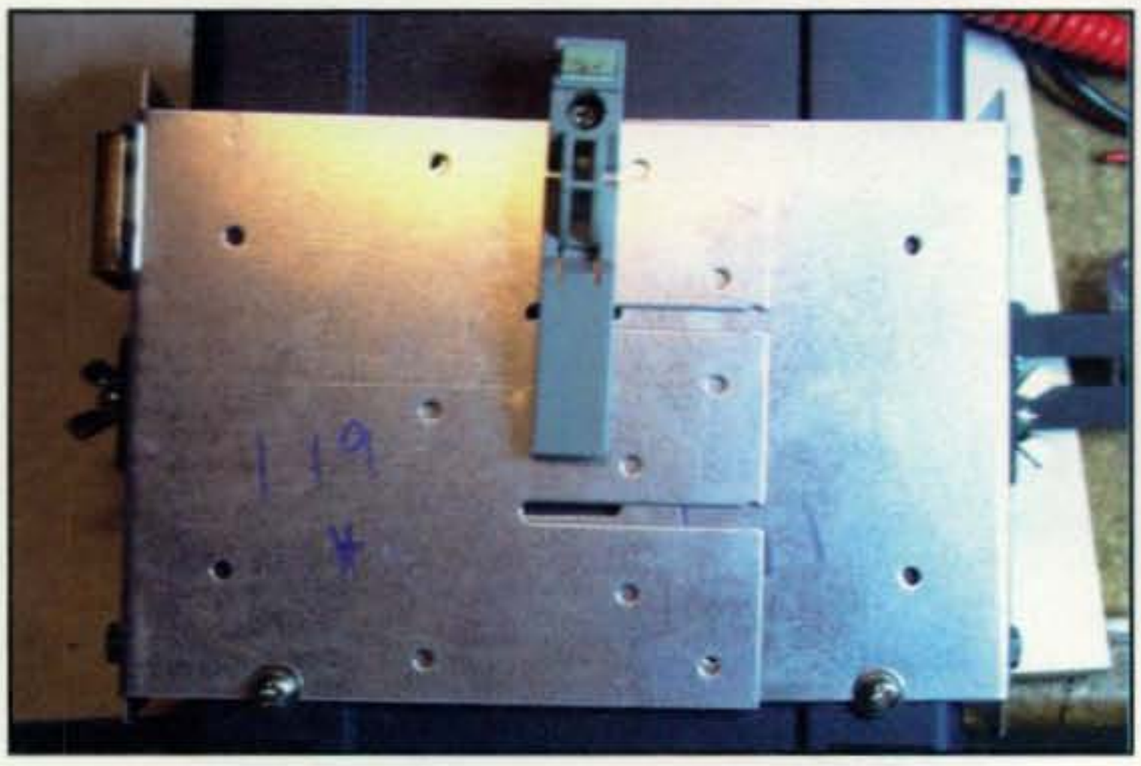

Photo 2– Three holes in the bottom of the SG-2020 are used to secure the mounting bracket to the radio.

Photo 3– Details of the side attachments to the radio as well as the mounting of the top bracket and mic clip.

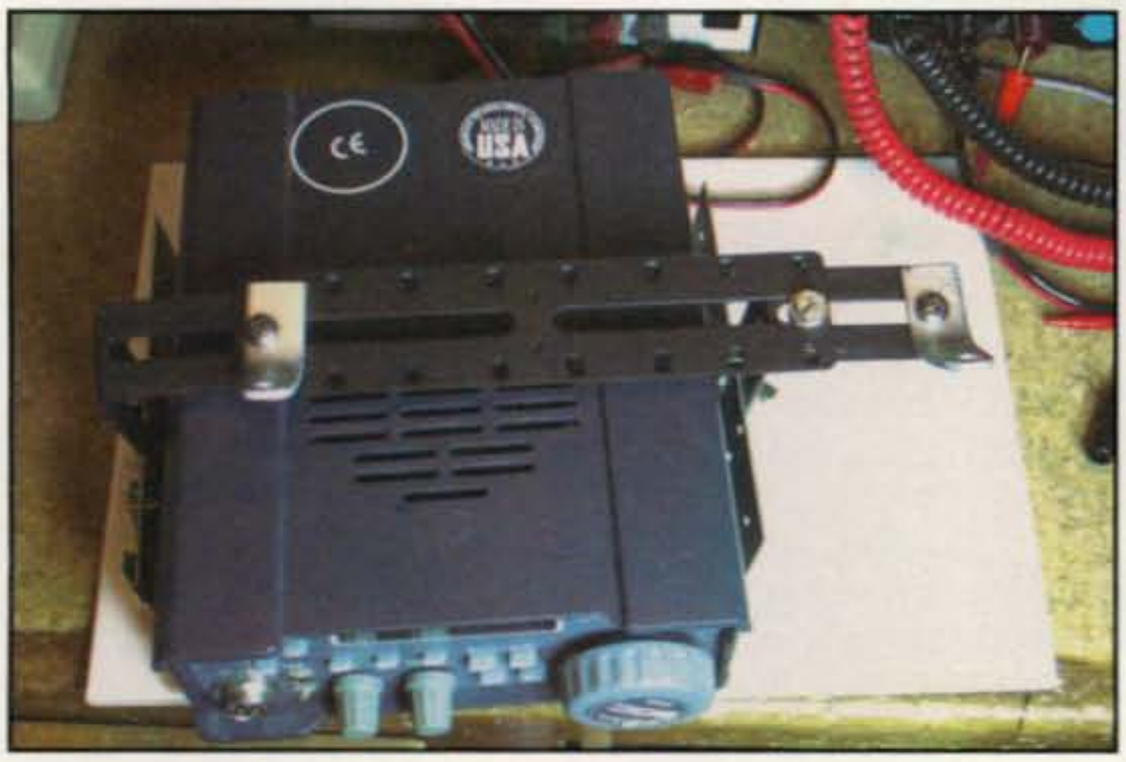

Photo 4– Once the mounting assembly is complete, it can be attached with wing nuts to a standard RadioShack bracket for mounting in your vehicle.

Photo 5– The SG-2020 mounted in the author's VW Beetle. The "TennaTune" box below it is the subject of a future article.

2020, and then nibbled out a notch for the screws. You'll need to use #6 × 5/8" screws for the two back screws, and a #6 × 3/4" screw for the front. Use #6 flat washers between the plates and the SG-2020 case, and put #6 split lockwashers under the heads of the screws. The last thing I did was to attach a RadioShack CB microphone holder (RS21-923) to the left mending plate. I drilled a hole for the top of the microphone holder, and used the two-sided tape provided with the holder for securing the bottom. The holder as well as the assembly details are shown in photo 3.

Now that I had a mounting assembly on the SG-2020, I attached it to the RadioShack mounting bracket using #8 screws, nuts, and wing-nuts as can be seen in photo 4. The wing nuts make it easy to remove the SG-2020 from your car when you feel uncomfortable leaving it unattended.

Installation

My SG-2020 is mounted under the passenger-side dash in my Y2K Bug (VW New Beetle, year 2000). As is the case in most modern cars, mounting the assembly in the VW is a challenge in itself. For my car, I made up brackets by cutting a 1/2" × 4" steel mending plate in half and filing the ends so they would fit into the dash mounting screw area on the car. You can see these brackets in photos 3 and 4. In the VW these mounting screws tie right into the car frame, and I verified that a good ground existed between the SG-2020 case and the car chassis. Photo 5 shows my final installation. Incidentally, the "Tenna-Tune" shown mounted under the SG-2020 is the subject of an upcoming article.

Incidentally, I operate HF mobile only when my XYL is driving or when I'm parked. There are just too many distractions in the heavily populated Dallas area, and safety is my primary concern. It should be yours as well.

Conclusion

The SG-2020 can make an excellent mobile rig, except that there is no easy way of securely mounting it. I've shown how to make up a mobile mount for this radio that works well, is very inexpensive (my total cost outlay was less than $10), and requires no modifications to the SG-2020 case. For the ultimate mount, you may wish to paint the assembly gray in order to match the SG-2020. Happy SG-2020 mobiling! ■

math's notes

BY IRWIN MATH,* WA2NDM

Non-Coax Video Transmission

For those experimenters who like to dabble with amateur TV, video cameras, monitors, and other video devices, this month we would like to make you aware of a new way to interconnect your video components.

The traditional way to connect closed-circuit TV cameras to monitors in the security industry (usually known as the CCTV portion of the industry) has always been with common RG-59 75-ohm coaxial cable. This method has been around for years and certainly works. However, there are times when spare conductors are available in some unshielded, multi-conductor cables being employed for other purposes, and it would be nice to eliminate the coax and use some of these spare conductors to convey the video signal.

There is a new method gaining in popularity today that does exactly that, employing so-called "video baluns." The video balun is a small device that is connected between the coaxial video output connector on the camera and a simple pair of twisted copper wires that are then used as the transmission line. The balun converts the unbalanced video signal into a balanced signal so that it can be transmitted over the twisted wires. Since the phase of the balanced signal is opposite on each conductor (with respect to ground), interfering signals that normally are in phase on each conductor tend to be rejected. At the other end of the link, another video balun converts the balanced signal from the twisted pair back into an unbalanced coaxial version for the monitor. This technique cleverly allows previously installed unshielded multi-conductor cable (such as ones containing extra telephone wires) to be used to transmit video over reasonable distances.

Fig. 1 shows the basic principle of operation of the video balun. The "transmitting end" is simply a wide-band transformer with a 75-ohm primary and a 100- to 120-ohm secondary (the approximate impedance of a twisted pair). Unbalanced 1-volt pp video from the camera is transformed into balanced video by the transformer. The balanced video is then sent over the twisted pair, which, as we have already mentioned, acts as a parallel 100–120-ohm transmission line. At the receiving end another transformer converts the balanced video back into the unbalanced version for the monitor. Both balun transformers, by the way, are exactly the same. Since the transformer at the transmitting end converts 75 ohms to 100 ohms, and the turns-ratio of a transformer is equal to the square of the impedance ratio, roughly 1.8 volts pp of video is present across the transmission line. The reverse takes place at the receiving end, where the voltage drops back to the normal 1-volt pp level.

Video baluns are inexpensive and do not require any power for operation. However, since they are only transformers, and since a twisted pair of wires is not really an ideal transmission line, the effective transmission distance for the basic balun set is usually limited to a few hundred feet or so. If one employs precision twisted wires with carefully controlled impedances for the transmission line, such as the so-called "category X cable," the transmission distance increases to as much as 1000 feet under ideal conditions. The various "cat-

*c/o CQ magazine

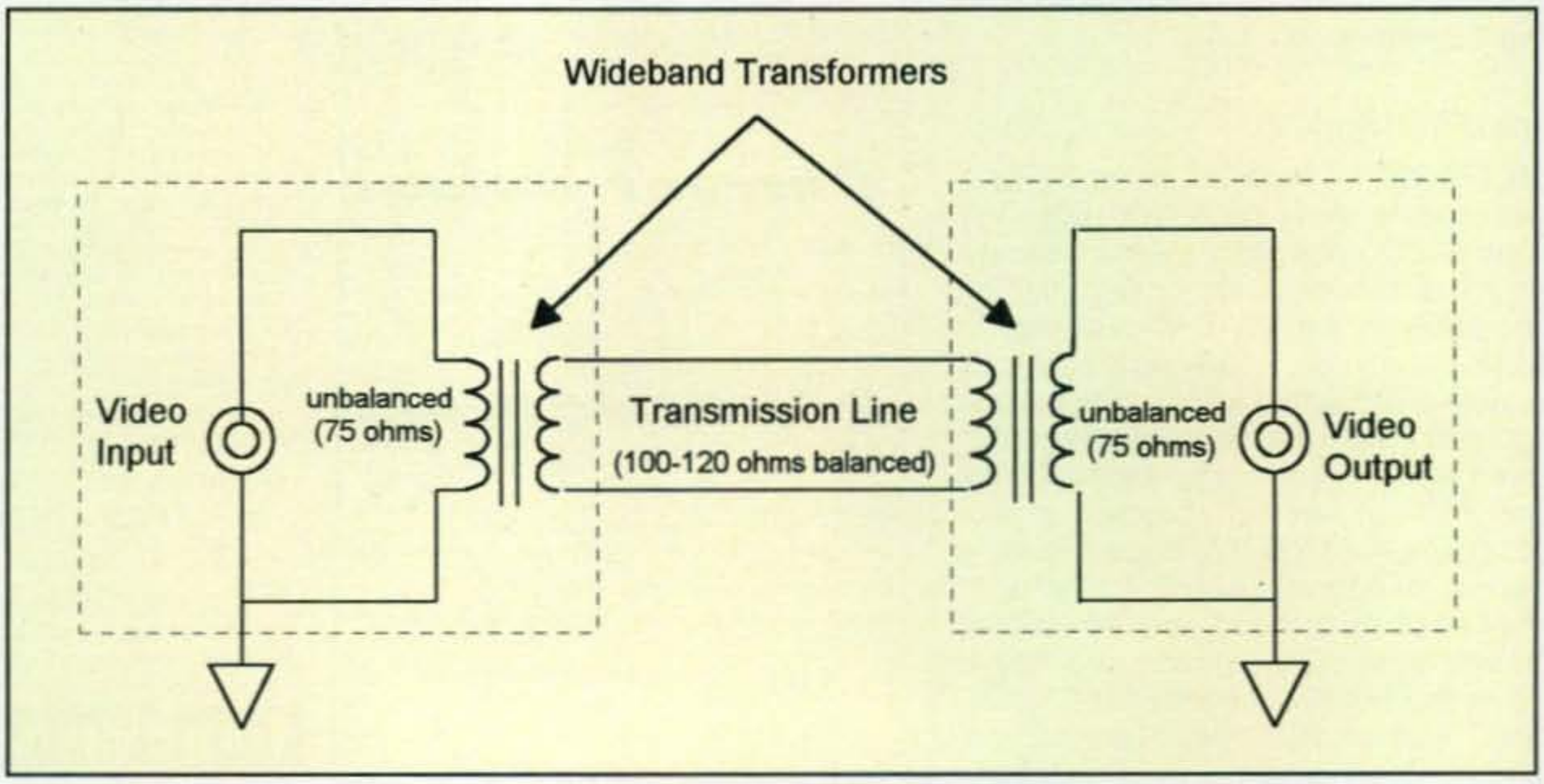

Fig. 1– Video balun transmission system.

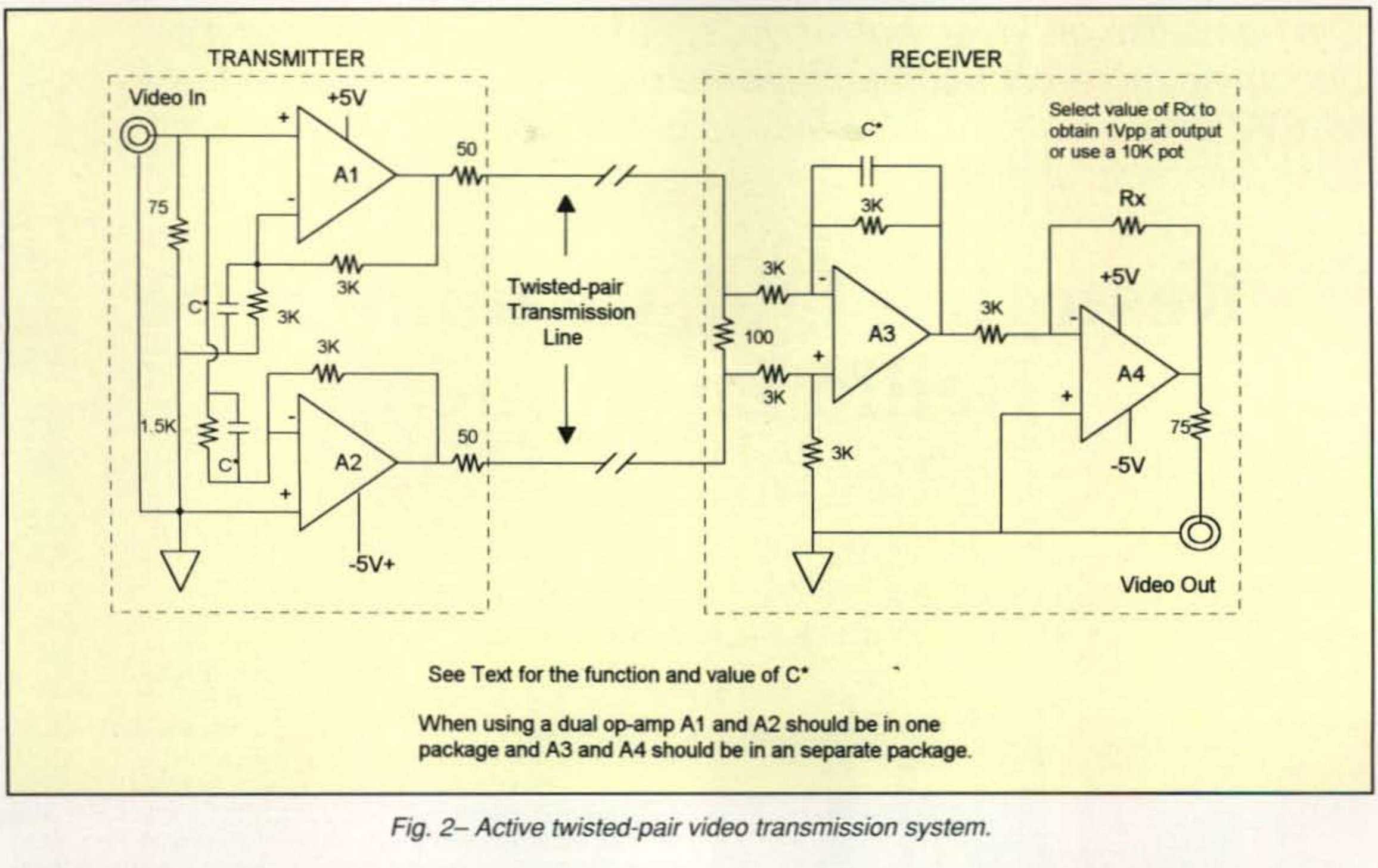

Fig. 2– Active twisted-pair video transmission system.

egory" type cables refer to the exactness of the twist, how carefully the cables are manufactured, and consequently the overall quality of the transmission properties. The higher the value of "X" in the category number, the better the cable.

Amateurs who wish to use this technique can purchase video baluns for about $30 to $40 each from various suppliers of CCTV equipment. If you are a true experimenter, though, you should obtain a couple of toroid cores and wind your own. There are plenty of sources of information on the internet and in the literature explaining how to wind such transformers.

If the desired transmission distance is very long, say several thousand feet or so, a different approach is needed if you still want to utilize twisted wires. Fig. 2 shows the schematic for an active video transmission system using op-amps to drive a twisted pair in the same way as the baluns. As you can see, two high-speed op-amps are connected to produce the balanced video signal. One is used in the inverting mode, and the other in the non-inverting mode. Depending on the values of the feedback resistor and the available supply voltage, the resulting balanced video can be several volts in amplitude. In the example given, the gain is only set to ×2 (since the Vcc range is only ±5V and the op-amp cannot swing to the rails), so approximately 2 volts pp is produced across the differential outputs.

In addition to voltage gain, the use of a small-value capacitor (C* in the schematic) across each of the input resistors will produce a slightly peaked video signal to compensate for cable losses. When using these capacitors, the value across the 3K resistor should be half that across the 1.5K resistor. You might start with 5 pF and 10 pF (or a trimmer) and adjust the values for best results in your particular application. The op-amps can be any common device (including a dual) that has a significant gain-bandwidth product. One example is the National Semiconductor LMH6643, but there are many others that will do quite well.

At the receiving end, a differential amplifier converts the balanced signal back into a single-ended one. Then a capacitor across the feedback resistor "de-emphasizes" the video back into a normal non-peaked signal. By experimenting with the values of the capacitors, transmission distances in excess of 2000 feet can often be achieved.

Such a system works fine as long as there are not too many signals present within the multi-conductor cable bundle. Even though the signal is balanced, and locally generated interference tends to be cancelled, the balance in any system is never perfect. As a result, cancellation will never be perfect, but may be well within the requirements of the application. In addition, although a long twisted pair of wires may work as a transmission line, it is also an antenna—albeit a poor one. Therefore, the system is prone to some forms of interference, no matter how careful you are.

I hope the above will be of interest to the video aficionados among us, but even if video is not your forte, the same technique can be used for audio or even long-distance data transmission. Changing the 75-ohm input load resistor to 600 ohms will result in a line-level audio transmission system. Since the system is DC coupled, changing the resistor to 3K will allow TTL signals to be transmitted, although the 5-volt level may not be reached due to the fact that the op-amps are not intended for rail-to-rail applications.

Please note that the all of the above is really meant to explain how these balanced/unbalanced systems work. Details such as resistive losses for long twisted-pair cables or high-frequency roll-off as a function of length are not dealt with. There are plenty of sources on the internet that explain this ad infinitum. If this is of interest to you, however, please do not be afraid to experiment. That's what it's all about!

73, Irwin, WA2NDM

Old hams like old gear, but so do lots of younger hams, and it's becoming more common to hear restored vintage radios on the air. VK6VZ offers a beginner's guide to getting those "boat anchors" back into "ship shape."

Restoring Old Vacuum-Tube Radio Equipment

A Beginner's Guide

BY STEVE IRELAND,* VK6VZ/G3ZZD

The author in his shack. You can see the following restored equipment : RCA AR88D (on Steve's left), Kingsley AR7 (by Steve's head), and Drake R-4C (on the main operating desk).

The day I fell in love with radio and vacuum tubes was in 1967, when as a 12-year-old I was shown into the radio room of the local Sea Cadet Corps. Three strongly-built benches were stacked end to end with a multitude of blue, grey, and khaki-painted steel boxes. On their fronts were dials and meters and on their sides were what looked like air vents, which were emitting a soft orange, yellow, or green glow.

Sitting in front of them, wearing a pair of military headphones, was a tall lad a couple of years older than myself. Very faintly I could hear a sound coming from the boy's headphones that I realised *(We are not "correcting," or Americanizing, spelling that is perfectly correct in VK-land.—ed.)* was Morse code.

With the colours, lights, and the tinkly sound of Morse, it seemed a strange, mysterious, magical world. From that day on, I was hooked.

When I was 16, my Uncle George found me a 1940s-vintage National HRO MX that I bought for 10 English pounds, using money earned from delivering newspapers. I loved its huge black dial and orange, glowing S- meter.

When I passed my Morse test and became G3ZZD, George built me a 1.8-MHz AM/CW transmitter using B7G- and B9A-type miniature tubes in a beautiful Hammerite-painted case. However, I liked the glowing tubes in it so much that I removed it from its case so I could look at them when keying the transmitter.

My fellow teenage radio amateur Mick, G8EPD, thought my attitude toward these old-fashioned devices was crazy. Mick was very modern and used to build equipment using the latest Mullard transistors. I told him that transistors were a load of trendy rubbish. What good was a device that didn't glow and that didn't give a visual indication of when it was overloaded, off-tune, about to explode, or had died? In turn, Mick rolled his eyes, in a manner that seemed to say, "My friend G3ZZD is a sentimental fool."

Well, this is possibly true, but enough story-telling. The object of the anecdote was to explain my passion for tube radio equipment, and to put a little more romance into your life by encouraging you to feel the same way.

Choosing the Object of Your Affection

There is a considerable variety of tube communications equipment available for restoration. There are also different challenges facing would-be restorers, depending on what era of radio they would like to restore.

In the VK6VZ shack I have two main varieties of tube radio equipment—ex-military stuff from World War II and commercial gear from the "golden age" of amateur radio in the 1960/1970s. In both cases this is equipment with which I became familiar—and loved—when I first become interested in radio. Although the attraction is the same (nostalgia for my youth) the restoration problems are somewhat different.

In general, equipment from the World War II era is *much* bigger and heavier than similar equipment from the 1960s/1970s, making it physically much more difficult to work on. For example, an RCA AR-88D receiver weighs over 100 lbs. and is almost 20 inches long by 20 inches deep and a foot high—a very imposing set indeed to move about on a work

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This RCA AR-88D receiver is far from being in original condition, with its first RF stage replaced with a miniature EF183 tube and its metal cabinet replaced by a wooden one made from West Australian jarrah. However, it works well and is a great conversation piece.

The Kingsley AR7. Like many other countries, Australia made its own version of the HRO receiver around World War II. This example is very original.

bench! In contrast, a Drake R-4C receiver from the 1970s weighs less that one fifth of the AR-88D and is less than a quarter of the size.

Now I love my RCA AR-88D (see the photo), but my back does not like me working on it. In contrast, while an R-4C does not inspire in me the same level of nostalgia as an AR-88D, it is great fun to restore, particularly due to the convenience of its size.

There is another facet of "what to restore?" that we should consider. Both the RCA AR-88 and the Drake R-4C fall into the "Ford" category; they were mass produced and thus relatively cheap to buy when they were made, and are still relatively so now. Unfortunately, the R-4C recently has become very popular to restore (and can approach Cadillac prices), but its older brother, the R-4B, can be still be bought cheaply, and in my opinion, in its basic form it is actually a better receiver.

The rising prices of R-4Cs are one thing, but looking at the prices of old Collins equipment is enough to give someone heart failure. For example, Collins 75A4 receivers can fetch over $1000 these days. However, to put this into context, new Collins radios were always expensive, so old Collins radios are no different (unless you are *very* lucky or it is a very ugly radio...).

My choice for a first radio to restore would be one which has some nostalgic value to me but doesn't fetch a premium price. A friend of mine in the UK likes restoring Heath SB-101s, as that was the first serious HF radio he ever used. Luckily, these are inexpensive and relatively plentiful. He is a *very* lucky man. The first vacuum-tube SSB transceiver I ever used was a Collins KWM-2A that a generous American friend lent me, and there is no chance of my ever having the money to own one of those!

Another thing to consider is whether you want a radio to restore to its original condition or would rather just put the radio back on the air for fun, using whatever components are at hand. Since I became interested in restoring old radios I have discovered that there are huge differences between these two approaches, and restorers tend to belong to either one camp or the other—rather like being a Republican or a Democrat.

My approach is the less conservative of the two (if I were an American, I would undoubtedly be a Democrat). However, I have a friend who is of the electronic Republican camp, and when he restores an old receiver, he immediately purges it of any non-original components or "modifications." In one case he bought a Kingsley AR-7 receiver—an Australian version of the HRO (see the photo)—that had been modified by the government department that had originally purchased it with a product detector. Although this modification actually substantially improved the performance of the AR-7, my friend immediately dismantled it and replaced with the original circuitry.

The first Drake R-4C I purchased for restoration was something of a "dud," having been neglected for most of its life and needing much work mechanically and electrically. Rather than simply restore it, the R4C ended up being "gutted" and its tubes (except two) replaced with semi-conductors. Whilst the modified R-4C now outperforms everything else in my shack—including a Yaesu FT1000MP—for receiving signals on the lower HF bands, my purist friend regards it as a great waste of a classic receiver.

Making Your Purchase

First of all, the best idea is to decide what sort of tube receiver you would like to restore, taking into account the factors we have just examined. This choice will also have an effect on where to look for such a receiver.

My first inclination is to ask around the local radio club, and friends and acquaintances who are interested in amateur radio. The world is full of radio amateurs who put old pieces of equipment to one side in their garage with the idea of one day restoring them. Often they never get around to it, and are quite happy to part with their piece of old gear, passing it on to someone who is keen to do something with it.

The next best thing is hamfests and ham junk sales of all kinds. It is a good idea to make sure you are on-site well

before the events actually start, so you can help sellers unload their cars and trucks and get first pickings/sighting of gear before the doors open to the rest of the world. The old notion that someone's rubbish is someone else's gold is as true as ever.

The "special interest" internet reflectors are also a good place to look for gear to restore. There are reflectors for Drake, Collins, and Heath gear, plus several devoted to boatanchor radios. If you don't already know, the term *boat anchor* principally is used in connection with the very heavy radio equipment used in the 1940s and '50s, in particular the war-surplus type. The ruggedness of this equipment is legendary. For example, the story goes that hundreds of AR-88s were used as "hardcore" for an extension to a runway at London's Heathrow airport after World War II.

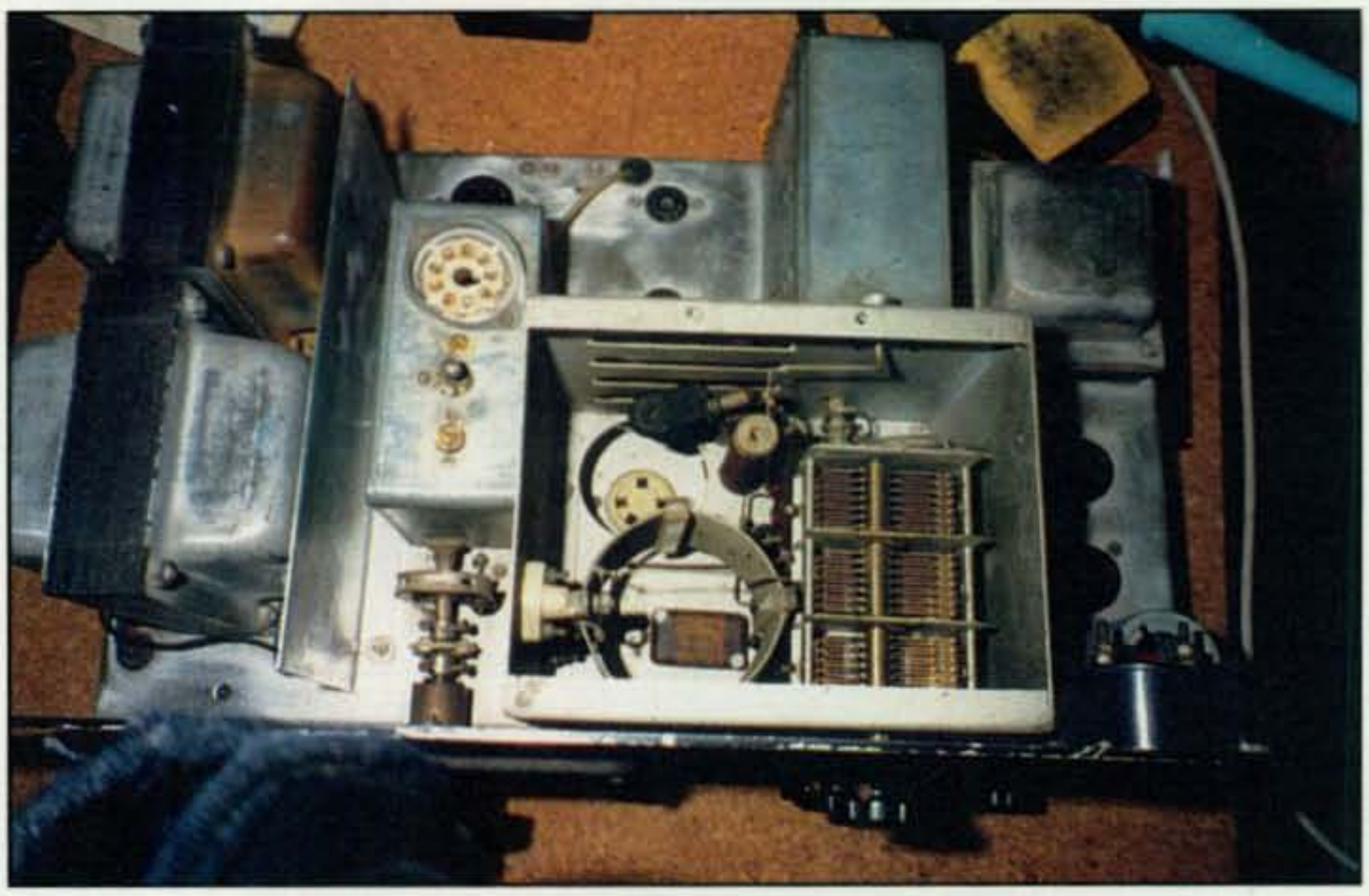
If you are interested in knowing more about the different types of boatanchor receivers, I thoroughly recommend getting the book *Communications Receivers – The Vacuum Tube Era: 1932–1981* by Raymond S. Moore.[1] I learned a lot of what I know about the history of vacuum-tube receivers from this book. It can be purchased through the mail, and details are given at the end of this article.

Another good option is a classified "wanted" advertisement in a radio magazine such as this one, or even in the local paper under "R" for radio. A friend of mine who is a non-licensed radio amateur has used the latter method for years with great success, he simply puts something such as "Wanted: a vacuum tube radio, preferably of the shortwave communications type," plus his phone number. He has "hooked" all sorts of amazing radios in this manner, including ones made by Collins, Drake, Hammarlund, and National.

One of the best reasons to buy locally is not only can you see what you are buying, you can carry the equipment away (okay, stagger off with it) yourself. The cost of transporting a Heath SB-101 or a Drake R-4C is likely to be a lot better than that of a Hammarlund SP-600 or an RCA AR-88D, but it is going to be *a lot* worse than a Kenwood TS-450S or an ICOM IC-706.

If you are *really* desperate, you could try looking on eBay on the internet, but this may only frighten and depress you, considering the ridiculous prices asked for some old radio equipment. On the other hand, the odd reasonably priced piece of vacuum-tube gear does come up on eBay from time-to-time. The only problem is you are likely to be competing with half the world to get it.

This Panda Cub 50W 1.8–28 MHz AM/CW transmitter is currently undergoing restoration at VK6VZ. It was designed by the legendary Louis Varney, G5RV, and commercially manufactured in the United Kingdom during the 1950s/'60s from World War II surplus components.



The surface of the Panda Cub chassis and its main transformer, choke, and modulation transformers were carefully cleaned with wire wool to get rid of oxidation.

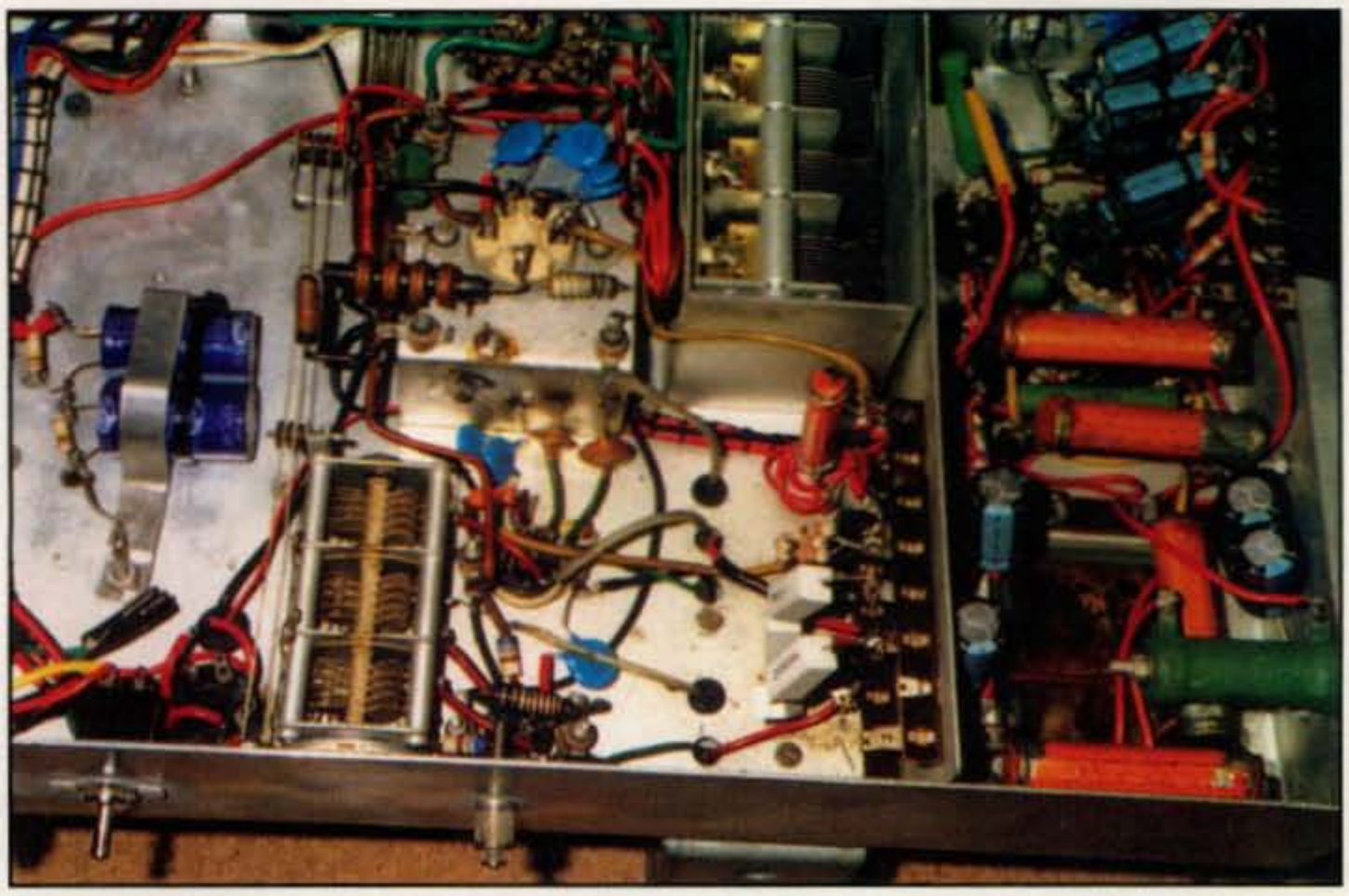
Starting the Restoration

Let us assume you have made your purchase of a piece of tube radio equipment and it is sitting proudly on the operating table. The first thing you have to do is avoid the obvious temptation of applying some AC mains power to it. If you are *absolutely certain* the radio has been in recent regular use, then this is probably okay, but if there is any doubt, don't do it!

Whatever anyone has said about an old tube radio being used recently, it never gets switched on in the VK6VZ shack until it has a thorough electrical cleaning and check-over. Also, AC mains power is always applied to the radio in steps via a *Variac*—a continuously variable AC transformer.

A tube radio that is over 20 to 30 years old is always going to have accumulated a lot of dust and dirt inside it due to the ventilation necessary for vacuum-tube-based equipment. While a dusty/dirty chassis is going to make no difference in its performance, dusty/dirty switch contacts and potentiometers could mean that the radio does not work at all.

Several vacuum-tube radios that



The underside of the Panda Cub transmitter. Note all the original electrolytic capacitors were replaced by modern TKR electrolytics. On the far left-hand side you can see TKR-type electrolytics used in series with 100K "equalisation resistors" (see text). In this case, the electrolytics replaced six "square" electrolytics about ten times their size. The original (and slightty melted) paper capacitors were replaced by 3KV disc ceramics.

The majority of these components showed signs of overheating or age and thus were removed from the Panda Cub and replaced with modern equivalents.

seemed dead have been revived at VK6VZ simply by cleaning their rotary switches, tube pins, and potentiometers with electrical-contact cleaning solvent.

Potentiometers are best cleaned by squirting electrical solvent (such as CRC CO Contact Cleaner) into their cases from an aerosol can and quickly rotating the associated spindle to and fro. The most effective way of cleaning rotary switches and vacuum-tube pins is to spray plenty of solvent on the tip of a cotton bud and briskly wipe this over their conducting surfaces. You will find the cotton bud quickly becomes dirty, and you should repeat this process (changing cotton buds) until no more dirt can be removed.

With rotary switches, it is easy to miss some of their contacts, on the basis of Murphy's Law, particularly those which are the dirtiest." It is always worth going over the rotary switches in a radio on *at least two separate occasions* because of this factor.

Once the switches and potentiometers seem clean, it is not a bad idea to clean the inside of the radio with a damp cloth (and the odd spray of contact cleaner). It might not help the radio's performance, but you will feel a lot better for it and will be able to judge the condition of its mechanical components far better.

Depending on where the owner kept the radio and how old it is, you can end up wrecking a couple of *J-cloths* and at least half a container of cotton buds during a clean-up.

If the radio is really old, the chassis—and components such as transformers—may have become so oxidised that wire wool or fine emery paper is needed to remove this. If this is the case, carry out the clean-up, but make sure you carefully "blow clean" the radio after any "rubbing down" has been completed.

This is also a good time to thoroughly familiarise yourself with how the equipment is operated by reading its operational/service manual from cover to cover. If you don't have a manual for the radio on which you are working, a search using Google (or similar) on the internet may well bring up a site run by a vintage-radio enthusiast where you can download one.

It is also good to do an internet search to see what other information on your radio you can turn up. Instructions may be available specifically for restoring a radio of the kind you have—say, covering particular aspects of the mechanical and electrical work necessary to bring it back to its full operational potential.

The Weakest Link

The next step is to look very carefully at the condition of the radio's capacitors (in particular, its electrolytics) and resistors (in particular, the wirewound ones). In my experience, these components are the most likely to suffer electrical failure, much more so than any of the vacuum tubes.

If any of the electrolytic capacitors show any signs of leakage from their cases, they need to be replaced. Any mica or paper capacitors with a leaky melted look should be replaced as well. While these components may still work okay for now, this situation is not likely to last. My motto is "if in doubt, take it out" and replace with a modern equivalent.

In particular, my suspicion about old electrolytic capacitors is such that these all are automatically replaced in any radio I work on that is older than 35 years or so. This can be done using modern electrolytic capacitors of a similar value and voltage rating. If you have ever heard or seen an electrolytic capacitor fail—usually with a sound like a gunshot and an incredible mess—you will understand why.

Although it used to be hard to obtain new high-voltage (i.e., tube-radio type) electrolytic capacitors, thanks to the

incredibly common usage of switch-mode power supplies, there is a ready supply of a range of values (i.e., 10 to 100 µF) with a 450V maximum voltage rating. These are ideal for use in most receivers, but in transmitters you may need to use a couple in series to obtain a suitable voltage rating. I recently replaced an old 16 µF 500V electrolytic in a 1950s AM/CW transmitter with two 10 µF 450V electrolytics in series.

When you are using capacitors in series in this manner, a 100K 0.5W resistor should be placed across the pins of each of the capacitors used. This helps to ensure that the voltage across each of the two capacitors in series is about the same.

Another useful thing to remember about these modern electrolytics is that they sometimes are referred to as "TKR capacitors." I'm not sure why.

The other component type that is likely to fail in an old tube receiver or transmitter is a resistor. Any that looks as though it may have been overheated at some time (burn marks, etc.) should be replaced with one of identical value and wattage (which usually will be considerably smaller than the original component). In the case of wirewound resistors, I usually check their continuity/value with a multimeter just to make sure they haven't gone open circuit.

These days some values of wirewound resistors are hard to find, in particular those with dissipations higher than 5 watts, so you may have to replace a resistor of this kind with either a series or parallel combination of smaller wattage resistors.

