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Amateur Radio

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

COMMUNICATIONS & TECHNOLOGY

FEBRUARY 2011

CQ

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On the Cover:
Richard Schwenke, N8GBA, of Marquette, Michigan. Details on page 78.

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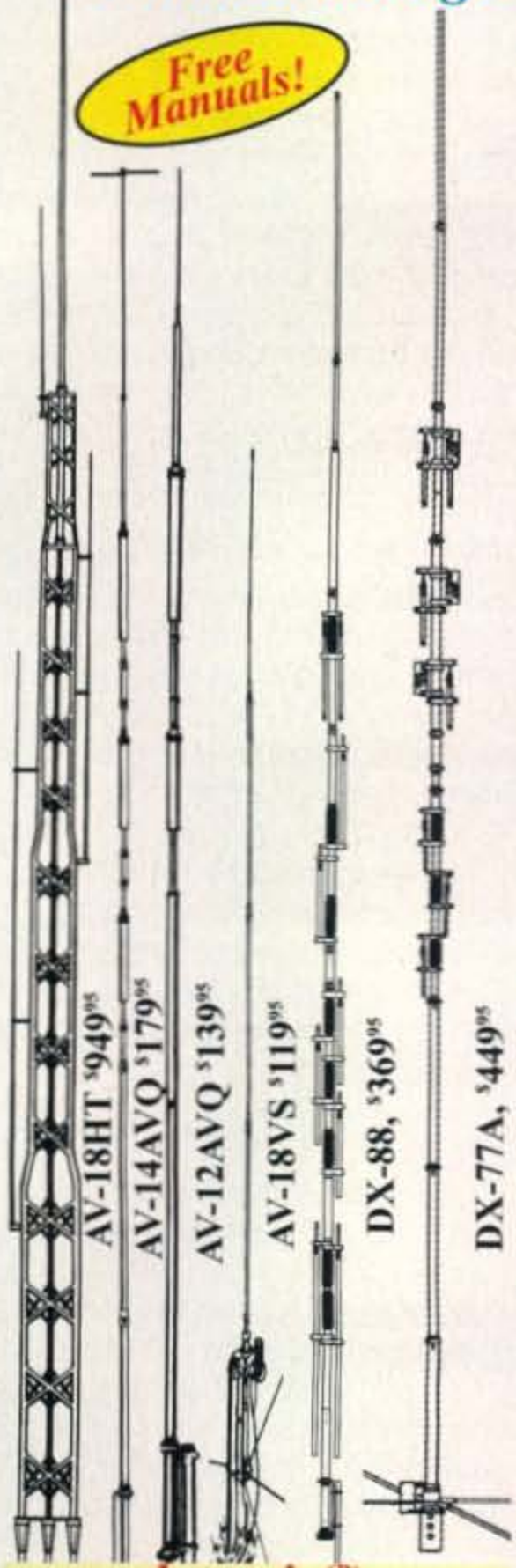

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AV-14AVQ, $179.95. (10,15,20,40 Meters). 18 ft., 9 lbs. **The** Hy-Gain AV-14AVQ uses the same trap design as the famous Hy-Gain Thunderbird beams. Three separate air dielectric Hy-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

AV-12AVQ, $139.95. (10, 15, 20 Meters). 13 ft., 9 lbs. **AV-12AVQ** also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $89.95.

AV-18VS, $119.95 (10,12,15,17,20,30,40,80 Meters). 18 ft., 4 lbs. **High** quality construction and low cost make the AV-18VS an exceptional value. Easily tuned to any band by adjusting feed point at the base loading coil. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

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

All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $199.95. Ground Radial System, GRK-88, $99.95. Roof Radial System, RRK-88, $99.95.

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

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

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$949.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$179.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$139.95	10,15,20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$119.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

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Full 1500 Watts, 43 feet, includes base mount

New! AV-6160 **$399.95** UPS SHIPPABLE

Operate all bands 160-6 Meters at full 1500 Watt with this self-supporting, 43 feet high performance vertical! It assembles in less than an hour and its low profile blends in with the sky and trees -- you can barely see it . . .

Exceptional Performance

The entire length radiates to provide exceptional low angle radiation 160-20 Meters and very good performance on 17-6 Meters. You can shorten it by telescoping it down for more effective low angle radiation on higher bands.

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A wide-range automatic or manual antenna tuner *at your rig* easily matches this antenna for all bands 160-6 Meters. There's no physical tuning adjustments on the antenna -- you simply put it up!

An optimized balun design allows *direct coax feed* with negligible coax loss (typically less than ½ dB 60-6 Meters and less than 1 dB 160-80 Meters with good quality, low-loss coax).

Extremely low wind loading

With just 2 square feet wind load, the AV-6160 has the lowest wind-loading and lowest visibility of any vertical antenna! The key is a six foot section of tapering diameter *stainless steel* whip that flexes in strong wind instead of stressing the bottom sections. Its 2-inch O.D.and .120 inch thick walled tubing bottom section makes it incredibly strong.

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ham radio news

Ham Heads FCC Oversight Committee

For decades, the FCC has overseen the Amateur Radio Service. Now, a radio amateur will be overseeing the FCC. Rep. Greg Walden (R-OR), W7EQI, is the new Chairman of the House Energy and Commerce Committee's Subcommittee on Communications & Technology. Keeping tabs on the FCC is one of its responsibilities. Walden is one of two hams in Congress, along with Rep. Mike Ross, WD5DVR (D-AR). When Walden's appointment was announced in mid-December, he notified his "followers" on Twitter with a message in Morse code! (See "Zero Bias" on page 8 for the full message.)

Walden is also chairman of the House Republican Leadership Committee and chaired the Republican Majority Transition Committee, which oversaw the transfer of leadership in the House of Representatives from the Democrats to the Republicans.

New Rules on Vanity and Club Calls Take Effect Feb. 14

It's a valentine from the FCC: the new rules regarding availability of certain vanity callsigns and transfers of trustees on club calls will take effect on February 14, 2011, sixty days after their publication on December 15, 2010, in the *Federal Register*. For a complete rundown of the new rules, see last month's "Washington Readout."

General Class Question Pool for 2011–2015 Released

The new pool of questions for the General Class (Element 3) license exam has been released by the Question Pool Committee of the National Conference of Volunteer Examiner Coordinators. The new question set will be used for exams administered on or after July 1, 2011, and will remain in use until June 30, 2015. According to the ARRL, the new question pool includes graphics and diagrams. The new question pool, as well as the graphics and diagrams, may be downloaded in various formats at <http://www.ncvec.org/page.php?id=358>.

ARRL Pushes FCC for Mandatory BPL Notching

And you thought Broadband over Power Lines was an issue that had faded into the dustbin of poorly conceived technology… Apparently not. The ARRL has filed an *ex parte* submission with the FCC, providing additional support for its stand that the Commission should require BPL system operators to "notch out" all amateur bands within the spectrum they use, to a depth of at least 35 dB. According to the *ARRL Letter*, most, but not all, BPL providers already do this. The League contends that such notching should be made mandatory for all BPL operators at all times, in order to protect amateur frequencies. The filing is part of the FCC's proceeding revisiting its original BPL rules commenced after a federal court ruled in favor of the ARRL's argument that the FCC had violated its own procedures in adopting its original rules.

Long-Delayed Echoes on 40 Meters

A ham in Germany has reported hearing echoes of his own signals on 40 meters, and even recorded them. The echoes returned some 46 seconds after each transmission by Peter Brogl, DK6NP, according to *Newsline*, which reported that Brogl first thought someone was recording his transmissions and retransmitting them, but he changed frequencies several times and still heard the echoes. Long-delayed echoes are not a new phenomenon—having been first reported in 1927—but their cause is still a mystery. DK6NP's recordings are online at <http://brogl.net/audio>.

10th Anniversary of ARISS

December 21, 2010 marked the winter solstice, a total lunar eclipse and the tenth anniversary of school contacts via ham radio in space through ARISS, Amateur Radio on the International Space Station. Since Astronaut William Shepherd's initial contact with the Burbank School in Burbank, Illinois, space station crew members and volunteer hams on the ground have conducted 565 successful contacts in 40 different countries, according to the AMSAT News Service.

One of the most active hams aboard the ISS has been Expedition 25 Commander Doug Wheelock, KF5BOC. Wheelock and the rest of his crew from Expeditions 24 and 25 returned to Earth on November 26 after more than five months in space. A new crew arrived on December 17, including two hams, US Astronaut Catherine Coleman, KC5ZTH, and the European Space Agency's Paolo Nespoli, IZØJPA. The expedition commander is Cosmonaut Dmitry Kondratyev, who does not have an amateur callsign.

KG4IUM Youngest Member of ARRL Board

A young woman who hopes to become an astronaut has become the youngest member of the ARRL Board of Directors in modern times, and perhaps ever, according to the *ARRL Letter*. Twenty-one year-old Andrea Hartlage, KG4IUM, was elected Southeastern Division Vice Director last fall and took her seat in January. Andrea is a junior at Georgia Tech, majoring in aerospace engineering, and hopes to become an astronaut in the future. The 2004 Amateur Radio Newsline Young Ham of the Year, Andrea's interest in space was sparked by her visit to SpaceCamp, which is *CQ* magazine's major contribution each year as a co-sponsor of the Young Ham of the Year program.

200 Meters and Up?

The Inter-American Telecommunication Commission (CITEL) has formally endorsed a proposal for the 2012 World Radiocommunication Conference (WRC-12) to grant a secondary allocation to amateurs in the medium-frequency (MF) band segment around 500 kHz. If approved, it would be the first worldwide amateur allocation on a wavelength higher than 200 meters since the beginning of radio regulation. According to the *ARRL Letter*, the specific proposal calls for creating two small ham frequency segments, at 461–469 kHz and 471–478 kHz. Most experimental operations to date in this range have used very low speed Morse code, and signals have been received over distances of several thousand miles.

Private Space Launch Deploys Four Cubesats

The private space program SpaceX deployed four small "cubesat" satellites during a two-orbit test flight in early December. The AMSAT News Service reports that it had managed to identify the functions of two of the four satellites. One is a military mission and the other is the University of Southern California's CAERUS satellite, which holds an FCC experimental license, as well as an amateur callsign, KJ6FIX, and a downlink on 437.600 MHz.