The main problem with conventional resistors that are 30 to 60 years old (or more, depending on the age of your radio) is that their values may have changed by up to 20%. Disconnecting one end and checking the value with your multimeter is the only sure-fire way to check to see if this has occurred to a resistor. If so, replace it with a modern resistor of identical value and wattage.

Powering Up

Once the radio has been thoroughly cleaned and its components checked, we can finally *think* about applying power via a Variac. However, power should not be applied before removing all the vacuum tubes from the radio.

The reason for this two-stage process is that if anything is wrong with the radio, this can make its diagnosis much easier (by removing one of the potential sources of failure from the equation, so to speak). Before removing the tubes, make sure you have a drawing/plan that indicates which tube belongs in which tube socket

Once the tubes have been removed, for safety reasons replace the radio in its case. *Never forget that the kind of voltages used in vacuum-tube equipment—i.e., over 200V—can be fatal. Great care must be taken to* ***never*** *handle the radio with AC power connected to it when it is out of its case.* ***Always*** *switch off the receiver, switch off the power at the outlet, and then unplug the radio's power cord from the outlet before removing the radio's case. Once this has been done,* ***do not*** *reconnect the AC connection to the radio until it is safely back in its case. Also be aware that power-supply capacitors may retain a charge long after the power is disconnected.*

These days, most radio amateurs are unlikely to have a Variac variable transformer, but you can bet that the friendly old-timer down the road has one stuck under his workbench, or the local radio club may own one you can borrow.

Before going any further, check that the mains input of the radio has been set to whatever is your local mains voltage. I know a few sad stories in which 110V AC radios were plugged into 240V AC mains supplies.

With the Variac's voltage control set to zero volts and its output connected to the radio's AC mains input, the Variac's input can be plugged into the AC mains. Now carefully increase the voltage control to about 25V (or 50V if you are on 240V AC mains) and leave the receiver alone for a couple of minutes. Then increase the Variac control to about 50V (100V if you are on 240V mains) and repeat the process.

This gradual build-up of the AC voltage allows the electrolytic capacitors inside the radio to reform—charge up slowly—making it much less likely for their dielectric to break down and consequently for them to go "short circuit" and explode.

Repeat the process in steps of less than 25V (or 50V for 240V lines) until the full local AC mains voltage is reached—i.e., 110V (or 240V in the UK/Australia). If the radio has dial lights, these will illuminate as the voltage is increased.

Once the full mains voltage has been reached, leave the radio with the voltage at this level for about half an hour, with you in attendance. After 30 minutes have passed, reduce the Variac to zero volts, switch off the radio, switch off the power outlet to which the Variac is attached, and remove the Variac's power cord from the mains outlet.

Next remove the radio's case and carefully replace the tubes in their sockets, spraying each socket's receptors with electrical contact cleaner before inserting each one. Once this has been done, replace the radio's case, reconnect the power cord to the Variac, and switch on the AC mains.

Once again, in a similar manner, increase the Variac in 25V steps until the full mains voltage is reached. When the mains voltage reaches about 50 percent of the maximum, you will notice the heaters of the tubes start to illuminate. If any of the tubes fail to illuminate, their heaters may be burnt out and the tube concerned should be replaced by one of an identical kind (or its equivalent).

As before, leave the radio running in this state for a further 30 minutes, with you in attendance. Obviously, if the equipment is a transmitter, it should *not* be switched to transmit during this time.

Ready to Go?

In 95 percent of the radios that I have restored following this process has resulted in a working radio. You also should look at the mechanical aspects of the radio, in particular the main tuning mechanism, and check that this is working correctly. If not, some reference to the manual/internet sources of information may be necessary.

If your radio fails to work, then it is a matter of carrying out some old-fashioned fault-finding. In contrast to the surface-mount, solid-state equipment of today, if you have a basic knowledge of electronics and are armed with a manual, a circuit diagram, and a multimeter, you have a good chance of actually being able to find and fix the problem yourself.

Working on 1950s and '60s vacuum-tube radios is *very* satisfying, as long as you are patient and, as was covered earlier in this article, take very good care to abide by some basic rules of electrical safety.

Good hunting if you decide you would like to become involved in this fascinating aspect of our hobby. For me, a vacuum-tube radio is alive in a way that its semiconductor sister just isn't. ■

References

1. *Communications Receivers—The Vacuum Tube Era: 1932–1981,* by Raymond S. Moore, 4th Edition, RSM Communications, P.O. Box 27, La Belle, FL 33975. This is a marvellous book. If you are interested in tube communications equipment, it is a must for your bookshelf.

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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

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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

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MODEL SS-10EFJ-98

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MOTOROLA HIGH POWER SM50, SM120, & GTX
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SS-10MG, SS-12MG
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SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

CIRCLE 134 ON READER SERVICE CARD

*ICS – Intermittent Communication Service

If you've ever wanted to leave your operating position even for just a moment, but were afraid you would not be there when the other op turned back to you, or wanted to wander even farther away from the shack and still be able to carry on your QSO, W6BAK suggests you consider going "wireless with your wireless."

Going Wireless With Your Wireless

BY ALAN PEVAR,* W6BAK

How nice it would be, I had always thought, to have a long-range, comfortable set of *wireless* headphones that I could use with my radio. Wouldn't it also be great to be able to affix an adjustable lightweight *wireless* boom mic, too? That would be operating "nirvana."

Just think about it . . . being able to walk around the shack or your home, make necessary adjustments, lounge on the couch, or even (yes, I admit it) sit on the—well, you know what—all without the person on the other end of the contact even knowing (unless you care to tell).

At first I didn't think this would be easy to accomplish because of the obvious potential radio frequency interference (RFI) problems. However, to my surprise that was not the case.

The author in his shack, about 15 feet away from the station. (Photos by Cindy Pevar)

Simple Construction

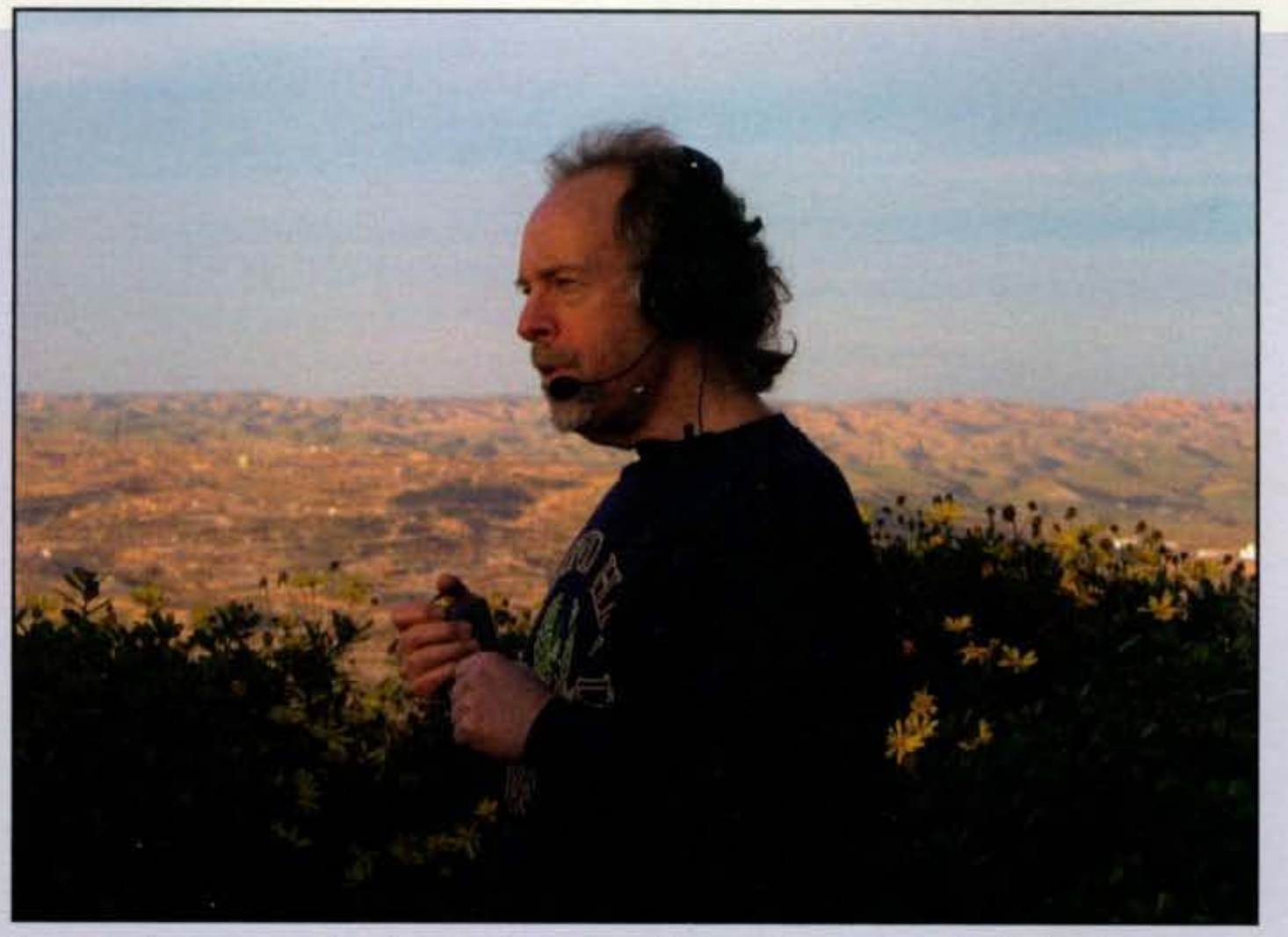
For my "roving headphones" I chose the Sennheiser HDR 8-9, a high-end model, which is available at many audiophile shops. They are extremely lightweight and comfortable and have an easy to-get-to gain control on one of the earpieces. The small, rechargeable Ni-Cad battery is easily changed, with an extra one in a charger ready to be used. The small 900-MHz transmitter for the headphones plugs into the transceiver's audio or speaker output, and believe it or not, it actually sits on top of my 1-KW Yaesu Quadra linear amplifier with *no* RF problems whatsoever!

**2708 Rio Vista Drive, Bakersfield, CA, 93306*
e-mail: <w6bak@cox.net>

The boom microphone for the headset required a little bit of ingenuity but was doable. Surprisingly, for me the best sounding mic turned out to be the one utilized in an inexpensive headset used with wireless telephones (a RadioShack "over-the-head" type). By carefully removing the flexible boom from the telephone headset's earpiece, you can then fasten it directly to the *wireless* headset with Velcro®.

The thin cable that comes out of the end of the flexible mic boom is then connected to the input (via mini plug) of a small, pocket-size 900-MHz transmitter (RadioShack Audio Link, No. 32-1252). The matching 900-MHz wireless receiver for the mic is plugged into the phone-patch input of my 1000MP. If your rig doesn't have a phone-patch input, you should be able to run the receiver audio straight into your mic jack. Also, as in the case of my headphones, I found absolutely *no* RFI! As an extra bonus, the mic's receiver has built-in bass and treble controls, making it sound really great.

With the now *wireless* mic fastened to the *wireless* headset, the mic's small transmitter in my pocket, and the transceiver's VOX switched on . . . *voila*. I'm free to roam! Should I wish to work CW or use a "wired" mic, I simply remove



It works just as well outside the house! Here the author is in his back yard, about 125 feet away from the station.

the small piece of Velcro® attached to the mic/boom and set it aside.

RFI Prevention Tips

Here are some basic tips on preventing RFI. First, use wireless headphones that provide as much interference protection as possible. Usually the high-end sets do that, as noted in their literature or right on the box, as in the case of mine. In addition, as an extra precaution RF chokes should be placed on the cables going to and from your new wireless equipment and the transceiver. You might have to make some slight adjustments in the placement of the headphone's transmitter to make sure its small antenna does not "couple" with other close vertical objects. You may even be able to construct an "external" 900-MHz antenna cut for the particular frequency and that can be placed high up and far away from your other gear. Also, of course, make sure both your mic and headset transceivers offer a choice of several operating frequencies, which is generally the case.

Range

Although most RF wireless headphones and mics list a range of up to 300 feet in their specs, I have found that 75–100 feet is a safer and more realistic coverage area to count on. This is still an enormous amount of square footage, compared to a 6-foot coiled cord!

One possible downside is that the transmission from your receiver or mic may be heard on a neighbor's 900-MHz receiver (as you are probably aware, all sorts of consumer wireless devices use the 900-MHz band). The probability of this occurring most likely is very small, but it can happen if a close neighbor just happens to be using a device tuned to the frequencies you are using (let's see you try to explain why their pre-verbal infant is speaking ham radio phonetics on the baby monitor!) In most cases, switching the operating frequencies should solve the problem. In any event, take into consideration the proximity and lifestyle (if known) of your neighbor.

The Bottom Line

My total cost for this project was about $360, with most of the expense ($200) going to the wireless headset. I later saw the same model advertised for $50 less, and you should be able to do fine with a less expensive model if your budget is tight, as long as you check for RFI resistance. The 900-MHz receiver cost me about $90, while the matching transmitter was $50 and the boom mic was another $20. I'd suggest going with the best wireless headset you can afford, both for sound quality and comfort.

I can assure you that once you try this easy modification in your operation, you certainly will use it often. Of course, there are times when you will need, or want, to stay put at the station, but you'll find that being able to travel more than the limited distance that a wired set of headphones allows is a wonderful option.

public service

BY BOB JOSUWEIT,* WA3PZO

No Bed of Roses is Pasadena

We're already into 2005 and the need for supplemental emergency communications continues to grow. Whether you're getting ready for the spring series of walks, runs, and other "thons," severe weather, or just planning what antenna to put up, you need to know what communication tools other than ham radio are available. Then the next time organizing officials say they are looking at using such-and-such a communication tool, you can offer a reason why they should stick with amateur radio.

This month we'll take a look at a new type of cellular phone service and its impact on amateur radio communications.

Amateur Radio and the Rose Parade

For the first time in over 30 years, this year amateur radio was not part of the world-famous Tournament of Roses Parade held on New Year's Day in Pasadena, California. Over 300 active members of the Tournament of Roses Radio Amateurs (TORRA) had been providing quick and efficient radio communications for Tournament officials.

Like many parade organizations across the country, the Tournament of Roses is composed of various committees that are in charge of everything from setup to logistics and transportation. The TORRA members worked with parade aides or marshals, called White Suiters because of their white uniforms. TORRA members' assignments began on New Year's Eve when the floats were brought into the formation area.

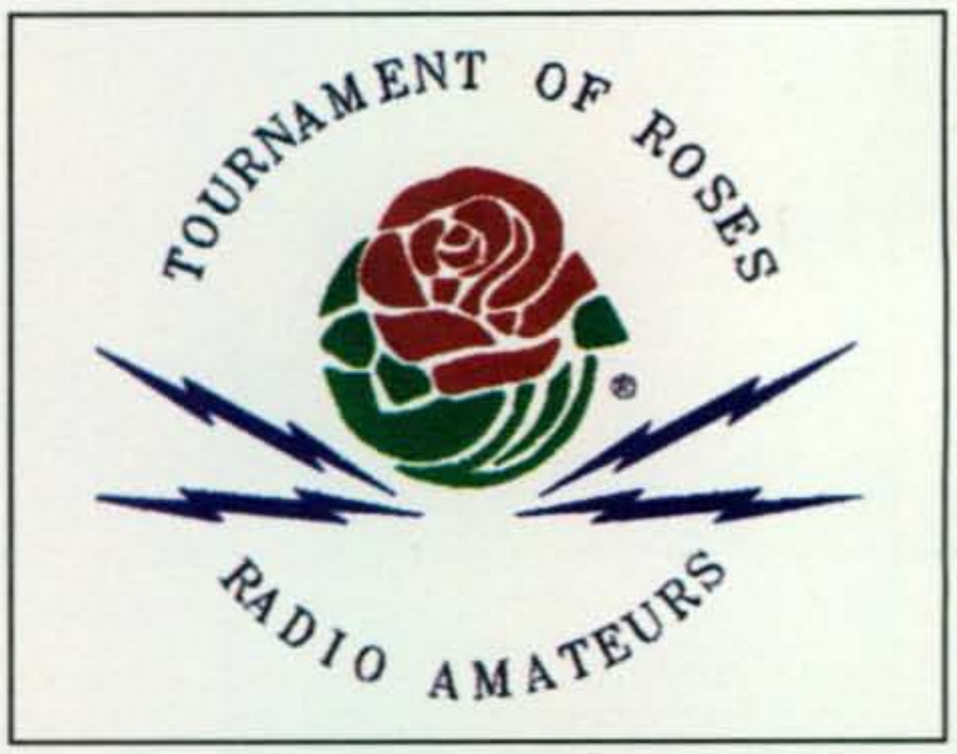
In addition to voice communications, TORRA provided Amateur Television from approximately 17 positions along the parade route. This gave officials a visual image of the parade and any problems that may have occurred along the route. Packet radio was used during the post-parade float viewing to accumulate data and assist with missing persons. As early as 1997, TORRA added APRS (Automatic Position Reporting System) to track the nine convoys of 60 parade floats that move from their construction barns to the parade's formation area. Some of the floats are 80 feet long and have to travel 20 to 30 miles. They all must be brought in from different directions. A float that large can't be told to make a U-turn because it came in from the wrong direction.

Changes in 2004

There were many changes at the parade headquarters in 2004. Some of the changes dealt with technology and the way Tournament organizers utilize it, and TORRA's part in it. Other changes had to do with increasing space demands from the commercial media covering the parade. At the end of last year's event, all TORRA-owned equipment had to be removed from the old net control and ATV storage facilities because of reallocation of building space by the Tournament committee. TORRA and Tournament committee personnel took a look at the role of ham radio operators and the changes that were required. According to the group, the location of the net control station and possible antenna moves were on top of the list.

TORRA officials said, "We were also dealing with a relocation of the motor home, recovering the stored TORRA property, finding new central storage for it, and desperately seeking someone with knowledge and experience willing to chair the ATV operation. Unfortunately, as we discussed options, made plans, dealt with continuing changes, etc., time grew shorter and shorter. At the steering committee meeting on Nov. 7th it became clear that there was still too much to do and not enough time to do it for a successful operation this year."

TORRA then added, "There have been no knock-down drag-out fights and nobody dumped anybody! We have a long-standing relationship with the Tournament of Roses and both organizations wish to maintain that relationship. We informed the Tournament of our inability to provide the outstanding service they are accustomed to receiving and agreed to sit down together early after the New Year to restructure our role and the communication services we provide."



The Tournament of Roses Radio Amateurs Logo. For the first time in over 30 years, this year amateur radio wasn't part of the parade.

Cell Phone or HT?

Other reports indicated that because Nextel was providing cell phones to all of the parade marshals, there was not a need for the hams to serve as shadow operators. The Nextel phones have a walkie-talkie feature called Direct-Talk.® Ac-

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

Philly Parade Honors Ham

Philadelphia's third largest parade chose to name the Grand Marshal's float in honor of a local ham and parade board member. Kim MacNamara-Josuweit, KB3COV (SK), the late wife of this columnist, was honored for her years of service to the parade and the community. In making the announcement, Mayfair/Holmesburg Holiday Parade Director Gary Cozens said, "With the theme being 'A Great Place to Live,' Kim was one of the people who make it that way." The community-service float was named in her honor. Last year the red, white, and blue Christmas float was made available to the local community and church groups to use as their float in the parade.

Kim had been involved with the Parade Organizing Committee since the early 1990s. She was responsible for coordinating transportation for the dignitaries marching in the parade, including local politicians, sports mascots (one of which is the Phillie Phanatic), and a variety of pageant winners. Kim, a member of the Holmesburg Amateur Radio Club, was also active in the Lincoln High School Alumni Association, serving as the database manager and newsletter editor. She passed away in 2003 after a brief fight with cancer. —*WA3PZO*

Grand Marshal float honors Holmesburg ARC Member KB3COV in the Philadelphia Parade. (Photo courtesy Steve Jones)

cording to the Nextel website, it operates on the 900-MHz ISM public frequency and provides group and private walkie-talkie capability. The company claims this is "ideal for use in remote locations, as a backup for emergency situations, or when network coverage may not be available."

Direct Talk® is an all-digital, off-network walkie-talkie service that works between compatible phones within a two-mile range, although other literature on the Nextel site promotes up to a six-mile range. The company admits that "terrain, weather, foliage, and man-made structures (such as buildings), among other things, may impact range availability."

There are currently two phones that offer this service. Each can be programmed with a phone number or group to talk to. Nextel says you can make sure that others in your group heard your transmission: "Whenever you press your PTT™ button to begin a communication, you will hear a chirp. If that chirp is followed by a 'bonk' sound and you get the error message on your phone 'User Not Available,' that means no one was able to hear your transmission. They may not be in your range, or they may not be on your code/channel combination." Nextel also says that regular cell phone service will not work when you are in the Direct Talk mode. The phone's battery life is rated at 290 minutes of talk time and 159 hours of standby time.

Cell Service in a Disaster

How reliable are these phones in a widespread disaster? Just ask those residents of Florida who were hit by several hurricanes last year. All cell sites require electricity, and when the power went out so did the cell service. Nextel walkie-talkies on which St. Lucie county officials relied were knocked out by the storm, as were telephones. In Volusia County, Nextel phone service failed during most of the three hurricanes that hit the area. Nextel plans to add 20 towers and cell sites in Volusia and Flagler counties by mid-2005. The coastal sites will include generators.

(Continued on page 60)

SAVE BIG ON ANTENNAS, TOWERS & CABLE

TELESCOPING ALUMINUM TUBING

DRAWN 6063-T832

.375	$.70/ft	1.250"	$1.55/ft
.500"	$.80/ft	1.375"	$1.75/ft
.625"	$.90/ft	1.500"	$1.95/ft
.750"	$1.00/ft	1.625"	$2.25/ft
.875"	$1.10/ft	1.750"	$2.50/ft
1.000"	$1.20/ft	1.875"	$2.75/ft
1.125"	$1.35/ft	2.000"	$3.00/ft
		2.125"	$3.50/ft

IN 6' OR 12' LENGTHS. 6' LENGTHS SHIP UPS. CALL FOR 3/16"AND 1/4" ROD, BAR STOCK, AND EXTRUDED TUBING.

CUSHCRAFT ANTENNAS

13B2/A148-10S	$159/89
A270-6S/A270-10S	$79/99
A3S/A4S	$439/549
A50-3S/5S/6S	$99/169/269
A6270-13S	$199
AR2/ARX2B	$55/69
AR270/AR270B	$89/99
R6000/R8	$309/459
X7/X740	$649/269
XM240	$679

CALL FOR MORE CUSHCRAFT ITEMS.

FORCE 12—MULTIBAND

C3	10/12/15/17/20m, 7 el	$659
C3E	10/12/15/17/20m, 8 el	$699
C3S	10/12/15/17/20m, 6 el	$579
C3SS	10/12/15/17/20m, 6 el	$599
C4	10/12/15/17/20/40m, 8 el	$799
C4S	10/12/15/17/20/40m, 7 el	$719
C4SXL	10/12/15/17/20/40m, 8 el	$1019
C4XL	10/12/15/17/20/40m, 9 el	$1189
C19XR	10/15/20m, 11 el	$999
C31XR	10/15/20m, 14 el	$1389

CALL FOR MORE FORCE 12 ANTENNAS.

TRYLON "TITAN" TOWERS

SELF-SUPPORTING STEEL TOWERS

T200-64	64', 15 square feet	$1209
T200-72	72', 15 square feet	$1429
T200-80	80', 15 square feet	$1649
T200-88	88', 15 square feet	$1949
T200-96	96', 15 square feet	$2249
T300-88	88', 22 square feet	$2189
T400-80	80', 34 square feet	$2089
T500-72	72', 45 square feet	$1979
T600-64	64', 60 square feet	$1869

MANY MORE TRYLON TOWERS IN STOCK.

BENCHER / BUTTERNUT

Skyhawk, Triband Beam	$1129
HF2V, 2 Band Vertical	$249
HF5B, 5 Band Minibeam	$359
HF6VX, 6 Band Vertical	$339
HF9VX, 9 Band Vertical	$369
A1712, 12/17m Kit	$54
CPK, Counterpoise Kit	$129
RMKII, Roof Mount Kit	$159
STRII, Roof Radial Kit	$125
TBR160S, 160m Kit	$139

CALL FOR MORE BENCHER/BUTTERNUT.

M2 VHF/UHF ANTENNAS

6M5X/6M7JHV	$209/269
6M2WLC/6M9KHW	$459/499
2M4/2M7/2M9	$95/109/129
2M12/2M5WL	$165/209
2M5-440XP, 2m/70cm	$179
440-470-5W/420-450-11	$139/95
432-9WL/432-13WLA	$179/239
440-18/440-21ATV	$129/149

SATELLITE ANTENNAS

2MCP14/2MCP22	$169/239
436CP30/436CP42UG	$239/279

ROHN TOWER

25G/45G/55G	$99/209/259
25AG2/3/4	$119/119/129
45AG2/4	$229/249
AS25G/AS455G	$49/109
BPC25G/45G/55G	$89/119/129
BPL25G/45G/55G	$99/129/149
GA25GD/45/55	$79/109/139
GAR30/GAS604	$39/29
SB25G/45/55	$49/109/129
TB3/TB4	$99/119

PLEASE CALL FOR MORE ROHN PRICES.

US TOWER

MA40/MA550	$1099/1699
MA770/MA850	$2799/4349
TMM433SS/HD	$1479/1789
TMM541SS	$1939
TX438/TX455	$1379/1899
TX472/TX489MDPL	$3139/8239
HDX538/HDX555	$1649/2889
HDX572MDPL	$7549

PLEASE CALL FOR HELP SELECTING A US TOWER FOR YOUR NEEDS. SHIPPED FACTORY DIRECT TO SAVE YOU MONEY!

COMET ANTENNAS

GP15, 6m/2m/70cm Vertical	$159
GP6, 2m/70cm Vertical	$149
GP9, 2m/70cm Vertical	$189
B10NMO, 2m/70cm Mobile	$39
SB14, 6m/2m/70cm Mobile	$59
SBB224NMO,2m/220/70cm	$69
SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$55
SBB7NMO, 2m/70cm Mobile	$69
UHV4/UHV6	$109/149

MORE COMET ITEMS IN STOCK—CALL.

HYGAIN ANTENNAS

AV18HT/AV18S	$689/79
AV620/AV640	$259/339
DIS71/72/73K	$269/569/359
DX77A/DX88	$389/319
EXP14/QK710	$519/159
LJ103BA/105CA/155CA	$145/259/379
LJ203BA/204BA/205BA	$289/479/679
TH3MK4/TH3JRS	$399/319
TH5MK2/TH2MK3	$849/319
TH11DX/TH7DX	$995/749
VB64DX/VB66DX	$139/249

GLEN MARTIN ENGINEERING

HAZER ELEVATORS FOR 25G

H2, Aluminum Hazer, 12 sq ft	$359
H3, Aluminum Hazer, 8 sq ft	$269
H4, HD Steel Hazer, 16 sq ft	$339

ALUMINUM ROOF TOWERS

RT424, 4 Foot, 6 sq ft	$159
RT832, 8 Foot, 8 sq ft	$239
RT936, 9 Foot, 18 sq ft	$389
RT1832, 17 Foot, 12 sq ft	$519
RT2632, 26 Foot, 9 sq ft	$869

UNIVERSAL ALUMINUM TOWERS

4-40'/50'/60'	$539/769/1089
7-50'/60'/70'	$979/1429/1869
9-40'/50'/60'	$759/1089/1529
12-30'/40'	$579/899
15-40'/50'	$1019/1449
23-30'/40'	$899/1339
35-40'	$1569

BOLD IN PART NUMBER SHOWS WIND LOAD CAPACITY. PLEASE CALL FOR MORE UNIVERSAL MODELS. SHIPPED DIRECT TO YOU TO SAVE YOU MONEY.

DIAMOND ANTENNAS

D130J/DPGH62	$79/139
F22A/F23A	$89/119
NR72BNMO/NR73BNMO	$39/54
NR770HBNMO/NR770RA	$55/49
X200A, 2m/70cm Vertical	$129
X500HNA/X700HNA	$229/369
X510MA/510NA	$189/189
X50A/V2000A	$99/149
CR627B/SG2000HD	$99/79
SG7500NMO/SG7900A	$75/112

MORE DIAMOND ANTENNAS IN STOCK.

MFJ

259B, Antenna Analyzer	$219
269, Antenna Analyzer	$299
941E, Antenna Tuner	$109
945E, Antenna Tuner	$99
949E, Antenna Tuner	$139
969, Antenna Tuner	$169
986, Antenna Tuner	$289
989C, Antenna Tuner	$309
1798, 80–2m Vertical	$249
1796, 40/20/15/10/6/2m Vert	$199

BIG MFJ INVENTORY— PLEASE CALL.

COAX CABLE

RG-213/U, (#8267 Equiv.)	$.36/ft
RG-8X, Mini RG-8 Foam	$.19/ft
RG-213/U Jumpers	Please Call
RG-8X Jumpers	Please Call

CALL FOR MORE COAX/CONNECTORS.

TIMES MICROWAVE LMR® COAX

LMR-400	$.59/ft
LMR-400 Ultraflex	$.89/ft
LMR-600	$1.19/ft
LMR600 Ultraflex	$1.95/ft

TOWER HARDWARE

3/8"EE / EJ Turnbuckle	$11/12
1/2"x9"EE / EJ Turnbuckle	$18/19
1/2"x12"EE / EJ Turnbuckle	$21/22
3/16" / 1/4" Big Grips	$5/6

PLEASE CALL FOR MORE HARDWARE.

HIGH CARBON STEEL MASTS

5 FT x .12" / 5 FT x .18"	$35/59
10 FT x .18" / 11 FT x .12"	$129/80
16 FT x .18" / 14 FT x .12"	$179/109
19 FT x .12" / 21 FT x .18"	$129/235
22 FT x .25" / 24 FT x .25"	$349/379

GAP ANTENNAS

Challenger DX	$289
Challenger Counterpoise	$29
Challenger Guy Kit	$19
Eagle DX	$299
Eagle Guy Kit	$29
Titan DX	$329
Titan Guy Kit	$29
Voyager DX	$409
Voyager Counterpoise	$49
Voyager Guy Kit	$45

PLEASE CALL FOR DELIVERY INFO.

LAKEVIEW HAMSTICKS

9106	6m	9115	15m	9130	30m
9110	10m	9117	17m	9140	40m
9112	12m	9120	20m	9175	75m

All handle 600W, 7' approximate length, 2:1 typical VSWR .$24.95

HUSTLER ANTENNAS

4BTV/5BTV/6BTV	$129/169/199
G6-270R, 2m/70cm Vertical	$169
G6-144B/G7-144B	$109/179

HUSTLER RESONATORS IN STOCK.

ANTENNA ROTATORS

M2 OR-2800P	$1249
HAM IV / T2X Tailtwister	$499/569
Yaesu G-450A	$249
Yaesu G-800SA / G-800DXA	$329/409
G-1000DXA	$499
Yaesu G-2800SDX	$1089
Yaesu G-550 / G-5500	$299/599

ROTATOR CABLE

R62 (#18)	$.32/ft.
R81/82/84	$.25/ft./.39/ft./.85/ft.

PHILLYSTRAN GUY CABLE

HPTG1200I	$.45/ft
HPTG2100I	$.59/ft
PLP2738 Big Grip (2100)	$6.00
HPTG4000I	$.89/ft
PLP2739 Big Grip (4000)	$8.50
HPTG6700I	$1.29/ft
PLP2755 Big Grip (6700)	$12.00
HPTG11200	$1.89/ft
PLP2758 Big Grip (11200)	$18.00

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TX SERIES CRANK-UP TOWERS

• Handles 35 square feet of antenna load at 50 MPH, 14.75 square feet at 70 MPH.

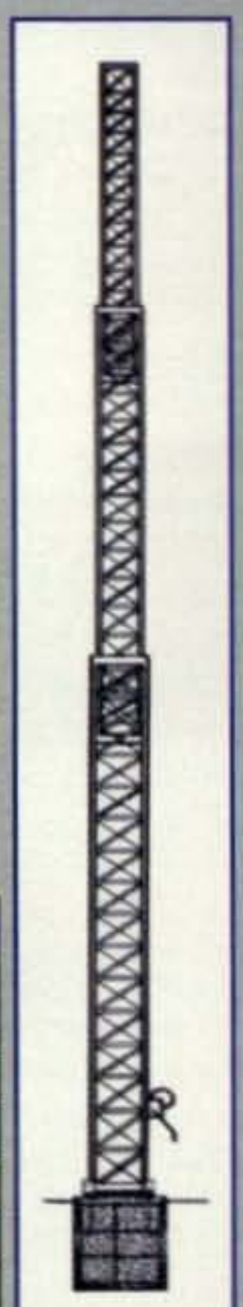
• All models supllied with hinged T-base, anchor bolts, hand winch (except motor drive models), top plate, and rotor plate.

• MDP & MDPL models include motor drive

• Options include coax arms, raising fixtures, masts, motor drives, and more!

Now shipping from CA for west coast customers, and KS for east coast and midwest customers, to reduce freight cost!

TX SERIES HEAVY DUTY CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
TX-438	38'	21'6"	355	$1,523	$1,379
TX-455	55'	22'	670	$2,107	$1,899
TX-472	72'	22'8"	1040	$3,462	$3,139
TX-472MDP	72'	22'8"	1210	$5,571	$5,049
TX-489MDPL	89'	23'4"	1800	$9,034	$8,239



HDX SERIES CRANK-UP TOWERS

• Heavy duty, handles 44.7 square feet of antenna load at 50 MPH, 35 square feet at 70 MPH.

• All models supllied with hinged T-base, anchor bolts, hand winch (except motor drive models), top plate, and rotor plate.

• MDPL models include motor drive

• Options include coax arms, raising fixtures, masts, motor drives, and more!

Now shipping from CA for west coast customers, and KS for east coast and midwest customers, to reduce freight cost!

HDX SERIES HEAVY DUTY CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
HDX-538	38'	21'6"	600	$1,807	$1,649
HDX-555	55'	22'	870	$3,162	$2,889
HDX-572MDPL	72'	22'8"	1600	$8,281	$7,549
HDX-589MDPL	89'	23'8"	2440	$10,841	$9,899
HDX-689MDPL	89'	23'8"	3450	$20,943	$19,129
HDX-5106MDPL	106'	24'8"	3700	$22,791	$20,799

MA SERIES CRANK-UP MASTS

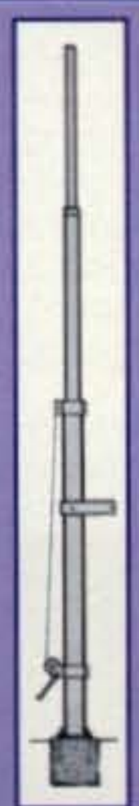
• Handles up to 22 square feet of antenna load. (See chart below)

• MDP models include motor drive.

• All models supllied with anchor bolts, load-actuated hand winch, and house bracket.

• Options include coax arms, raising fixtures, motor drives, self-supporting and rotator bases, remote control panel, and more!

Now shipping from CA for west coast customers, and KS for east coast and midwest customers, to reduce freight cost!



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	$1,099
MA-550	55'	22'1"	435	22	9	$1,875	$1,699
MA-550MDP	55'	22'1"	620	22	9	$3,584	$3,249
MA-770	71'	22'10"	645	15.5	5.5	$3,091	$2,799
MA-770MDP	71'	22'10"	830	15.5	5.5	$4,890	$4,449
MA-850MDP	85'	23'6"	1128	15.3	6.3	$6,591	$5,999

TMM SERIES COMPACT CRANK-UP TOWERS

• Handles 20 square feet of antenna load at 50 MPH, 8 square feet at 70 MPH.

• Compact design is great for areas with tower restrictions, or where a less intrusive installation is desirable.

• All models supllied with hinged T-base, anchor bolts, load-actuated hand winch, 8' steel mast, top plate, and rotor plate.

• Options include coax arms, raising fixtures, motor drives, thrust bearing, remote control panel, and more!

Now shipping from CA for west coast customers, and KS for east coast and midwest customers, to reduce freight cost!

TMM SERIES COMPACT CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
TMM-433SS	33'	11'4"	315	$1,626	$1,479
TMM-433HD	33'	11'4"	400	$1,970	$1,789
TMM-541SS	41'	12'	430	$2,135	$1,939

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Will Nextel phones replace ham radio? This phone is set up for Direct Talk®. (Photo courtesy of Nextel website)

It's clear that Nextel systems will not cover that large an area, but neither will some two-way radio systems, such as FRS (Family Radio Service). Even if a group with Nextel radios is deployed, they would be better served by having a ham with them who could communicate over longer distances. Workers who were used to being teamed up with a ham radio operator will find that they will have to stop what they are doing and attempt to get a message through. The phones don't offer the amateur radio infrastructure of nets for different purposes and the possible use of different modes such as APRS and video.

Meetings are scheduled between TORRA and the Tournament of Roses early this year. It will be interesting to see what happens next. It is clear that having a handheld radio may not be enough to continue to provide our traditional public-service activities.

Pooling Resources

Last November, enhanced cooperation between amateur radio's emergency-service organizations was the subject of a groundbreaking conference attended by regional leaders from New York and New Jersey. The 20 participants included members of the Amateur Radio Emergency Service; Radio Amateur Civil Emergency Service; and Army, Air Force, and Navy-Marine Corps contingents of the Military Affiliate Radio System. ARRL Assistant Field Service Manager Steve Ewald, WV1X, represented the ARRL, as did Pete Cecere, N2YJZ, Eastern New York Section Manager, and Tom Carrubba, KA2D, New York City-Long Island Section Emergency Coordinator.

The Army MARS newly designated New York ARRL liaison officer, Richard Meirowitz, WA2ELE, organized the session, which was chaired by state MARS director Steve Pertgen, W2FXJ. It was hosted by Castle Point VA Medical Center in the Hudson Valley north of New York City.

Informal cooperation is nothing new to ARES, RACES, and MARS members, many of whom participate as individuals in two or even all three of the organizations. The day-long focus at Castle Point was on launching more formal collaboration regionally and nationally.

Keynote speaker Robert Hollister, N7INK, Eastern Area Coordinator from Army MARS headquarters, Ft. Huachuca, AZ, said he hoped MARS management and ARRL headquarters would both pursue the goal of interoperability. To jump-start that, he provided an overview of the Department of Defense MARS program with emphasis on the emergency communication support to a wide variety of military and government response agencies.

The amateur and military services already collaborate once a year on Armed Forces Day, when operators from both are invited to communicate across the bands—hams listening on previously announced military frequencies and responding on their own, and

Georgia Hams Walk on Water

Members of the Oconee County Amateur Radio Society (OCARS) recently installed an eight-bay Maxrad 2-meter commercial-grade antenna atop the new million-gallon Oconee County (GA) Water Tower. The base of the tower is at 1250 feet above sea level with the tank top at 165 feet above the ground. OCARS is excited about this installation being a vital link for its ARES and RACES communication commitments.

Shown in one of the photos is the climbing crew—Larry Cole, N4IWP, in the white hat, and Marty Williamson, KB4ZUN, in the black hat. Ground crew (not pictured) Don Wingo, N6LHZ; Greg Brooks, N4ULL; Tommy Strickland, KD4DTT; and Lee Schram, W4DKA, pulled the ropes and made sure the tools and supplies—and the crew—went up and came down safely. The tower itself is 165 feet tall.

Larry Cole, N4IWP, and Marty Williamson, KB4ZUN, complete the repeater antenna installation in Georgia.

Having the opportunity to walk on water may be a great experience, but getting there can be a challenge. (Photo courtesy Bill Ronay, KM4LS)

Larry communicated to the ground using his Alinco HT until he dropped it from the 155-foot level after going through the first of three wasp nests at "check points" along the two ladders leading to the top of the tower. Miraculously, after making the several trips to the top of the dome, neither reported even a near-sting. The Alinco (except for a slight dent or two) still works just fine!

OCARS, formed nearly nine years ago as a communications support unit for the Oconee County EMA, has steadily grown and proudly earned the respect of Quinton Still, Oconee County EMA Director. OCARS has a permanent position in the EOC. OCARS also maintains an area 2-meter link with the Athens Regional Medical Center in nearby Clarke County. As EMA Director, Quinton Still relies on OCARS' expertise. Recent ARES and RACES training drills have proven the Oconee Water Tower site to be strategic.

With this Maxrad installation, OCARS is now able to communicate across more than a dozen counties in northeast Georgia. Future plans to extend coverage even farther include installation of additional antennas in adjoining counties.

vice versa. Several pilot operations have also employed ARES/RACES members in past Army Reserve exercises at the local level.

A suggestion was made that the ARRL use its contacts with the Federal Communications Commission to obtain clearance for a similar program of year-round interoperability in training and emergency situations.

It was also proposed that the amateur community assist MARS in its mission of providing early-warning notification of emergency situations—"Essential Elements of Information" (EEI) messages—for relay to DoD and the Department of Homeland Security.

After Hollister's briefing on overall MARS operations, MARS eastern area emergency operations chief John Scoggin, W3JKS, of Wilmington, DE described the organization's emergency operations as deployed in countrywide Army Signal exercise Grecian Firebolt last summer. State MARS Director Pertgen then outlined ongoing operations in the immediate region. Steve Ewald called attention to the Emergency Communication Certification courses and tuition grants available for hams completing them.

The familiarization talks were followed by discussion of specific areas where interoperability can be put to work. Bob Hollister suggested that ARES/RACES participation in the next annual Army Signal exercise be worked out on a state-by-state basis. Also proposed was designation of MARS-ARRL liaison officers at the state level, following the example of Dick Meirowitz in New York.

A retired aerospace engineer with three U.S. patents to his name, Dick has been a ham since 1949 and a MARS member since 1952 (while still in college). At the suggestion of state director Pertgen, Meirowitz ran his own feasibility test of MARS-ARES-RACES collaboration during the Grecian Firebolt-04 Army Reserve exercise last summer. It was, Meirowitz said, "a small but successful joint effort." Outside New York, Meirowitz is known among MARS members as co-leader of an antenna construction seminar conducted on the air several years ago. He is currently developing a broadband field antenna for emergency use. Dick holds the position of Army MARS Antenna Coordinator on the special staff of Army MARS Chief Robert Sutton.

Eastern Area Coordinator from Army MARS Robert Hollister, N7INK, operates from a remote location. (Photo courtesy Charles Morris, N7DQS)

A New Year

This month we've taken a look at some new cooperation among MARS, ARES, and RACES. We've also seen that technology is catching up to us in the types of communications that are available to the general public and the agencies we serve. This year I'd like to take a look at some ways groups are using technology in public-service events. Is there an event you cover that uses something besides HTs to communicate during the event or a management technique that helps make the event run more smoothly? Drop us a note and let us know.