(Continued on page 10)

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

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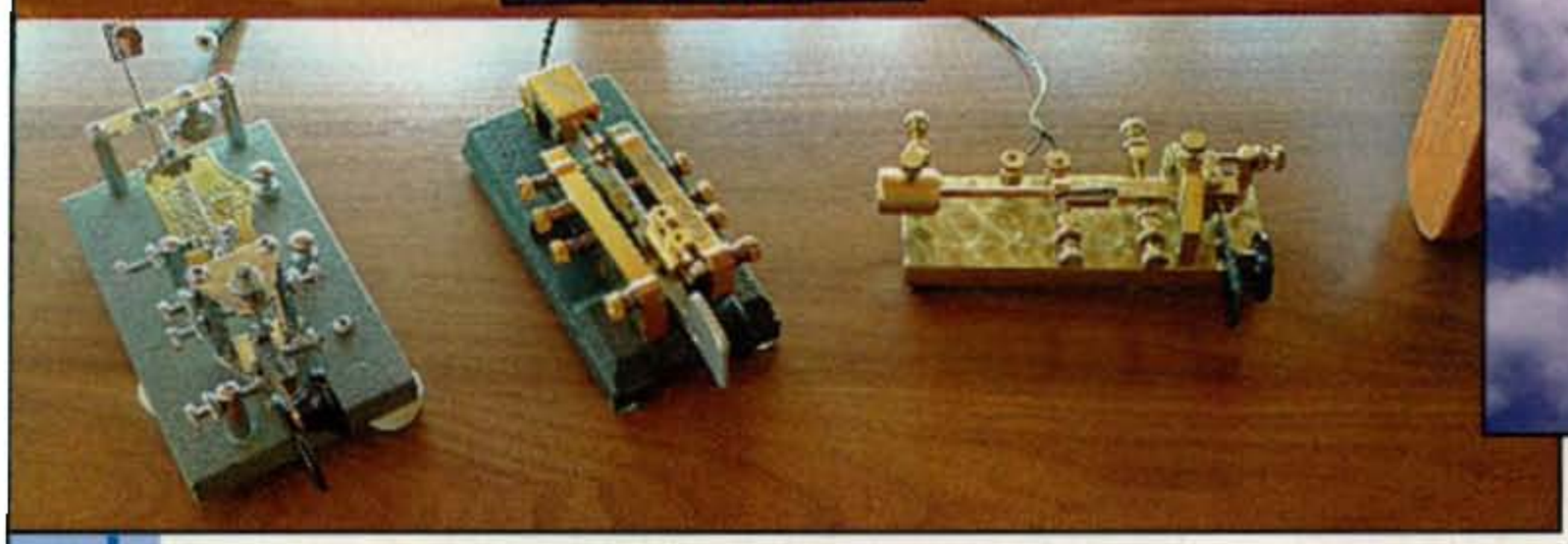

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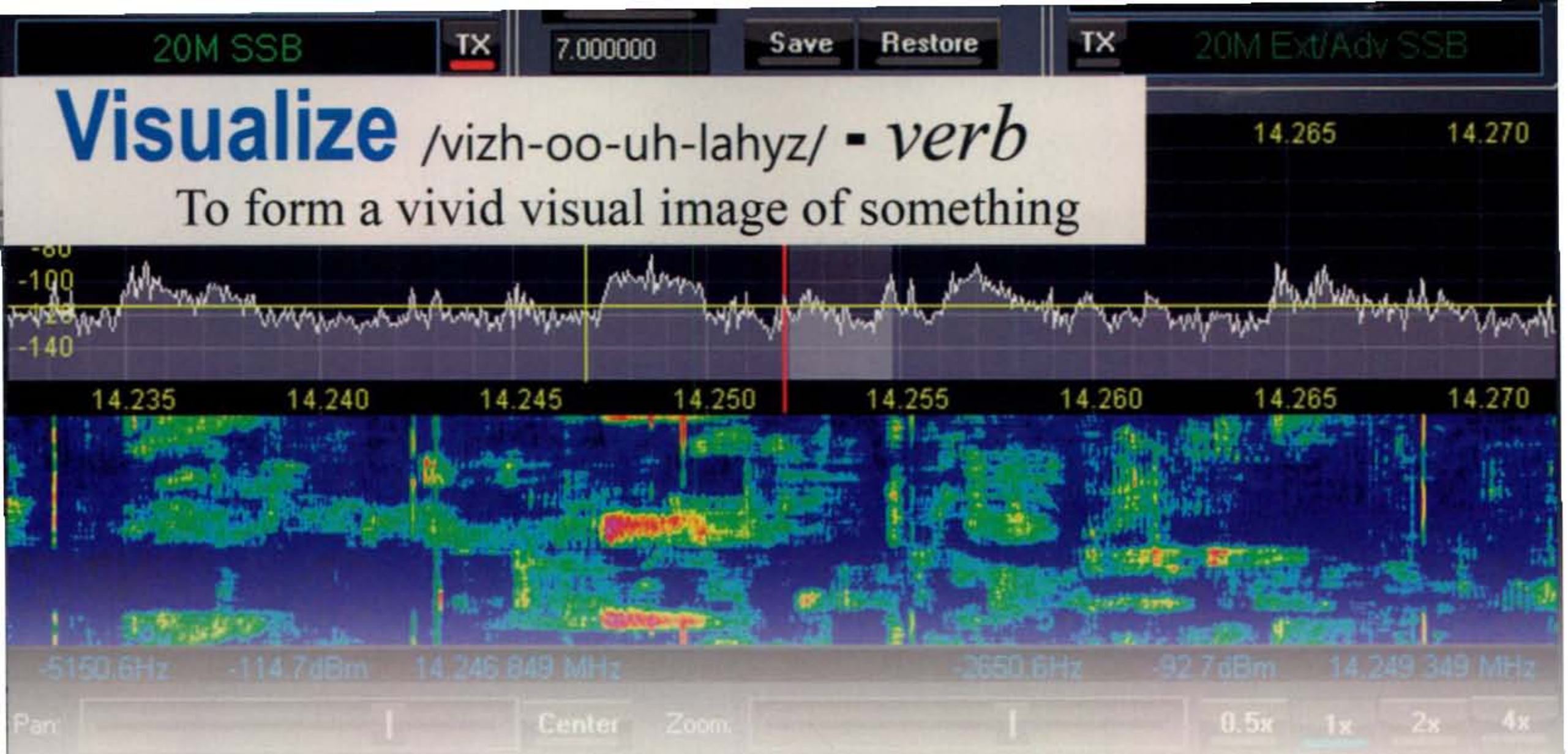

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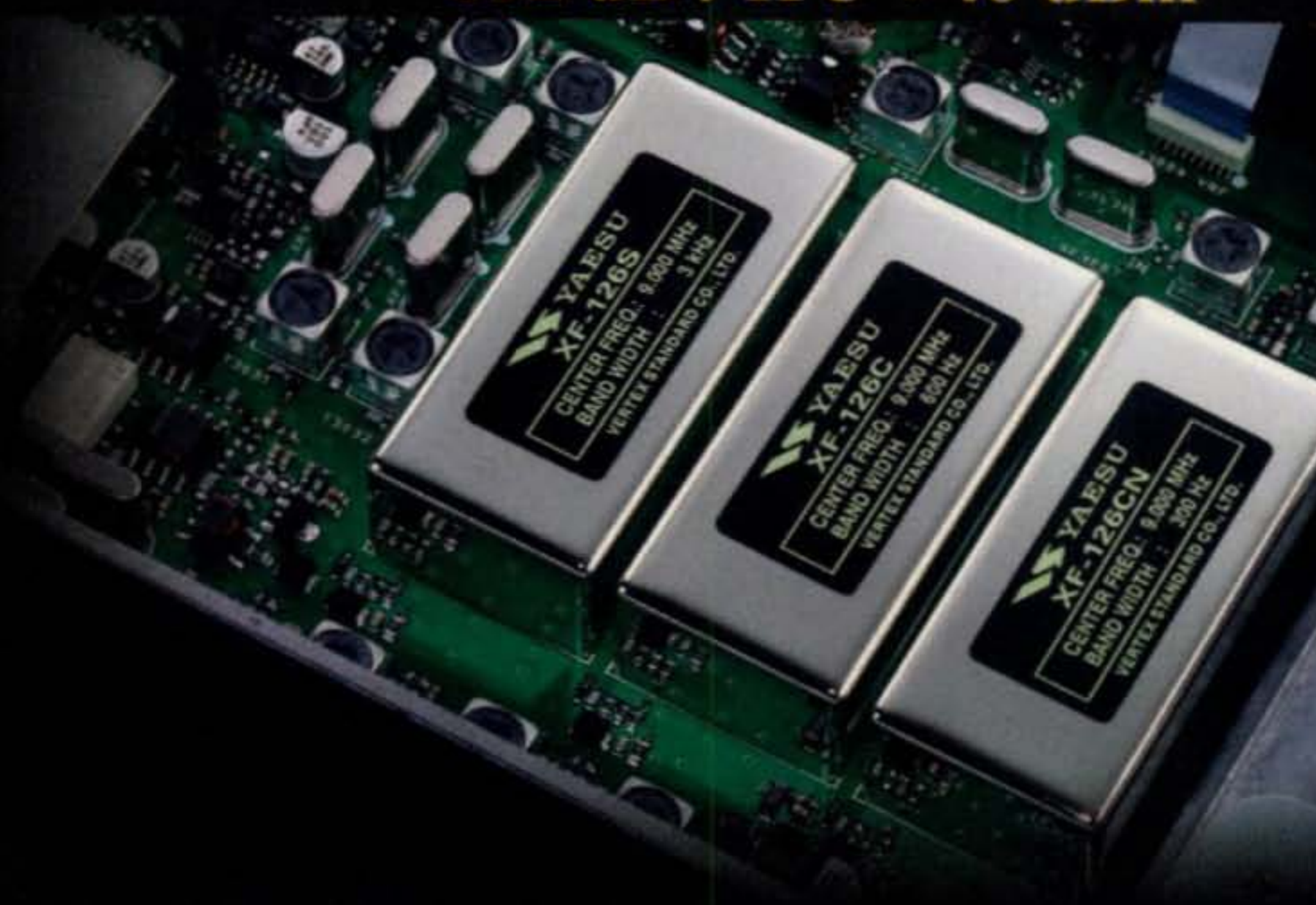