This month I would like to thank Bill Sexton, NI1N, and Bill Ronay, KM4LS, for supplying information.

What new projects are you going to take on this year? I already have one in mind. What's yours? Until next time . . .

73, Bob, WA3PZO

Crystal Sets—Build 'em for Fun

BY DAVE INGRAM,* K4TWJ

Oh, those dear little crystal sets! We built them as kids, we are still building them as adults, and they continue to stand as popular homebrew items among radio amateurs and electronic enthusiasts of all ages. What is so special about crystal sets? They are easy and fun to assemble and get working, they are original free-play radios, and they also make handy survival radios for emergency preparedness. Experimenting with different circuit configurations and detectors is another reason for the great interest in crystal sets.

Some folks have made dozens of crystal sets—

Photo A– This shortwave crystal set made by KF4YJQ uses a popular 1N34 glass-encased diode and double-tapped 7-turn coil to tune from the AM broadcast band to approximately 12 MHz. Circuit details are in fig. 1(B).

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

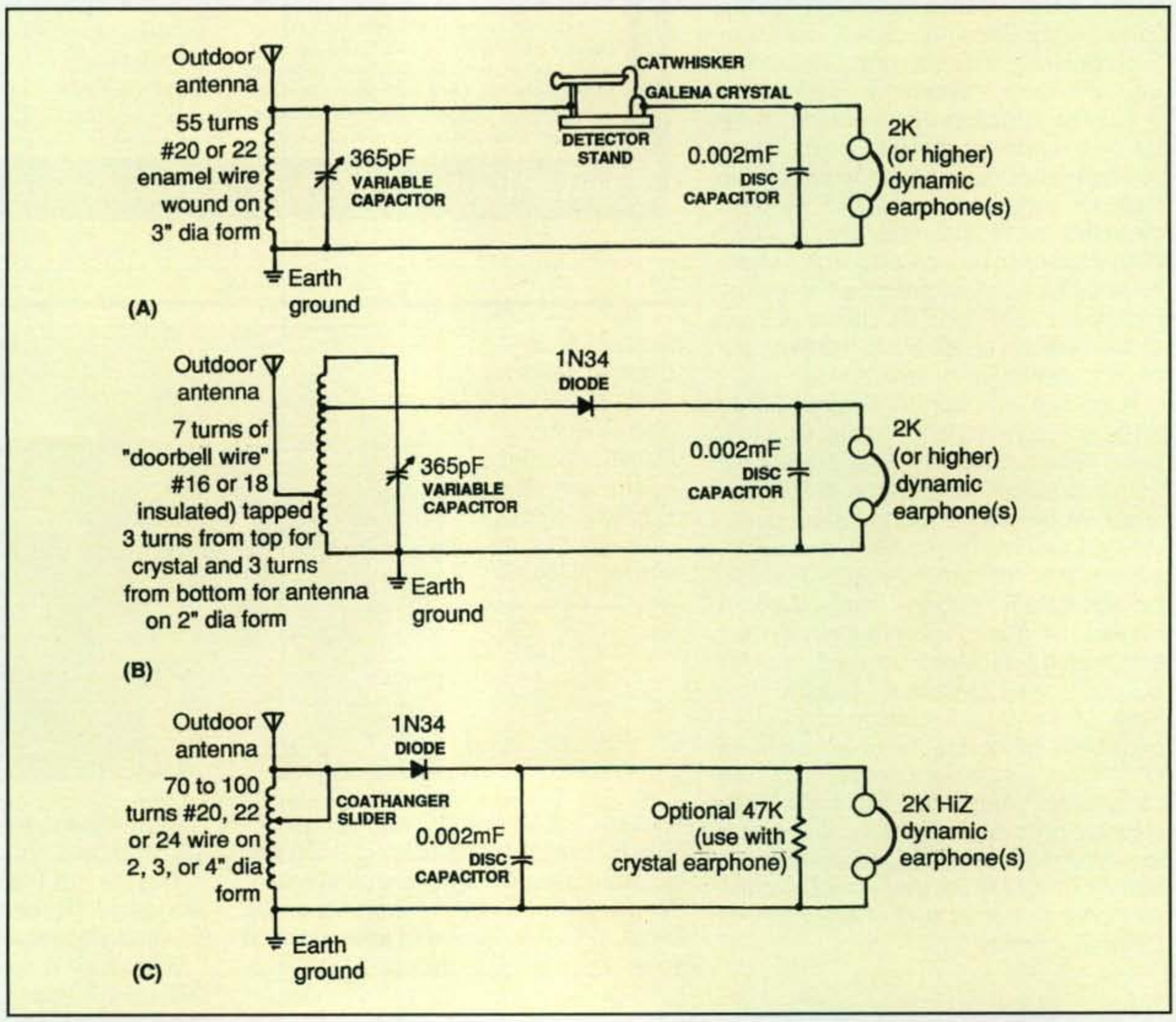

Fig. 1– Three popular circuit diagrams of crystal sets like those featured in this month's column. (A) and (B) coincide with the sets built by KF4YJQ (photo A and C). (C) is a "generic" and easy-to-build version.

NEW from Kuranishi Instruments LTD, Japan
BR-210 Professional-Grade SWR/Antenna Analyzer

Perform SWR and impedance measurements with confidence! The BR-210 is a laboratory grade precision test instrument providing a wide-band RF signal source for analyzing antenna systems and other equipment without the need for a separate transmitter. • 1.8-170MHz • High precision meter • 500mW 50 Ohm dummy load included • Impedance measurements: 12.5 - 300 Ohm • Connector: SO-239

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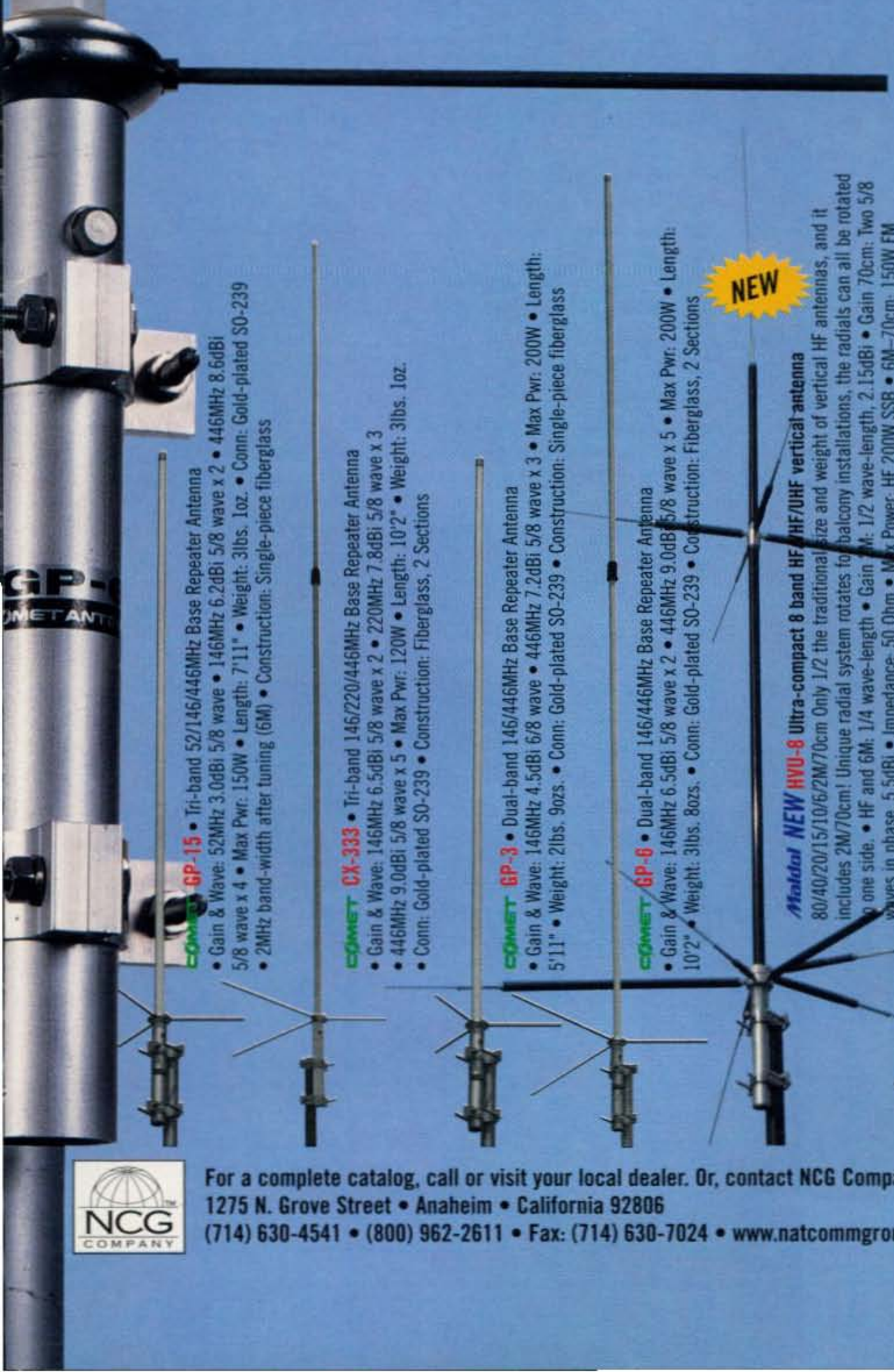
Dualband and Multiband Base Antennas

Wi-Fi/802.11b/LAN/HSMM Access Point Antennas



COMET GP-15 • Tri-band 52/146/446MHz Base Repeater Antenna
• Gain & Wave: 52MHz 3.0dBi 5/8 wave • 146MHz 6.2dBi 5/8 wave x 2 • 446MHz 8.6dBi 5/8 wave x 4 • Max Pwr: 150W • Length: 7'11" • Weight: 3lbs. 1oz. • Conn: Gold-plated SO-239
• 2MHz band-width after tuning (6M) • Construction: Single-piece fiberglass

COMET CX-333 • Tri-band 146/220/446MHz Base Repeater Antenna
• Gain & Wave: 146MHz 6.5dBi 5/8 wave x 2 • 220MHz 7.8dBi 5/8 wave x 3
• 446MHz 9.0dBi 5/8 wave x 5 • Max Pwr: 120W • Length: 10'2" • Weight: 3lbs. 1oz.
• Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

COMET GP-3 • Dual-band 146/446MHz Base Repeater Antenna
• Gain & Wave: 146MHz 4.5dBi 6/8 wave • 446MHz 7.2dBi 5/8 wave x 3 • Max Pwr: 200W • Length: 5'11" • Weight: 2lbs. 9ozs. • Conn: Gold-plated SO-239 • Construction: Single-piece fiberglass

COMET GP-6 • Dual-band 146/446MHz Base Repeater Antenna
• Gain & Wave: 146MHz 6.5dBi 5/8 wave x 2 • 446MHz 9.0dBi 5/8 wave x 5 • Max Pwr: 200W • Length: 10'2" • Weight: 3lbs. 8ozs. • Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

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• Conn: SO-239 • Height: Only 8'6" • Weight: 5lbs. 7ozs.

COMET GP-9/GP-9N • Dual-band 146/446MHz Base Repeater Antenna • BEST SELLER!
• Gain & Wave: 146MHz 8.5dBi 5/8 wave x 3 • 446MHz 11.9dBi 5/8 wave x 8 • Max Pwr: 200W • Length: 17'8" • Weight: 5lbs. 11ozs. • Conn: GP-9 Gold-plated SO-239 • GP-9N Gold-plated N-type female • Construction: Fiberglass, 3 Sections

COMET GP-24 The standard high gain 2.4GHz access point antenna for maximum range/signal strength • 2400-2500MHz • Gain: 15.4dBi • Length: 5'10" • Weight: 2lbs. 9ozs. • Conn: Gold-plated N-female • Construction: Heavy-duty white fiberglass radome

COMET GP-24-3 The same physical high gain 2.4GHz antenna as the GP-24, but with a 3-degree electrical downtilt to concentrate the signal to the horizon and below

COMET GP-24-S Medium gain access point antenna for applications where maximum distance is not as important as a solid signal around and directly below the antenna. • Gain: 9.9dBi • Length: 3'9"
• Weight: 1lb. 14ozs. • Conn: Gold-plated N-female • Construction: Heavy-duty white fiberglass radome

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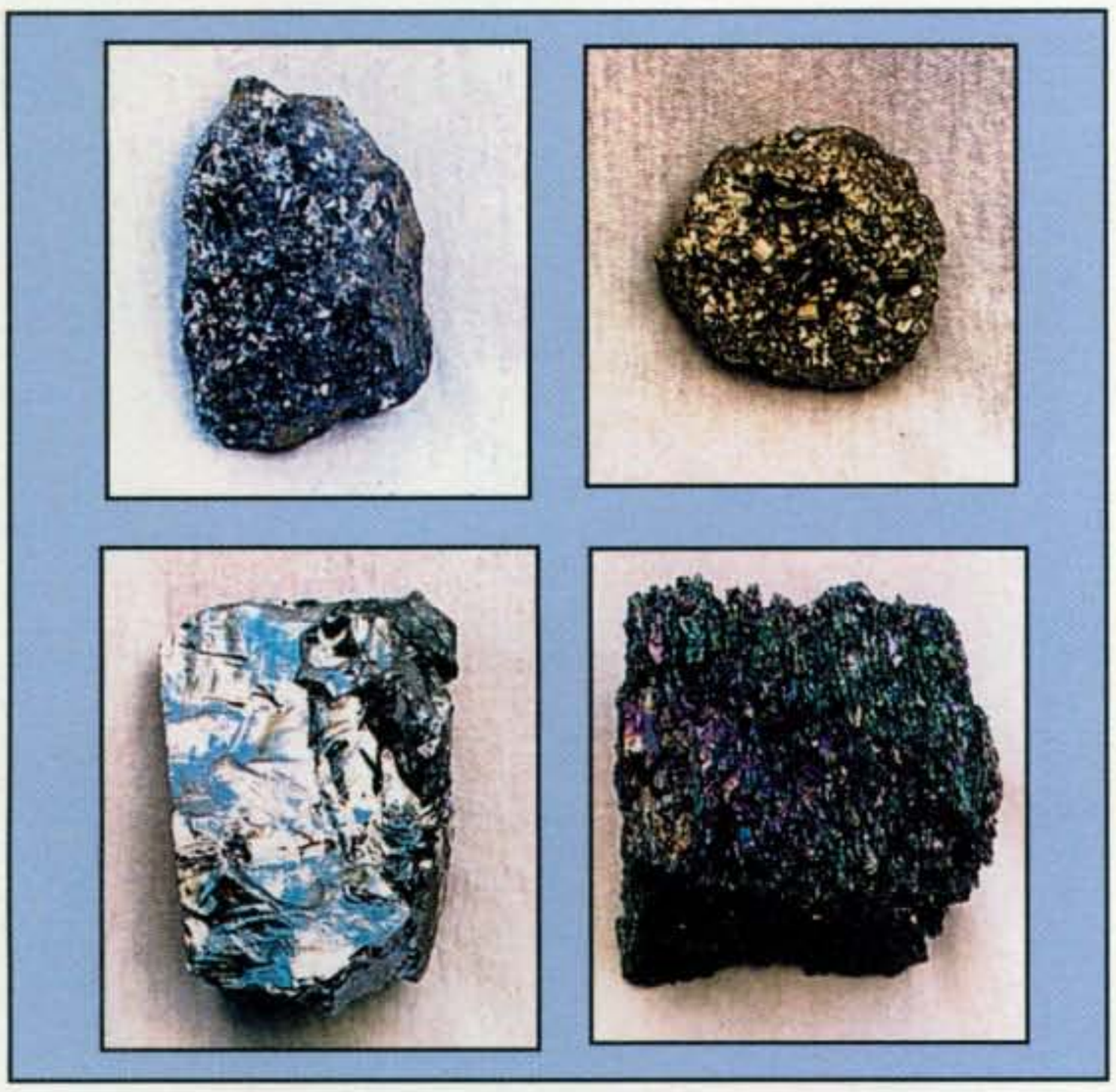

Photo B– Here you see four popular types of crystals used in catwhisker-type detector stands. They are (in order of preference) galena (top left); iron pyrites, or "fools gold" (top right); silicon (lower left); and carborundum (lower right). Each crystal chunk shown is approximately 2.5 inches in size. Lance Borden, WB5REX, sells them in small pieces to fit in cups for detector stands. (Photo courtesy WB5REX)

some using glass-encased diode detectors, some using catwhiskers and galena crystals in open detector stands, some modified into field strength meters, and more. Such dedication truly warrants recognition, so this month's column highlights those eternally cherished crystal sets, with a hearty invitation to build one or two yourself! What style or design to choose? We will share some thought-provoking ideas and views, and then let you make that call. Fair enough?

We sense some new amateurs may be reading this column and asking exactly what crystal sets are and what frequency ranges they cover. Simply explained, they were our very first radio receivers. Most of the circuit configurations are similar; the main differences are associated with physical layout and coil size. Most crystal sets use a large coil with 60 to 100 turns of wire and cover the AM broadcast band. Some crystal sets—such as the one built by our good friend Walt Bullerwell, KF4YJQ, and shown in photo A—use a coil with only a few turns to cover the shortwave spectrum up to around 12 MHz. Although a sort of "dink" project, it is also possible to use an external signal-generating source (like the one included in my Super Mite mini-transmitter featured in August 2004 *CQ*) as a wireless BFO (beat frequency oscillator) to copy CW on a crystal set—that is, assuming you use a good outdoor antenna and incoming signals are rather strong. Crystal sets lack RF and AF amplifier stages and thus are not too sensitive.

You can also assemble a crystal set to receive the (118 MHz) AM aircraft band or the (88 to 108 MHz) FM broadcast band. In fact, a fascinating article written by Peter Bertini describing how to build an FM crystal set appeared in November 2004 *Popular Communications* magazine, and copies are available from CQ Communications. Finally, you can build a crystal set with a small coil and glass-encased diode and use a sensitive meter (250 microamp ideal, 1 milliamp acceptable) in lieu of an earphone to make a neat field strength meter that is perfect for checking antennas. As I said earlier, experimenting with crystal sets is a blast!

Catwhiskers and Galenas

One of the main components in a crystal set is (obviously enough) its crystal, and investigating various types used over the years shows us how both the crystals and radio evolved from, well, rocks or minerals. Prior to the days of glass-

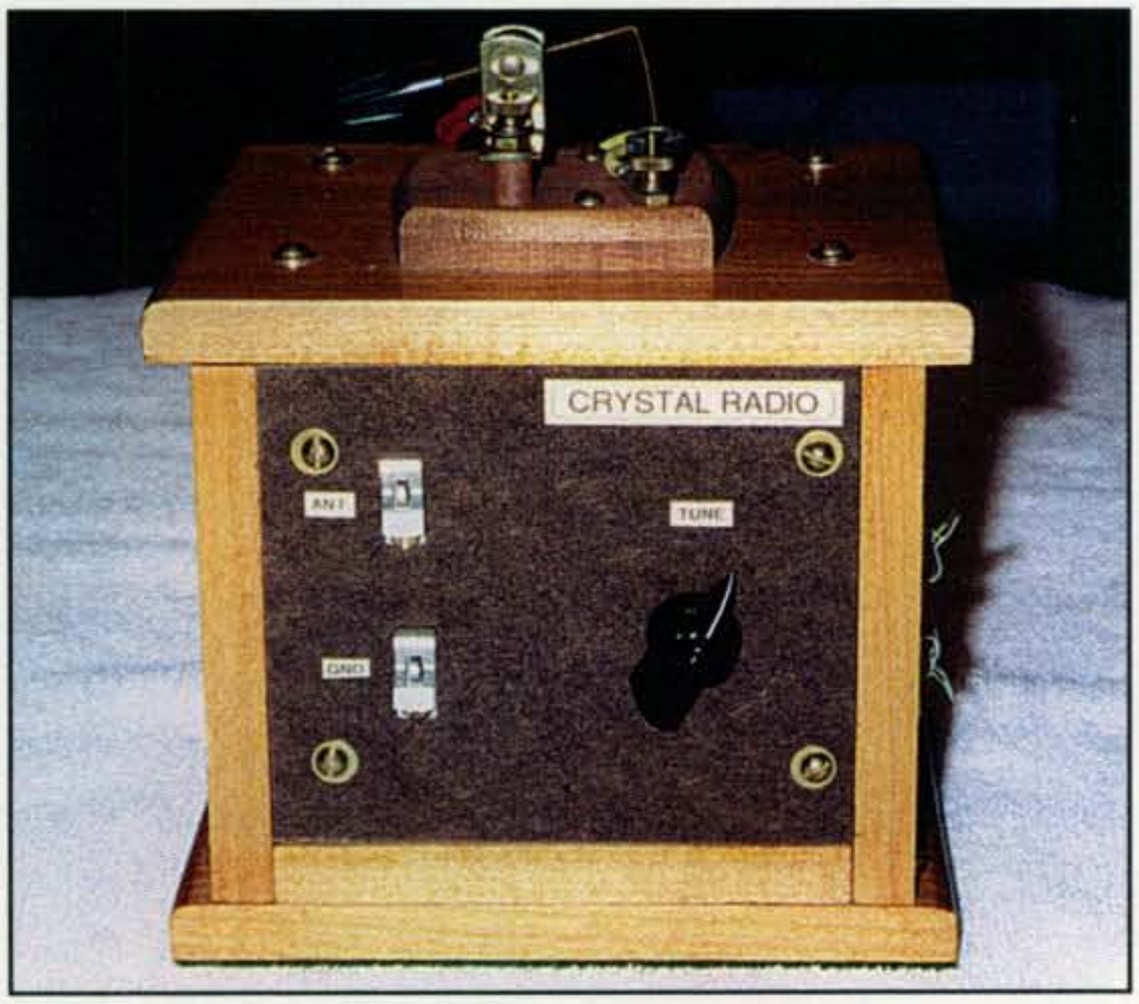

Photo C– This trim little wood-encased crystal set was made by Walt Bullerwell, KF4YJQ. It sports an authentic 1910-style detector stand with catwhisker and galena crystal, features a large coil and variable capacitor mounted inside the box, and tunes the AM broadcast band (circuit details in fig. 1[A]). (Photo courtesy KF4YJQ)

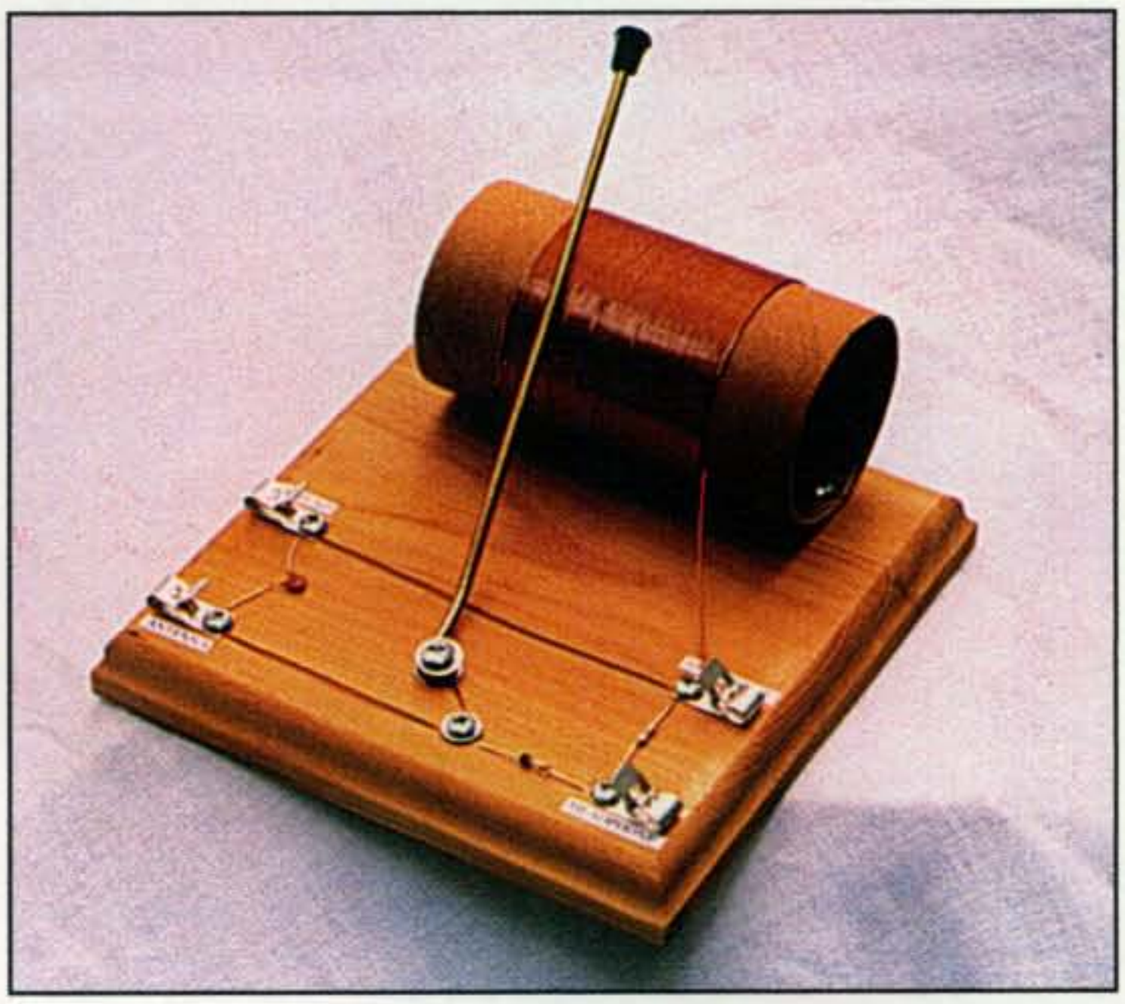

Photo D– Lance Borden's "Picard"-version kit crystal set is complete with all the pieces, including sandpaper for removing enamel from the coil wire. It tunes the AM broadcast band. The plaque-type base has pre-drilled holes for screws. A glass-encased or stand-type detector may be used. (Photo courtesy WB5REX)

enclosed diodes, open-air crystal detectors using nuggets of iron pyrites (or "fools gold"), galena, silicon, or carborundum (photo B) secured in a small metal cup on the detector stand (as shown in photo C) were used to detect radio signals. A thin wire (nicknamed a "catwhisker") attached to the stand's

A Heart-Healthy Crystal Set

Would you like to home-assemble your own retro version of an all-time favorite crystal set? Build a heart-healthy Quaker Oats® box crystal radio. It is a genuine classic, and since you will eat the oats prior to building the radio, you will be working to lower your cholesterol in the process! Who knows? You may even become hooked on building oats-box sets in different styles and start displaying them throughout your home and office. They are irresistible!

Here Lance Borden, WB5REX, shows us the "quick and easy" way to make an oats-box set. Simply cut off the box top and bottom, wind 100 to 120 turns of No. 18 or 20 enamel-coated magnet wire on the box, secure the wire ends, and then mount the box on a wood base. Next cut a metal coat hanger to serve as a tuning rod. Bend a small loop at one end so it can be secured to the wood base with a screw and flat washer, and then sand the coating from the rod and coil wire where they contact one another. Check with your ohmmeter to ensure good coil-to-rod conductivity across the coil's full length, and then assemble the remaining circuit according to the accompanying diagram. Lance used an authentic golden-oldie detector stand with a galena crystal mounted in its holder, or cup, for authenticity, but you may substitute a modern 1N34 ("glass") diode if desired.

Remember to use only a high-impedance earphone (2K ohm or higher); low impedance earphones or earbuds (8, 16, or 32 ohms) do not work in crystal sets. A high-impedance crystal earphone is usually the least expensive and most preferred type (it has a crisp, clean sound). It will appear as an open circuit to the crystal set, so connect a 47K ohm (or 68K ohm, as it's not critical) 1/2-watt resistor in parallel with the earphone during hookup. As an alternative, use a 2K ohm (or higher) dynamic-type earphone and omit the resistor.

This quickly assembled crystal set uses a regular- or large-size oats box for the coil form and a genuine galena crystal in an authentic 1910 detector stand. It is a classic!

If you prefer to make a more deluxe oats-box crystal set, do not cut the ends from the box. Mount the coat hanger on standoffs or metal spacers near each end and add a sliding metal ball to the coat hanger so it can move up and down the coil for tuning. We will leave exact mechanical details to your creative ingenuity. Route the interconnecting wires and 1N34 crystal inside the box; add screws with double nuts for antenna, ground, and earphone terminals; connect a long outside antenna; and have fun. That's the purpose of dinking with crystal sets!

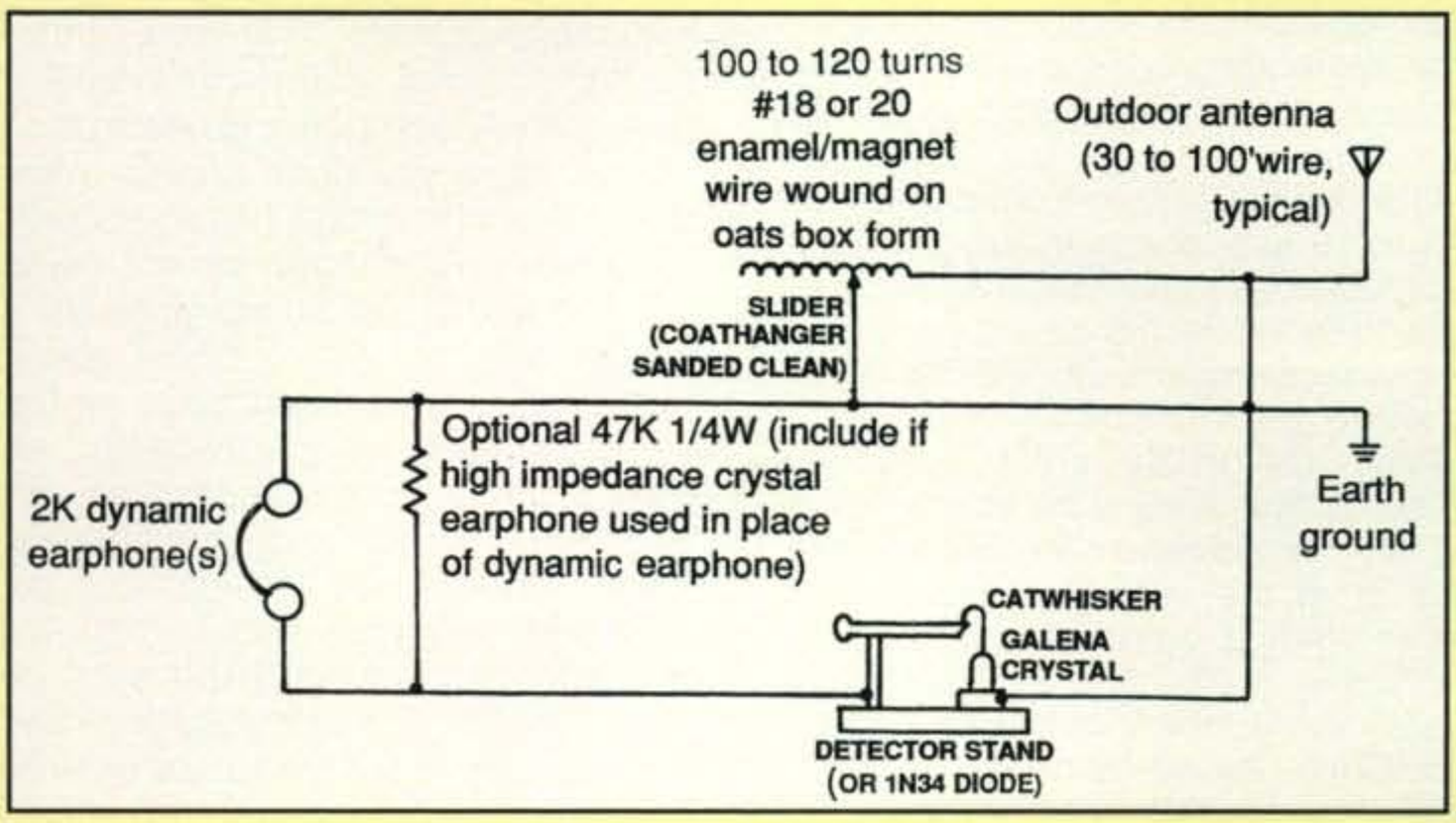

Diagram of the oats-box crystal set.

adjustable arm was moved over the crystal's surface until it located its most sensitive spot for detection, and then the spot was marked for future reference.

Sharp "wireless" operators kept several pre-marked crystals ready for use in the event one burned out due to a surprise thunderstorm or damage from a nearby high-power transmitter. Spark operators aboard large ships especially were aware of the need for extra pre-marked crystals, as another ship could pass by while in port and unexpectedly begin transmitting at any time (ZAP!). That is why many high-power stations are still referred to as "rock crushers." Use a magnifying glass to look inside a modern glass-enclosed diode such as the ever-popular 1N34 and you will see an ultra-small wire, or "catwhisker," touching a very tiny germanium crystal chip. It is a miniature version of an original galena-and-catwhisker detector of the early 1900s!

The refinement and sale of crystals for detectors reached a high level of popularity during the 1910s, with several small companies offering both detector stands and ready-to-use crystals. The crystals are rather scarce today, but our good friend and column guest Lance Borden, WB5REX, has a small supply of crystals (and stands) available for sale. If you wish to make an authentic 1910-style radio, that's the way to go!

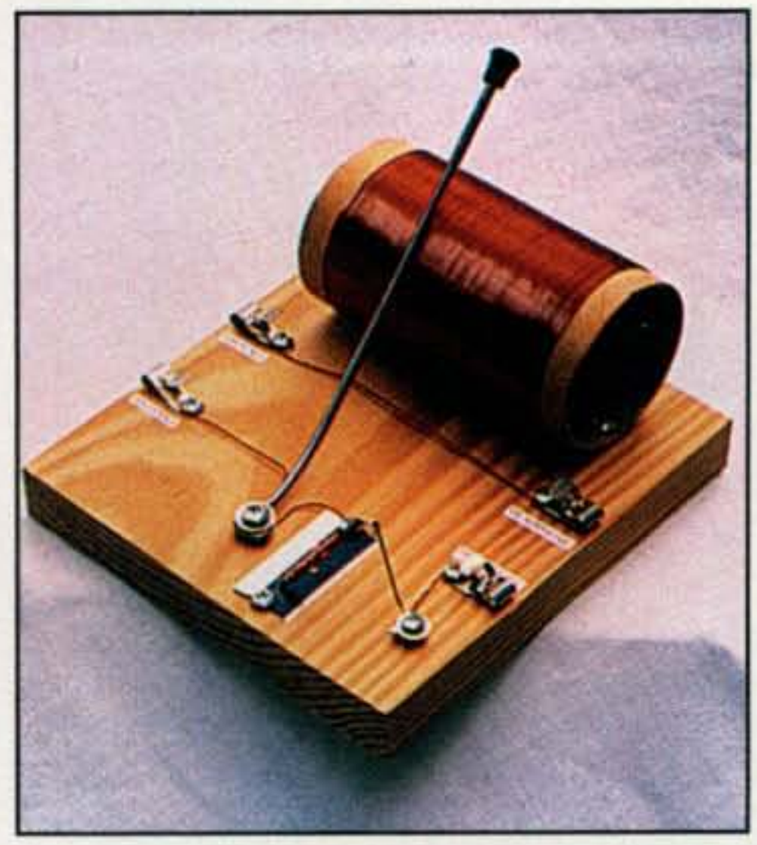

Photo E– Lance Borden's World War II Foxhole version kit crystal set is authentic-retro right down to its blue, single-edge Pal razor blade and wood pencil lead detector like included in a GI's field kit. The circuit is similar to that of the Borden's Oats box set shown in the sidebar, except the tuning rod connects to the antenna and detector rather than the ground side of coil. (Photo courtesy WB5REX)

Cool Kits

Are you enthusiastic about building crystal sets but are turned off by the parts-hunting aspect? Consider a ready-to-assemble kit such as the ones available from Lance Borden (photos D, E, and F). Each kit comes with a pre-punched wood base and custom coil form, a large spool of magnet wire, all the small hardware, and even sandpaper for scraping enamel from ends of coil wire. Accompanying instructions are superb and include an informative discussion of the set's history as well.

Borden's Picard-version kit crystal set (photo D) is straightforward in design and uses a 1N34 diode. However, it is laid out so a vintage detector stand with catwhisker and galena can be substituted (sheer class for sure!). The coil consists of approximately 75 turns on a 2 1/4-inch form with pre-drilled end holes. Winding goes so smoothly that I wound the set's coil while sitting in a hospital waiting room. I just positioned the feed spool between by feet/shoes and wound turns on the form in my lap while sitting in a chair.

Don't Forget! Join in the CQ Gang Activity

In honor of *CQ*'s 60th anniversary this year, we're sponsoring a special on-the-air activity during the first 60 days of 2005, from January 1 through March 1. Any ham who's ever had any connection with *CQ* magazine, as a columnist, author, or even subscriber, may sign "/60" after his or her callsign during this period and everyone's invited to contact enough "/60" stations to qualify for the "CQ Gang Award."

Plus, CQ club station WW2CQ will be on the air from around the country, signing "/61" for operation in the first call area, "/62" from the second call area, etc. We're offering a special certificate for contacting WW2CQ in all ten US call areas. See complete details on both the CQ Gang Award and the WW2CQ operation in last month's issue of *CQ* (December 2004, page 22), or on our website at <http://www.cq-amateur-radio.com>.

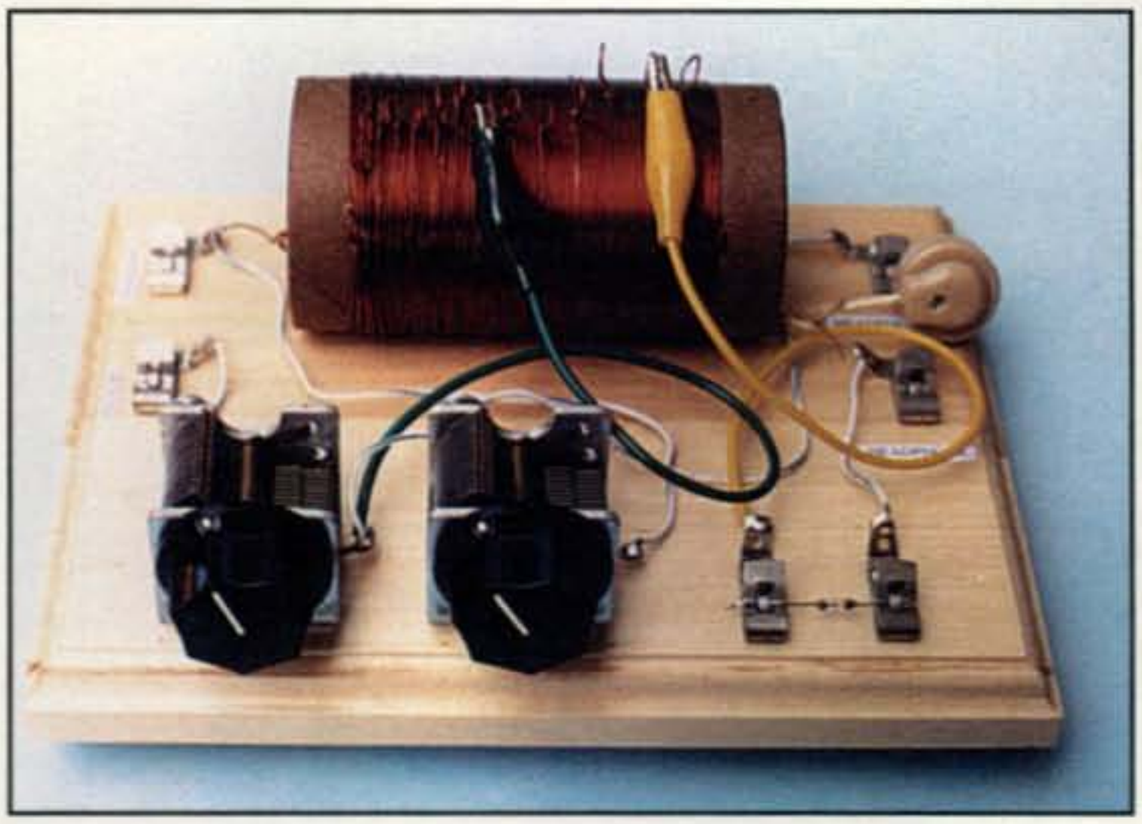

Photo F– Borden's deluxe Dunwoody kit crystal set uses a double-tuned and multi-tapped coil and covers both the AM broadcast band and shortwave spectrum up to around 10 MHz. The little gem has a fine-crafted wood base, and sensitive crystal earphone and works quite well. (Photo courtesy WB5REX)

The World War II Foxhole kit crystal set (photo E) is famous for its use by GIs during the war. It served as an endless source of timely news and entertainment, and since it did not use a (mildly radiating) local-oscillator stage like a superheterodyne radio, enemy forces with "sniffers" could not track it down. Lance must have access to a time capsule, as we have not seen genuine Pal single-edge, blue razor blades as used in this receiver for sale in many moons (and no, stainless-steel blades cannot be substituted as detectors).

The deluxe Dunwoody kit crystal set (photo F) is slightly more challenging to build, but it looks great and exhibits surprisingly good performance on both the standard AM band and international shortwave broadcast bands up to around 10 MHz. An outdoor antenna and earth ground plus fairly strong signal levels are required for shortwave reception, but that is typical of any "free play" radio.

More details (and kits!) are available directly from Lance Borden, WB5REX, 13911 Kensington Place, Houston, TX 77034; telephone (nights) 281-481-0149 or <www.xtalman.com>. Lance, incidentally, is a very interesting chap. He is employed at the Johnson Space Center in Houston as a navigational and subsystem manager for the space shuttle, so he works with ultra-high-tech electronics during the day and low-tech crystal sets at night.The good life for sure!

Conclusion

That fills our available space for this month, so we will now bow out with a quick invitation to show us your favorite crystal set(s)—homebrew and/or commercially made—via future crystal set "World of Ideas" columns. Send me your photos and circuit diagrams (please note my new address on the first page of the column), and I will get some well-deserved recognition going your way. Between us, we will ensure the simple glamour and attractiveness of crystal sets continue.