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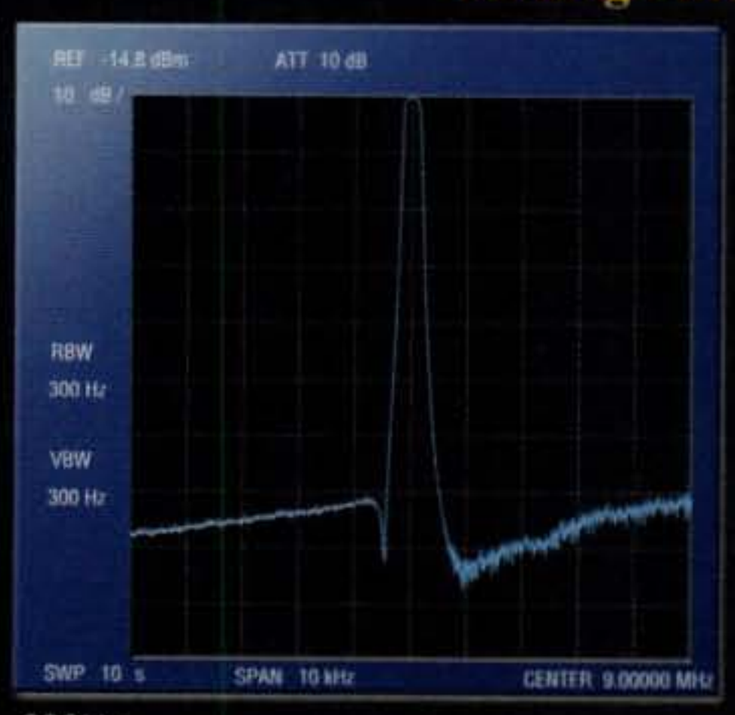
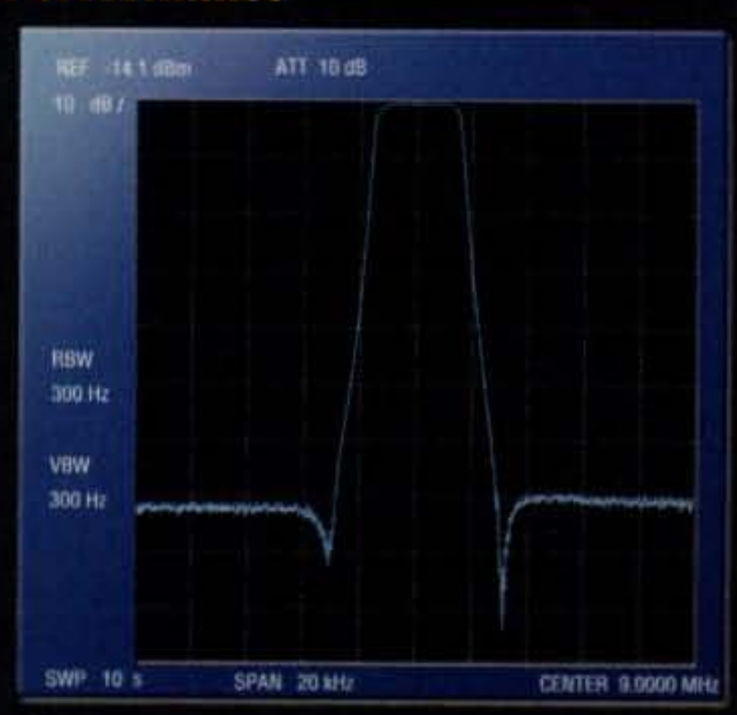


300Hz



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BY RICH MOSESON,* W2VU

Mythbusting

Myth (n): 2. a: a popular belief or tradition that has grown up around something or someone; b: an unfounded or false notion (Merriam-Webster.com)

There's a wonderful TV show on the Discovery Channel called "Mythbusters," in which the hosts put various common beliefs to the test and either confirm or refute them. On the show, this usually involves blowing things up, hurling projectiles at high speeds, or doing other visually-exciting things.

We have some ham radio myths we'd like to put to the test as well, but since we haven't yet mastered the art of blowing things up on a printed page and don't have the resources to test, say, whether an old tube-style radio, commonly called a "boatanchor," will actually keep a boat from floating away with the tide, we'll have to rely for our tests on old-fashioned concepts such as words and numbers.

Myth #1: Ham Radio is Shrinking/Dying

I've lost track of how many times we've covered this here, but this bit of misinformation simply won't go away. Various hams have been predicting the imminent end of ham radio nearly since it returned to the air after World War II. Fact: As of November 30, 2010 (the latest date for which statistics were available as this is written), there were 695,457 active amateur licenses in the FCC database, according to ah0a.org. This is the highest number ever. Period. For more analysis of our current licensing numbers, see my August 2010 editorial.

Myth #2: Ham Radio is Old-Fashioned

Even I have been guilty of this one on occasion in this age of Blackberries, Twitter, and various iThings, comparing ham radio to horseback riding or sailing, both of which continue to thrive despite their not being the most efficient means of getting from one place to another. But I was brought up short on this by my son, Dan (KC2OOM), who said: "Building your own satellites is old-fashioned? Bouncing signals off of meteor trails and the moon is old-fashioned? Software-defined radio is old-fashioned?" I learned long ago not to argue such things with my kids … especially when they're right.

Myth #3: Morse Code Usage Will Die Off Now That It's No Longer Required

It has now been four years since the FCC eliminated the Morse code testing requirement for all classes of amateur radio licenses in the United States. It was predicted by many at the time that without the license requirement, code usage would quickly drop off. Yet nearly from the beginning, we've heard reports of growing numbers of hams getting on the CW bands, operating slowly and building up their skills, and of newly-licensed hams saying they now *wanted* to learn code even though they no longer had to. Numbers of logs submitted in our CW contests have continued to grow, often setting records, and the number of stations worked in those logs has grown as well. Plus, in a fascinating analysis in this month's issue of our sister magazine, *WorldRadio Online*, columnist Randall Noon, KCØCCR, used published Field Day statistics to conclude that the number of *active* hams has increased steadily in recent years, as well as the number of active hams using CW. The number of CW QSOs reported for Field Day has grown by nearly 40,000 from 2005 to 2010! You can read his complete article by downloading the current issue of *WRO* at <http://www.worldradiomagazine.com>.

Morse code is even showing up on Twitter! When Oregon Congressman Greg Walden, who's also K7EQI, was named to chair the subcommittee whose responsibilities include overseeing the FCC, he notified his "followers" via Twitter with a short Morse code message:

.-- .. .-.. .-.. / -.-. .... .- .. .-. /
-.-. --- -- -- / .- -. -.. / - . -.-.
.... / .... .- -... / --... ...-- ... /
.-- --... . --.- ..