73, Dave, K4TWJ

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

A Cornucopia of Neat Ideas for the Shack and Shop

Here is a collection of hints and tricks I use around the shop and shack. A lot of these ideas are not new, and unfortunately I have lost track of their originators. As one of my former bosses used to say, "If you see a good idea, steal it. We don't need to re-invent the wheel every time." Thus, here are some of my favorite ideas for the shack and shop. Feel free to steal these ideas and pass them on!

Photo 1– A coffee mug will help stabilize half-full beverage cans or a small HT on your desk or workbench.

In the Shack

First, have you ever spilled a beverage can (usually half full) all over your workbench or, worse, into your keyboard? I can honestly say that I have never done that, but I have come very close many times. Finally I figured out an easy and cheap way to keep half-full soda cans stable (see photo 1). The coffee cup can help keep a small HT from flopping down as well, especially if a long, gain-type antenna is mounted to the radio. Of course, the ceramic mug is replaced with a plastic version in the workshop; see "In the Shop" later on in the column.

Another good idea is to mount a dry-erase or bulletin board near your door to post notes to yourself of upcoming projects, contests, or radio activities or to keep shopping lists handy. The door location is also an ideal place for the fire extinguisher, first-aid kit, and telephone.

An uninterruptible power supply (UPS) is a valuable asset for your desktop computer. Prices of these units are becoming reasonable, and they are available at most office-supply stores. Computer UPS units include a battery (gel-cell), charger, and AC-to-DC power source. Of course, if your station computer is a battery-powered laptop or notebook, then you probably will not need a secondary source of power . . . well, unless your battery dies. Another type of UPS has 12 VDC output and is used for things such as security-gate systems and fire alarms. These units are more suitable for ham radio station use, as an alternate or emergency power source for small transceivers or HTs (see sidebar article and photo 2). Check to see what the output voltage is before you make your purchase.

Speaking of emergency preparedness, make sure you have a flashlight or portable (battery-powered) lamp handy at all times. An emergency lamp with rechargeable batteries should always be within reach. I have one in the kitchen and one in the master bedroom. A unit that can serve as a flashlight will have more value, so you may want to shop around at your favorite home center or hardware store to find a good one.

Do you keep a station log, paper or digital? If you do not, you should. Although the FCC Rules have not required a station log since the 1980s, you should still keep accurate station records. A log is not only a place to keep track of your contacts, it should also be a record of any maintenance needed or completed, or new equipment or station changes. If you perform public-service activities, you may wish to keep notes on the event so you can turn your notes into a nice "ham radio to the rescue" type of article.

In the Shop

One of my shop safety rules is "no glass containers or dishes allowed." This includes jars used to

Photo 2– With simple modifications, surplus UPS units such as the ones you see here can be a great source of emergency power. Look for units with a 12-volt gel-cell inside.

*16428 Camino Canada Lane, Huntington Beach, CA 92649
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The Short Vertical Antenna and Ground Radial

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This small but solid guide walks you through the design and installation of inexpensive, yet effective short HF vertical antennas. With antenna restrictions becoming a real problem, this book could keep you on the air!

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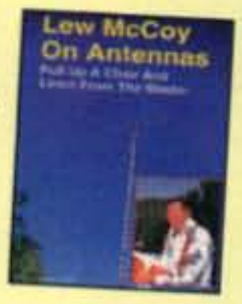
McCoy on Antennas

by Lew McCoy, W1ICP



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

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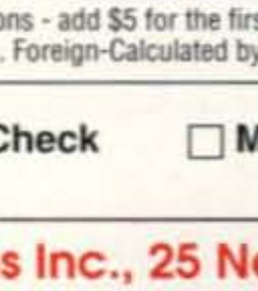
Heathkit - A Guide to the Amateur Radio Products

by Chuck Penson, WA7ZZE



This greatly expanded Second Edition is a must for collectors and Ham history buffs, but is a terrific trip down memory lane for any Ham who was there or wishes he had been. Pick up this 328-page volume and you won't be able to put it down!

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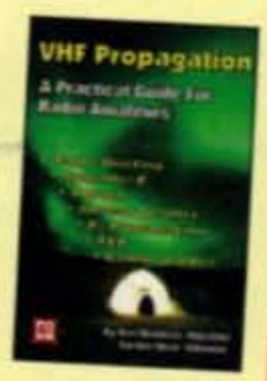

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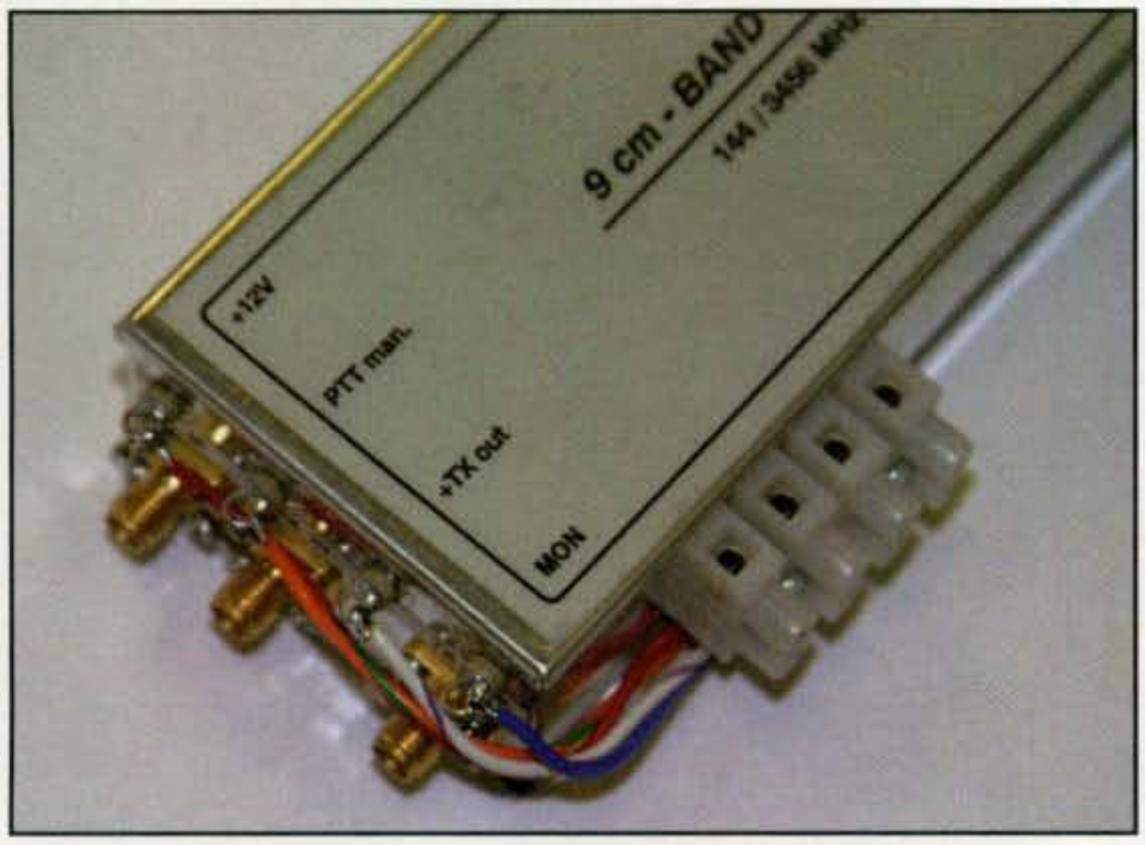

Photo 3– Ceramic feed-through capacitors are used to ensure shielding is kept intact. You can extend the life of these connectors by installing screw-type barrier strips near the connection.

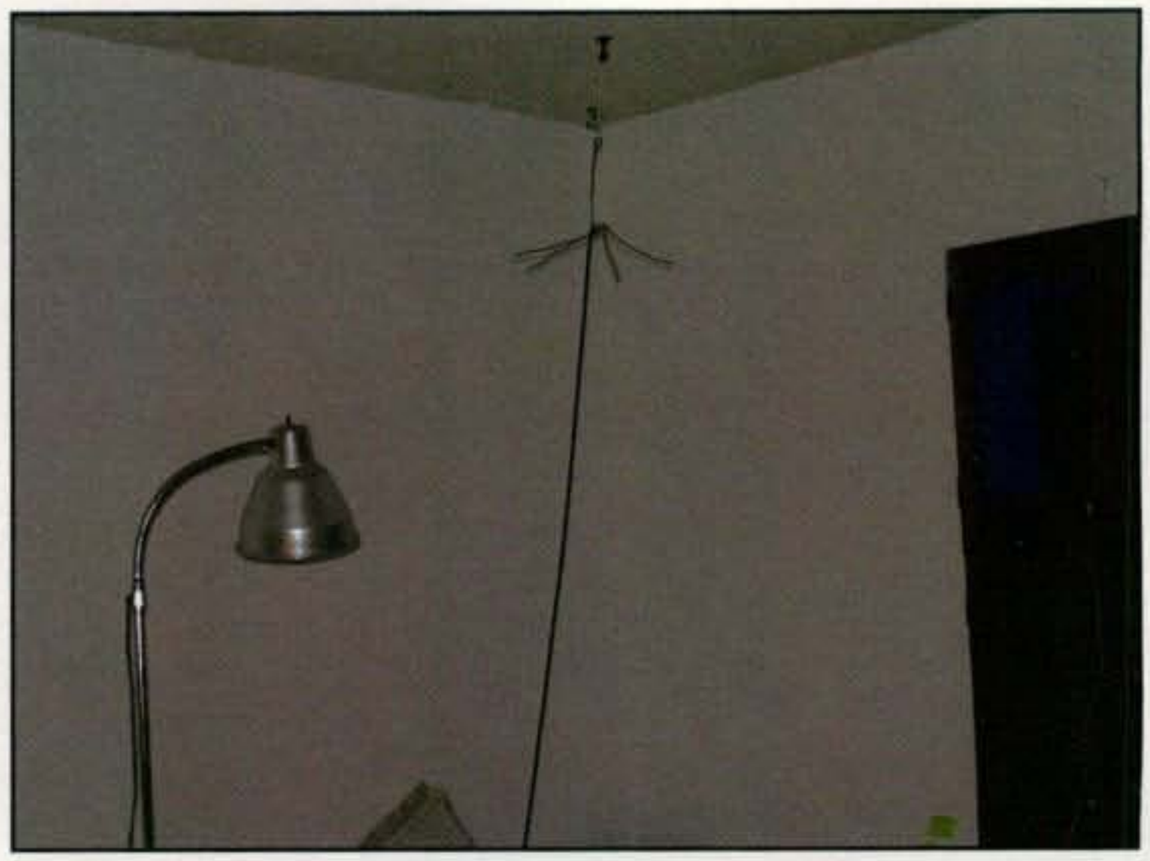

Photo 4– A simple antenna can be used for an indoor base station. Having access to your favorite repeater while working on projects can be a very useful source of instant information.

store junk-box parts, such as screws and nuts, since things always seem to want to crash to the floor, creating a double-messy safety hazard. You have to clean up the glass shards as well as what-ever was stored inside or whatever was being eaten. Plastic is the best type of container. I have standardized on 18-ounce peanut-butter containers.

Here's another good shop idea: When taking something apart, I use an old speaker magnet to hang onto screws and other fasteners. The magnet is better than the old standard muffin tin or small tray, since the screws will stay stuck to the magnet and not roll around or bounce into some crack or hole in the floor. Of course, if you are using good stainless-steel hardware, it will not stick to the magnet. Therefore, I add some double-sided tape (also known as "carpet tape") to the bottom of a tray or bowl. This sounds extreme, but I am just tired of losing hardware, especially if it is a special screw or a metric fastener that I do not have in my junk box.

Recently, just before finishing a project, I broke a ceramic feed-through capacitor, ruining a power input line. I had to re-drill and tap new threads for the new feed-through, since I did not have an exact replacement. This was a very tricky and risky repair. Now I wire my feed-through pins to screw-type barrier strips to extend the "life" of the connections. This idea is especially useful when you need to remove and

Photo 5– Pieces of scrap PVC pipe and a couple of caps ensure that small or dangerous tools are stored safely in your tool bag. The label serves two functions: It says what is inside the container, and the label is positioned on the left to indicate which end to open as an added safety precaution for sharp items that can poke or cut.

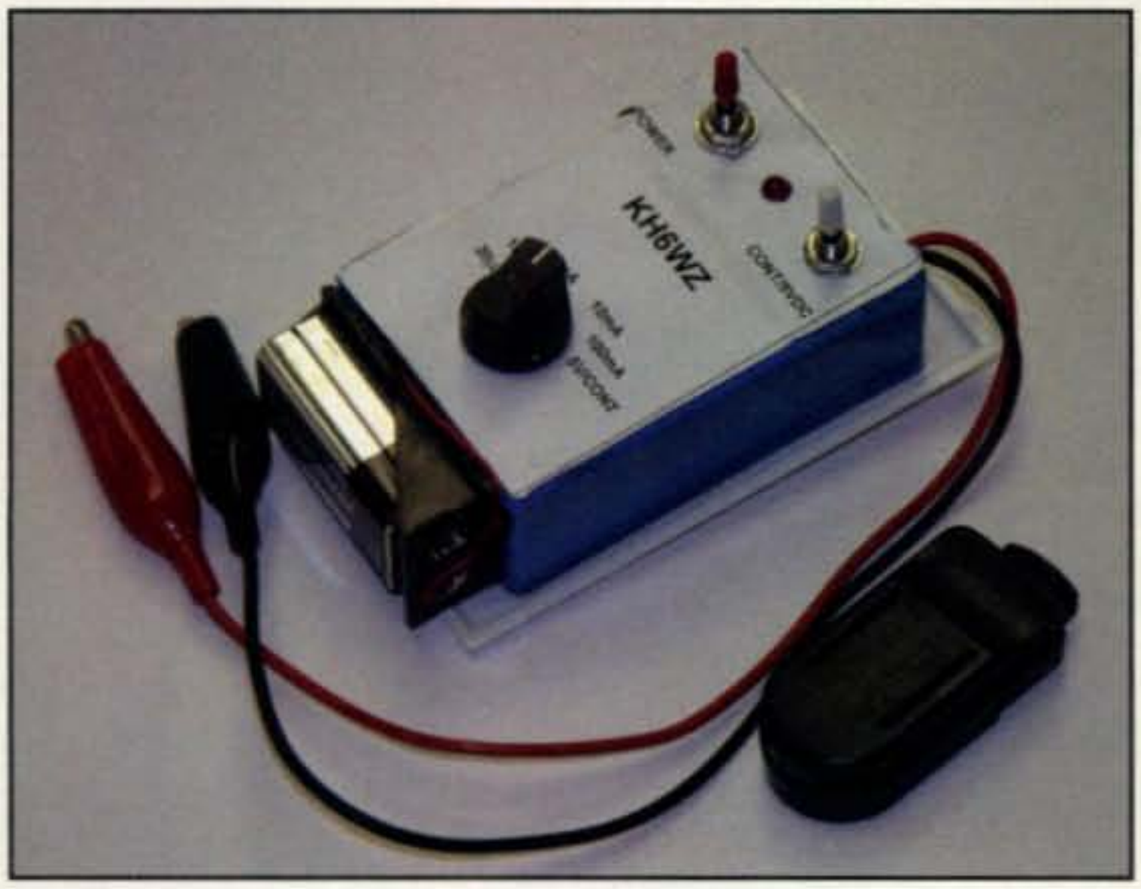

Photo 6– Simplify battery changes by mounting battery clips on the outside of projects. Inexpensive cell-phone belt clips can be used to make portable projects handier.

replace a circuit or module, or when you are experimenting and changing circuits (see photo 3).

A broadcast radio and an FM transceiver may also be a nice addition to your shop. Not only will they keep you company when you are working alone, the ham rig may be a "lifeline" to call someone on the outside if you need help. I find it very handy to get on one of my favorite repeaters and seek help when I need assistance. A "squishy ground plane" antenna (see"Beginner's Corner," June 2004 *CQ*, page 68) is suspended from the ceiling in my laboratory (spare bedroom). The homemade antenna works fine for just about all of my favorite repeaters (see photo 4).

If you keep some of your tools in a toolbox or toolbag, you may have a hard time finding a small tool buried deep inside. I keep small tools in scraps of PVC pipe (see photo 5). The X-Acto® knife and pointed-tip tweezers are also dangerous just rattling around inside, ready to poke you._

Always use lockwashers when fastening together chassis parts. Also, do not even think about re-using split lockwashers, since once they are torqued down, they are "done." A "liquid lockwasher," such as LockTite, is also suitable, but sometimes a bit messy. Nail polish can also work in a pinch. The color is up to you.

Using a UPS for Ham Radio Power

Uninterruptible Power Supply (UPS) units and/or battery chargers, usually with dead batteries, can be found at flea markets, swap meets, or surplus houses at very reasonable prices. For example, the brand-new 12-volt UPS units in photo 2 were found at a local electronics surplus store for less than $10 each. As you can see, there were two types available—a functional circuit board and a nice plastic-box cabinet version. Both types were meant to used with 12-volt gel-cells. Although they did not come with batteries, the battery type (voltage, current rating, and size) was indicated on a label inside the unit. I am not certain what they were used for, but in any case, they make dandy portable power units for VHF transceivers and HTs. The 7-maH gel-cells allow several days of operation with either a mobile rig (at low power) or HT. The best part is that this portable power pack can be left plugged in the 110-VAC mains to maintain charge, silently ready and waiting for use.

A green LED indicates 12 volts DC is available from either the power supply section directly or from the battery pack. I added a neon lamp to indicate AC power is on (charging/normal standby). An Anderson PowerPole is used for the 12-VDC output, ready to plug into any rig or accessory that takes 12 volts. More information on gel-cells and some hints on Anderson PowerPoles can be found in the February 2004 "Beginner's Corner," on page 68.

Now when I need a hefty, yet portable source of 12 VDC, I unplug the AC cord, grab the handle, and go!

When building a battery-operated project, consider mounting the battery clip on the outside of the box or chassis to make changing the battery easier (see photo 6). Also shown in photo 6 is a cell-phone belt clip ($5 at the local electronics discount store). The belt clip provides a handy way to mount or hold small projects, such as the simple meter tester.

Do you have a favorite trick, tip or hint to add to these ideas? If so, send it in, along with a good photo or digital image, for use in a future column!

73, Wayne, KH6WZ

References

Anderson PowerPole information: Anderson Power Products website at <http://www.andersonpower.com>.

Information on UPS and modifications for ham radio power sources: Pagel, Paul, "UPS Saves the Data-and the Day," *QST*, September 1998, p. 80.

Logging rules simplified: Smith, Carol, AJ2I, "Most Logging Eliminated (Happenings)," *QST*, August 1983, p. 56.

digital connection

BY DON ROTOLO,* N2IRZ

Introducing "RSQ" Digital Signal Reports

I often marvel at the signal reports given, especially during contests. Everyone is 59 or 599, even if there is obvious difficulty in copying the other station. This is not meant as a disparaging comment about contesters. QSO rate is critical, so they don't really have the time to carefully measure the other station's signal and then give (and record) an accurate report. However, in casual ragchews an accurate signal report can be helpful to the other ham's understanding of his/her own station's performance. Those of you who have worked me know that I tend to give out honest signal reports, and rarely are stations really 59 at my receiver.

On PSK 31, however, I do not actually listen to the signal. Not only does it drive my family crazy (remember, I'm in the middle of the family room here), I really don't get any useful information out if it. RST (Readability, Strength, Tone) reports have little or no meaning here, so other than a careful reading of IMD, how can we let the other station know how well he is doing? We could tell him that he has hot audio, but how does one code that onto a QSL card?

The answer is given by a team of hams who wrote an article for Australia's *Amateur Radio* magazine last August. *CQ*'s eagle-eye editor, W2VU, who reads even more voraciously than I do (a feat indeed), saw that article, which describes a new method of reporting signals in the PSK31 world—RSQ.

The following discussion is based entirely upon that article, which was published under Graeme Harris, VK3BGH's byline, with acknowledgement given to the rest of the team (Bob, K6MBY, Ian, GM4KLN, and Milton, W8NUE). My goal in passing along this information is to encourage the RSQ system's adoption and use in the PSK31 world.

RSQ stands for Readability, Strength, Quality, and the method discussed offers specific scales and standards for each number, as shown in Table I. Of course, the scale is somewhat subjective, but nonetheless we can start giving out much more meaningful reports if we use this sensible method.

Readability is the percentage of text that is properly decoded. 100% is easy to recognize, but remember that we can still understand a message even if a large number of characters are missing. *Strength* is a visual measure of the strength of the waterfall trace. I don't find my radio's S-meter to be particularly useful, especially in the presence of multiple signals in the passband, while the system sensitivity (and therefore relative brightness of displayed traces) is fairly constant. *Quality* is a measure of the number of visible sidebands to the main signal. I want to emphasize that the goal is *no sidebands at all!*

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As with the accurate use of RS and RST reports, if RSQ reports are consistently used and become a natural part of most PSK31 QSOs, we all will benefit. PSK31 and its related cousins are ultra-low bandwidth modes, allowing dozens of QSOs in a very small slice of spectrum. Amateurs have always prided themselves on their ability to understand and seek the best possible technical performance from their stations. A well-adjusted station (technically, not psychologically) doesn't occupy more spectrum than necessary, allowing others to enjoy the great natural resource of radio as well. Your signal also goes farther on less power— the RF in those sidebands is absolutely wasted—and maybe that will give you the edge in your next QSO with that rare one.

I hope to have the privilege of activating WW2CQ/62 on 40-meter PSK31 around the time you'll be reading this, and you absolutely can expect to receive an accurate RSQ report from me. Come on out, get on the air, and have some fun watching me type in real time!

For more information on the RSQ system, visit <http://www.psb-info.net>.

How's Your Signal?

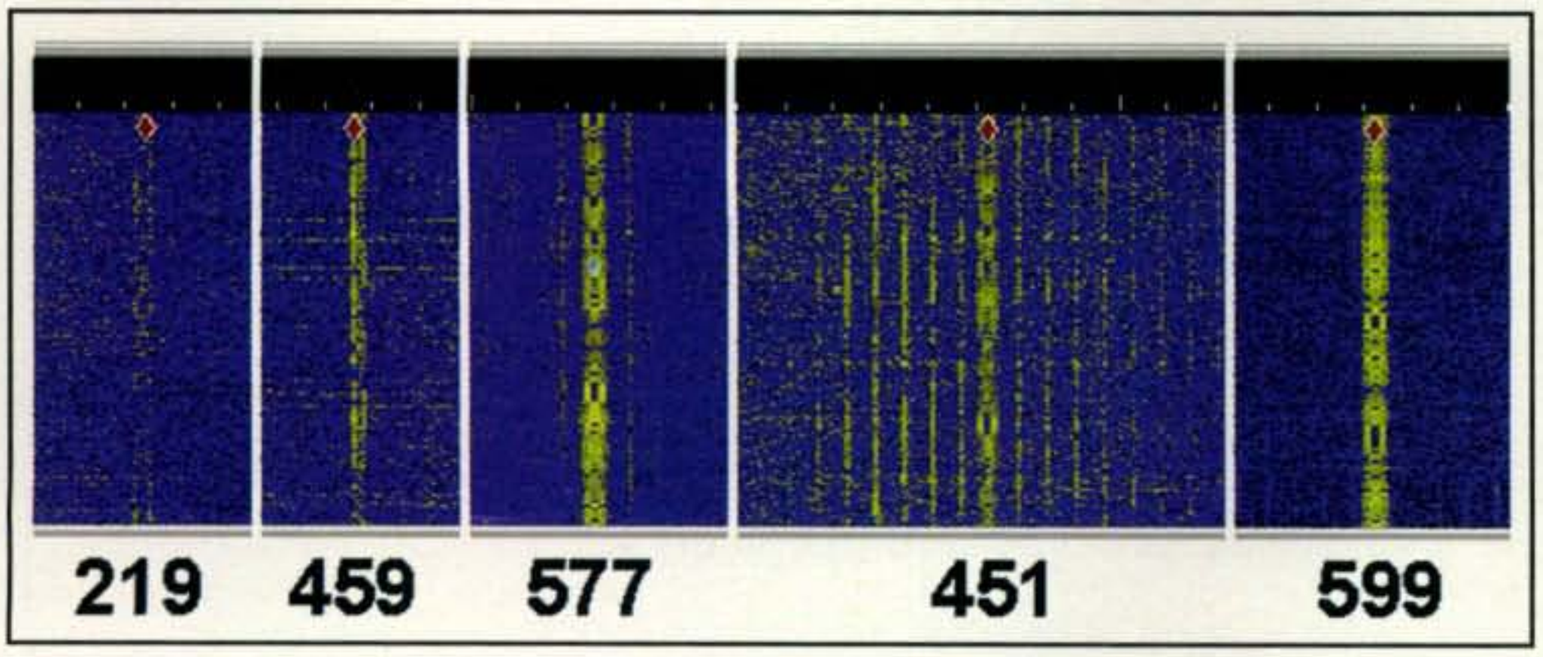
Are you sending a good, clean signal? That's been a fair question for radio amateurs since the days of spark. We all know that a properly adjusted transmitter produces a spectrally clean signal, which also happens to sound quite good to the ears. An overdriven transmitter, whether at audio or RF, produces distortion and unnecessarily widens the transmitted signal, causing interference to others on the band while making for a less understandable signal.

These issues apply to all types of transmission—FM, AM, SSB, and even CW. Overdriving is not the only possible problem, of course (CW has its key clicks and phone can have hum), but it's sadly one of the more common ones. In the digital world we tend to see fewer problems, since many digital modes strongly depend upon a lack of distortion for good performance.

Pushing the Limits

Has anyone ever tried to make a VHF packet connection with "hot" audio, hitting up against the radio's deviation limiter? You can decode the other stations just fine, but they never acknowledge your transmissions. Listening on another receiver, it sounds like a harsh static burst instead of an almost musical "braaap." The point is that most digital modes are not tolerant of distortion, so if you want to get it working, you have to adjust your transmit chain properly.

Some of the more modern modes, designed to be extraordinarily robust in the relatively noisy HF



Five different PSK31 signals on the air, as seen on the waterfall display of DigiPan 1.6d. Note the RSQ reports I added beneath each of the signals, and how the Readability can be high even if the Strength is low, and Quality should be (and usually is) high. It took quite a bot of searching to find those two low-quality signals!

The K4ABT RASCAL sound-card interface. It is an inexpensive and relatively simple device, using good isolation transformers and ferrite beads to avoid feedback issues. Note the transmit audio level adjustment potentiometer inside the small hole. For more information, go to <www.packetradio.com>.

radio environment, are much more forgiving of distortion. As the science of digital communications advances, the developers of new protocols for HF often try to enhance the ability of their protocol to survive the vagaries of the HF communications channel, while maintaining throughput and spectral efficiency. This means that on a good HF channel, your transmitted signal can be downright *awful* and still be understood at the other end. However, that's no excuse for a dirty signal.

When I operate, I generally use a digital keyboard mode. My station is located at the computer in the family room, so if I were to operate phone, I'd be disturbing the rest of the family. If you hang out around 7075 kHz long enough—say, an hour when the band is open—you'll come across PSK31 signals that look like a freshly plowed farm field (lots and lots of little parallel grooves stretching off to the distance). Those sidebands—often only one set, and sometimes dozens—are distortion, pure (impure?) and simple. The cause is a too high setting of the transmit audio.

Even with such significant overmodulation, splattering across kilohertz of spectrum for a 31-Hz wide signal, it's rarely a problem to decode the signal. As far as the fellow at the transmitting end is concerned, he (or she) is able to both send and receive, and so he does not know there is anything wrong with his signal *unless someone tells him!*

For some folks, though, telling another operator that there is something wrong with his signal is a daunting task. First, you have to try to avoid judging the other operator, sounding accusatory, or saying anything that will put him on the defensive. Some folks are happy when you let them know "their breath stinks," while others take great offense. I try to first engage them in a QSO—making the contact after their current QSO is over—and once we're "talking," I casually mention that their output audio is "hot." Then I ask how mine looks, and suggest that maybe we can try adjusting it.

Assuming they don't immediately terminate the QSO, or otherwise indicate hostility, I then try to explain how simple the adjustment is, how exactly to do it, and get them to try turning it down a bit. Some folks literally do not want to hear it and others have a hard time understanding even simple directions, but the majority end up making the simple adjustment and cleaning up their signal tremendously.

Simple Adjustments

This is what I often tell the other operator when it comes time to adjust the transmitter drive: If you are using DigiPan software, the adjustment is accessed through the Configure/Transmitter Drive menu. If you are using some other software, you can either read the setup instructions, or just open up the advanced volume controls by double-clicking the little speaker icon in the system tray (this applies to Windows®, of course. I don't know the equivalent setup on a Mac, but I cannot imagine it being much different). Many sound-card interface adapters, such as the K4ABT RASCAL I'm using, also have an adjustment potentiometer on them, which you can use instead.

Simply adjust the Wave output slider down. If I see a lot of sidebands, I tell them to drop it by half of what they have set it to, or more; otherwise I recommend dropping it by one-fourth. Once they have reached the one-third point on the wave slider, I ask them to go to the master volume slider instead. If possible, you don't want any of the controls very close to their upper or lower limits, since adjustments tend to get touchy there.

In DigiPan there is a little number at the bottom of the screen which gives the IMD (inter-modulation distortion) measurement. A measurement of –25 dB or

lower is considered excellent, and anything in the –22 dB or lower range is probably fine. On the other hand, valid IMD readings in the teens or single digits indicate a serious problem. However, this measurement isn't always a reliable indicator of the other station's transmit performance, since you have to be aware of the conditions under which this measurement is valid.

First, you have to be measuring an unmodulated (idle) carrier. Measurements taken while the other station is sending data are meaningless (and DigiPan doesn't even display them). Second, the receive audio chain in your station needs to be properly and carefully adjusted to avoid errors caused by the IMD performance of the receiver. You are measuring the first pair of sidebands as compared to the desired signal, so signals that are weak will cause you to measure more noise than expected, making for erroneous readings. That means you need a good, strong signal (but not overloading) to measure. Then adjust the receiver's RF gain down until IMD just starts to rise instead of fall. At that point, much of the receiver's IMD has been adjusted out, leaving a reasonably accurate measurement of the other station's signal. Note that readjustment is necessary for each signal measured.

Technology on the Move

In last December's column, I mentioned that I would also be reporting on some tests performed by Rick Muething, KN6KB, on the performance and efficiency of some HF modes. Rick undertook these measurements as part of his presentation at the ARRL/TAPR Digital Communications Conference last September in Des Moines, Iowa. His paper describes these measurements in the context of a new digital HF mode called SCAMP, which he and others were developing.

The reason for developing SCAMP (Sound Card Amateur Message Protocol) is to create an alternative to relatively expensive PacTOR equipment. WinLink 2000 requires an error-free data mode for transporting data over HF, and right now PacTOR is about the best there is. SCAMP incorporates many of the features of PacTOR, with the result that a similar spectral efficiency and data throughput on real HF channels is seen. Testing is well under way, with the first transcontinental QSO occurring on December 4, 2004 as reported at <http://www.arrl.org/news/stories/2004/12/07/6/?nc=1>.

Since I'm out of space for this month, I won't be presenting Rick's findings. The topic of PSK signal quality is simply too important to shortchange. In the near future I promise to cover the new SCAMP mode in detail, once it becomes available outside the beta-testing team.

Also, last November I participated in a conference call with some of the folks from SkyPilot Network Inc. about their unique and exciting deployment of WiFi (802.11) technology to create what is essentially a Wide-Area Network (WAN), much like what packet was in the early 1990s—except at megabit speeds. This technology could be exactly what the HSMM folks are looking for. The equipment is quite inexpensive for commercial gear and could easily be afforded by larger clubs. However, for the rest of us, I see some potential for hams to re-use what we already know and have to replicate the system, perhaps even making interoperable equipment, to build what we've all been waiting for. I'll go into more details of the system in a future column, but for now, visit <www.skypilot.com>.

Readability (% of text)

R5	95%+	Perfectly readable
R4	80%	Practically no difficulty, occasional missed characters
R3	40%	Considerable difficulty, many missed characters
R2	20%	Occasional words distinguishable
R1	0%	Undecipherable

Strength

S9	Very strong trace
S7	Strong trace
S5	Moderate trace
S3	Weak trace
S1	Barely perceptible trace

Quality

Q9	Clean signal, no visible sidebar pairs
Q7	One barely visible pair
Q5	One easily visible pair
Q3	Multiple visible pairs
Q1	Splatter over much of the spectrum

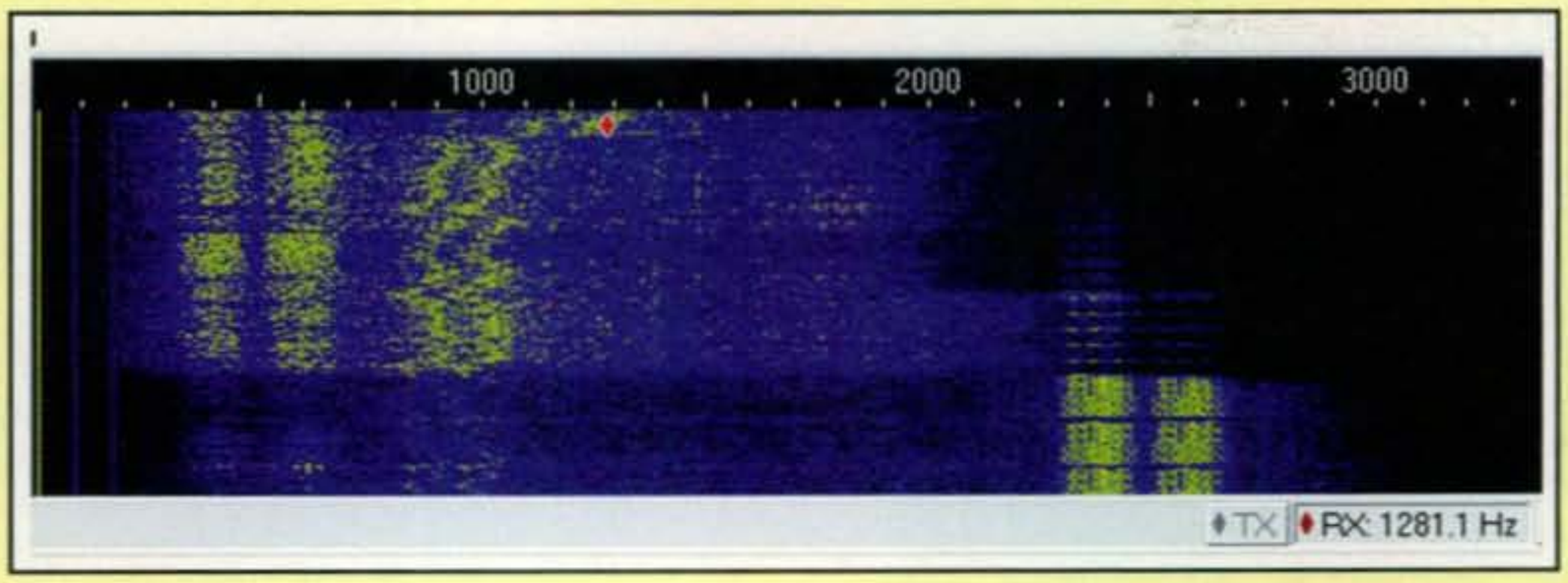
Table I– RSQ standards.

It's a good feeling to have more ideas to write about than I have column space, but I still want to hear from you, the readers. I find that receiving a letter or e-mail from a reader is the highlight of my day, and especially so when someone tells me about an idea for a column he or she would like to see. While I try to cover topics varied enough to interest at least a fair number of the readership, perhaps there's a favorite topic you haven't seen covered yet. Let me know. Until next time . . .

73, Don, N2IRZ

Interference, AGC and IF Shift

In my December column I mentioned how many have experienced "interference" from a PacTOR robot coming up on or near a PSK31 QSO, wiping it out. Bill Gerth, W4RK, the Emergency Coordinator for the Wil-liamson County (TN) ARES, wrote to mention that the WinLink 2000 PacTOR frequencies are chosen to avoid the PSK segments, and reminded me of something I had forgotten to mention—IF shift. Whenever a relatively loud (or wideband) signal comes up in the radio's passband, the Automatic Gain Control (AGC) will decrease the receiver gain to avoid overload. This causes any less powerful signals to fade into the noise, possibly disrupting a QSO. The simple solution is to either use your IF shift to put the loud signal outside the passband, or tune the radio for the same effect, thus eliminating the AGC compression. The accompanying picture shows what happened when I shifted the IF passband down in frequency to eliminate the loud signal at the right. See how the signals to the left just pop out of the noise? The vertical scale is about 30 seconds.



Extreme Performance Action Value

Take to the air and take to the road. Be ready for action when the bands are red-hot. With Alinco mobile transceivers, you get superb audio quality and low noise. Whether you're a county-hunter, contester, DX chaser or just looking for a pleasant QSO with a new contact, Alinco delivers extreme performance in value-packed mobile radios.

For Demanding Amateurs Like You!

High flying HF

DX-70TH

HF + 6M Mobile/Base Transceiver

Put a proven performer to work for you! 100 watts output and a "no nonsense" design that's easy to use at home or on the go. "All mode" performance on all bands including 6m. Removable, remote mount control head, big display, wide choice of operator parameters and full QSK CW operation. Getting on HF has never been so easy, and if you haven't tried 6 meters, you're missing a lot of fun. Why wait? With a DX-70 you're ready for action!

Daring dual bands

DR620T VHF/UHF

Mobile/Base FM Transceiver with Wide Band Receive ***Dare to be different with this "new breed" mobile.*** VHF and UHF operations are a snap but there's a lot more. Listen to wide band broadcast FM signals, AM Airband, monitor weather and other public safety frequencies and keep track of it all with the large alphanumeric display that lets you change display colors! You can add the optional internal TNC for packet or APRS® operations or be among the first to enjoy digital voice communications with the optional digital module. Removable remote-mount head also allows you to invert the transceiver for the best speaker placement, illuminated mic, internal duplexer, CTCSS encode+decode, DCS and more!

DR-605TQ VHF+UHF

Dual Band Mobile FM Transceiver

Who said dual-banders had to be expensive? Dual band, dual watch and crossband repeat at a price that's amazingly low. CTCSS encode+decode, 50 memories per band, internal duplexer, large controls. Massive heatsink for quiet, fan-free operation. Reviewers loved this radio; you will too!

Sizzling single bands

DR-135T MkII

VHF FM Mobile/Base Transceiver

This rugged 2 meter mobile is ready for the "real world" of heavy use in demanding conditions. Whether you're chasing storms or chatting through the commute, you'll appreciate the large alphanumeric display, the big illuminated mic and the well designed functions that are easy to use. 100 memories, AM Airband receive, high stability TCXO, ignition key on/off feature, theft alarm, direct frequency input & optional internal TNC or optional internal digital voice module and more!

DR-235T 222 MHz

FM Mobile/Base Transceiver

If you're not yet on 222 MHz, you're not using all your privileges. From voice contacts to remote control of repeaters and more, now you can get on 222 MHz at a reasonable price. Enjoy 100 memories, alphanumeric channel labels, ignition key on/off operation, large illuminated mic, autodial memories, CTCSS encode+decode, DCS, wide/narrow FM operation, optional internal TNC and a host of features.

DR-435T MkII UHF

FM Mobile/Base Transceiver

There are many reasons you might want a monoband 440 MHz transceiver and the DR-435 is ready for whatever job you have in mind. From working repeaters, UHF satellites, remote command and control, data or simplex voice, and more; you'll find the 100 memories, large alphanumeric display, mic with illuminated keys all well designed to suit your purposes. Packed with features like CTCSS encode+decode, DCS, tone bursts, theft alarm, alphanumeric display, autodial memories, high stability TCXO and more.

www.ALINCO.com

what's new

BY KARL T. THURBER, JR.,* W8FX

A Mini HT, Five-Time-Zone Clock, Baluns, Analyzer . . . and more

This month we'll focus on some noteworthy radio gear, hamshack accessories, antennas and antenna accessories, books, and other items of interest to our readers. Let's begin with a look at a super-thin HT from Alinco.

Radio Gear

New Alinco Mini HT. Alinco has introduced the DJ-C7T Pocket HT "Second Generation" Credit Card Size Dual Band Transceiver. The new, 2m/70cm HT is a very small, pocket-size transceiver that succeeds the very popular Alinco DJ-C5. After leading the way in miniature electronics technology with its popular "credit-card"-size transceivers, Alinco has created a new "pocket-size" HT that's small in size but big in added memories and modes (see photos A and B).

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←Photo A– Alinco has introduced the DJ-C7T Pocket HT "Second Generation" Credit Card Size Dual Band Transceiver. The new 2m/70cm HT is a very small, pocket-size transceiver that succeeds the popular Alinco DJ-C5. This photo shows the front of the new mini HT. (Photo courtesy Alinco)

Photo B– Is this HT thin, or what? After leading the way in miniature electronics technology with its revolutionary "credit-card" size transceivers, Alinco has created a new "pocket-size" HT that's small in size but big in added memories and modes. (Photo courtesy Alinco)

One of the most noticeable improvements over the predecessor DJ-C5 is the audio quality. With a completely redesigned internal speaker, the DJ-C7T delivers audio with a quality that reportedly rivals many bigger radios. It also offers an SMA antenna port and a two-way antenna system that allows you to use an optional earphone cable to monitor FM broadcast reception while using the SMA antenna port for the helical antenna (included) or a choice of other optional antennas.

The new DJ-C7T has 200 memories, two-way antenna systems, wideband receive including FM broadcast and AM aircraft bands, auto repeater setting, VFO, memory and scan modes, and more. There are 39 CTCSS encode and decode settings (decode is included as a standard feature), as well as four tone bursts that make the unit usable for repeater operations in many parts of the world. The large display is said to be easy to read, and it provides information to the user about a number of useful radio features.

Alinco has added a split function and the ability to clone units by cable. Also, the Alinco DJ-C5T optional microphones/earphones are cross-compatible with the DJ-C7T. Moreover, the DJ-C7T can transmit up to 300 mW output with the included lithium-ion battery. Using optional external power, the radio can transmit up to 500 mW output.

For more information, contact Alinco through its North American distributor, Ham Distribution, Inc., 15 South Trade Center Pkwy., Conroe, TX 77385 (936-271-3366; e-mail: <usrep@alinco.com>; on the web: <http://www.alinco.com>).

Accessories for the Shack

New MFJ-135 Five Time Zone Clock. A versatile and attractive 24-hour clock from MFJ Enterprises is shown in photo C. The new 12-inch world time quartz clock shows five time zones at a single glance. The displayed time zones are UTC, Local, Honolulu, Tokyo, and Moscow time.

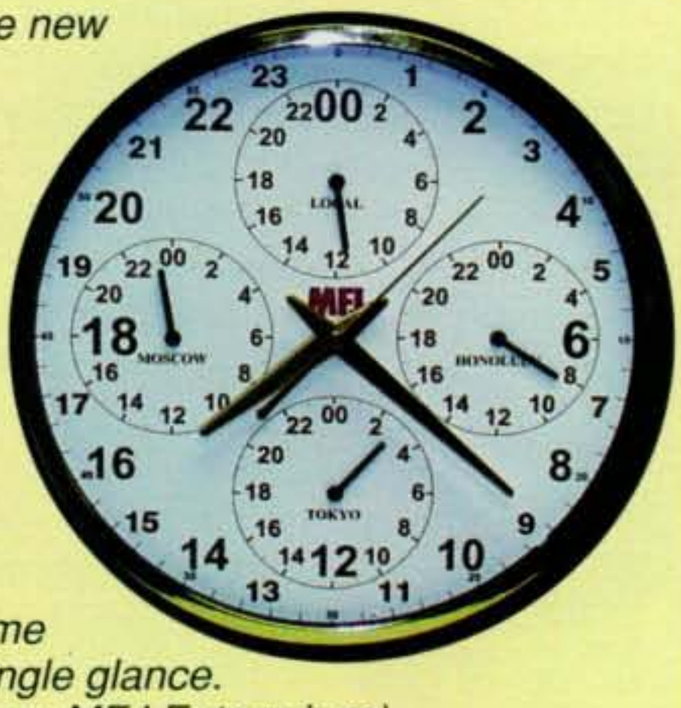

Photo C– The new versatile, handsome 24-hour five-time-zone clock from MFJ Enterprises is shown in this photo. The 12-inch world time quartz clock shows five time zones at a single glance. (Photo courtesy MFJ Enterprises)

The clock has five independently set dials, and the face is said to be highly visible and easy to read.

The handsome wall clock has a black outer trim, gold inlay stripe, and gold hands on black numbers. An attractive white face makes the clock suitable for any ham shack or other room in your house. The MFJ-135 is priced at $39.95, and it's covered by MFJ's famous One year No Matter What™ limited warranty. Under the warranty, MFJ will repair or replace (at their option) your MFJ product for one complete year.

For additional information or a free catalog, contact MFJ Enterprises, Inc., 300 Industrial Park Rd., Starkville, MS 39759 (1-800-647-1800; e-mail: <mfj@mfjenterprises.com>; on the web: <http:// www.mfjenterprises.com>).

Antennas and Antenna Accessories

EZRadial™ from RadialWave. RadialWave LLC has introduced EZRadial (photo D), a patent-pending Ground Radial/Counterpoise System for HF vertical antennas. According to proprietor Mike Cameron, W5MGC, "Hams are a pretty smart bunch. They know that to perform well, most HF vertical antennas require a good ground radial or counterpoise system. Yet, too often, hams neglect this half of their antennas!" EZRadial is RadialWave's answer to this problem.

EZRadial is specially designed for amateurs who want to get their HF verticals up fast, and who also want to get them down fast. Its compact design and easy means of attaching radial wires makes it suitable for DXpeditions and for Field Day, QRP, or emergency use.

Photo D– RadialWave LLC has introduced EZRadial™, a patent-pending Ground Radial/Counterpoise System for HF vertical antennas. EZRadial is specially designed for amateurs who want to get their HF verticals up fast, and who also want to get them down fast. See details in the text of this month's column. (Photo courtesy RadialWave LCC)

EZRadial is made of stainless steel and comes complete with 16 binding posts (which can be used to attach several radial wires), a U-bolt for connection to a mast, and a double-ended UHF-type coax connector for coupling the transmission line and HF vertical coax to the EZRadial. The base EZRadial retails for $40; the upgraded EZRadial—which includes 16 resilient ground stakes, 16 terminals, and 8 warning flags—retails for $55.

For more information, contact Mike Cameron, W5MGC, at RadialWave LLC, 2025 Savannah Drive, McKinney, TX 75070 (214-5329857; e-mail: <sales@radialwave.com>; on the web: <http://www.radialwave.com>).

Photo E– Recently NCG Company introduced the Kuranishi Instruments BR-210 Standing Wave Analyzer, a follow-on to the BR-200. The upgraded BR-210 is both a standing-wave (SWR) and an antenna-impedance analyzer that covers the range 1.8–170 MHz. (Photo courtesy NCG Company)

Kuranishi Instruments BR-210 Standing Wave Analyzer from NCG Company. NCG Company, Inc.™ specializes in the export and import of communications products and various specialty items, not only for the amateur radio market, but also for the land-mobile and Wi-Fi markets. NCG is the distributor for several Japan-based product lines and companies, including

Photo F– DX Engineering has recently introduced a dozen new baluns that have ratios of 1:1, 2:1, 4:1, 6:1, 9:1, and 12:1. The firm's MaxiCore™ current baluns use innovative technology to concentrate flux at the core. See the text for details. (Photo courtesy DX Engineering)

Comet, Maldol, Daiwa, and others. Recently, NCG Company introduced the new Kuranishi Instruments BR-210 Standing Wave Analyzer (photo E) and through most major radio dealers is now distributing this upgraded version of the predecessor BR-200.

The BR-210 is both a standing wave (SWR) and antenna impedance analyzer that covers the range 1.8–170 MHz. In this upgrade, the SO-239 connector has been repositioned from the side of the case to the top, and the switches have been changed from toggle switches and slide switches to push-button selectors. When accurate test results are of primary importance, you will find that the BR-210 is a laboratory-grade tool that accurately measures SWR and impedance and that also may be used for determining the resonant frequency of an antenna system.

The BR-210 directly measures antenna properties without the need for a separate transmitter, SWR bridge, or other equipment. The compact, lightweight, battery- or 12-VDC-operated unit makes it easy to evaluate antenna systems. The unit's intuitive displays make possible quick and accurate antenna adjustments.

The BR-210 also can be used as a general-purpose, low-power signal source. Its several capabilities make it ideal for all-around experimentation with receivers, amplifiers, and other equipment. Important features include a wide-band, temperature-stabilized oscillator; a highly sensitive, high-precision Yokagawa meter for measurement accuracy; an included 50-ohm dummy load; and low current drain, which provides long battery life.

The BR-210's MSRP is $499.95; contact your local or favorite dealer to purchase. For more information, contact NCG Company, Inc., 1275 North Grove Street, Anaheim, CA 92806-2114 (phone 1-800-962-2611; e-mail: <sales@natcommgroup.com>; on the web: <http://www.cometantenna.com>).

A Dozen New Baluns from DX Engineering. The folks at DX Engineering bill themselves as "your source for complete antennas and professional grade antenna parts." With this motto in mind, the company recently introduced a dozen new baluns—having ratios of 1:1, 2:1, 4:1, 6:1, 9:1, and 12:1—that can increase antenna performance and reduce equipment stress.

The firm's MaxiCore™ current baluns use innovative technology to concentrate flux at the core, which results in minimal insertion loss and a low SWR across the HF range of 1.8–30 MHz (one new model, the H05-P, has a bandwidth of 1–60 MHz).

The new product line, a sampling of which is shown in photo F, also includes special antenna-tuner models that accommodate the extraordinary stresses of tuning across the entire HF spectrum. Rated at up to 10-plus kW continuous operation, tuner baluns are also available with a cast-aluminum housing and feature a breakdown voltage greater than 7000 volts. Other features include gasket seals, Teflon® and silver SO-239 connectors, and ceramic output posts with stainless-steel hardware. The new baluns are priced from $39.95 to $139.95.

For more details and specific pricing information, contact DX Engineering, P.O. Box 1491, Akron, OH 44309 (1-800-777-0703; email: <dxengineering@dxengineering.com>; on the web: <http://www.dxengineering.com>).

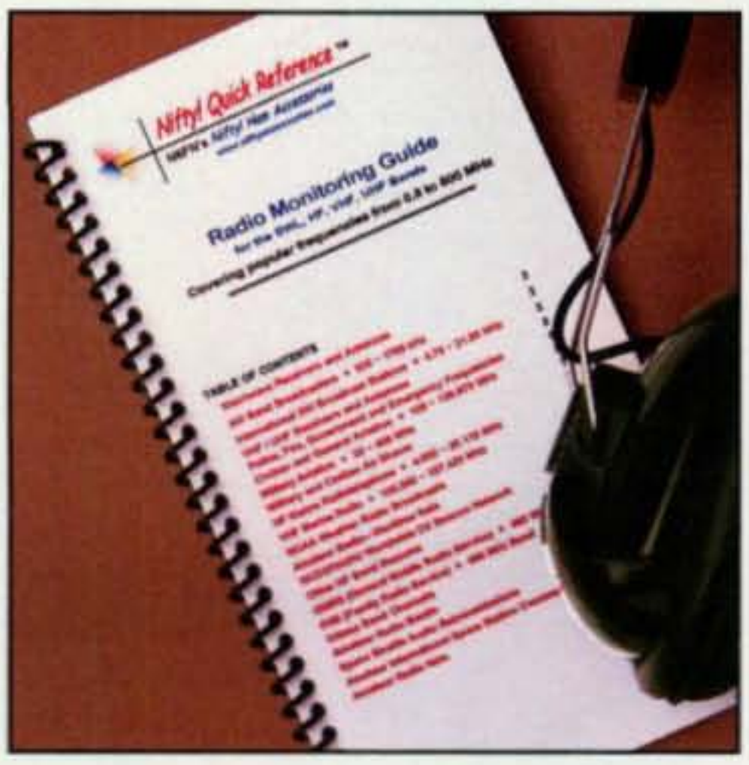

Photo G– The Radio Monitoring Guide *from Nifty! Ham Accessories is designed to provide a practical and condensed guide to shortwave listening and VHF/UHF scanning. Covering the frequencies from 0.5 to 500 MHz, the new guide pinpoints band segments where radio "action" is found. (Photo courtesy Nifty! Ham Accessories)*

From the Bookshelf

Nifty! Ham Accessories *Radio Monitoring Guide.* Bernie Lafreniere, N6FN, let us know of yet another addition to his growing series of quick reference guides. While his other guides have been designed for various ICOM, Kenwood, and Yaesu radios, this one is somewhat different. Billed as the *Radio Monitoring Guide* (photo G), it's designed to provide a practical and condensed guide to shortwave listening and VHF/UHF scanning. Covering the frequencies from 0.5 to 500 MHz, this short-term guide pinpoints band segments where radio "action" is found.

The new guide includes frequency and background information for monitoring a variety of radio services. These include civil, general, and military aviation; air shows; police and fire; HF and VHF marine; amateur maritime nets; weather, DX radio beacons, GMRS and FRS; the Space Shuttle and the International Space Station; and other radio services. URLs (internet addresses) are provided for websites offering current SWL broadcast schedules, free SW listening tools and software, and in-depth information for monitoring maritime, aviation, and military communications.

In addition, operational information and suggestions are provided for using general-coverage amateur radio and VHF/UHF transceivers for SWL and VHF/UHF monitoring.

Printed in color and laminated for durability, the compact, 16-page 4.5" × 8" *Radio Monitoring Guide* is designed as a ready reference to the most-listened-to frequencies. The price is $15.85 plus s/h.

For more information, contact Nifty! Ham Accessories, 1601 Donalor Drive, Escondido, CA 92027; (60-781-5522; e-mail: <berniel@niftyaccessories.com>; on the web: <http://www.niftyaccessories.com>).

Two New Books from Que®. Are you perhaps ready to upgrade your current PC and possibly add a few cutting-edge "must have" accessories to it? If so, you may find that today's staggering array of hardware and software choices may be overwhelming. Even the experts have a difficult time keeping up with the latest motherboards,

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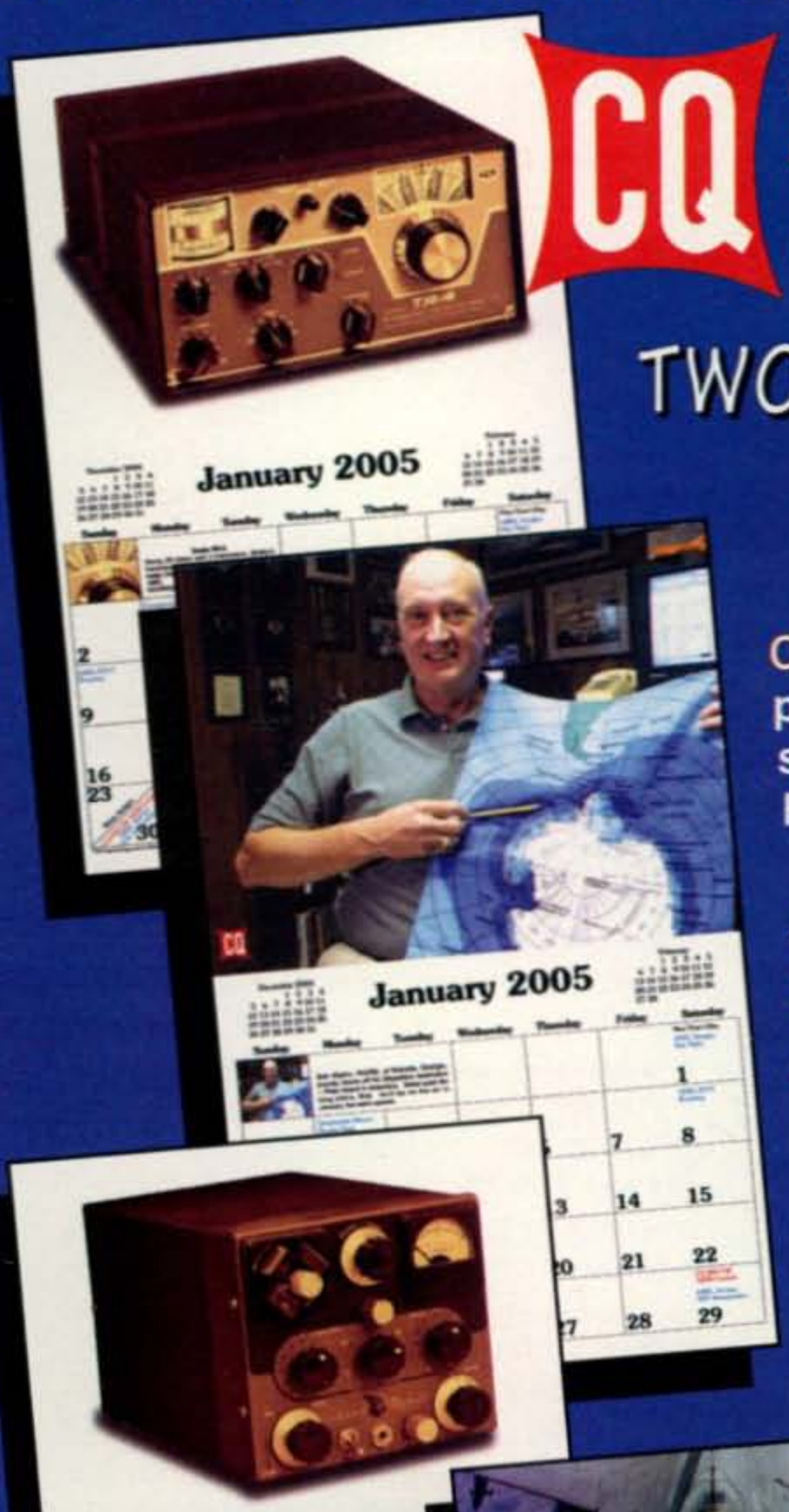

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Amateur Radio Operators Calendar - 15 spectacular images of some of the biggest most photogenic shacks, antennas, scenics and personalities. These are the people you work, the shacks you admire, the antenna systems you dream about!

These 15 month calendars (January '05 through March '06) include dates of important Ham Radio events such as major contests and other operating events, meteor showers, phases of the moon, and other astronomical information, plus important and popular holidays. Great to look at, and truly useful!

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That's where *Maximum PC* magazine comes in. You may already be familiar with the magazine's show-no-mercy approach to product reviews. Now you can get the best reviews from the past year in one place, the *Maximum PC 2005 Buyer's Guide* from Que books, which is organized and expanded to cover details that couldn't be covered in the magazine. If you're shopping for new PC hardware and software, this book should help you make sense of it all.

The new Que book (Que is an imprint of Pearson Education) is authored by the magazine's editor-in-chief, George Jones. The indexed, 288-page, 17-chapter book also includes a look at the Maximum PC Lab, its benchmarking techniques, the rationale behind its review ratings, and its friendly but hard-nosed staff. At the bottom line, the $29.99 book should help you to not let marketing rhetoric, overblown claims, and incomplete product specs drive your next PC hardware purchase.

Also new from Que is Leo Laporte's *2005 Gadget Guide*. This fascinating book is all about "cool gadgets" of all shapes and sizes. These include gadgets you attach to your computer; gadgets you carry around on a belt clip; gadgets that ride along with you in your car; and gadgets you talk into, or type on, or shoot pictures with.

The 304-page book is organized into eight major categories. These include separate sections on gadgets for computers, digital photography, home movies, home audio/video, automotive, and telephones; plus portable gadgets and game gadgets. In short, the $24.99 guide is a "wish book" of more than 300 of the author's very favorite gadgets. With only a few exceptions, the products are actual, honest-to-goodness consumer products, which means you can readily purchase them for your own personal use.

For more information, contact Pearson Education, 200 Old Tappan Road, Tappan, NJ 07675 (phone 1-800-922-0579; on the web: <http://www.quepublishing.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 John Drum, W4BXI; Thierry G. Lombry, ON4SKY; Drew Straka, W8MTN; Dave Clarke, VE6LX; Jeff Reinhardt, AA6JR; Wayne Smith, K8FF; Mick Swertnik, KB6JVT; Henry Pollock, K4TMC; Steve Landry, N2ZNU; Dennis Abdalla, K4JOD; and Mike Cameron, W5MGC. By all means, please keep those cards, letters, and e-mails coming!

A special note: If you e-mail us, please include your full name and amateur 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

Check Out What's New at the CQ Website. Oh, yes, while we have your attention, check out what's new at the CQ Amateur Radio website, which you'll find at <http://cq-amateur-radio.com>. While we don't usually spend a great deal of time in your "What's New" column promoting our own publications and products, we would like to ensure that you're aware of what's available online from CQ. In fact, you probably will be surprised by the depth and scope of information available on the website, which is ably maintained by CQ Website Administrator Doug Bailey, KØFO, and Webmaster Emily Leary of the CQ staff.

Among many other things, the CQ website site includes the CQ Information Center; hamfest and special events listings; various announcements and news; the CQ Store (for your magazine, book, CD, and video needs); an e-mail staff and editorial contact page; an application to receive the CQ E-mail Newsletter; a link to the searchable CQ Magazine Archive of back issues; the BPL (Broadband over Power Lines) Info Center; an online guestbook; awards and contest rules and information; contest results; links to other CQ websites; and much more. Be sure to check out the website.

Wrap-Up

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

Overheard: A long time ago, I learned that those folks who reached their goals with ease probably aimed their sights too low.

73, Karl, W8FX

Note: *Listings in "What's New" are not product reviews and do not constitute a product endorsement by CQ or the column editor. Information in this column is primarily provided by manufacturers/vendors and has not necessarily been independently verified. The purpose of this column is to inform readers about new products in the marketplace. We encourage you to do additional research on products of interest to you.*

60 Great Things About Ham Radio

In celebration of *CQ*'s 60th anniversary in 2005, we've come up with 60 great things about ham radio, which we'll bring you each month, five at a time. We're sure you'll have more great things that we haven't thought of, so when we're all done, we'd love to compare our list with yours.—*W2VU*

This month, we'll focus on the people you'll meet in ham radio.

6. Some of the nicest people you'll ever meet – Most hams are genuinely nice people. Sure, we'll have our petty squabbles from time to time, and we'll likely debate the merits of code exams forever, but it's very rare to find hams who are nasty, vindictive people. They're just not welcome in that worldwide community (see #5 last month).

7. Some of the smartest people you'll ever meet – Hams come from all walks of life and you'll find highly educated people and even the occasional Nobel laureate within our ranks. But you'll also find a lot of regular people with a lot of common sense, and people who may not have multiple college degrees but who know an awful lot about their chosen specialty area. And more often than not, they're happy to share that knowledge.

8. Some of the most interesting people you'll ever meet - Get on the radio. Get beyond the location and signal report and start having some real contacts. You'll discover a world of fascinating people at the other end of your antenna. You'll find them at club meetings, too.

9. Some of the most generous people you'll ever meet (along with some of the cheapest!) – Anyone who's ever been to a hamfest flea market knows that hams are among the world's premier bargain-hunters ("You can have it for free." "Can't you do any better than that?"). But if you *need* something —whether you're a newly-licensed ham who needs a rig to get on the air or you're operating at a disaster and need some special piece of equipment—if anybody has it available and can get it to you, you can use it as long as you need it. Visiting a new place and looking for a place to eat? Don't be surprised to be invited to dinner.

10. Friends around the world (including those you haven't met yet) – If you travel, and make contact with a ham at your destination ahead of time, don't be surprised to be met at the airport, or taken to dinner, or given a tour of the city or the club station, or any combination of the above. No matter where you go, ham radio provides the opportunity for you to have a friend at every stop.

We'll be back next month with another installment…

qrp

BY DAVE INGRAM,* K4TWJ

QRP: Still the Biggest Thrill of All

The thrills, excitement, and amazing feats accomplished with QRP never cease, but only get better with each day's operation. In fact, the QSO success with QRP seems greater now than when the sunspot counts were high and band conditions were at their peak. How can that be? Everyone has his or her own opinion, but I am convinced there are fewer U.S. amateurs on the air today, and as a result, you can work the world while running only a few watts of power. Your QRP signal could have been heard just as well (or better!) a few years back, but you typically were covered up by louder signals. Now we (and the DX) are cranking up the gain on our receivers, listening more carefully, and having a ball. What about you? Are you spending more time wading through viruses, worms. and spam on the internet than having fun on the air? Life comes at you fast. Turn your head twice and you miss its special treats. Fine-tune that antenna, switch on your favorite rig, and enjoy some good QRP QSOs along the way!

Does QRP really go the distance? Is it really a viable means of daily communication? Yes, indeed. Just ask Russ Eberhard, N9IV. I answered his medium-strength (569) CQ on 30 meters and was quite surprised to learn he was running only 3 watts with a little Elecraft KX1. Comparing notes with Russ, we learned that he lives in an antenna-restricted area and uses attic-mounted dipoles for 30 and 20 meters, plus a thin 95-foot longwire for other bands/needs, and has worked over 70 countries with QRP during the last two years. In additional to the KX1, Russ has a Yaesu FT-817, a recently restored Heathkit HW8 (one of the few affordable classics from yesteryear), and a Ten-Tec Jupiter that serves as a "big rig" (photos 1 and 2). Some of Russ's more recent and notable achievements with QRP include working ZP6CW in Paraguay with the HW8 and 3B8CF on Mauritius plus EM1HO in the Antarctic with the FT-817.

Russ says his secret for QRP success is patience and persistence: listening carefully for the DX, noting their operating habits, and spotting that special lull in a pile-up when a low-power signal can be heard most clearly. I agree completely, and I also find getting on the air at the least opportune and most inconvenient time always proves to be the most rewarding. Possibly it is just luck, but every time I am absolutely bogged down with "must do" chores is precisely when the bands are at their best for QRP. Now mix our advice with your own ideas for success and give QRP DXing a go. Chances are good you will be pleasantly surprised with the results!

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

Elecraft's New Mini Kits

As mentioned in our previous "QRP" column (December 2004), Elecraft has recently introduced four mini-module kits with some impressive assets worthy of recognition. The mini-kits contain a small number of parts, go together in a flash, and produce some handy support gear for the home and/or portable setup. Specifically, the kits consists of an XG1 Receiver Test Oscillator and S-meter calibrator, a wideband noise generator, a 4:1 mini-

Photo 1– Answering that proverbial question "must I use QRP exclusively all the time to be considered a real QRPer?" is this modern setup of Russ Eberhart, N9IV. The station consists of a 5-watt Yaesu FT-817, a 100-watt Ten-Tec Jupiter for those times when QRP can't quite make the grade, two antenna tuners, and a neat WB9LPU prototype key with a green knob. (Photo courtesy N9IV)

Photo 2– A classic QRP rig is the true sign of a QRP purist, and this restored-to-new and beautifully enclosed Heathkit HW8 station owned by N9IV is an example of that fact. The setup includes power supply, speaker, and a snazzy plastic-encased Hi-Mound key. (Photo by N9IV)

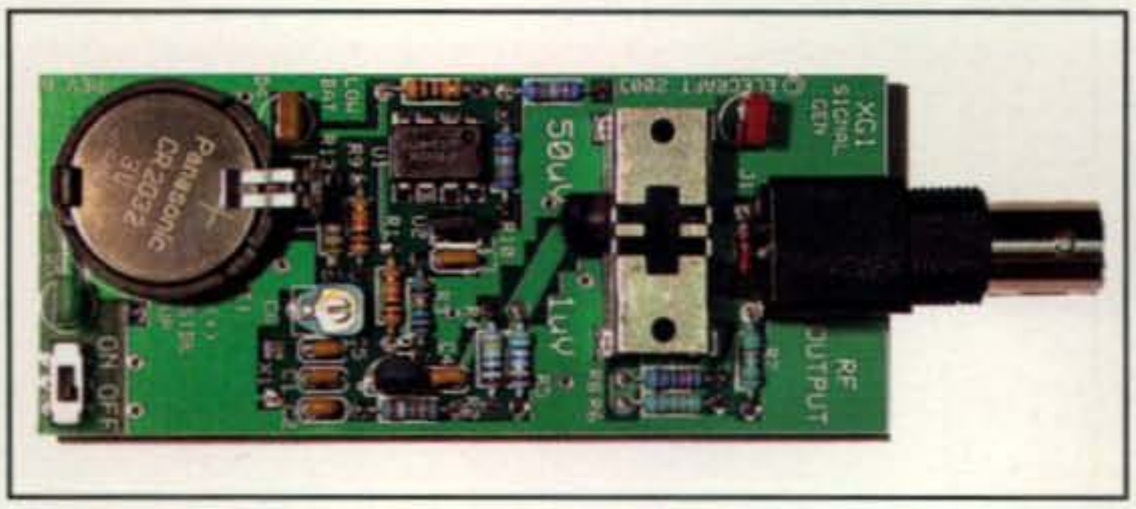

Photo 3– The new XG1 Receiver Test Oscillator kit from Elecraft is quite handy for cross-comparing receivers and on-the-spot checking of the performance of used gear found in hamfest fleamarkets. The little oscillator measures 1.5 by 3.5 inches, output is a precise 1 µV or 50 µV signal on 7.040 MHz, and the unit is powered by an on-board 3-volt coin cell. (Photo courtesy Elecraft)

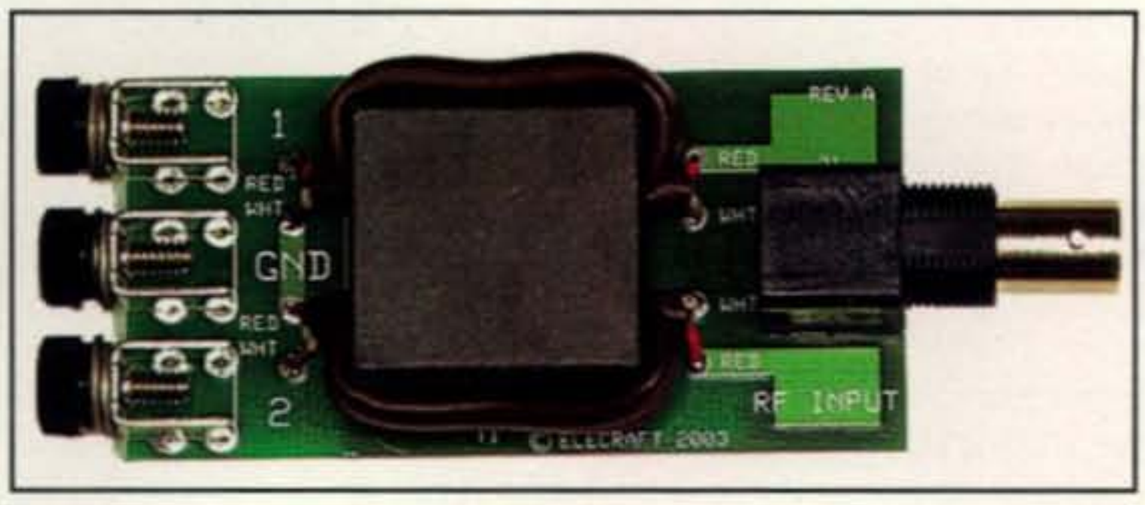

Photo 4– Elecraft's new 4:1 Mini Balun Kit handles up to 150 watts and works from 500 kHz to 55 MHz with an SWR below 1.2:1. Board measures 1.5 by 3.5 inches and includes BNC input socket, screw terminals on balanced output, and is ideal for doublets or extended double Zepp antennas. (Photo courtesy Elecraft)

balun, and a wideband 20-watt dummy load (photos 3, 4, 5, and 6).

The XG1 Test Oscillator produces a precise 1-microvolt-level signal on 7.040 MHz, which is quite beneficial for evaluating and cross-comparing "specs" and sensitivity of various receivers and transceivers. The test oscillator also gives you a good idea of how a 1-microvolt signal actually sounds on your receiver, and a second output level of 50 microvolts corresponds to a standard S9 level for further comparing receiver performance and S-meter accuracy. At some time or another many of us homebrew an unusual type of receiver or consider purchasing a rig of unknown performance, and this test oscillator really proves its worth at such times.

The noise generator covers 100 kHz to 500 MHz, and its constant output is useful for checking and aligning IF stages in receivers. An RF signal generator could also be used for this function, but signal generators are usually large and require setting to an exact frequency (and level) for use. A noise generator is smaller and easier to use, and this one also has its own on-board battery for power. The 4:1, or 200-to-50 ohm, balun measures only 1.5 to 3.5 inches, handles up to 150 watts, and operates from 500 kHz to 55 MHz with an SWR of less than 1.2:1. Combine it with a "rollup" antenna made with extra-thin wire, and you have a high-performance "pocketable" radiator for portable operations. The dummy load is useful up to 225 MHz and includes an on-board RF detector for use with a voltmeter so you can calculate a low-power transmitter's exact output into the dummy load. More details (and kits!) are available directly from Elecraft at <www.elecraft.com> or via telephone at 831-662-8345. Check them out!

More Kit Rigs

Our ongoing quest for bringing new QRPers up to speed continues this month with a brief look at some time-proven Vectronics mini kit rigs produced by MFJ Enterprises and available through amateur radio dealers nationwide. These items are especially designed for QRPers who already have a full-featured low-power transceiver for main station use but are still interested in a mini kit rig for portable operation—a rig built by one's own hand, so to speak. The Vectronics kits are reasonably priced, are laid out on roomy PC boards for fairly easy assembly, and make dandy "first homebrew projects."

First is the Vectronics two-IC receiver kit that is available for 20-, 30-, 40, or 80-meter operation (photo 7). The receiver is built around the ever-popular NE-612 oscillator/ mixer and LM-386 audio-amplifier IC and includes VFO frequency control that you can tailor (with jumper wires) to cover a full band or any desired portion of a band. The NE-612 and LM-

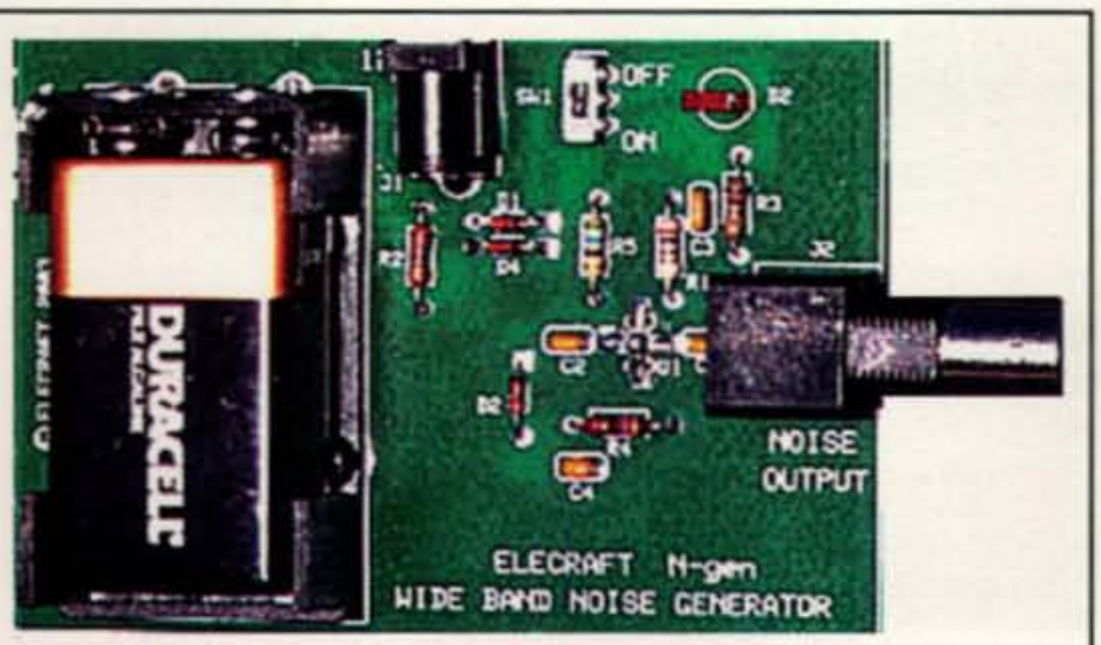

Photo 5– Elecraft's new Wide Band Noise Generator kit is super-handy for quickly aligning receivers in the field. It is pocket-size and outputs noise from 100 kHz to 500 MHz for instant IF peaking. (Photo via Elecraft)

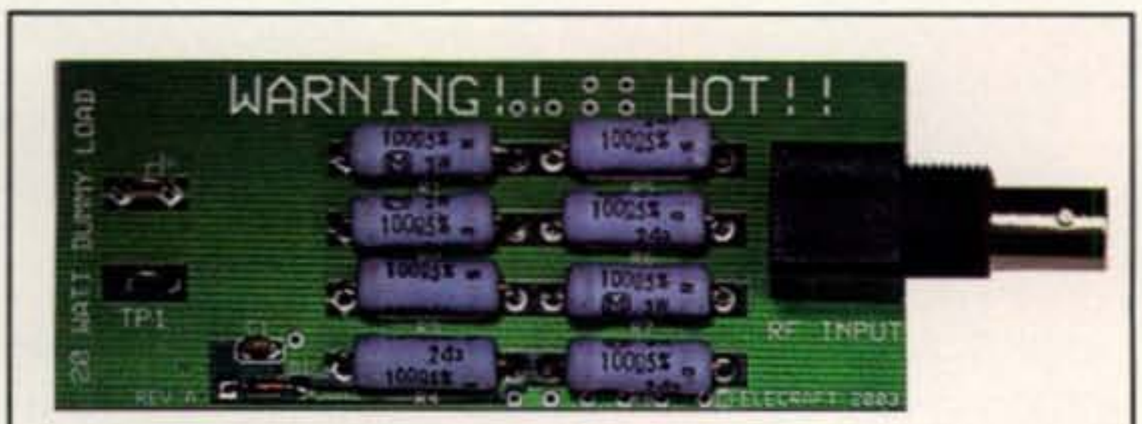

Photo 6– Every QRPer appreciates having a small dummy load with an on-board detector for measuring low power levels with a voltmeter, and this new Elecraft dummy load kits fills the bill in high style. It is small and quite versatile. (Photo courtesy Elecraft)

386 are an outstanding combination, and they make a very good direct-conversion receiver. The only drawback to direct conversion is it lacks an IF-level crystal filter, so it receives both upper and lower sidebands of CW signals equally. Some folks—mainly those who have difficulty listening to or concentrating on only one tone or CW note while ignoring others—may find direct conversion challenging to use. Personally, I find it more than acceptable for lighthearted QRP operation. In fact, I often connect an external audio amplifier with a small speaker to a direct-conversion receiver and use it like a no-tune scanner. When tuned to 10.104 or 10.105 MHz, for example, you can keep an ear on what's happening from 10.100 to 10.108 or 10.110 MHz and then join the action or answer a CQ anytime. It's great, and it is also a feat that can't be accomplished with a "big rig" (too selective, you know).

The Vectronics transmitter kit is also available in 20-, 30-, 40-, and 80-meter versions, and it too uses a circuit of proven design and performance (photo 8). Here a 2N3904 and 2N2222 drive a 2N3053 to approximately 1 watt output. Included on the transmitter's PC board is VXO frequency control with an approximate 6- to 15-kHz tuning range plus T/R switching for the receiver. It is a well-designed item, and 1 watt is a good balance between effective output power and respectable battery life when operating portable.

Visualize combining a Vectronics receiver and transmitter with a common VXO for frequency control, add T/R switching, mount it on a single 4.5 by 5 inch PC board, and you have the Vectronics transceiver kit. It makes a neat, fun rig, and the only point to watch during use is making sure you tune in and call stations on the right sideband or frequency. How? After assembly and during checkout, use your main station transceiver as a band monitor and reference to determine if you should tune the mini-rig's dial in a clockwise or counterclockwise direction so it tunes like a "big rig." Then by ignoring the "wrong" sideband and calling stations at or near zero beat, you eliminate "on frequency" guesswork and noticeably improve your odds for success. Surprisingly, the

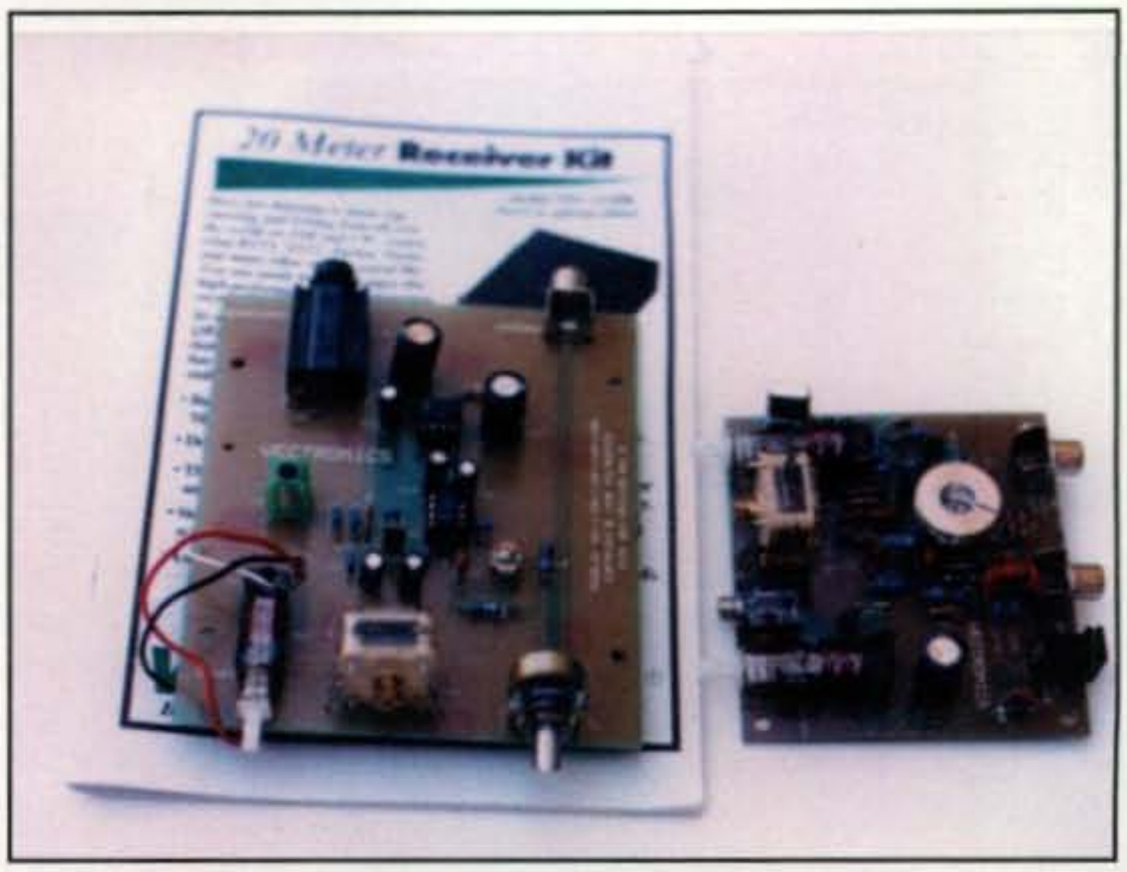

Photo 7– The Vectronics two-IC receiver kit (left unit) measures 4.5 by 5.5 inches. It goes together in a flash and works quite well for its simple design. The Vectronics transmitter kit (right unit) measures 3.5 by 4 inches, is also easy to build, and pumps out a solid 1-watt signal. The creative ideas for mounting these units in some special case as discussed in the text are endless. (Photo courtesy MFJ Enterprises)

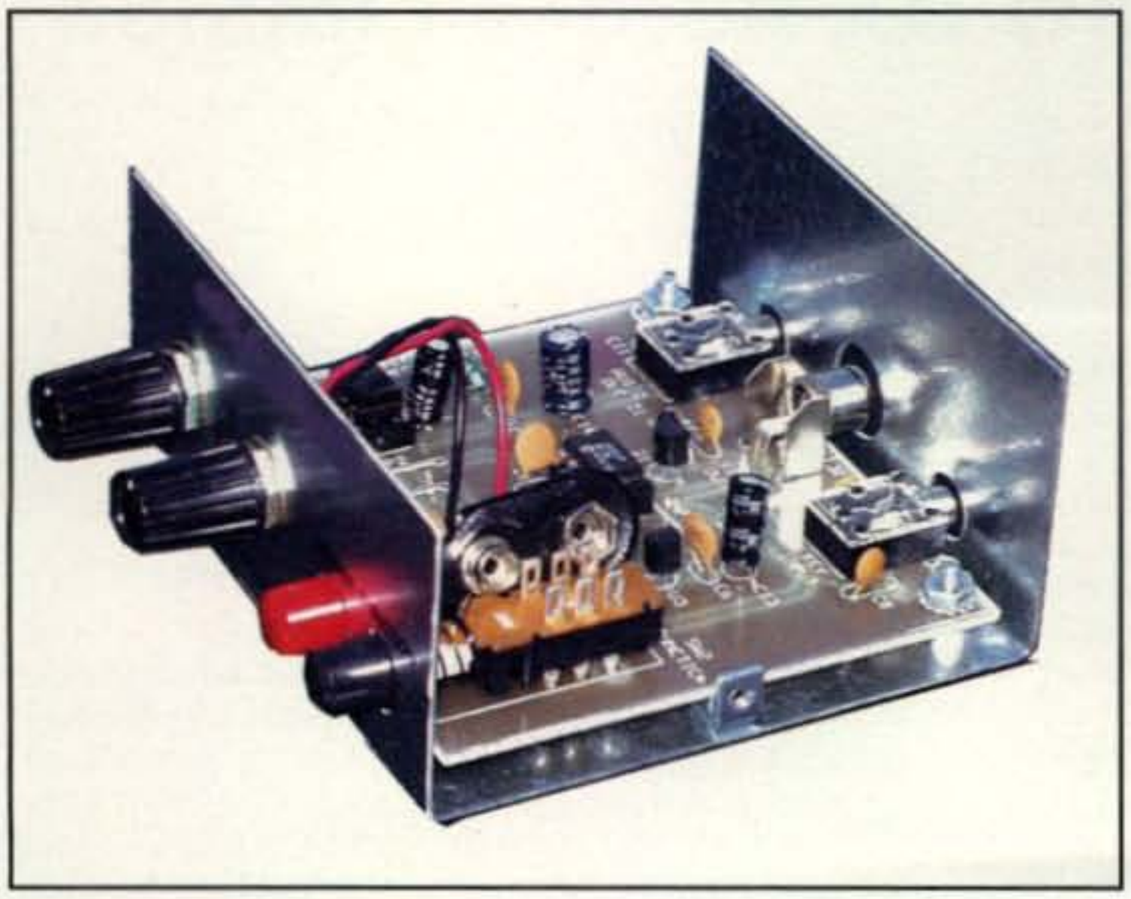

Photo 8– The Vectronics transceiver kit is a combination of the Vectronics receiver and transmitter with VXO and T/R switching on one board. The little rig is inexpensive and available for 20-, 30-, 40-, or 80-meter operation. It is shown in its optional case. (Photo courtesy MFJ Enterprises)

most often experienced pitfall in using any QRP gear is not its low power; it is being slightly off-frequency. Even if your signal is weak, it probably will be heard if it falls within the other station's receive passband. The other station may even assume you are DX and return to your call out of curiosity.