("Will chair comm and tech sub 73s w7eqi")

Myth #4: Electronic Confirmations Will Doom Traditional QSL Cards

The use of electronic confirmation systems for contacts—such as eQSL and the ARRL's Logbook of the World (LoTW)—keeps growing, but apparently that is not having a negative impact on the exchange of traditional QSL cards. The ARRL announced in mid-December that 2010 had seen "a dramatic increase" over 2009 in the number of cards received from members for its outgoing QSL bureau, which routes cards to hams around the world. The number of cards processed jumped 16% to more than 700,000 (and there were still two weeks left in the year). Likewise, DX cards coming to the League's incoming QSL bureaus were up significantly as well, as were DXCC award applications (up 13%).

Online confirmations may be quick and efficient for building up award credits, but QSL cards were always about much more than operating awards. They are graphic representations of the worldwide reach of our hobby. A collection of colorful QSL cards from around the world has always been among the most cherished possessions of most active hams. Apparently, it still is.

Myth #5: Hams Don't Build Anything Anymore

This one is even older that the "ham radio is dying" myth, being bandied around at club meetings, on the air, and in the magazines' letters columns nearly since commercial ham gear first came on the market in the 1930s. You'll even find a reference to it in this very issue, early on in the "Digital Connection" column. Digital Editor N2IRZ writes, "In past columns, we've established that fewer hams are building things these days." Now I don't like to disagree with our own columnists in print, but I also don't believe in censoring them because I disagree with them. But I must disagree. Our "Kit-Building" column has been an instant hit, and last summer—because people were writing this in—we added "homebrewing/kit-building" to the interests section of our reader survey reply cards. So far, we've only gotten three months' worth of responses, but they've been very consistent at 27%, 28%, and 30%. That puts it smack in the middle of the interests we list on the card, just above digital (sorry, Don). At least among *CQ* readers, building in ham radio is alive and well.

So … get on the air. Enjoy your hobby, and share the excitement. Make it your personal goal to help at least one new person get into ham radio (and get active) every year, and you can help protect our future.

73, W2VU

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

Cushcraft R8 *8-Band Vertical*

Covers 6, 10, 12, 15, 17, 20, 30, and 40 Meters!

The Cushcraft R8 is recognized as the industry gold standard for multi-band verticals, with thousands in use worldwide. Efficient, rugged, and built to withstand the test of time, the R8's unique ground-independent design has a well-earned reputation for delivering top DX results under tough conditions. Best of all, the R8 is easy to assemble, installs just about anywhere, and blends inconspicuously with urban and country settings alike.

Automatic Band Switching: The R8's famous "black box" matching network combines with traps and parallel resonators to cover 8 bands. You QSY instantly, without a tuner!

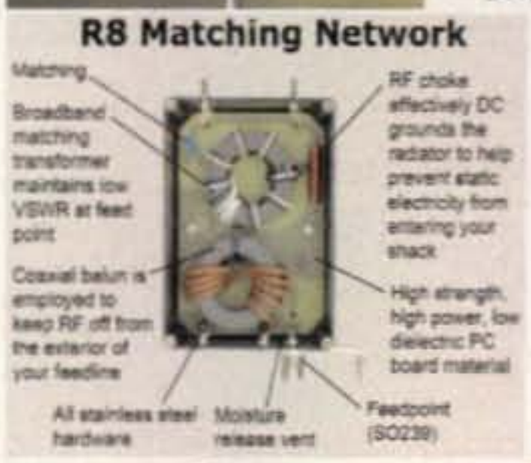
Rugged Construction: Thick fiberglass insulators, all-stainless hardware, and 6063 aircraft-aluminum tubing that is double or triple walled at key stress points handle anything Mother Nature can dish out.

Compact Footprint: Installs in an area about the size of a child's sandbox -- no ground radials to bury and all RF-energized surfaces safely out of reach.

Legal-Limit Power: Heavy-duty components are contest-proven to handle all the power your amplifier can legally deliver and radiating it as RF rather than heat.

The sunspot count is climbing and long-awaited band openings are finally becoming a reality. Now is the perfect time to discover why Cushcraft's R8 multi-band vertical is the premier choice of DX-wise hams everywhere!

R-8GK, $56.95. R-8 three-point guy kit for high winds.



MA-5B *5-Band Beam*

Small Footprint -- Big Signal

The MA-5B is one of Cushcraft's most popular HF antennas, delivering solid *signal-boosting directivity* in a bantam-weight package. Mounts on roof using standard TV hardware. Perfect for exploring exciting DX without the high cost and heavy lifting of installing a large tower and full-sized array. Its 7 foot 3-inch boom has less than 9 feet of turning radius. Contest tough -- handles 1500 Watts.

The unique MA-5B gives you 5-bands, automatic band switching and easy installation in a compact 26-pound package. On 10, 15 and 20 Meters the end elements become a two-element Yagi that delivers solid power-multiplying gain over a dipole on all three bands. On 12 and 17 Meters, the middle element is a highly efficient trap dipole. When working DX, what really matters are the interfering signals and noise you *don't hear*. That's where the MA-5B's impressive side rejection and front-to-back ratio really shines. *See* ***cushcraftamateur.com*** *for gain figures.*

Cushcraft 10, 15 & 20 Meter Tribander Beams

Only the best tri-band antennas become DX classics, which is why the Cushcraft World-Ranger A4S, A3S, and A3WS go to the head of the class. For more than 30 years, these pace-setting performers have taken on the world's most demanding operating conditions and proven themselves every time. The key to success comes from attention to basics. For example, element length and spacing has been carefully refined over time, and high-power traps are still hand-made and individually tuned using laboratory-grade instruments. All this attention to detail means low SWR, wide bandwidth, optimum directivity, and high efficiency -- important performance characteristics you rely on to maintain regular schedules, rack up impressive contest scores, and grow your collection of rare QSLs!