Optional metal enclosures are available for the Vectronics kits, or you can just mount them in a case/cabinet of your choice. This is where most homebrewers fall short, just cramming their new pride and joy into the first utility box available rather than adding a touch of personal creativity and class. One of my favorite choices for an enclosure is a retro-style AM/FM table-model radio such as those cool Crosley reproductions sold by Universal Radio, Inc. The radios usually include a tape deck that when removed gives ample room to mount a Vectronics receiver or transceiver board in the case. The Vectronics audio output then connects to, or in place of, the tape deck's head/pickup lead, resulting in a QRP rig with excellent speaker volume and super eye appeal. Try this simple-yet-effective idea yourself. You will love it, and it is also a terrific way to enhance every room in the house with a QRP rig.

Look for Vectronics kits near MFJ's main display at hamfests, in dealers showrooms, or check out the full Vectronics line at <www.vectronics.com>. You can also order the kits by telephoning MFJ Enterprises at 1-800-647-1800. Build some, and enjoy life in the QRP lane.

Wrap Up

As this month's column closes, I think about all of our friends and their fascinating stories of what inspired them to get started in QRP. It may have been working someone running low power or working some special station while using low power, or . . . well, you tell me and I will tell the multitudes via future columns. Fair enough? Postal mail for the text and 35-mm photos still work fine, or you can e-mail me at <k4twj@cq-amateur-radio.com>. May the force of good signals always be with you!

73, Dave, K4TWJ

vhf plus

BY JOE LYNCH,* N6CL

New 403-GHz QSO DX Record Claimed

Just at the deadline for this column, the following was reported by Brian Justin, WA1ZMS. He and Peter Lascell, W4WWQ, bested their previous 403-GHz record by nearly an additional kilometer. The details of the QSO follow:

On December 21, 2004 at 0127 UTC, WA1ZMS/4 worked W4WWQ/4 on 403 GHz over a distance of 1.4 km. W4WWQ/4 was located at N37-21-13.7, W79-10-15.0 and WA1ZMS/4 was located at N37-21-24.3, W79-11-11.1. The weather at the time of the QSO was: temperature –7.8°C, dew point –18.9°C; relative humidity 41%, station pressure 1000 mb. These weather conditions resulted in an atmospheric loss of 3.46 dB/km.

The gear used for this QSO was the same as that used previously on 241/322/403 GHz. Signals were very weak on the W4WWQ end of the exchange, while several dB of margin existed on the WA1ZMS end. The exchange had to be sent several times for W4WWQ to copy the CW by ear. This new QSO exceeds our former DX of 0.5 km as well as conquers the 1-km barrier for amateur frequencies above 400 GHz (except for visible light).

(The above information courtesy of Buck Rogers, K4ABT.)

Possible Explanations for The November 2004 Sporadic-*E* Event

In last month's column I included reports from Europe regarding the unusual sporadic-*E* event that took place on November 10, 2004. This time, from Volker Grassmann, DF5AI, comes commentary on and a few possible explanations for this event. For more information, see DF5AI's website: <http://www.df5ai.net>.

In early November a series of aurora openings enabled DX QSOs on 50, 70, and 144 MHz. On November 10, 2004, at around 1700 UTC, VHF operators made a noteworthy observation during an aurora opening, that being 144-MHz sporadic-*E* QSOs from England, Germany, the Benelux countries, France, Switzerland, Italy to Greece and Bulgaria, corresponding to 1500 to 1800 kilometers DX distance.

The DX conditions appear indeed typical of sporadic-*E* QSOs—i.e., very high field strengths, T9 tone quality, fast and deep fading periods. Yes, there is reason to assume that all these QSOs correspond to sporadic-*E* forward scatter—with one exception, though, that being the normal time of year. These types of QSOs appear between May and August, but are very rarely observed in November.

Did the aurora opening in the north of Europe cause this sporadic-*E* opening in the south? What mechanism may be responsible for it? To answer these questions very precisely, we do not know and we will never figure out for sure, because no data material is available to solve the puzzle. All we can do is speculate.

Here is some of my speculation: During severe geomagnetic disturbances we may find a large variety of effects on all regions of the ionosphere—e.g., strong electric fields generating electrical currents that are associated with magnetic fields disturbing the Earth magnetic main field (which explains the geomagnetic variations we may measure on the ground).

We also can find electron precipitation along the Earth magnetic field lines—i.e., charged particles beaming from the magnetosphere into the upper atmosphere. Their kinetic energy finally manifests itself in *Joule heating*, which subsequently affects the neutral components of the atmosphere and may cause wavelike oscillations similar to a stone disturbing the surface of a lake.

This so-called *gravity wave* demonstrates that wavelengths between tens of kilometers to hundreds of kilometers may travel from the polar ionosphere towards mid-latitudes. Gravity waves are believed to play a role in the generation of sporadic-*E*. For example, this past November 10th's sporadic-*E* opening is perhaps supported by gravity waves originating from the highly disturbed ionosphere farther north.

Similar effects are well known in ionospheric physics, but in this particular case it is nothing else other than a speculation (for example, we cannot answer the question why simultaneous aurora and sporadic-*E* openings do not occur more often during conditions of severe geomagnetic disturbances). More information on gravity waves and their impact on the generation of sporadic-*E* will appear on my website in the first or second quarter of 2005.

VHF Plus Calendar

Feb. 2	Last Quarter Moon.
Feb. 6	Very poor EME conditions.
Feb. 7	Moon Perigee.
Feb. 8	New Moon.
Feb. 13	Moderate EME conditions.
Feb. 15	First Quarter Moon.
Feb. 20	Moon Apogee. Poor EME conditions.
Feb. 24	Full Moon.
Feb. 27	Moderate EME conditions.

—EME conditions courtesy W5LUU.

Do Thunderstorms Cause Sporadic-*E* Propagation?

A perennial question for the weak-signal operator is whether or not there is a connection between sporadic-*E* propagation and thunderstorm activity. Now comes word from Volker, DF5AI, of a longitudinal study under way in Europe. The following was excerpted from his website (http://www.df5ai.net):

Do thunderstorms create sporadic-*E* layers enabling long-distance VHF communication? Some radio amateurs indeed claim a strong relationship between sporadic-*E* and "big thunderstorm formations." We may even find radio amateurs considering a more general link between the weather and sporadic-*E* activity on 144 MHz. Many radio amateurs remain skeptical, though, but thunderstorm effects on sporadic-*E* remain "a theory that refuses to die."

In early 2004, a group of radio amateurs launched a new project to investigate this subject in more detail. Sabine, DL1DBC, develops and operates the data acquisition and data analysis software tools; she maintains the database and manages contacts to commercial weather information services providing actual atmospherics data. Udo, DK5YA, contributes sporadic-*E* observations resulting from his European sporadic-*E* summary reports. Additionally, he organizes access to weather information archives.

Allard, PE1NWL, operates the DXrobot service on the internet. For example, he can access the latest sporadic-*E* information communicated by radio amateurs. The interconnection between his and Sabine's computers exchanges data within short reaction time. Gabriel, EA6VQ, contributes his experience in the analysis of 144-

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MHz sporadic-*E* openings and provides data and results originating from his studies.

Joachim, DL8HCZ, editor-in-chief of *Dubus* and *Funktelegramm* magazines, analyses ham radio publications relevant to this project and investigates the details of ham radio observations that need to be analyzed in more detail. Volker, DF5AI, communicates the latest project status reports on this website and manages the contacts to the scientific community.

We are currently working on a detailed paper that will discuss the speculations, investigate the facts, and examine relevant scientific results. We plan to publish our findings in a future issue of *Dubus* magazine.

New HAMSAT Announced

According an announcement from AMSAT-India, a new HAMSAT is expected to be launched sometime this month or next. The following particulars were taken from <http://www.amsat-india.org>:

HAMSAT Configuration: HAMSAT is a 40 kg micro-satellite to be launched onboard PSLV (Polar Satellite Launch Vehicle) from the Sriharikota launch range. It will be a co-passenger along with another remote-sensing satellite (most likely IRS-P6) to be launched on the same vehicle.

It is cuboidal in structure, of about 630 mm ×630 mm×550 mm size. It has body-mounted solar panels on the four sides. Antennas for communication are mounted on the top; the bottom portion interfaces with the launcher.

It will orbit in a spinning orbit around the poles at an altitude of about 817 km (LEO). The bus electronics perform the functions of attitude control, telemetry, telecommand, and data acquisition and are controlled by a single microprocessor. Satellite Telecommand (TC) and Telemetry (TM) are on the VHF band.

VUSAT payload: There will be two transponders—Indian and Dutch–as main and redundant systems. Both of them will be operating in Mode-B configuration with UHF uplink and VHF downlink. This mode is also known as U-V operation. They are linear transponders designated to operate in CW/USB/FM modes of amateur communication. Since they are linear transponders they may be tried in other modes of operation, too. They will have an output power of about 30 dBm (which is equal to 1 watt). They will share common turnstile antennae for input and output along with satellite mainframe TC/TM systems.

Typical link calculations are as below:

1. UHF uplink (435.25 MHz center frequency)
   Ground station power: 40 dBm (10 watts)
   Antenna gain: 12–18 dBi
   EIRP at maximum antenna gain: 56 dBm
2. VHF downlink (145.90 MHz centre frequency)
   Antenna gain: 16 dBi
   Received carrier power (at ground RX): –107 dBm (1 µV)

Please note that both the transponders will have 60 kHz bandwidths.

Transponders may be differentiated by their respective beacons: The Indian transponder will have an unmodulated carrier on 145.940 MHz, whereas the Dutch transponder will have modulated information on 145.860 MHz. The satellite will have a periodicity of about 7000 seconds and is likely to be visible for about 10–12 minutes maximum during a good pass.

Smithsonian Displays Amateur Satellites

The following is from AMSAT-NA (http://www.amsat.orgamsat-new/archive/OSCAR/index.php):

The James S. McDonnell Space Hangar opened Monday, November 1, 2004 at the National Air and Space Museum's Udvar Hazy Center near Dulles Airport. In it is a display case containing a full-scale model of OSCAR, the first amateur satellite to fly in space. It's been many years since OSCAR was on display at the Smithsonian. It had been in storage in recent years. In the exhibit it is joined by PCsat and NUSAT-1.

The display identification for OSCAR reads: "Oscar I Communications Satellite, Full-scale model. Launched in December 1961, Oscar I was the world's first amateur satellite. The California-based radio operators who developed the original built this model. Gift of Project Oscar, Inc." You can see more photos about OSCAR and learn more about Project OSCAR by visiting the Project OSCAR Archive at <http://www.projectoscar.net/archive.php>.

The PCsat display features the thermal mass model of PCsat complete with anten-

nas. The model's identification reads: "PCsat Thermal Mass Model. PCsat, developed by U.S. Naval Academy cadets and launched in 2001, allows amateur users to report and receive position information and messages from specially designed walkie-talkies nearly anywhere in the world. Gift of the U.S. Naval Academy."

The introduction plaque for the display that you see in the case with OSCAR reads:

"Amateur Satellites: Amateur satellites have been a small but important part of space activity since the beginning of the Space Age. In contrast to large-scale, expensive government programs, amateur satellites demonstrate that the 'little guy' can build working, useful satellites with commercial off-the-shelf components and small budgets.

"Oscar I, the first amateur satellite, was launched in 1961 and inaugurated a series of communications satellites developed by the amateur radio community. Since that time, more than 40 Oscars (Orbiting Satellites Carrying Amateur Radio) have been launched. Amateur satellites have proven to be an ideal way to introduce college students to space technology. And as electronics have become more compact, powerful, and durable, amateur satellites have become an important way to demonstrate the potential of small spacecraft.

"In addition to OSCAR and PCSat, a student built project NUSAT-1 (Northern Utah Satellite) is on display. NUSAT 1 was the first student-organized satellite project and was built by students at several Utah universities. It flew on the Space Shuttle in 1985 and is a gift of Weber State College."

Story and photos courtesy of Perry Klein, W3PK.

Lawrence Ross (left), a 5th grader at Victory Christian School, Tulsa, OK, asks a question of ISS Commander Leroy Chiao, KE5BRW, while Bill Griffin, NI5X, controls the earth station at Tulsa Air & Space Museum. Complete story in the Winter 2005 CQ VHF magazine. (N6CL photo)

EarthLink Says BPL Too Expensive

According to an article that appeared in an *ARRL Letter* (http://www.arrl.org/news/stories/2004/12/16/3/?nc=1), EarthLink has decided to pull out of its previous commitment to BPL research. Citing this research, which indicates that ADSL2+ is a much more promising mode of broadband transmissions, officials at EarthLink have notified the FCC that, according the *ARRL Letter* report, EarthLink's analysis . . .

indicated that BPL is the most expensive of the broadband technologies it evaluated. In a chart titled "Next generation broadband," EarthLink said that wireless and BPL "are not likely to be competitive in cost and performance with cable and DSL over the last mile to the home."

The company has judged as "not successful" one unspecified BPL technical trial using Amperion equipment in a "wireless /BPL combo." In discussing other trials using Ambient and Current Technologies equipment—one of which EarthLink had invested in—the ISP's assessment was that the high cost per household passed—$125 in both instances—would require a better than 15 percent market penetration to attain a competitive cost.

EarthLink said its assessment determined that ADSL2+ [Asymmetric Digital Subscriber Line] technology is the "best option" and can offer VoIP as well as high-speed broadband (at 6 to 10 MB per second) and video over copper wire and using on-premise consumer equipment. The company also indicated that it plans to invest in ADSL2+ technology.

It is important to note that ADSL2+ is landline technology that travels over the phone line. While ADSL2+ promises increased upstream and downstream speeds, it does not solve the rural problem where DSL service is not available. For a copy of a white paper espousing the virtues of ADSL2+, go to: <http://www.aware.com/products/DSL/adsl2.pdf>.

EarthLink's results suggest the possibility that we may have turned a corner with regard to BPL. For more information pertaining to BPL and other sources for broadband internet service, please see N6CL's article in the Winter 2005 issue of *CQ VHF* magazine.

New 144-MHz Beacon

John Theofilopoulos, SV3AQR, has installed a new 144-MHz beacon. The beacon is on 144.488.0 MHz, using the call SV3AQR/B. The grid locator is KM07QS. It is near Amalias, Peninsula of Peloponesos, Greece. Its ASL is 50 meters. It runs 5 watts on CW into a 3-element Yagi, pointing in the direction of 320 degrees.

John says that any SWL reports, remarks, or suggestions are very welcome. QSL to John via his *Callbook* address.

On the Air

George Carr, WA5KBH, reports the following information:

I finally got my 50th state for WAS-50 MHz. I had all but Rhode Island. Worked W1JJ on October 24 and have received his QSL. The cards have been sent to the ARRL and I am now awaiting the wallpaper. I have also gotten my WAC on 50 MHz as well! I had all but AF and finally worked EA8.

The fine-business aurora experienced last November did not begin to creep down here in EM30. It was dead on both 50 and 144 MHz.

I have made it a habit of calling CQ on 50.125 MHz each day when I am climbing the I-10 bridge here in Lake Charles, Louisiana to see if there are any openings. This is at least twice a day as I commute to work. Maybe yet . . .

Call for Papers

Ray Rector, WA4NJP, announced that the Southeast VHF Society has issued a call for papers for its *Proceedings* for the 2005 conference. You can contact Ray at <wa4njp@bellsouth.net>. This year's conference will be held in Charlotte, North Carolina. As of press time, the location and other details had not been determined. For up-to-date information, please check the society's website: <http://www.svhfs.org/conf_2005.htm>.

Silent Keys

Larry Kayser, VA3LK. Bob McGwier, N4HY, reports the following:

My great friend Larry Kayser, VA3LK, of many years in AMSAT, QRP, and a great lover of using low to the ground Yagis for ground enhancement on EME, passed away suddenly from a heart attack.

Larry loved his Elecraft K1 and his Elecraft KX-1. He was the first person to complete a two-way transatlantic (full QSO) on 137 kHz. He was a big-time technical contributor to AMSAT. He loved showing me his single M^2 Yagi and his 200-watt linear which produced echoes that I thought were not possible on 2 meters off the moon using "ground" enhancement on the lake where he lived.

Larry was an indomitable spirit and it can easily be said that he never did anything half way. He will be missed.

Just before his untimely death, Larry prepared a paper on the possibilities of a transatlantic 144-MHz QSO. He suggests an automated two-way type of transmission involving sending and receiving tones that is modeled after the WSJT software developed by Joe Taylor, K1JT. To read his paper, go to:

<http://www.df5ai.net/ArticlesDL/ExternalRes/Beacon_memo_1.pdf>.

Lennart (Lenna) Suominen, OH1NL. It is with sadness that we report the passing of Lennart (Lenna) Suominen, OH1NL, an EME pioneer, who, along with W6DNG, made the first 144-MHz EME QSO on April 11, 1964. Comments from the Moonnet listserv include the following:

"I will be always thankful to such an EME pioneer to give a newcomer like me so much fun on EME, at least for a long period. My thoughts are with Lenna and his family."—*Wolfgang, DL5MAE*

"I never worked or met OH1NL, but like many here I recall his record-making contact on 2-meter EME. That news inspired me to strive to work moonbounce myself (although it would be many years before I was able to accomplish it)."—*Russ, K2TXB*

"This is great loss to the world amateur radio community, that OH1NL passed away. I worked him first time in around 1965 on 2m meteor scatter; that time I was in Czechoslovakia, as OK2WCG. He will be certainly remembered by all of us."—*Ivo Chladek, ZS6AXT*

"I am very sad to learn the death of Lenna, OH1NL, pioneer of EME. I remember the first time I wrote to him after his first QSO on 144 MHz with W6DNG and his answer: 'We knew that it was possible!'"—*Marius Cousin, F8DO*

"May I also say how sorry I am to hear that Lenna has passed away. He was an inspiration to us all on EME and MS in those early days of the 1960s."—*Peter, G3LTF*

"As someone who formed part of the generation of EMEers first active in the 1970s, the recent passing of OH1NL and several other EME pioneers has greatly saddened me. Isaac Newton said that 'we all stand on the shoulders of giants' and that's as true of EME as any of field of human endeavor."—*Chris, GW4DGU*

"I am very sorry to hear that Lenna, OH1NL, has passed away. I will always remember his great achievement opening way to EME for others."—*Paul Chominski, WA6PY*

Peter Riml, OE9PMJ/OE9XXI. The following is from Erich Rupprechter, OE9ERC:

I have to convey the sad news that on June 7, 2004 Peter, OE9PMJ, lost the struggle for his life. He had been hospitalized for two weeks as a consequence of a prostate carcinoma, which unfortunately was detected too late for effective treatment. A number of ham friends were with him during the last days and I am sure he enjoyed being surrounded by hams until the very end. Until very recently he had been active on the moon using his OE9XXI call!

Peter was known worldwide not only for his EME activities but also for a number of technical innovations such as microwave filters, antenna designs, transverters, easy-to-build dishes, and many more. His technical articles have been translated and published in a number of languages (Japanese, English, Russian, French, just to name a few).

He joined the Austrian Amateur Radio Society. In 1977/78 he built one of the first repeaters located high up in the alpine mountains. In the following years he dominated the VHF/UHF contests in Austria before he conquered the "ham summit" EME. His ham career culminated when he achieved DXCC number 1 on 1296 MHz (23 cm band)!

He was an Elmer to a number of other hams. It is not by chance that there are a good number of active EME stations within the small Austrian ham population.

Being a self-educated person who always took technical challenges as an opportunity to expand his knowledge, he started evening school at age 46 to become officially an engineer. Just when his engineering consulting service started to take off he learned about his deadly disease. The doctors predicted he would have 4–6 weeks to live, but his strong will bought him more than a year. He had so many projects he wanted to finish.

Peter's untimely passing should remind all of us OMs to seriously consider making a trip to our MD for a checkup. Who knows what else we might have to contribute to our hobby given time!

And Finally . . .

Thanks for keeping me in the loop by sending me your reports. I look forward to continueing to receive them and will publish them in future columns.

Until next month... 73, Joe, N6CL

dx

BY CARL SMITH,* N4AA

Working DX—The Hard Way

The big fall contests are behind us now, and we look forward to the smaller ones in addition to the ARRL DX contest and the CQ WPX contests in the spring. This solar cycle is definitely going to be "one for the books," if I'm not mistaken. Some really weird patterns are emerging here in early December as I write this. The ARRL 10 Meter contest proved to be "different" in many respects. Back-scatter was "in" for most of the weekend . . . at least at my location. I told one W5 on Friday evening that he had the loudest signal I had ever heard, outside of a local only a half mile away. Just a short time later I could barely hear him. One had to make very quick exchanges in that contest.

Each year the Magnolia DX Association (MDXA) holds its Christmas DX dinner. (Left to right) Tom Harrell, N4XP, Floyd Gerald, N5FG, and Frank Smith, AHØW, were among those who attended this past December's event. Tom and Frank were featured speakers at the dinner. Oh . . . you might recognize Floyd as the CQ WAZ Award Manager. (Photo courtesy of Tom, N4XP)

Working the WARC Bands

I really had not been too interested in getting involved in chasing countries on more bands. However, "never say never."

I was encouraged to make some comments on my DXing under less-than-ideal conditions. By that I mean I have never had a resonant antenna for the WARC bands and just didn't try to work those bands.

I happened to see a comment by someone (I don't remember who) about his using an 80-meter antenna for 30 meters, and another who used a 40-meter antenna for 17 meters. Well, with some time to spare one weekend in early August, I decided to try using my existing antennas for the WARC bands. Was I in for a surprise!

I have a 2-element Cushcraft 40-meter beam at 65 feet. I made the decision that I would not even attempt to use my amplifier for this experiment. I punched the button for 17 meters on the FT1000MP and hit the tuner button. As I watched, the SWR dropped to nearly zero and the tuner stopped. Hitting the key a few times, I saw a full 100 watts output with virtually no SWR. Hmmm, I thought . . . maybe this *will* work.

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

The team that operated from Lord Howe last fall—four Australians and two Italians. (Photo courtesy of Dick, VK9LH, and Dee, W1HEO/VK9LM)

When you move to a new QTH you have to get the antennas up, right? Tom, N4XP, had to put in a substantial concrete base for his new 89-foot, motorized crank-up tower. Here he stands in the hole he eventually filled with 12 yards of concrete. (Photo courtesy of Tim, N4XP)

The WPX Program

SSB

2921 .....SP1DMD

Mixed

1947 .....AA4MF 1948 .....K9TTT

CW: 700 JH8WGT. 1950 I2EAY.
SSB: 1150 G3TSZ. 1400 I2EAY. 1600 AA1KS
MIXED: 700 K4IJQ. 1940 KØKG. 2400 I2EAY. 2940 N4UH, W1CU. 5500 W2FXA.

160 Meters: CT1EEN

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT.

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.

CQ DX Awards Program

SSB

2449 .....DU1IVT 2450 .....DU1UGZ

SSB Endorsements

320 .....KZ2P/335 250 .....DU1IVT/254
320 .....W8AXI/334 200 .....DU1UGZ/235
300 .....AC6WO/301

RTTY Endorsements

320 .....K3UA/328

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.

After tuning around a bit and working some DX stations, I wondered if the antenna was directive. I swung the antenna around while listening to a number of stations and found that, lo and behold, it was directive indeed, and obviously had some gain to boot. I'm not looking at the technical aspect of this; the thing worked, and that was all that counted as far as I was concerned.

Following my 17-meter experiment, I decided to try 12 meters and found the 40-meter beam worked on 12 just as well as, if not better than, it did on 17.

I have done fairly well on 30 meters using my 80-meter dipole. It's only up 50 feet at the center, but it has provid-

ham radio news *(from page 4)*

New "Woodpecker" Reported on UHF

Hams who were active on HF during the Cold War probably remember the "Russian woodpecker," signals that obliterated portions of the HF spectrum from time to time and which turned out to be from Soviet over-the-horizon radar. Now, hams in the western US are reporting a new type of "woodpecker"-type pulsing noise on the 70-centimeter band. Reports on Newsline indicate that the source may be a new US military system called the Enhanced Position Locating Reporting System. The ARRL told Newsline it is aware of the situation and is pursuing solutions through high-level channels. The amateur allocation on 70 centimeters is secondary to government radiolocation, and we may not interfere with them, so negotiations are the only possible route.

KE5BRW's First Contact

We all remember our first ham radio contact, and Leroy Chiao, KE5BRW, is particularly likely to remember his ... since he made it from space, where he's currently Commander of the International Space Station. The ARRL Letter reports that Chiao made his first contact, using the space station's NA1SS callsign, with a group of Italian schoolchildren on November 19. "This is my first ham radio contact," he told the students, "so I'm honored to be sharing this experience with you."

On December 9, Chiao talked with a school in Ottawa, Ontario, where Sheila Martin, wife of Canadian Prime Minister Paul Martin, was among the guests listening in. Afterwards, Chiao made several casual contacts and promised to get on the air whenever he could during his time off.

Georgia City Requires CC&Rs to Permit Ham Antennas

The city of Acworth, Georgia, has added language to its Residential Development Standards that prohibit homeowner's associations and deed restrictions from barring amateur radio antennas. According to the ARRL Letter, Acworth's standards now include a provision stating that "Antennas for amateur radio stations licensed by the Federal Communications Commission will not be prohibited by Declaration of Covenants, Conditions and Restrictions or homeowners' associations, and the installation of such antennas must be reasonably accommodated." The provisions apply only to new developments approved after the adoption of the new rules. Acworth is a suburb of Atlanta, with a population of about 20,000. Two of its aldermen are licensed amateurs, Tim Richardson, W4IOU, and Bob Weatherford, KI4COP.

FCC: Don't Ignore U$

Most of the time, when a ham is cited by the FCC for a possible rules violation, he or she responds quickly. In fact, federal law requires a prompt response. Occasionally, though, a ham may choose to ignore those letters, and that can get expensive. For example, the FCC says Paul Westcott, KCØOAB, was sent a letter in June, 2004, regarding alleged interference and possible lack of a control operator. Westcott responded to the first letter, according to the FCC, but has apparently ignored a follow-up request for more information and a Warning Notice about his failure to reply. As a result, the Enforcement Bureau is proposing that Westcott be fined $4,000 for "willfully and repeatedly failing to respond in writing to Commission correspondence." And it hasn't even begun to consider the original alleged violations.

(Continued on page 114)

5 Band WAZ

As of December 1, 2004, 664 stations have attained the 200 zone level and 1415 stations have attained the 150 zone level.

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

none

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)
IK1AOD, 199 (1)
DF3CB, 199 (1)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
K5MC, 199 (22)
W1JZ, 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)
EA7GF, 199 (1)
N4PQX, 199 (26)
JA5IU, 199 (2)
CT3DL, 199 (26)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
N4XR, 198 (22, 27)
RU3DX, 198 (1, 6)
N6HR/7, 198 (34, 37)
OE2LCM, 198 (1, 31)
W7SX, 198 (18, 23)
HA1RW, 198 (1, 31)
WK3N, 198 (23, 24)
HA9RT, 198 (1, 31)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)

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

HL3GOB (170 zones)

Endorsements:

N6HR (199 zones)
DL2KQ (200 zones)
BA4DW (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
569 ..... K4EM

12 Meter SSB
35 ..... BA4DW

15 Meter SSB
616 ..... JQ2HJR

20 Meter SSB
1133 ..... 9A2YC

80 Meter SSB
84 ..... WØCM

12 Meter CW
46 ..... DL1AMQ

17 Meter CW
54 ..... DL1AMQ 55 ..... BA4DW

30 Meter CW
60 ..... DL1AMQ 61 ..... BA4DW

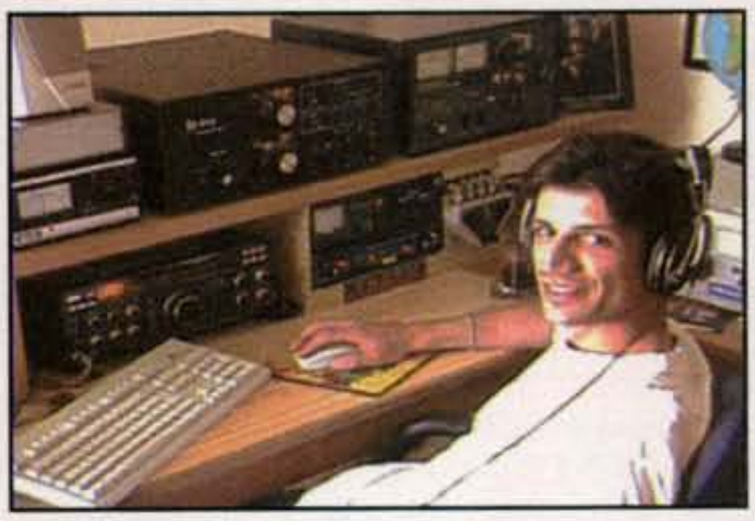
160 Meters
202 ..... DL1AMQ 203 ..... OH2BO

All Band WAZ
SSB
4944 ..... WA2BEV 4945 ..... W7BJB

Mixed
8333 ..... DKØPM 8335 ..... RX9FM
8334 ..... JF1SVV

All CW
447 ..... JA7ARM 448 ..... SM7WJC

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>.



An active operator on Cyprus, Paris, 5B4XF, has an excellent station setup. He enjoys the WARC bands and contesting. He is planning to move to a bigger piece of land where he can freely put up plenty of aluminum. (Photo courtesy of John, KDØJL)

ed 63 countries on that band, again with my 100 watts. I managed to work the VP8 DXpedition on the Falklands and several other "goodies" as well.

As of today, after just four months of intermittent operation, I have worked 104 countries on 17 meters and 61 on 12 meters, all with only 100 watts and my *40-meter beam*. There are some pretty good DX goodies in my log—for example, 9M, 9V, YI, 6O, TN, and YB.

You just never know what might work until you try! You don't have to have stacked monobanders to have fun working DX on the WARC bands. My activity on these bands brought back some of the fun I remember from many years ago when I was looking for my first 100 countries anywhere I could find them.

VU4NRO/VU4RBI—Andaman

It really did happen. A team of ops from India came on the air on December 3rd

as planned, and as of this writing, they have been providing DXers worldwide with their "last one" for several days. Unfortunately, in much of the eastern U.S., DXers have been frustrated by not being able to hear the VU4 signals. The west coast has had a field day, but not so for the rest of the country. It appears that the team will be staying for the entire month of December, so we can only hope that propagation improved to give others a chance at working that "last one" before December 31st.

This operation was considered a "door opening" event. With a good operation this time, it is expected that future operations will be authorized, with more time for planning for equipment, antennas, and so on.

3YØX—Peter I

This big DXpedition should be in progress as you read this. According to the latest news release, everything was proceeding on schedule for the team to begin operation on January 21st, lasting until February 4th. You are invited to visit the website <www.peterone.com> for an excellent presentation on Peter I. The team announced that Iridium Satellite provided them with equipment, allowing them to stay in touch with home and provide daily uploads of log information and daily updates from the team, including photos of interest. Make no mistake: This is a *major* operation and a very expensive one. Members of the team are providing 74% of the total cost, and they request your help with the remaining

Most Wanted Countries

2004	Prefix	Country	2003
1	P5	North Korea	3
2	VU4	Andaman	2
3	BS7	Scarborough Reef	1
4	VU7	Lakshadweep	4
5	7O	Yemen	6
6	3Y/P	Peter I	5
7	KP1	Navassa	8
8	KP5	Desecheo	9
9	3Y/B	Bouvet	11
10	KH7K	Kure	19
11	FT8W	Crozet	17
12	FT8X	Kerguelen	13
13	ZS8	Marion Island	12
14	FR/G	Glorioso	14
15	FT8Z	Amsterdam	21

Table I– The top 15 countries on The DX Magazine*'s 2004 Most Wanted list.*

Looking Ahead in CQ

Here's a look at articles we're working on for upcoming issues of *CQ:*

- "CQ Market Survey: HF Transceivers," by WB6NOA
- CW Results, 2004 CQ WW WPX Contest
- "Morse Code the Old Way," by WA8SME
- "HF Meteor Scatter," by VE3ACK

Do you have a ham radio story to tell? See our writers' guidelines on the CQ website at <http://www.cq-amateur-radio. com/guide.html>.

THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

5264 9A2AA	3808 N6JV	3291 KF2O	2987 HAØIT	2550 W7OM	2175 WB3DNA	1772 VE9FX	1487 WT3W	825 KL7FAP
4792 W2FXA	3768 YU1AB	3284 WB2YQH	2944 IT9QDS	2510 K9UQN	2100 VE6BF	1741 AB5C	1472 OK1DWC	803 VE3NQK
4257 W1CU	3668 N4MM	3246 KØDEQ	2824 W2ME	2457 JN3SAC	2070 I2EAY	1705 W2EZ	1369 KW5USA	742 K5IC
4211 9A2NA	3589 N5JR	3234 JH8BOE	2790 W9OP	2422 W8UMR	W018 HA9PP	1697 Z35N	1226 EA2BNA	738 AK6I
4149 EA2IA	3548 N9AF	3166 K9BG	2772 YU7GMN	2399 W6OUL	1976 DJ1YH	1674 YBØAI	1220 K6UXO	
4111 F2YT	3489 N5JR	3149 I2EOW	2744 9A4W	2385 K5UR	1948 CT1EEB	15Y1 N1KC	1130 PY1NEW	
403I N4NO	3489 SM3EVR	3121 PAØSNG	2720 K2XF	2287 OZ1ACB	1837 AA1KS	1580 KX1A	1090 W2OO	
3822 VE3XN	3395 S53EO	3082 IK2ILH	2705 W9IL	2212 PY2DBU	1823 KØKG	1535 AJ6Z	933 SM7GXR	
3816 I2PJA	3379 I2MQP	3011 W2WC	2701 WA1JMP	2203 W4UW	1773 W7CB	1521 NG9L	865 N5DD	

SSB

4583 IØZV	3215 I2MQP	2646 LU8ESU	2143 W2WC	1954 CT1EEN	1615 KI7AO	125O I2EAY	1078 EA3KB	776 YBØAI
4027 ZL3NS	3160 N4NO	2618 OE2EGL	2094 LU5DV	1942 W7OM	1562 W2ME	1256 VE7SMP	1043 AI6Z	755 VE6BF
4018 VE1YX	3084 CT1AHU	2594 I8KCI	2028 K5UR	1937 I8LEL	1562 SV3AQR	1238 LU4DA	990 HA9PP	737 IK8OZP
3793 I2PJA	3049 F2FX	2563 KF7RU	2027 NQ3A	1862 EA7TV	1538 VE9FX	1218 WT3W	978 EA7HY	733 AK6I
3764 F6DZU	3004 N5JR	2516 EA1JH	2021 N6FX	1830 K3IXD	1520 DF7HX	1215 W3LL	934 KX1A	601 K7SAM
3373 9A2NA	3000 I4CSP	2509 EA5AT	2014 K2XF	1721 DK5WQ	1480 A5C	1194 N1KC	903 N9DI	
3353 EA8AKN	2817 I2EOW	2432 IN3QCI	1994 W4UW	170 IT9SVJ	1460 NG9L	1190 K4CN	851 KU4BP	
3307 OZ5EV	2782 KF2O	2325 CX6BZ	1993 W9IL	1701 K8NDU	1458 JN3SAC	1162 EA5DCL	822 K1BYE	
3260 CT4NH	2741 PAØSNG	2289 HAØIT	1973 I3ZSX	16OI W6OUL	1386 IK4HPU	1148 AG4W	822 W8UMR	
3226 EA2IA	2734 4X6DK	2209 IK2QPR	1969 CT1EEB	1669 W2FKF	1384 LU3HBL	1143 EA3EQT	812 KUYJ	

CW

4356 WA2HZR	2959 9A2NA	2386 EA7AZA	2146 N6FX	1958 VE6BF	1841 W6OUL	1520 4X6DK	1203 K6UXO	953 PY4WS
3655 K9QVB	2948 LZ1XL	2380 KF2O	2129 JN3SAC	1939 K5UR	1718 I2EAY	1430 EA2CIN	1158 YU1TR	898 WT3W
3610 N4NO	2694 N5JR	2268 W8UMR	2112, OZ5UR	1007 W9IL	1712 I2MQP	1352 WO3Z	1132 WA2VQV	767 VE9FX
3361 VE7DP	2476 W2WC	2260 I7PXV	2043 K2XF	1893 EA5YU	1584 IK2ECP	1337 AC5K	1048 KX1A	642 PP6CW
3229 EA2IA	2416 KA7T	2149 K9UQN	2036 IK3GER	1882 W7OM	1531 I2EOW	1235 AI6Z	998 T94GB	624 W9IND

expenses. There is a very convenient donation form on the website, or you can mail your financial support to K4UEE, F2JD, JA1ELY, or ZL2AL.

Most Wanted Survey

Each year *The DX Magazine* conducts a Most Wanted Survey to determine what DXers worldwide consider to be the most wanted countries. Some of the results are shown in Table I. If you are interested in the full list of the top 100, see the website <www.dxpub.com>.

This list is interesting in that some of those in the top 15 either recently have been active or will be in early 2005. For example, VU4, Andaman is active now; 3Y/P, Peter I will be active in January/February; FT8X, Kerguelen will see action in March/April; and FR/G, Glorioso is scheduled for an operation in May 2005. This list undoubtedly will change substantially for 2005, and we'll see some new countries move into the top ten next year. I can't recall this many top ten Most Wanted being made available before in such a short period of time. There should be a lot of DXCC Honor Roll plaques issued in the next year.

We're into a new year, and I trust you will all find this year to be the one in which you work the DX you desire. I'm looking forward to spending more time on the WARC bands and adding to my totals. Perhaps I'll run into you on those bands or in one of the contests in the coming year. It's been fun working many of you recently, and please forgive me for not remembering all of your names when I do work you.

I hope you enjoy the chase, and above all . . . have fun!

73, Carl, N4AA

QSL Information

JA1SKY/6 via JA1SKY
JA2CXF via LoTW
JA2ZL/6 via JA2ZL
JA5BEX/SO2005 via JA5BEX
JA6PNR/6 via JA6PNR
JE4NKF/4 via JE4NKF
JH7VHZ via LoTW
JJ1VRO via LoTW
JL4GEL/4 via JL4GEL
JQ6KJA/6 via JQ6KJA
JR22RKK/6 via JR22RKK
JR2RKK/6 via JR2RKK
JR6TYH/JD1 via JR6TYH
JW1EOA via LA1OEA
JW4SNA via LA4SNA
JW6BKA via LA6BKA
JW9LMA via LA9LMA
KG4GJ via KB7GJ
KH4/N7TNL via N1AIA
KL8DX via KL8DX
KM1CC via KB1GSO
KP3Z via WC4E
LAØFA via LoTW
LA1PHA via LoTW
LA2GH via LoTW
LA9HW via LoTW
LY/OZ5IPA via OZ5AAH
LYØHQ via LY2MW
MMØLEO via W3LEO
N1BCL/KH6 via N1BCL
N3L via KA3UNQ
OE3ZK via LoTW
OJØYC via OH6GDX
OK1DTP/C6A via OK1TD
OK1DXD via LoTW
ON4ASV via LoTW
ON7BS via LoTW
ON7VS via LoTW
OZ4PAX via LoTW
P29SX via G3SXW
P29XF via G3TXF
P40H via OK2BMT
P49Y via AE6Y
PA3BBP via LoTW
PG7V via LoTW
PJ2/DL5CW via DL5CW
PJ4J via DJ2MX
PU1LJA via LoTW
PYØF/PS7JN via PS7JN
PY1LJA via LoTW
PY1WMJ via PY1WMJ
RA3DNC via LoTW
RA6YDX via LoTW
RA9KM via LoTW
RW9ON/9 via RW9ON
SF30A via SM5AQD
SM1TDE/OA4 via SM1TDE
SM2CEW via LoTW
SM3B via LoTW
SM5CSS via LoTW
SM5LWC via LoTW
SM5LWC/7 via LoTW
SM5Q via SM5AOE
SM6BSK via LoTW
SM6INC via LoTW
SM7N via LoTW
SN25JP via SP4GFG
SP3XR via LoTW
SP6CIK via LoTW
SV5/OK2BOB via OK2BOB
SV8/DF7XE via DF7XE
T30T via K7ZZ
T6EE via KE6GFF
T98AQL via IZ4AQL
TG7I via TG9ANF
TG7M via TG9ANF
TK/I2FUG via I2FUG
TK/IK2AQZ via IK2AQZ
TK/IK2JYT via IK2JYT
TK/IW2HUZ via IW2HUZ
TM8AKR via TM8AKR
TM8RIM via FØEHB
TO7C via F9IE
TO7X via F5MUX
TU5JM via TU5JM
TY5M via PA7FM
TZ5M via PA7FM

(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>.)

RSGB Books now available from CQ

Antenna Topics

byPat Hawker, G3VA

RSGB. 2002 Ed. 384 pages.
This book is a chronological collection of selections of G3VA's words over the years. Hundreds of areas and subjects are covered and many a good idea is included.

Order No. RSAT **$29.00**

HF Antenna Collection

RSGB, 1st Ed., 1992. 233 pages.
A collection of outstanding articles and short pieces which were published in Radio Communication magazine during the period 1968-89. Includes ingenious designs for single element, beam and miniature antennas, as well providing comprehensive information about feeders, tuners, baluns, testing, modeling, and how to erect your antenna safely.

Order: RSHFAC **$16.00**

IOTA Directory - 11th Edition

Edited by Roger Balister, G3KMA.
RSGB, 2002 Ed., 128 pages
This book is an essential guide to participating in the IOTA (Islands on the Air) program. It contains everything a newcomer needs to know to enjoy collecting or operating from islands for this popular worldwide program.

Order: RSIOTA **$15.00**

Antenna Toolkit 2

By Joe Carr, K4IPV
RSGB & Newnes, 2002 Ed.
256 pages.A definitive design guide for sending and receiving radio signals. Together with the powerful suite of CD software included with this book, the reader will have a complete solution for constructing or using an antenna; everything but the actual hardware!

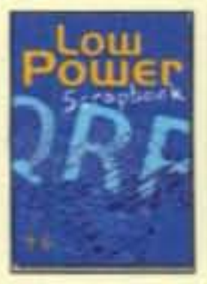
Order: RSANTKIT2 **$40.00**

Practical Projects

Edited by Dr. George Brown, M5ACN
RSGB 2002 Ed, 224 pages
Packed with around 50 "weekend projects," Practical Projects is a book of simple construction projects for the radio amateur and others interested in electronics. Features a wide variety of radio ideas plus other simple electronic designs and a handy "now that I've built it, what do I do with it?" section. Excellent for newcomers or anyone just looking for interesting projects to build.

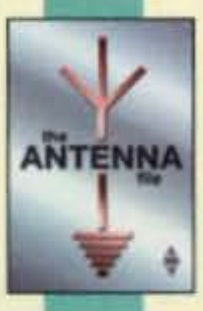
Order: RSPP **$19.00**

Low Power Scrapbook



RSGB. © 2001, 320 pages.
Choose from dozens of simple transmitter and receiver projects for the HF bands and 6m, including the tiny Oner transmitter and the White Rose Receiver. Ideal for the experimenter or someone who likes the fun of building and operating their own radio equipment.

Order: RSLPS **$19.00**



The Antenna File

RSGB. ©2001. 288 pages. **$34.95.**
Order: **RSTAF**
50 HF antennas, 14 VHF/UHF/SHF antennas, 3 receiving antennas, 6 articles on masts and supports, 9 articles on tuning and measuring, 4 on antenna construction, 5 on design and theory, and 9 Peter Hart antenna reviews. Every band from 73kHz to 2.3GHz!

Order: RSTAF **$32.00**

The Antenna Experimenter's Guide

RSGB. 2nd Ed, 1996. 160 pages.
Takes the guesswork out of adjusting any antenna, home-made or commercial, and makes sure that it's working with maximum efficiency. Describes RF measuring equipment and its use, constructing your own antenna test range, computer modeling antennas. An invaluable companion for all those who wish to get the best results from antennas!

Order: RSTAEG **$28.00**

HF Amateur Radio

RSGB. 2002 Ed.
The HF or short wave bands are one of the most interesting areas of amateur radio. This book takes the reader through setting up an efficient amateur radio station, which equipment to choose, installation, and the best antenna for your location and MUCH more.

Order: RSHFAR **$21.00**

Amateur Radio Mobile Handbook

RSGB. 2002 Ed., 128 pages.
The Amateur Radio Mobile Handbook covers all aspects of this popular part of the hobby. It includes operating techniques, installing equipment in a vehicle and antennas, as well as maritime and even bicycle mobile. This is essential reading if you want to get the most out of your mobile station.

Order: RSARMH **$21.00**

Backyard Antennas

RSGB, 1st Ed., 2000, 208 pages.
Whether you have a house, bungalow or apartment, Backyard Antennas will help you find the solution to radiating a good signal on your favorite band.

Order: RSBYA **$30.00**

Radio Communication Handbook

Edited by Dick Biddulph, G8DPS and Chris Lorek, G4HCL.
RSGB, 7th Ed., 2000, 820 pages.
This book is an invaluable reference for radio amateurs everywhere. It also provides a comprehensive guide to practical radio, from LF to the GHz bands, for professionals and students.

Order: RSRCH **$50.00**

RSGB Prefix Guide

By Fred Handscombe, G4BWP.
RSGB. 6th Ed., 2003. 48 pages.
This book is an excellent tool for the beginner and the experienced hand alike. Designed with a "lay flat" wire binding for ease of use the new "Prefix Guide" is a must for every shack.

Order: RSPFXG **$13.50**

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awards

BY TED MELINOSKY,* K1BV

Awards from Scotland and Brazil

This month we present two DX award series. The first is from the Orkney (Scotland) Amateur Radio Club, and the second is from the Liga de Amadores Brasilerios de Radio Emissao (LABRE).

The Orkney ARC Award Series

The Orkney Islands group consists of over 70 islands off the northern coast of Scotland. Many of them are small and uninhabited. The larger islands generally are populated and have regular amateur radio operation by resident operators. The Orkney Amateur Radio Club sponsors an attractive award for contacting these islands and is involved in activating the islands that are uninhabited. It also sponsors an award for working all Orkney parishes.

General requirements: Contacts may be made on all authorized bands and modes. If contacts are made with stations that are not members of the Orkney ARC, then their cards must be submitted with your application. If contact is with a club member, a card need not be sent. The list of members is shown below. SWL okay. For both of the awards, an Orkney amateur may be counted more than once if he or she is worked from different Orkney locations. No use of repeaters or other relays. All bands and modes okay. The application form can be found on the club's website (http://www.eu009.com/) and its use is requested. Endorsements are available for any band, mode, or QRP.

Fees: Each certificate is $US10, 20 Euros, or 12 IRCs. Subsequent endorsements are $US6, 6 Euros, or 9 IRCs. Apply to: David Wishart, Awards Manager, Orkney ARC, Curcum, Swannay by Evie, Orkney Islands, KW27 2NS, United Kingdom.

Club members: GM0HQG, GM0HTH, GM0HTT, GM0IFM, GM0WED, GM3POI, GM4SLL, GM4WMM, GM8FWS, MM0DGI, MM0EAX, MM0GKB, MM0RDD, MM0SJH, MM1APX, MM3POI, MM3SWW, MM5DWW.

Worked All Orkney Islands Award. Only islands officially endorsed by I.O.S.A. are eligible for this award (see list below). Europeans must contact five Orkney islands. All others need three. A QSL card (or certified list) will be required for any contacts made with amateurs who are not members of the Orkney Amateur Radio Club, as stated above. Endorsements: EU for each three additional islands, and all others also for three additional islands. Please try to establish the island name/reference during the QSO. This is especially important if the Orkney station is mobile/portable.

Official list of Orkney Islands: Auskerry, Burray, Calf-of-Eday, Cava, Copinsay, Eday, Egilsay,

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

Donald G. Dorn, K5AAR
USA-CA All Counties #1104
November 2, 2004

Lorraine Peerenboom, K8XTQ
USA-CA All Counties #1105
November 12, 2004

Lawrence Ashton, N2OCW
USA-CA All Counties #1106
November 22, 2004

USA-CA Honor Roll

500
YV5IAL.....3323
K5AAR.....3324
K8XTQ.....3325
AB7PG.....3326
N2OCW....3327

1000
W8WV.....1676
K5AAR.....1677
K8XTQ.....1678
N2OCW....1679

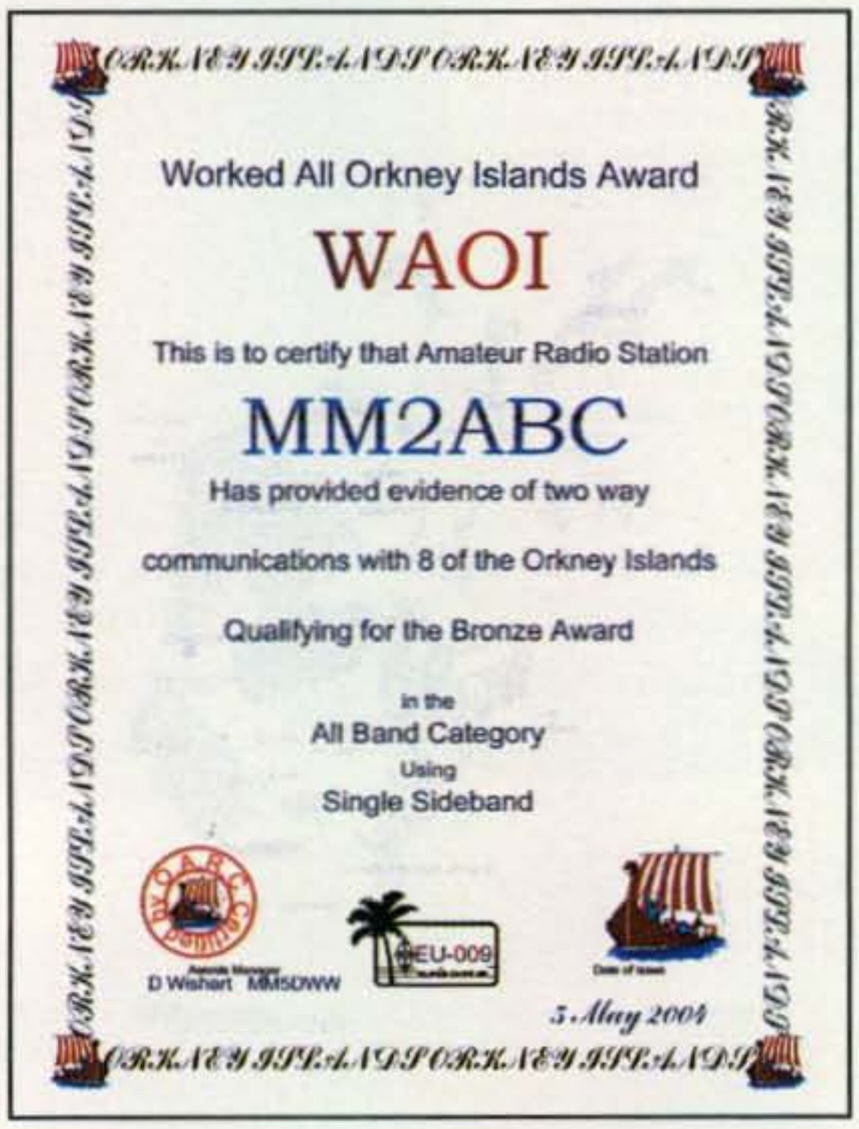
1500
K5AAR.....1399
K8XTQ.....1400
N2OCW....1401

2000
K5AAR.....1295
K8XTQ.....1296
N2OCW....1297

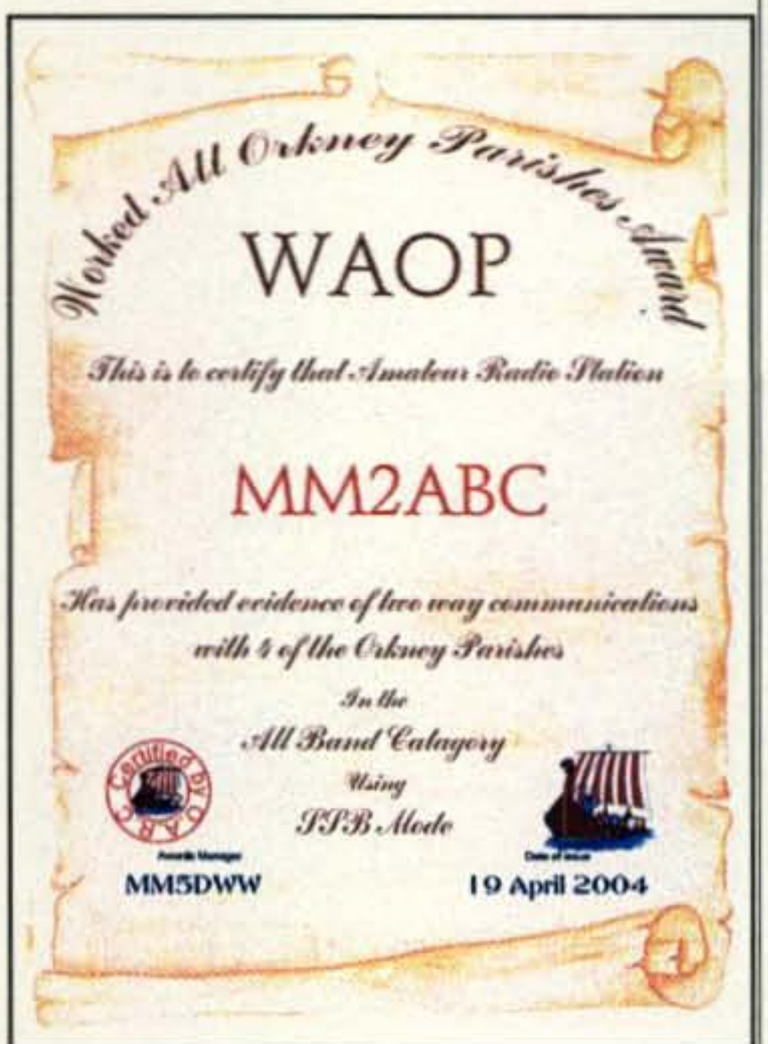
2500
K5AAR.....1216
K8XTQ.....1217
N2OCW....1218

3000
K5AAR.....1125
K8XTQ.....1126
AF3X.....1127
AA4UT.....1128
N2OCW....1129

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.



The Worked All Orney Islands Award is sponsored by the Orkney (Scotland) ARC.



Work Orkney parishes to earn the Worked All Orkney Parishes Award.

Eynhallow, Fara, Faray, Flotta, Gairsay, Glims-Holm, Graemsay, Grimbister, Hellier-Holm, Holm-of-Scockness, Hoy, Hunda, Lamb-Holm, Linga-Holm, Mainland, Muckle-Green-Holm, North Ronaldsay, Papa, Papa-Stronsay, Westray, Rousay, Sanday, Shapinsay, South Ronalday, Stronsay, Swona, Switha, Westray, Wyre.

Worked All Orkney Parishes Award. European stations need contacts with four Orkney parishes. The parishes must be on the official list as shown below. All others need two parishes. Endorsements: EU for each additional three parishes; others for two additional parishes. Please try to establish the parish name during the QSO. This is especially important if the Orkney station is mobile/portable.

List of parishes: Birsay, Evie, Sandwick, Harray, Rendall, Stromness, Stenness, Firth, Orphir, Kirkwall & St. Ola, St Andrews-Holm, Deerness.

LABRE Award Series

The national awards program of Brazil is sponsored by the Liga de Amadores Brasilerios de Radio Emissao (LABRE). This is a well-thought-out awards program emphasizing contacts with the geographical sections of Brazil and the southern Atlantic region. The awards present a modest but achievable challenge for the average DX hunter. The certificates are of the type you will want to frame and display in your shack. They are well designed and colorful.

You'll have to dig into your QSL collection for the Worked All Brazil award.

Some of the Brazilian states are somewhat scarce (just like DE, NV, and WY are for stations outside the U.S.) and you will have to add them to your "want list." That's the fun and challenge of award hunting.

At first glance, the DBDX award seems to be an easy-to-earn mini-DXCC. Read the rules carefully; all countries must be contacted on 160, 80, or 40 meters. This introduces a little spice in this version of DXCC.

General requirements: All contacts must be made from the same country, or within a radius of 125 miles. Contacts must be with land stations. Contacts with ships, anchored or not, and aircraft are not allowed. No date requirements. Three types of certificates are available: Mixed Phone/CW, Phone, and all CW. The WAO, WAB, and WAS awards may be endorsed for SSTV, RTTY, VHF, and satellite, with single-band endorsements. DBDX may be endorsed for RTTY, SSTV, and single-bands.

GCR list is acceptable. Each award costs $US10 or equivalent in IRCs. Submissions should be sent to: LABRE Headquarters (Award Manager), Caixa Postal 004, 70359-970 Brasilia, DF, Brazil. Internet: <http://www.labre.org/>.

Worked All America (WAA). Confirm contacts with at least 45 countries in the American geographic area (one must be PY):

6Y Jamaica
8P Barbados
8R Guyana
9Y Trinidad/Tobago
C6 Bahamas
CE Easter Is.
CE Chile
CE Juan Fern.
CE San Felix
CM/CO Cuba
CX Uruguay
FG Guadeloupe
FM Martinique
FO8 Fr. Polynesia
FO8X Clipperton
FP St. Pierre
FS St. Martin
FY French Guiana
HC Ecuador
HC8 Galapagos
HH Haiti
HI Dominican Rep.
HK Colombia
HKØ Bajo Neuvo
HKØ San Andres
HKØ Malpelos
HP Panama
HR Honduras
J3 Grenada
J6 St. Lucia
J7 Dominica
J8 St. Vincent
KC4 Navassa
KG4 Guantanamo
KL7 Alaska
KP4 Porto Rico
KP4D Desecheo
KS4 Serrana (HKØ)
KV4 Virgin Is.
K,W USA
LU Argentina
OA Peru
OX Greenland
PJ Neth. Antilles
PJ St.Maarten
PY Brazil
PYØ St.Peter
PYØ Trinidade
PYØ Noronha
PYØ Abrolhos
PZ Surinam
TG Guatemala
TI Costa Rica
TI9 Cocos
V2 Antigua
V3 Belize
V4 St. Kitts
VE Canada
VP2E Anguilla
VP2M Montserrat
VP2V Br.Virgin Isl.
VP5 Turks/Caicos
VP8/LU Antarctica
VP8/LU Georgia
VP8/LU S. Shetlands
VP8 Falklands
VP8/LU S. Sandwich
VP8/LU S. Orkney
VP9 Bermuda
XE Mexico
XF4 Revilla Gigedo
YN Nicaragua
YS Salvador
YV Venezuela
YVØ Aves Isl.
ZF1 Cayman Isl.
ZP Paraguay


Liga de Amadores Brasileiros de Rádio Emissão

A LIGA DE AMADORES BRASILEIROS DE RÁDIO EMISSÃO-LABRE tem o prazer de certificar que _____ comprovou satisfatoriamente, nesta data, haver estabelecido contatos bilaterais, a partir de 15 de novembro de 1945, com outras estações de radio-amadores, situadas em 45 países diferentes, das Américas.
O presente diploma, comprobatório de seu trabalho eficiente, é conferido como justo prêmio de sua excelente realização.

Brasília-DF,

DIPLOMA Nº

The Worked All America Award if offered by LABRE for working at least 45 countries in the American geographic area.

Worked All Brazil (WAB). Contact Brazilian stations in all 26 states and the capital city, Brasilia (PT2). The states are:

PP1 Espirito Santo (ES)
PS8 Piaui (PI)
PY1 Rio de Janerio (RJ)
PP2 Goias (GO)
PT2 Brasilia (DF)
PY2 Sao Paulo (SP)
PP5 Santa Catarina (SC)
PT7 Ceara (CE)
PY3 Rio Grande Sul (RS)
PP6 Sergipe (SE)
PT8 Acre (AC)
PY4 Minas Gerias (MG)
PP7 Alagoas (AL)
PT9 Mato Grosso Sul (MS)
PY5 Parana (PR)
PP8 Amazonas (AM)
PQ8 Amapa (AP)
PY6 Bahia (BA)
PQ2 Tocantins (TO)
PV8 Roraima (RR)
PY7 Pernambuco (PE)
PR7 Paraiba (PB)
PW8 Rondonia (RO)
PY8 Para (PA)
PR8 Maranhao (MN)
PY9 Mato Grosso (MT)
PS7 Rio Grande Norte (RN)

Worked All Oceans (WAO). Confirm contacts in all nine Brasilian geographic regions plus 21 other countries that border on the Atlantic Ocean. In the following list the region number is followed by the acceptable prefixes.

Region 1: PY1 and PP1
Region 2: PY2, PP2, PQ2, and PT2
Region 3: PY3
Region 4: PY4
Region 5: PY5 and PP5
Region 6: PY6 and PP6
Region 7: PY7, PP7, PR7, PS7, and PT7
Region 8: PY8, PP8, PQ8, PR8, PS8, PT8, PU8, PV8, and PW8
Region 9: PY9 and PT9
Oceanic Islands: PYØ

Confirm contacts with a minimum of 20 countries from the DXCC list (one of which must be PY) to qualify for the DBDX Award from LABRE. ⟶

DBDX Award. Confirm contacts with a minimum of 20 different countries from the ARRL official DXCC list. One must be PY. Endorsement stickers are available for each additional twn. All contacts must be on 160, 80, and 40 meters only.

You are invited to submit the rules and a sample copy of your club or group's awards for a future column. Publicity is the key to a successful awards program.

73, Ted, K1BV

Lorraine Peerenboom, K8XTQ
USA-CA All Counties #1105

This time we hear from Lori, K8XTQ, who was granted USA-CA All Counties #1105 on November 12, 2004.

I got my first ham ticket in 1997 as a Technician.My OM, Fred, KE8TQ, bought me a 6-meter rig and Yagi antenna, and wow! Working the U.S. and Canada got me going to get 5 wpm. I got Tech Plus in time for the CQ WW SSB Contest and that started my contesting and DXing adventures. In 1998 I upgraded to General by passing the 13 wpm exam. I was still into contesting, DXing, and now chasing IOTA *(Islands on the Air—ed.)* and U.S. islands.

There are certificates for first-place this and that all over the wall and also 5 Band DXCC. I even have the 2000 ARRL Millennium Award. Then CQ came out with their 2001 Millennium Award. By February I had DXCC and WPX and I only needed two zones to go when I thought, "How hard would it be to work 500 counties?" So I tuned into the county hunting net on 14.336. Well, those other two zones are still out there somewhere. Yeah, I got hooked on county hunting and have been there ever since.

The first mobile I worked was Carol, KIØJD, in Hill and Live Oak, Texas. That's all it took. Just like a certain brand of chips, I couldn't stop with just one. I just had to keep going until I worked them all. It took until October 18, 2004 to finish the last one. I found out that Dan, KM9X, and Judy, KB9MGI, were going through Gallatin, Illinois and a couple of counties close to Jasper, so I e-mailed Dan to ask Judy if a little detour to Jasper would be possible. It was and it worked out great. I owe Dan and Judy for that one. And I owe Frank, AA9JJ, for coming down to 40 and telling me to go up to 20 and try it, as they were up there in Jasper and calling me. I heard them, so it was only a 2/2, but we heard one another and the reports were good. Who said everything in the world has to be a 5/9 all the time?

Meeting all those mobiles for the first time a couple of Dayton Hamventions ago was a great thrill. I consider everyone on the net my extended family. Everyone works to help everyone else get the counties they need. That's a true family spirit. Helping assist net control, do relays, moving mobiles off frequency so folks can work them is great. That's hams helping hams. Going to 40 and helping hold the frequency and helping run a mobile is a blast and another way of helping out. I owe a lot to Jim, KZ2P/K2JG, for allowing me to help on the net and for all he has taught me. I also owe a lot to all the mobiles out there for being there day after day putting out counties. Who can forget people such as KC1NA, WB4FFV, NFØN, WG6X logging on the fly, KB6UF who can make you laugh the whole run, KA1JPR, and those familiar voices of the Carols (AB2LS, KIØJD, and KA4TYG). I could go on and on, but that would take up pages and pages to be able to mention them all.

Some members of the Dayton Amateur Radio Assn., of which I am a member, think working counties is too big of a challenge. I say the bigger the challenge the more fun it is. I even had my OM put a rig in the truck so I wouldn't miss a county I needed. Now that we have traded in the truck for a small car, it will be a while until I figure out where to put the rig and the Outbacker antenna. I had a Hustler for the truck, but that won't work on the Toyota.

Lorraine Peerenboom, K8XTQ, USA-CA All Counties #1105.

Before I got my 40-meter Hamsticks, I had to kick the OM off his chair/rig to get on 40 with his rig. He didn't mind so much being kicked off the chair, but I think he did mind when he occasionally hit the floor in the process. It doesn't make for a happy family when that happens too often.

I use a 20-meter inverted-Vee for most of my county hunting and it works just fine. I even started getting back into CW and working a few counties I needed using that mode. I still have to practice some to get better at it, though.

I remember the first year working counties and helping on the net and chasing contesters away from the net frequency. Fred's first remark was "I didn't ever think I'd see the day this would happen to a crazy contester. I used to have to beg you to shut off the rig and go to bed at almost 2 AM!" So I guess I've come a long way. Now it's "We'll go to lunch as soon as I finish helping Jim run this county and then work the next one cause it's one I need."

I even changed my call from KC8HWV to K8XTQ so I would have the "X" to be good for Bingo (an award offered by MARAC), and it's close to Fred's call. All I have now is 474 for bingo and I've already started the second time around. Wait a minute . . . have to QRT. I hear a county I need for Bingo. Sorry about that, but I have to go for now. You know how we county hunters are.

—Lori, K8XTQ

contesting

BY JOHN DORR,* K1AR

2004 *CQ* Contest Survey Results

February's Contest Tip

Do you struggle with knowing when to change bands? A simple technique is to find one or more of the larger multi-op stations and store their frequency in one of your VFO memories. Occasionally monitoring a "full-time" station on a band is a good way to see if a band is open (and to where) and can sustain rate without taking the risk yourself. If a big station is CQing on a band with few answers, it's likely not to be a place you should go.

Calendar of Events

Jan. 29–30	**CQ WW 160 Meter CW Contest**
Jan. 29–30	REF CW Contest
Jan. 29–30	UBA SSB DX Contest
Feb. 5	Minnesota QSO Party
Feb. 5–6	Vermont QSO Party
Feb. 5–6	New Hampshire QSO Party
Feb. 5–7	Delaware QSO Party
Feb. 7	North American SSB Sprint
Feb. 12	Asia-Pacific CW Spring Sprint
Feb. 12–13	PACC Contest
Feb. 12–13	Louisiana QSO Party
Feb. 12–13	RSGB 1.8 MHz CW Contest
Feb. 12–13	CQ WW RTTY WPX Contest
Feb. 14	North American CW Sprint
Feb. 26–27	**CQ WW 160 Meter SSB Contest**
Feb. 26–27	REF SSB Contest
Feb. 26–27	UBA CW DX Contest
Feb. 26–27	North American RTTY QSO Party
Feb. 27–28	North Carolina QSO Party
Mar. 5–6	ARRL SSB DX Contest
Mar. 27–28	**CQ WW WPX SSB Contest**

They have been a long time coming, but I'm pleased to report the final results of my 2004 *CQ* Contest Survey, which appeared in the August issue of *CQ* and on Tom, K8CX's website (www.hamgallery.com). As has become customary with these survey projects, I've tried to probe a few controversial topics and at the same time investigate areas that can be fun or topically interesting. This time around the subject matter was wide-ranging, spanning topics from packet spotting to your favorite contest radio.

As always, I appreciate your interest and support. This time, with the assistance of K8CX's website, we had record-breaking participation from all over the world. When all the dust settled, there were 493 entries from 42 countries (see Table I for more detail). Thus, without any further delay, let's get right to the results.

Some Aging Statistics

Unfortunately, I have to begin this year's survey results with some disturbing news. For the first time in over a decade of *CQ* contest surveys, the average age of the participants peaked over 50 years old—50.28 years, to be precise. As a group, we continue to get older with limited infusion of youthful contesters, if you believe the conclusions of this survey. In fact, although the youngest respondent was a 15-year-old in Croatia, there were only eight responses from folks under the age of 27! In contrast, the oldest respondent this time was a W3-land fellow who continues to march along at the ripe old age of 87, sporting 70 years of contest experience. What I found encouraging about his response was that he still manages to operate 16 hours/week on average, 95% of it on CW. Equally impressive was another fellow who at 83 years old got his start in contesting only 10 years earlier at the age of 73. Needless to say, that's a strong argument for believing it's never too late to start something new in your life!

In addition to our increasing age, we are also piling on the experience, with an average level of contesting clock time at 19.68 years. Simple math tells us that on an average basis we got our start in contesting right around the time we turned 30 years old (some much earlier, like me; others getting their feet wet much later in life).

*2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

The Final Results

Well, now that the general analysis has been dealt with, it's time to move on to summarizing your actual survey responses. So, without further ado, here are the final results.

1) Do you spend more time on the radio (including contests) or on the internet?

a) Radio – 213 (44.0% of total)
b) Internet – 271 (56.0% of total)

As has often been said, 25 years ago who would have guessed this dynamic to be the case—a trend that says we spend more time on our computers than we do with our radios. However, the facts are what they are and to some, sadly computers win the race! Now to be fair, many of you indicated that you use your computers as part of your ham radio experience, so the skew towards PCs is not as bad as it seems. Nevertheless, computers have taken a significant position in our ham radio experience. In fact, it was a small number of responses indeed that specifically indicated the lack of internet connectivity in the shack.

2) How do you envision contesting in 10 years?

a) Forget about contesting; ham radio will not even be around anymore – 14 (2.9% of total)
b) Contesting will be better than now with more activity and interest – 174 (35.7% of total)
c) Things will remain pretty much the same as they are today – 300 (61.4% of total)

I felt a rush of relief on this one as I measured the optimism meter of contesters. Virtually no one, as the results indicate, felt that ham radio was going

to fold up its tent and disappear in the near-term. To be fair, however, only a third of you indicated any meaningful growth. Thus, as is sometimes said, "the status is quo," sir.

3) In addition to your contest club, do you belong to a local club?

a) Yes – 231 (47.9% of total)
b) No – 137 (28.4% of total)
c) I don't belong to any clubs – 37 (7.7% of total)
d) I only belong to a local club and not a contest club – 77 (16.0% of total)

This one probably was not that surprising to most of you. As contesters, we are blessed with access to a wide-range of resources, including contest clubs. The good news is that nearly half of you are also involved in a local club, which helps to dispense the rumor that contesters are an elitist crowd that gets involved in little else. Local clubs are a great way to mentor newer hams into the ranks of contesting. By being engaged at the local level, you can share your experiences with others—and not simply via Microsoft PowerPoint™ presentations. Also, for those of you who don't have access to a contest club, the local club can be your outlet for engaging with fellow hams who have an interest in contesting. Remember, many contest clubs were created as spin-offs from the local group.

4) Do you believe packet radio is an asset or a detriment to contesting?

a) Asset – 228 (49.5% of total)
b) Detriment – 233 (50.5% of total)

This question was probably the most controversial of the 2004 Contest Survey, as opinions are so polarized around packet spotting. Not surprisingly, we are split almost down the middle when it comes to our feelings about the value of packet and its contribution to contesting. Of all the questions this year, this one spawned the most additional unsolicited comments, with many of you not being particularly shy about your feelings. Whether you agree or disagree with the use of packet spotting in contesting, it's clear from your responses that the "cat is out of the bag" and that half of you like what you see. Those who view packet as a detriment need to accept that fact and work to ensure it is properly used, encouraging newcomers to view it as a tool and not a substitute for high-quality operating. Well, we can dream, right?

5) What has been your favorite radio (including your current rig)?

FT1000 series – 169 (36.5% of total)
IC-756Pro – 54 (11.7% of total)
Ten-Tec ORION – 31 (6.7% of total)
TS-850 – 30 (6.5% of total)
IC-765 – 27 (5.8% of total)
IC-781 – 22 (4.8% of total)
Ten-Tec OMNI VI – 20 (4.3% of total)
TS-930 – 18 (3.9% of total)
TS-940 – 17 (3.7% of total)
IC-746 – 10 (2.2% of total)
IC-7800 – 9 (1.9% of total)
Elecraft K2 – 8 (1.7% of total)
TS-870 – 8 (1.7% of total)
TS-950 – 5 (1.1% of total)

One each: TS-2000, IC-918, Ten-Tec Paragon, IC-775, FT-101ZD, TR-7, HRO-60, Drake C-Line, FT-840, HT-37/75S3, Yaesu 8900R, FT-817, IC-720, IC-706, TS-180, HT-202, IC-90A, KWM-2, Yaesu 757GX, Heath 2-er, Ten-Tec Argonaut 509, FT-847, FT-707, Ten-Tec Jupiter, KWM-380, IC-761, FT-990, FT-102, TS-570D, IC-740, FT-920, KWS1/75A4, IC-735, TS-440 – (35 answers/7.6% of total)

I realized after asking this question that your favorite radio is, of course, limited to the radios that you have used and/or own. Thus, although a new IC-7800 could actually be your favorite radio, you simply may not have had the opportunity to operate with one. That said, there was clear support for the Yaesu FT-1000 radio family as the contest radio of choice (please be sure to install widely circulated modifications that eliminate the transceiver's key clicks on CW!). The new Ten-Tec ORION had a nice showing, but the manufacturer that carried the most varied responses was clearly ICOM. Thus, marketing opportunities abound with these responses. By the way, I'd like to see how the individual using the Heathkit Two-er does in the next CQ WW contest!

6) Apart from contesting, what is your second favorite activity within ham radio?

a) DXing – 339 (69.7% of total)
b) Public Service – 10 (2.1% of total)
c) Ragchewing – 3 (0.6% of total)
d) Local club involvement – 9 (1.9% of total)
e) Antenna experimentation – 99 (20.3% of total)
f) Homebrewing/Technical endeavors –14 (2.9% of total)
g) Other – 12 (2.5% of total)

Well, these responses certainly mirror my own personal preferences. I'll admit that I still like good old-fashioned DXing and two thirds of you appear to agree with me. It does make sense that DX operating and contesting go hand in hand. Where else can you work DXCC in one weekend so easily? I was also pleased to see such a sizeable number of you who enjoy antenna work. All of this ties together nicely, although it would have been nice to see ragchewing and public service take a more prominent role in your portfolio of "next choice" activities.

2004 CQ Contest Survey Response Breakdown

Call Areas

WØ 19	W4 42	W8 31
W1 67	W5 77	W9 20
W2 33	W6 21	VE 36
W3 23	W7 27	

DX Entities

5B4 1	I 3	S5 1
9A 2	IT9 1	SM 6
9M2 1	JA 1	SV 1
CT1 1	KH6 2	TF 2
DL 7	KL7 2	UA 2
EA 3	LU 1	VK 2
EA6 1	LY 4	XE 1
EA8 1	OE 1	YL 1
EI 1	OH 3	YO 1
F 3	OK 1	YV 1
G 11	ON 5	ZL 3
GM 2	OZ 1	ZS 1
HA 2	P4 1	
HB9 1	PA 2	

U.S./Canada responses: 396
DX responses: 87 (40 countries)
None indicated: 10
Total responses: 493

Table I– Geographic response analysis of the 2004 survey.

7) How would you rather spend your time when involved in contesting?

a) Operating your own station by yourself or with others – 372 (77.2% of total)

b) Station construction and being a host operator – 21 (4.4% of total)

c) Operating someone else's station – 76 (15.7% of total)

d) Helping someone else build his/her station – 10 (2.1% of total)

e) Other amateur radio activities altogether; I don't operate contests – 3 (0.6% of total)

Although I and many others have spent most of our contesting careers operating from other stations, an overwhelming majority of you indicated that you get the most pleasure from contesting when operating from (and presumably building) your own stations. I can say from personal experience (especially of late) that part of the attraction that comes from guest operating includes the social aspects of participating with others. My hat is off to those of you in Category A!

8) What is your favorite contest?

a) CQ WW DX – 224 (46.9% of total)

b) CQ WW WPX - 39 (8.2% of total)

c) ARRL International DX – 59 (12.2% of total)

d) ARRL SS – 61 (12.8% of total)

e) NA Sprint – 20 (4.2% of total)

f) Other – 75 (15.7% of total)

Well, this is *CQ* magazine after all, isn't it? Not surprisingly, the CQ WW DX prevailed as your favorite contest. I'd like to think this is the case regardless of the source of my survey, and with nearly 4000 logs submitted in the 2004 CQ WW SSB contest, it's clear that the results are supported by fact. A wide variety of "other" contests were deemed to be favorites, with the prevailing trend towards RTTY events. Digital modes have taken off like wildfire in our hobby, and nearly 10% of you indicated that digital contests are indeed your favorite operating events.

9) On average, how many hours per week do you operate your radio and what % of that is on CW?

a) Number of hours – 9.83

b) % using CW – 70.46%

If you're a busy guy like me, you're probably asking yourself, "How does anyone find time to operate 10 hours per week on the radio?" In reality, I probably invest that much time myself when you count weekends and operating before work (assuming I'm not writing a contest column). Given the opportunity to show my biases a bit, I was especially encouraged to see how much of your operating time is spent on CW. While our old friend Samuel Morse has taken it on the chin a bit of late, it's clear that CW operating is still the favored mode of contesters and is likely to be around for a long time to come.

10) Have you recently built and completed a working homebrew project for your station?

a) Yes – 316 (66.6% of total)

b) No – 158 (33.4% of total)

I have to admit that I was totally shocked on the surface when I saw the number of you who are actively building homebrew projects. Unfortunately, the stereotype of today's ham radio world is one of appliance operating. The notion of taking the top cover off our transceivers is daunting in and of itself. To be fair, much of our "homebrewing" time is not spent building the next hot transceiver, as you will see shortly, but two thirds of us at least have some familiarity with the bench and know how to turn on our soldering irons.

11) If yes to Question #10, what did you most recently build?

There was a potpourri of responses to the types of projects you are actively building, but the theme seemed to center around antenna switching, SO2R (single op, two radio) configurations, and computer interfaces. That said, a few of you (and I mean less than 10) indicated your attempts at more advanced projects such as QRP rigs or UHF gear. In any event, all of this is fantastic for our hobby and you are to be commended. Here's a summary of the project list you supplied: antennas, antenna switching, SO2R setups, computer/radio interfaces, CW keyer, Elecraft K2, 6L6 Novice transmitter, stubs, QRP rig, HF amplifier, UHF pre-amp, power supply, microwave controller.

Final Comments

Well, another *CQ* Contest Survey is in the bank. It's a lot of work to pull all of this together, but each and every time I do it I learn something new about contesting and what's on your mind. Thanks again for your support and participation. We'll be sure to run another survey later this year.

There are still many great contests scheduled for this operating season (ARRL DX, CQ WW 160 SSB, CQ WW WPX, NA Sprint), so I encourage you to get involved. The current solar conditions are nothing more than a distraction from what is otherwise still a good time on the radio. See you on the bands!

73, John, K1AR

CQ WW CW Contest Conditions

BY TOMAS HOOD,* NW7US

A Quick Look at Current Cycle 23 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly,November 2004: 44
Twelve-month smoothed, May 2004: 44

10.7 cm Flux
Observed Monthly, November 2004: 113
Twelve-month smoothed, May 2004: 109

***Ap* Index**
Observed Monthly, November 2004: 26
Twelve-month smoothed, May 2004: 14

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for February 2005

	Expected Signal Quality			
Propagation Index.....	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 7-9, 13-14,22-24	**A**	**A**	**B**	**C**
High Normal: 1-3, 6, 12, 16-18, 21, 25, 28	**A**	**B**	**C**	**C-D**
Low Normal: 10-11, 15, 19-20, 26-27	**B**	**C-B**	**C-D**	**D-E**
Below Normal: 4	**C**	**C-D**	**D-E**	**E**
Disturbed: 5	**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 good (B) on Feb. 1–3, fair to poor (C-D) on the 4th, poor (D) on the 5th, etc.

The 2004 CQ World-Wide DX CW Contest weekend of November 27 and 28 started off at the tail end of a period of unsettled geomagnetic activity. Several official forecasting centers (SEC/NOAA, US Air Force, and SIDC) predicted a continued downward trend in the planetary *A*-index (*Ap*). The SEC published a prediction of an *Ap*-index of 10 on the 27th and 5 on the 28th. Another forecast put the *Ap* at 15 on the 27th and 10 on the 28th, while SIDC said the *Ap* would be 12 on both days. They all concurred that the *Ap* trend was downward, which would make the contest weekend more productive. In this column I predicted High Normal conditions for the first contest day and Low Normal for the second. Did this hold true?

Earlier in November we experienced periods of rather high geomagnetic storminess. Planetary *K*-index (*Kp*) readings reached 9 at times (the highest index mark), and there were some active auroras, both visual and radio (Au).

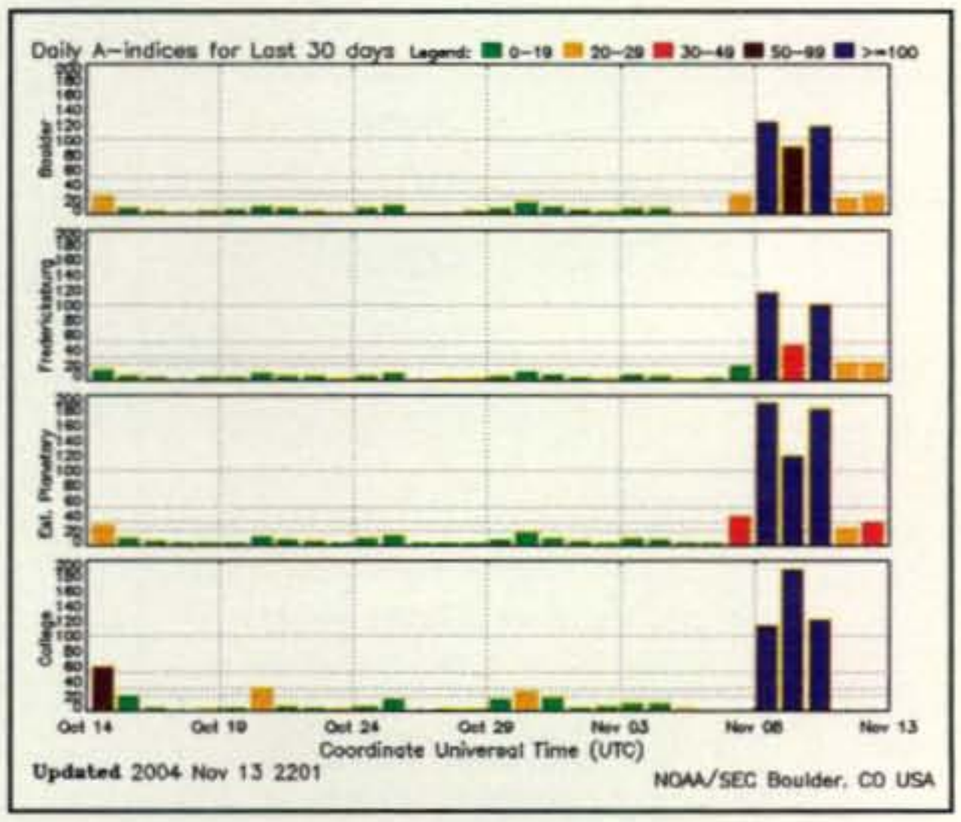
As the contest starting time arrived, a large and well-defined coronal hole that spanned the surface of the visible side of the sun, from the Northern Hemisphere to the Southern Hemisphere, was rotating to the very center of the Sun. The center of the sun is known as the "geo-effective position," because events that occur in that region are most likely to influence the Earth. A flare, coronal hole, or coronal mass ejection (CME) occurring near the center of the sun's visible face will eject materials and energy into the path of the Earth. This particular coronal hole, numbered by Jan Alvestad as CH129, was moving into a fully geo-effective position right in time for the CQ WW CW Contest. This caused the solar wind speed to exceed 400 kilometers per second as measured near the Earth. The wind's pressure also increased.