It goes without saying that the World-Ranger lineup is also famous for its rugged construction. In fact, the majority of these antennas sold years ago are still in service today! Conservative mechanical design, rugged over-sized components, stainless-steel hardware, and aircraft-grade 6063 make all the difference.

The 3-element A3S/A3WS and 4-element A4S are world-famous for powerhouse gain and super performance. **A-3WS, $499.95,** 12/17 M. **30/40 Meter** *add-on kits* available.

Cushcraft Dual Band Yagis

One Yagi for Dual-Band FM Radios

Dual-bander VHF rigs are the norm these days, so why not compliment your FM base station with a dual-band Yagi? Not only will you eliminate a costly feed line, you'll realize extra gain for digital modes like high-speed packet and D-Star! Cushcraft's A270-6S provides three elements per band and the A270-10S provides five for solid point-to-point performance. They're both pre-tuned and assembly is a snap using the fully illustrated manual.

Cushcraft Famous *Ringos* Compact FM Verticals

W1BX's famous *Ringo* antenna has been around for a long time and remains unbeaten for solid reliability. The Ringo is broad-banded, lighting protected, extremely rugged, economical, electrically bullet-proof, low-angle, and more -- but mainly, it just plain works! To discover why hams and commercial two-way installers around the world still love this antenna, order yours now!

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announcements

• The following special event stations are scheduled for February:

W3C, Washington County Sportsmen Show, Washington Crown Center Mall, Washington, Pennsylvania; 1200 to 1800 UTC each day, February 3–6 on 7.225 and 14.250 MHz (SSB). QSL information: Ed Oelschlager, 60 Carl Ave., B2, Eighty Four, PA 15330. Details: <http://www.wa3comarc.org >.

WA5DTK, Siege Days at the Alamo Historic Commemoration, San Antonio, Texas; February 23 through March 6 , frequencies 7.040 and 7.240 MHz; and 14.050 and 14.250 MHz. For special QSL, write to Barry Brewer, 601 Wagon Wheel Trail, Pflugerville, TX 78660.

K8BF, Sixth Annual Freeze Your Acorns Off (FYAO)QRP Station; Portage County Amateur Radio Service (PCARS) <http://www.portcars.org>, Kent, Ohio; February 19, 1500– 2300 UTC in general areas of 15, 20, 40 and 80 meters SSB, CW, and Digital. Also FM on Echolink through the KC8RKV node. Contact K8BF or the other stations signing /FYAO. Certificate available: Send QSL and large SASE to Al Atkins, KB8VJL, 12433 Chamberlain Rd., Aurora, OH 44202.

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

Jan. 29, **Desert Rats and Palm Springs DX Club Hamfest, Raffle, Winter Field Day**; Palm Springs, California. Contact Peter Reinzuch, VE7REZ, <ve7rez@desertrats.am> or Evan DeRoun, KI6WNF, <riversidecountyares@gmail.com>; <http:// www.desertrats.am>. (Talk-in 146.94— PL 107.2)

Feb. 6, **Great Hamfest of the North,** Hatillo Municipal Coliseum, Hatillo, Puerto; Caribbean Amateur Radio Club. Contact Serafin Martinez, KP4FIE: <serafinmrtnz@yahoo.com>. (Talk-in 147.21–, tone 127.3, 146.52 simplex; walk-in exams)

Feb 11–13, **Orlando HamCation**, ARRL Southeastern Division Convention, Central Florida Fairgrounds, Orlando, Florida. Information: <www.hamcation.com>; telephone 407-841-0874 (toll-free 800-214-7541); e-mail: <info@hamcation. com>; P.O. Box 547811, Orlando, FL 32854-7811 [SASE]. (Talk-in 146.76; exams Saturday) ***See Us at the CQ Booth!***

Feb. 26, **HAM-CON, Vermont's Amateur Radio Convention,** Hampton Inn Convention Center, Colchester, Vermont; The Radio Amateurs of Northern Vermont. Information: e-mail <w1sj@arrl.net>, web http://www.ranv.org>, or contact W1SJ at 802-879-6589. (Talk-in on 145.15, 146.67; exams)

• • • •

ham radio news

N6GHZ Named AMSAT Director of Launch Opportunities

Bill Ress, N6GHZ, of Camino, California, has been appointed to the new post of Director of Launch Opportunities by AMSAT President Barry Baines, WD4ASW. In this role, Bill will be the central point for managing launch opportunities for the Project Fox cubesat program as well as finding ride-sharing opportunities and representing the amateur satellite organization at small satellite conferences.

Mexican Near-Space Launch Includes Crossband Repeater

The Amateur Radio Club of the State of Guanajuato, Mexico, has staged its second high-altitude balloon launch featuring amateur radio. The SARSEM-ICARUS II mission was launched on November 20 and rose to more than 94,000 feet before beginning its descent. *Newsline* reports that it carried a crossband UHF-to-VHF repeater, which provided over 100 contacts for hams in 13 Mexican states, covering a range of more than 500 miles. The balloon also carried various sensors and a video camera transmitting live video back to the ground via amateur television on 900 MHz. The group plans a third flight sometime this year.