While the 27-day rotation method did show that the *Ap* should have continued on a downward trend, I had to make a last-minute update that estimated High Normal conditions on the 27th and either High Normal or Low Normal conditions on the 28th.

The returning sunspot region NOAA 0696, which had produced several X-class flares and halo-CMEs during the previous rotation, was being watched for potential flares during the contest period as well. A series of strong flares would shut down the higher HF bands, making contest conditions rough over daylight paths.

The flux, however, looked promising. The forecasts all pointed to a 10.7-cm flux of at least 115 for both days, with some forecasting 130 to 135.

At 0001 UTC on November 27, 2004, the *Kp* was 3 and the 10.7-cm flux was holding at 111. During the first part of the UTC day, the *Kp* fluctuated



The planetary A-index (Ap) prior to November 7, 2004 was quiet to unsettled, providing very reliable HF communications. All of that changed on November 7, when we had a series of days with very elevated geomagnetic activity.

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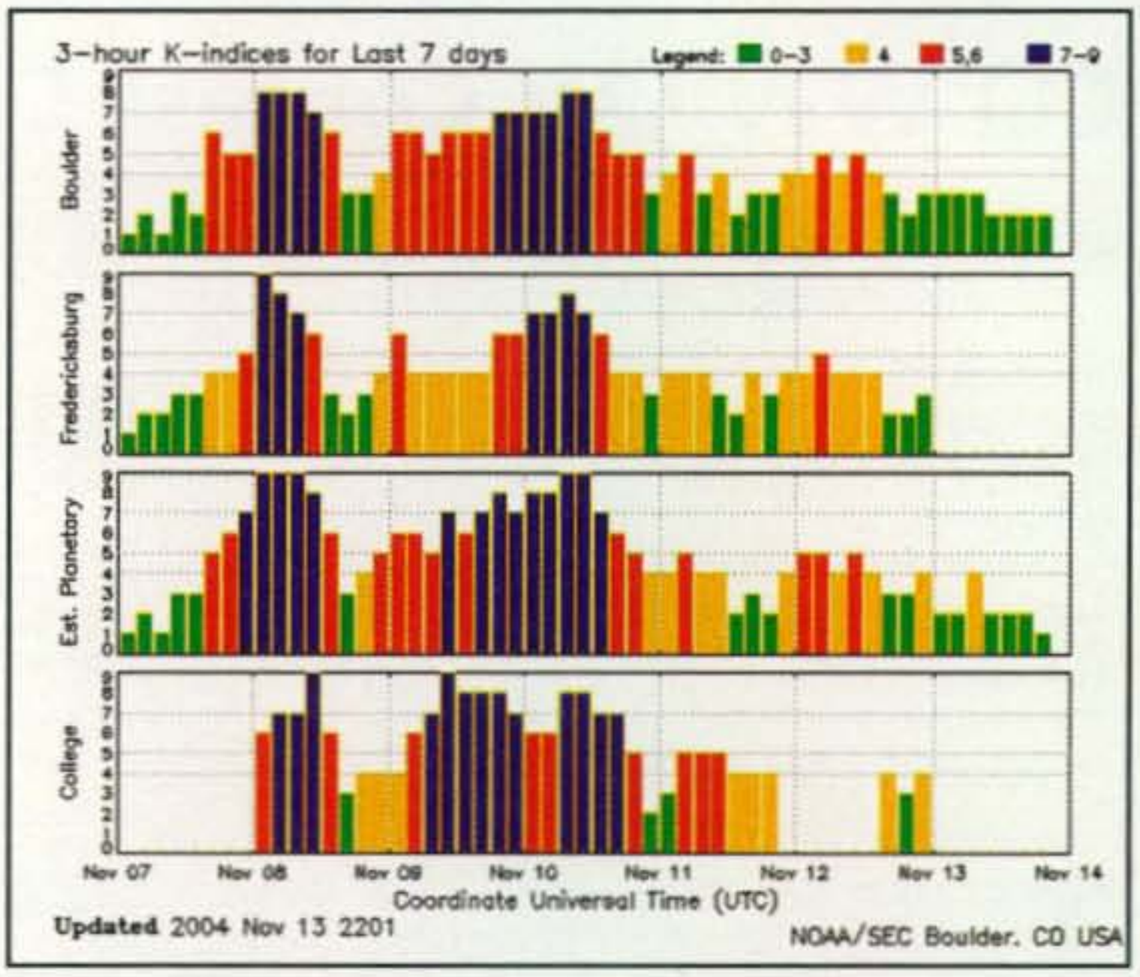
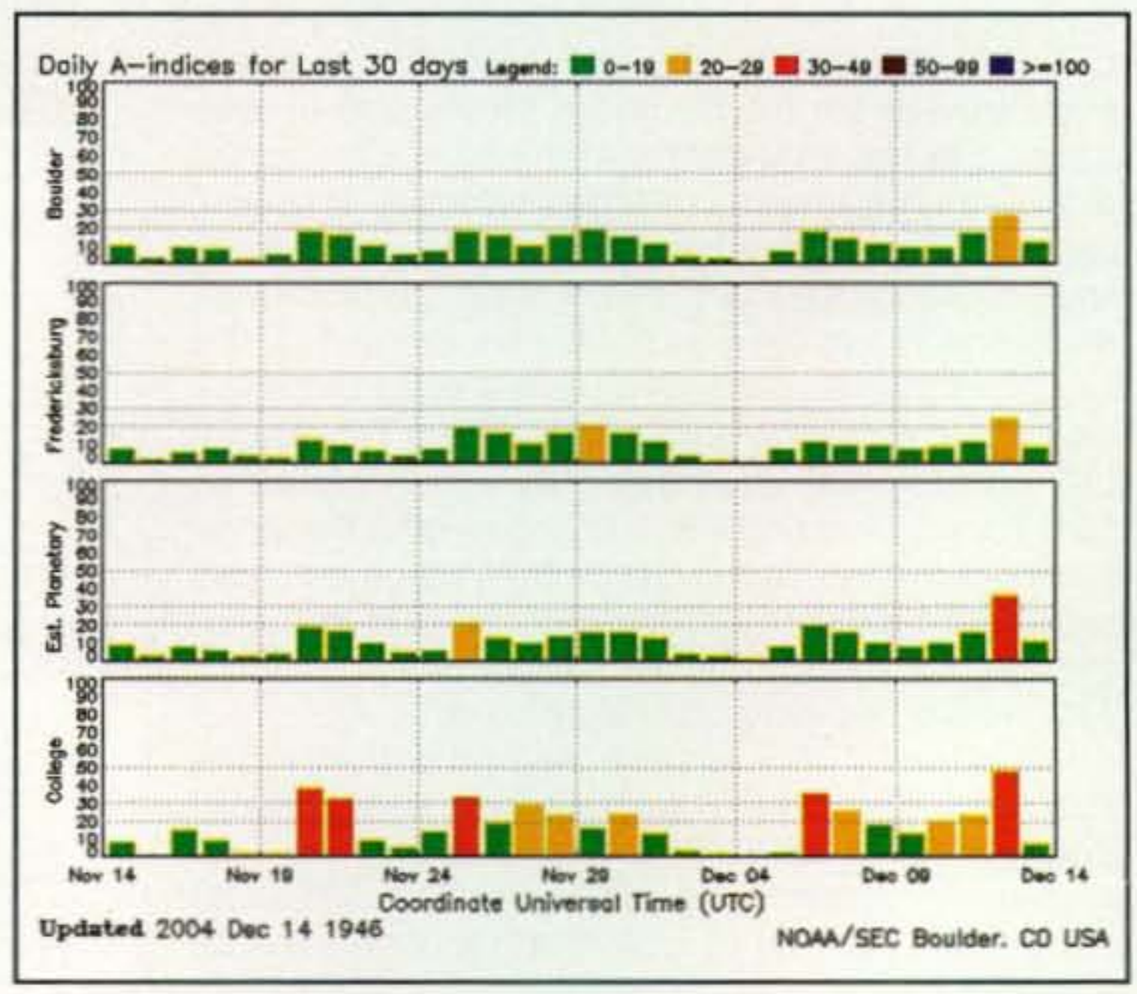


The planetary K-index (Kp) over the course of the storm that started on November 7 shows how severe conditions became. The estimated planetary K-index reached the highest level, 9, several times and for extended periods, all but shutting down worldwide HF communications.

between 2 and 3, while the flux fell one point to 110. Then, at the 0900 reporting period, the *Kp* rose to 5, only to fall back down to 2 and 3 during the rest of the day. On November 28 the *Kp* reading ranged between 2 and 4. The flux on the second contest day was recorded as 113. This meant a higher average geomagnetic activity level during the second day of the contest, which depressed the ionosphere over most paths, especially those over the higher latitudes.

How did you fare? With the increased efficiency of CW, were you able to overcome the less-than-optimal propagation?



The planetary A-index (Ap) showing conditions during the CQ WW CW contest on November 27 and 28, 2004. The overall geomagnetic activity level was unsettled to active. This made for a reasonably good contest period.

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings. An ** indicates best time to check for 6 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *standard* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 GMT, etc.

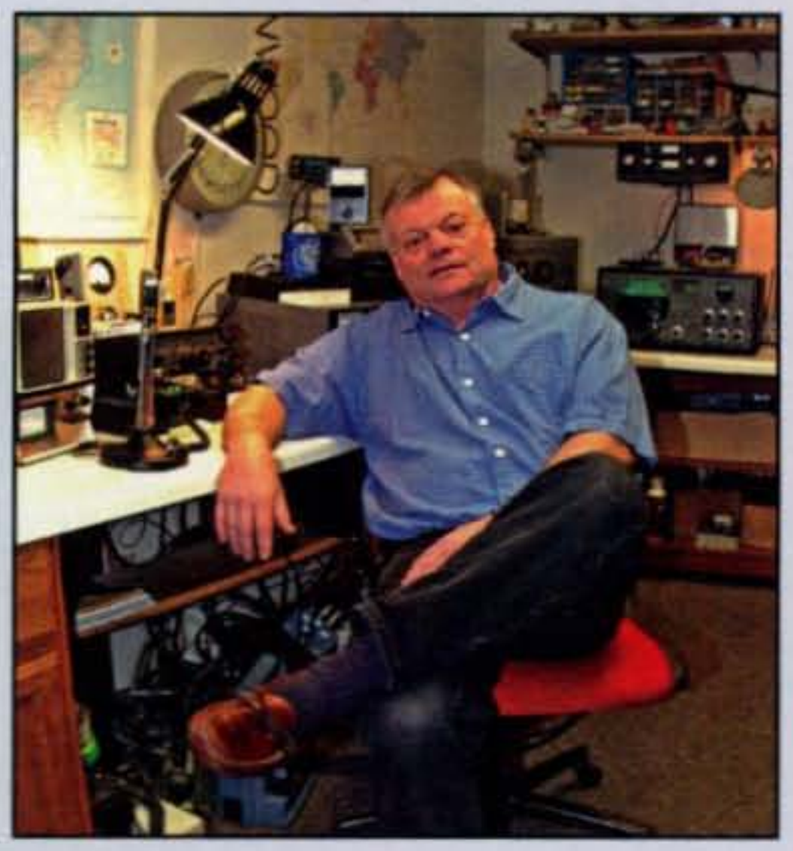
5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

February 15 - April 15, 2005
Time Zone: EST (24-Hour Time)
EASTERN USA To:

Reception Area	*10/15 Meters*	*20 Meters*	*40 Meters*	*80 Meters*
Western & Central Europe & North Africa	10-12 (1)** 08-10 (1) 10-12 (2) 12-13 (1)	06-08 (1) 08-11 (2) 11-12 (3) 12-13 (4) 13-14 (3) 14-15 (2) 15-17 (1)	16-17 (1) 17-19 (2) 19-20 (3) 20-00 (2) 00-02 (3) 02-03 (2) 03-04 (1)	18-20 (1) 20-21 (2) 21-01 (3) 01-02 (2) 02-03 (1) 20-22 (1)* 22-01 (2)* 01-02 (1)*
Northern Europe & European CIS	09-12 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-14 (2) 14-16 (1)	17-19 (1) 19-02 (2) 02-03 (1)	20-22 (1) 22-00 (2) 00-02 (1) 20-00 (1)*
Eastern Mediter-anean & Middle East	09-11 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-14 (3) 14-15 (2) 15-17 (1)	18-20 (1) 20-23 (2) 23-01 (1)	19-23 (1) 20-22 (1)*
Western Africa	10-13 (1)** 09-10 (1) 10-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-19 (1)	18-19 (1) 19-00 (2) 00-02 (1)	19-21 (1) 21-23 (2) 23-01 (1) 21-01 (1)*
Eastern & Central Africa	11-13 (1)** 09-11 (1) 11-14 (2) 14-15 (1)	13-15 (1) 15-18 (2) 18-19 (1)	19-22 (1) 22-00 (2) 00-01 (1)	20-00 (1)
Southern Africa	10-13 (1)** 09-10 (1) 10-12 (2) 12-13 (3) 13-14 (2) 14-15 (1)	07-14 (1) 14-16 (2) 16-17 (3) 17-18 (2) 18-20 (1)	18-20 (1) 20-22 (2) 22-00 (1)	21-23 (1) 21-23 (1)*
Central & South Asia	09-11 (1) 16-18 (1)	06-07 (1) 07-09 (2) 09-11 (1) 18-21 (1)	04-07 (1) 17-21 (1)	04-07 (1) 18-20 (1)
Southeast Asia	17-19 (1)	06-07 (1) 07-09 (2) 09-11 (1) 19-21 (1)	05-08 (1) 19-21 (1)	06-07 (1) 19-21 (1)
Far East	16-19 (1)	06-07 (1) 07-09 (2) 17-20 (1)	05-08 (1) 17-19 (1)	06-07 (1) 17-18 (1) 06-07 (1)*
South Pacific & New Zealand	14-16 (1) 12-15 (1) 15-18 (2) 18-19 (1)	15-19 (1) 19-22 (2) 22-07 (1) 07-09 (2) 09-11 (1)	00-01 (1) 01-02 (2) 02-06 (3) 06-07 (2) 07-08 (1)	02-03 (1) 03-06 (2) 06-07 (1) 02-07 (1)*
Austral-asia	15-17 (1)** 09-11 (1) 22-16 (1) 16-18 (2) 18-20 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-18 (1) 18-20 (2) 20-22 (1)	03-05 (1) 05-07 (2) 07-08 (1)	04-05 (1) 05-06 (2) 06-07 (1) 04-07 (1)*
Caribbean, Central America & Northern Countries of South America	11-16 (1)** 07-08 (1) 08-09 (2) 09-11 (4) 11-13 (2) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	05-06 (1) 06-07 (2) 07-09 (4) 09-10 (3) 10-14 (2) 14-16 (3) 16-18 (4) 18-19 (3) 19-21 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-03 (3) 03-05 (2) 05-07 (1)	19-21 (1) 21-04 (2) 04-06 (1) 20-02 (1)* 02-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-15 (1)** 08-09 (1) 09-11 (2) 11-13 (1) 13-14 (2) 14-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-10 (2) 10-14 (1) 14-16 (2) 16-17 (3) 17-19 (4) 19-20 (2) 20-22 (1) 22-23 (2) 23-00 (1)	19-21 (1) 21-04 (2) 04-07 (1)	21-06 (1) 01-05 (1)*

On the Cover



"Ham radio has been ... so much a part of my life that it's become my life," says Gene Wicklund, WØZOK, of Horace, North Dakota, noting that he grew up with ham radio and got started in electronics at age 10, hanging around with hams and ham clubs before getting his own license in 1969. Today, Gene runs a business built on his ham radio experience, designing and installing electronic equipment systems for area businesses. He even built and runs his own cable TV system (that's what the dishes behind him in the cover photo are for).

On the ham bands, Gene says he's active on 160 meters through 70 centimeters and runs two repeater systems, one each on 2 meters and 440 MHz. He's also active in weak-signal VHF and UHF —the antennas atop the 120-foot tower in the photo are Yagis for 2 meters and 432 —and on HF, particularly enjoys operating AM with vintage gear. His main AM station is all Hallicrafters—an SX-101 MkIII receiver, HT-32A transmitter, and HT-41 linear amplifier. In the inset photo on the cover, you can also see Gene's Astatic D-104 microphone to his right, a Hallicrafters SX-42 receiver over his left shoulder (underneath a Dentron 3000-A tuner), and, peeking over his left shoulder, a Heathkit DX-100 transmitter. Gene says he still has the first receiver he ever owned, a Hallicrafters S-52.

In our main photo, Gene is taking advantage of perfect antenna weather to perform some preventive maintenance on his guy system, although he tells us that since that photo was taken, he has replaced the steel guys with Phillystran. The two vertical antennas visible behind Gene on the tower are his repeater antennas. The tower also supports several HF dipoles. *(Cover photo by Larry Mulvehill, WB2ZPI)*

McMurdo Sound, Antarctica	15-17 (1)	17-19 (1) 19-22 (2) 22-00 (1) 07-09 (1)	22-00 (1) 00-04 (2) 04-06 (1)	003-04 (1)

Time Zones: CST & MST (24-Hour Time) CENTRAL USA To:

Reception Area	*10/15 Meters*	*20 Meters*	*40 Meters*	*80 Meters*
Western & Southern Europe & North (1)*	08-09 (1) 09-12 (2) 12-13 (1)	06-08 (1) 08-12 (2) 12-14 (3) 14-15 (2)	16-18 (1) 18-21 (2) 21-00 (1) 00-02 (2)	18-20 (1) 20-00 (2) 00-01 (1) 20-00
Africa		15-17 (1)	02-03 (1)	
Northern Europe & (1)*	08-11 (1)	07-08 (1) 08-10 (2)	19-22 (1) 22-00 (2)	20-01 (1) 21-01
European CIS		10-12 (1) 12-13 (2) 13-15 (1)	00-02 (1)	
Eastern Mediter-ranean & Middle East	08-11 (1)	07-11 (1) 11-14 (2) 14-16 (1) 22-00 (1)	19-20 (1) 20-22 (2) 22-23 (1)	20-22 (1)
Western Africa (1)*	09-12 (1)** 08-10 (1) 10-13 (2) 13-15 (1)	07-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	18-20 (1) 20-22 (2) 22-01 (1)	21-00 (1) 21-23
Eastern & Central Africa	08-11 (1) 11-13 (2) 13-14 (1)	07-12 (1) 12-14 (2) 14-15 (3) 15-16 (2) 16-18 (1)	19-23 (1)	19-22 (1)
Southern Africa (1)*	10-12 (1)** 08-10 (1) 10-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	07-13 (1) 13-15 (2) 15-16 (3) 16-17 (2) 17-19 (1) 22-00 (1)	18-20 (1) 20-23 (2) 23-00 (1)	19-22 (1) 2-022
Central & South Asia	09-11 (1)	06-07 (1) 07-09 (2) 09-11 (1) 19-21 (1)	04-08 (1) 17-21 (1)	05-07 (1) 17-19 (1)
Southeast Asia	10-13 (1) 17-19 (1)	06-07 (1) 07-10 (2) 10-12 (1) 17-21 (1)	04-08 (1) 17-19 (1)	05-07 (1) 17-18 (1)
Far East (1)*	16-18 (1)** 16-17 (1)	06-07 (1) 07-09 (2)	02-04 (1) 04-07 (2)	04-07 (1) 05-07
Far East	17-18 (2) 18-19 (1)	09-11 (1) 16-18 (1) 18-20 (2) 20-22 (1)	07-08 (1)	
South Pacific & New Zealand (1)*	14-17 (1)** 11-16 (1) 16-18 (2) 18-20 (1)	06-07 (1) 07-10 (2) 10-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-02 (1)	22-00 (1) 00-01 (2) 01-06 (3) 06-07 (2) 07-08 (1)	00-02 (1) 02-06 (2) 06-07 (1) 03-07
Austral-asia (1)*	14-17 (1)** 12-16 (1) 16-18 (2) 18-20 (1)	06-07 (1) 07-09 (3) 09-12 (2) 12-15 (1) 15-17 (2) 17-19 (1) 19-21 (2) 21-00 (1)	01-04 (1) 04-06 (3) 06-07 (2) 07-08 (1)	04-05 (1) 05-06 (2) 06-07 (1) 05-07
Caribbean Central America & Northern (1)*	11-15 (1)** 07-08 (1) 08-09 (2) 09-11 (3)	05-06 (1) 06-07 (2) 07-09 (4) 09-10 (3)	18-19 (1) 19-20 (2) 20-02 (3) 02-05 (2)	19-21 (1) 21-04 (2) 04-06 (1) 20-02
Countries (2)*	11-13 (2)	10-15 (2)	05-07 (1)	02-04
of South (1)*	13-15 (4)	15-16 (3)		04-05
America	15-16 (3) 16-17 (2) 17-18 (1)	16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)		
Peru, Bolivia, (1)*	12-14 (1)**	05-07 (1) 07-08 (1)	19-20 (1) 07-09 (2)	21-05 (1) 20-04 (2)
Paraguay, Brazil, Chile, Argentina, & Uruguay	08-10 (2) 10-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	09-12 (1) 12-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2) 00-01 (1)	04-06 (1)	01-04
McMurdo Sound, Antarctica	15-17 (1)	16-19 (1) 19-22 (2) 22-00 (1) 07-10 (1)	22-01 (1) 01-04 (2) 04-06 (1)	01-04 (1)

Time Zone: PST (24-Hour Time) WESTERN USA To:

Reception Area	*10/15 Meters*	*20 Meters*	*40 Meters*	*80 Meters*
Western & Southern Europe & North Africa	08-11 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-12 (2) 12-14 (1) 22-00 (1)	19-22 (1) 22-00 (2) 00-01 (1)	19-22 (1) 20-22 (1)*
Northern & Central European CIS	08-10 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-12 (2) 12-13 (1) 22-00 (1)	19-21 (1) 21-22 (2) 22-23 (1)	19-22 (1) 20-22 (1)*
Eastern Mediter-ranean & Middle East	08-10 (1)	07-10 (1) 10-11 (2) 11-13 (1) 22-00 (1)	18-21 (1)	18-20 (1)
Western Africa	09-10 (1)** 08-09 (1) 09-12 (2) 12-14 (1)	05-07 (1) 07-08 (2) 08-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	18-22 (1)	19-21 (1) 19-21 (1)*
Eastern & Central Africa	09-11 (1)	06-08 (1) 11-13 (1) 13-15 (2) 15-16 (1)	18-21 (1)	18-20 (1)
Southern Africa	09-11 (1)** 08-10 (1) 10-13 (2) 13-14 (1)	05-06 (1) 06-08 (2) 08-13 (1) 13-17 (2) 17-18 (1) 23-01 (1)	18-22 (1)	19-21 (1) 19-21 (1)*
Central & South Asia	08-10 (1) 18-20 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-20 (2) 20-21 (1)	05-08 (1) 17-19 (1)	05-07 (1) 17-18 (1)
Southeast Asia	16-18 (1)** 08-10 (1) 16-17 (1)	02-07 (1) 07-09 (2) 09-11 (1)	02-04 (1) 04-06 (2) 06-08 (1)	05-07 (1)
Southeast Asia	17-18 (2) 18-19 (1)	16-17 (1) 17-19 (2) 19-20 (1)		
Far East	14-16 (1) 16-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-19 (3) 19-20 (2) 20-22 (1)	01-02 (1) 02-04 (2) 04-06 (3) 06-07 (2) 07-08 (1)	02-03 (1) 03-06 (2) 06-07 (1) 03-06 (1)*
South Pacific & New Zealand	15-17 (1)** 11-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	06-09 (1) 09-11 (2) 11-16 (1) 16-18 (2) 18-19 (3) 19-21 (4) 21-22 (3) 22-00 (2) 00-04 (1)	21-22 (1) 22-06 (3) 06-08 (2) 08-09 (1)	22-00 (1) 00-06 (2) 06-07 (1) 22-00 (1)* 00-06 (2)* 06-07 (1)*
Austral-asia	15-17 (1)* 14-16 (1) 16-19 (2) 19-20 (1)	07-08 (1) 08-11 (2) 11-17 (1) 17-18 (2) 18-20 (3) 20-21 (2) 21-23 (1)	00-02 (1) 02-03 (2) 03-06 (3) 06-07 (2) 07-08 (1)	02-03 (1) 00-06 (2) 06-07 (1) 03-06 (1)*
Caribbean Central	10-14 (1)* 07-08 (1)	05-06 (1) 06-07 (2)	18-19 (1) 19-20 (2)	19-20 (1) 20-03 (2)

America	08-12 (2)	07-09 (4)	20-01 (3)	03-04 (1)
& Northern	12-14 (3)	09-14 (2)	01-04 (2)	20-01
(1)*				
Countries	14-16 (2)	14-16 (3)	04-06 (1)	01-03
(2)*				
of South	16-17 (1)	16-18 (4)		03-04
(1)*				
America		18-20 (3)		
		20-22 (2)		
		22-02 (1)		
Peru,	10-15 (1)**	06-07 (1)	18-20 (1)	21-04 (1)
Bolivia,	07-08 (1)	07-09 (2)	20-03 (2)	22-03
(1)*				
Paraguay,	08-10 (2)	09-13 (1)	03-05 (1)	
Brazil,	10-12 (3)	13-15 (2)		
Chile,	12-13 (2)	15-16 (3)		
Argentina	13-15 (3)	16-18 (4)		
& Uruguay	15-16 (2)	18-19 (3)		
	16-17 (1)	19-21 (2)		
		21-23 (1)		
McMurdo	13-15 (1)	16-19 (1)	22-02 (1)	02-05 (1)
Sound,	15-17 (2)	19-22 (2)	02-05 (2)	
Antarctica	17-18 (1)	22-02 (1)	05-06 (1)	
		06-07 (1)		
		07-09 (2)		
		09-11 (1)		

**Indicates best time for 160 meter openings.*
***Indicates the best time for 10 meter openings.*
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 40 and 20 meter openings.

Propagation charts prepared by George Jacobs, W3ASK.

February Propagation

From the middle of February through March and early April, typical equinoctial propagation conditions can be expected on the HF bands. This usually means a noticeable improvement in conditions between the Northern and Southern Hemispheres. Look for improvements between the United States and South America, Africa, Australasia, Antarctica, and parts of Asia. Equinoctial propagation occurs during the spring and fall months, when the sun is most directly overhead at the equator, producing similar ionospheric characteristics over large areas of the world. It tends to maximize during sunrise and sunset periods and over both short- and long-path openings.

During the daylight hours, optimum DX propagation conditions are expected on 17 meters. The band is forecast to open to all areas of the world sometime during this period, often with strong and stable signals with little fading or noise. Conditions on 15 will be good, too, although the level of solar activity is much lower this year than in the years since this cycle's peak, reducing the chance of *F*-layer propagation on the higher HF bands. (Of course, sporadic-*E* [*Es*] propagation certainly can keep these bands open, especially during the summer season.)

Daytime conditions on 10 and 12 meters will be less exciting. Openings will be possible for stations in low-latitudes using north-south paths, with few openings expected into Europe and the Far East.

Excellent worldwide DX openings to most areas of the world are forecast for 17 and 20 meters during the daylight hours. Conditions are expected to become optimal for an hour or two after sunrise and again during the late afternoon. With increasing hours of daylight during February, expect the HF bands to remain open for an hour or so longer into the early evening than during the winter months.

During the early evening hours and to as late as midnight, seven bands should be available for DX openings; 15, 17, 20, 30, 40, 80, and 160 meters. Fifteen and 17 meters should hold up for openings toward Central and South America and the Caribbean, the Pacific area, the Far East, and parts of Asia. Even better openings to many areas of the world may be possible on 20 meters during this period, with the strongest signals from southerly and westerly directions. Good DX conditions are also forecast for 30, 40, and 80 meters for openings toward the east and the south. Openings in the same direction, but with higher noise levels and weaker signals, should also be possible on 160 meters.

Between midnight and sunrise it should be a toss-up among 20, 30, and 40 meters for DX paths. These bands should open to many areas of the world, with conditions favoring openings toward the south and the west. Expect similar conditions on 80 meters, but with weaker signals and higher noise levels. Be sure to check 160 meters for some unusual DX openings toward the south and the west during this period. Conditions on the bands between 160 and 20 meters are expected to peak at local sunrise.

VHF Conditions

It might be rewarding to check for 6-meter openings during the daylight hours. Some short-skip openings over distances of about 1200 to 2300 miles may occur, with rare sporadic-*E* openings.

Trans-equatorial (TE) scatter propagation tends to increase during the equinoctial period, and some 6-meter openings may be possible between 7 and 10 PM local time. The best bet for such openings is between the southern tier states and South America for paths approximately at right angles to the equator. An occasional TE opening may also be possible on 2 meters. Unlike *F2*-layer or sporadic-*E* openings on 6 meters, TE openings are characterized

by very weak signals with considerable flutter fading.

Auroral displays tend to occur somewhat more frequently during the equinoctial period. Unusual short-skip conditions often occur on the VHF bands during these displays. Openings, generally over distances of several hundred and up to about 1300 miles, may take place by means of reflection from the ionized region produced by an auroral display. Flutter fading and multi-path echoes characterize auroral-type openings. To take maximum advantage of such openings, rotatable antennas should be beamed toward the auroral display, if it is visible.

Large areas of sporadic-*E* ionization also accompany most auroral displays. Reflection of VHF signals from these regions can make possible short-skip openings between distances of 750 and 1300 miles. Signals reflected in this manner are usually strong and stable as compared to those reflected directly from an auroral display.

Auroral activity often occurs during periods of radio storminess on the HF bands. Check the Last-Minute Forecast at the beginning of this column for those days expected to be Below Normal or Disturbed during February. These are the days on which VHF auroral-type openings are most likely to occur. Don't forget to check out the *CQ VHF* magazine propagation column for an in-depth look at propagation on VHF and above.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for November 2004 is 44, down four points from October's 48. The lowest daily sunspot value during November, 26, was recorded on November 21 and is considerably higher than the October 10 count of zero. The highest daily sunspot count was 76 on November 1. The 12-month running smoothed sunspot number centered on May 2004 is 44, down two points from April's 46. A smoothed sunspot count of 33 to 35, predicted by the SIDC, is expected for February 2005. The SEC predicts the sunspot count to be 24, give or take about 12 points.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 113 for November 2004, quite a bit higher than 106 for October. The 12-month smoothed 10.7-cm flux centered on May 2004 is 109, just down from April's 112. The predicted smoothed 10.7-cm solar flux for January 2005 is about 86, give or take about 16 points.

The observed monthly mean planetary *A*-index (*Ap*) for November 2004 is 26, a very large jump from October's 9, and even higher than July's 23. The 12-month smoothed *Ap*-index centered on May 2004 is 14, down from April's 16. Expect the overall geomagnetic activity to be quiet to active during most days in February, although there is a possibility for a strong geomagnetic storm on a couple of days, since we are getting close to the spring Equinox. Refer to the Last-Minute Forecast for the outlook on what days that this might occur.

Please participate in my online propagation discussion forum at <http://hfradio.org/forums/>. I have also enhanced my Space Weather and Radio Propagation center at <http://prop.hfradio.org>, so take a look. These resources may also be viewed on a cell phone or other wireless device that has WAP/WML features by browsing to <http://wap.hfradio.org>.

Drop me an e-mail or send me a letter if you have questions or topics you would like to see me explore in this column. I'd also love to hear any feedback you might have on what I have written. Until next month . . .

73, Tomas, NW7US/AAA0WA

Update:

Wireless Signaling Without Radiated Power

The following update from author Walter Bain, W4LTU, is the result of additional information provided by reader William Lawson, AE6HP, after Bain's article, "Wireless Signaling Without Radiated Power—The Future?" was published in the November 2004 issue of* CQ.

While this information makes it clear that the specific mechanism proposed by Bain for wireless communication without radiated power—electrical and magnetic potentials based on the Aharonov-Bohm effect—cannot work, it does not alter the basic premise of the article, which is that what we have now may not be all there is, and that experimentation and research are needed to make the next leap in communications technology.

This was highlighted by reader Carter Rose, KD6GN, who passed along to us news that an international group of scientists has been honored by the European Union for showing that teleportation of "photonic twins" is possible across significant distances, with the potential for creating a whole new means of secure communications (see <http://www2.rnw.nl/rnw/en/features/science/041206rf>). Different method, same goal. —*W2VU*

The main thrust of my article was based on the detection of potentials by the Aharonov-Bohm effect, a principle that had been accepted as valid for 30 years. However, there are additional factors that were unknown to me or to the outside reviewers used by *CQ* prior to publication. These factors recently were pointed out by Bill Lawson, AE6HP, who holds a PhD in Plasma Physics.

Bill has very kindly taken an exceedingly *complex* subject and described it in non-mathematical terms. I will attempt to pass along what has been learned and hopefully provide readers with a better understanding of what is a fascinating, though complex, topic.

Although the Aharonov-Bohm effect is most simply formulated as being due to the vector potential, a further mathematically equivalent formulation can express the effect *solely* in terms of the magnetic flux through a loop. This makes it impossible to determine the actual value of the vector potential using the Aharonov-Bohm effect (or by the Josephson junction effect, which is essentially the same thing). Bill points out that some deep constraint in the formulas prevents us from seeing the value of the vector potential directly, and that this appears to be a fundamental property of the vector potential.

Further, it is surprising but true that the effect depends on the magnetic flux through a loop even though that magnetic field (associated with the potential) is shielded and is not present on the paths of the electron interferometer described in the text! To repeat, in the Aharonov-Bohm effect, the magnetic field is showing an effect in an area where it is not present! As you might guess, in such situations where bizarre things happen, quantum mechanics is involved.

In any case, the potential cannot be measured by the Aharonov-Bohm effect, nor by the Josephson Junction effect, nor by any other effect currently believed possible. As a result, signaling by potential cannot be expected to be valid. In addition, all seven listed patents, granted from 1984 to 1998, are invalid on technical grounds, as they rely on detection of potentials using Josephson Junctions.

The fundamental idea of signaling by other than radiated power should not be dismissed, however. The principle is simply demonstrated by induction, such as by two coupled inductors. Perhaps the future holds a technique that will combine a gradual drop-off with distance, with no power being radiated. This then might permit realization of the diverse benefits outlined in the article.

73, Walt, W4LTU

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ham radio news *(from page 93)*

Bush Calls for New Look at Spectrum Management

Calling the current system of federal spectrum management outdated and cumbersome, President Bush has ordered all federal agencies to develop specific plans for current and future spectrum needs by December 1, 2005. According to *Federal Computer Week*, the plans must include bandwidth and frequency needs for current and future technologies and services, planned uses for new technologies and suggestions for meeting spectrum needs. In addition, the Department of Homeland Security will have to identify overall public safety spectrum needs and develop a comprehensive plan to meet those needs. The Executive Memorandum was issued November 30, 2004 in response to recommendations by a task force the President established in May 2003 to develop and implement a new spectrum policy. Spectrum management for federal agencies is coordinated by the Commerce Department's National Telecommunications and Information Administration, but state and local public safety frequencies are assigned by the FCC. It is unclear at this point what impact the order will have on the FCC's spectrum policies and what, if any, impact there may be on amateur frequencies, many of which are shared with government users.

FCC Looks Toward Permitting Cell Phones, Broadband on Aircraft

The FCC is looking into the possibility of lifting its current ban on using personal cell phones aboard commercial aircraft, along with ways to provide broadband internet connections so passengers can stay connected via their laptops while in flight. There was no discussion of permitting other types of radio operation aboard aircraft, so it's likely your HT will have to stay turned off even if your cell phone and wireless laptop can be turned on.

On the Air with SCAMP

One of the criticisms of Winlink 2000 on-air e-mail software is that the equipment needed to run it is quite expensive. An alternative that uses your computer sound card is currently being tested, according to the ARRL Letter. It's called SCAMP, which is short for Sound Card Amateur Message Protocol. On-air testing began in late November of the SCAMP protocol, which is designed to permit the transmission of text messages and binary file attachments over 2-kHz bandwidth channels on either HF or VHF. For more information, contact Rick Muething, KN6KB, of the Winlink development team, at <kn6kb@arrl.net>.

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The FT DX 9000D brings you the highest total system performance available today. Its ultra-quiet 400 MHz High Resolution Direct Digital Synthesizer teams up with the high-level receiver design to yield a typical two-tone dynamic range of >110 dB along with a 3rd-order Intercept Point in excess of +40 dBm. The fully-loaded FT DX 9000D includes three permeability-tuned, motor-driven "μ" RF Tuning modules with Q>300, for ultra-sharp RF selectivity found nowhere else in the Amateur Radio industry!

FT DX 9000: for those who demand elite-class performance. . .

FT DX 9000D

200 W Transceiver

To request a copy of the FT DX 9000 Technical Overview, please call (714) 827-7600, Ext. 2272.

FT DX 9000MP
400 Watt Version
(Future Production Item)

FT DX 9000 Contest
200 Watt Configurable Version

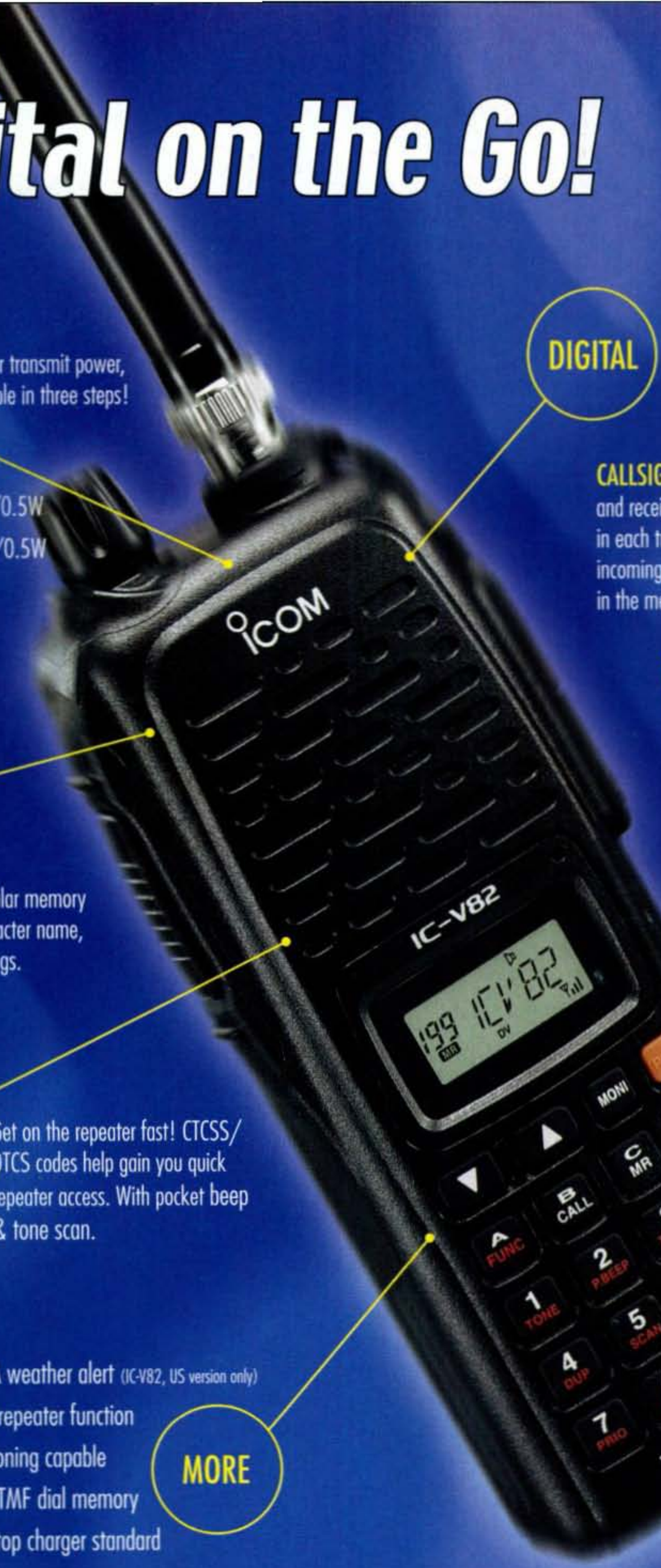
Modifications from 200W to 400W, or 400W to 200W, are not possible. Display image simulated; actual appearance may vary. Photo depicts after-market lamp, keyboard and keyer paddle, not included in FT DX 9000D purchase price.

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

Vertex Standard, US Headquarters,
10900 Walker Street, Cypress, CA 90630

Digital on the Go!

NEW
UHF Version **IC-U82**
VHF Version **IC-V82**
MONO BANDERS!



POWER

Superior transmit power, selectable in three steps!

IC-V82 • 7W/4W/0.5W
IC-U82 • 5W/2W/0.5W

DIGITAL

Traditional 2M or 70CM operation combined with optional UT-118 D-STAR format digital unit for voice and data communication! Includes the following features:

CALLSIGN CALLING. In digital mode, your callsign and receiving callsign (or CQ message) are included in each transmission. Callsign squelch lets you choose incoming calls by callsign. Received callsigns are stored in the memory automatically!

POSITION EXCHANGE. When connected to an external GPS receiver, position information can be exchanged.

MORE DIGITAL. 20 character text message - up to 6 messages can be pre programmed, Digital code squelch, Emergency communication, and more!

D-STAR READY! with optional equipment

MEMORY

Store up to 200 regular memory channels with 6-character name, tone, & duplex settings.

ACCESS

Get on the repeater fast! CTCSS/ DTCS codes help gain you quick repeater access. With pocket beep & tone scan.

MORE

NOAA weather alert (IC-V82, US version only)
Auto repeater function
PC cloning capable
16 DTMF dial memory
Desktop charger standard

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