(from page 4)

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NEW!

AS-43A Digital Conversion Kit for your analog wattmeter. See our website for details.

Vector Network Analyzer Model VNA 2180

Measures impedance magnitude, phase and transmission parameters for antennas, filters, and discrete components - using one or two ports.

- Frequency range is 5KHz to 180MHz.
- Data plots include: impedance, SWR, return loss, S11 and S21.
- Plots can be saved for before and after comparisons.
- Dual Smith charts with zoom and rotation.
- Analog/digital I/O port for accessories.
- Native USB connectivity.

AIM 4170C Antenna Lab RF Analyzer

The AIM 4170C antenna analyzer measures the complex impedance (magnitude and phase) at each frequency of interest in the range of 5KHz to 180 MHz. A PC is used to calculate all RF parameters, including R +/-X, Magnitude and Phase, SWR, Return Loss, line loss, and more and plot the results in an easy to read graph and interactive Smith Chart.

Designed and priced for amateurs, but commercial lab-quality. Native RS-232; USB with adapter.

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IC-2820H Dual Band FM Transceiver

• D-STAR & GPS upgradeable 2M/70CM • 50/15/5W RF output levels • RX: 118-173.995, 375-549.995, 810-999.99 MHz** • Analog/digital voice with GPS (optional UT-123) • 500 alphanumeric memories

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• 100W HF/6m Transceiver, gen cov. receiver • Dual DSP 32 bit • Three roofing filters- 3, 6, 15khz • 5.8 in WQVGA TFT display • Hi-res real time spectrum scope

IC-7700 Transceiver. The Contester's Rig

• HF + 6m operation • +40dBm ultra high intercept point • IF DSP, user defined filters • 200W output power full duty cycle • Digital voice recorder

IC-2200H 2M Mobile Transceiver

• 65W Output • Optional D-STAR format digital operation & NEMA compatible GPS interface • CTCSS/DTCS encode/decode w/tone scan • 207 alphanumeric memories • Weather alert

IC-92AD Analog + Digital Dual Bander

• 2M/70CM @ 5W • Wide-band RX 495 kHz - 999.9 MHz** • 1304 alphanumeric memories • Dualwatch capability • IPX7 Submersible*** • Optional GPS speaker Mic HM-175GPS

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• 1.8-24MHz + 6M Amp • 1KW amplifier • 100% duty cycle • Compact body • Detachable controller • Automatic antenna tuner

IC-7200 HF Transceiver

• 160-10M • 100W • Simple & tough with IF DSP • AGC Loop Management • Digital IF Filter • Digital Twin PBT • Digital Noise Reduction • Digital Noise Blanker • USB Port for PC Control

ID-880H Analog + Digital Dual Bander D-STAR

• D-STAR DV mode operation • DR (D-STAR repeator) mode • Free software download • GPS A mode for easy D-PRS operation • One touch reply button (DV mode) • Wideband receiver

IC-V80 2M Handheld Transceiver

• 2M @ 5.5W • Loud BTL audio output • Military rugged • Classic 2M operation

IC-80AD Analog + Digital Dual Bander D-STAR

• D-STAR DV mode operation • DR (D-STAR repeater) mode • Free software download • GPS A mode for easy D-PRS operation

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Join Gordo for a high-frequency rig tour and learn what's new from the dozen HF radio manufacturers in their 2011 lines of equipment...

High-Frequency Transceivers

By GORDON WEST,* WB6NOA

High-frequency transceiver manufacturers forecast a banner year for ham operators getting the most dBs for the buck. "Solar Cycle 24 is taking off with a record number of hams enjoying high-frequency excitement!" comments Chip Margelli, K7JA, the new Director of Advertising Sales and Marketing for the CQ Communications family of magazines.

Our Amateur Radio Service has attracted the highest level of licensed operators, nearly 700,000 strong:

Extra Class:	122,680
Advanced Class:	59,487
General Class:	155,460
Technician Class:	341,972
Novice Class:	15,858
Total:	**695,457**

(Source: AHØA FCC database review, November 2010)

There is something for every licensed ham on the HF bands. Novice and Technician Class operators enjoy CW privileges on 80, 40, and 15 meters, plus CW and data on a portion of 10 meters, and the excitement of SSB voice from 28.300 to 28.500 MHz. There's plenty of fun for even a brand-new operator with an an HF radio.

General Class and legacy Advanced Class operators may enjoy all modes, all power, and the thrill of single sideband on portions of every high-frequency band.

MFJ-9020 single-band, 20-meter transceiver

Extra Class is granted all privileges throughout the HF bands. Of course, nearly everyone gets full privileges on 6 meters and shorter wavelengths!

There is more positive marketing news from the dozen HF manufacturers—no major price increases and high-frequency receiver performance has never been greater.

This year we look at HF equipment by price ranges:
"Twelve and Under": under $1200
"In the Teens": $1300 to $1999
"Twenty-One and Over": $2000 and up

A note about prices: The prices we list here are representative of roughly the middle of a range of "street prices" for this equipment, many of which are discounted significantly from the manufacturer's list prices. Some dealers' prices may be higher for some radios or lower for others, or may offer additional value that's not included in a sticker price. In addition, changes in exchange rates may affect the price of foreign-built gear, so use our prices for guidance only.

We also encourage you to look at the total value of what you are getting for your investment, including cost of accessories, cost of shipping, the dealer's knowledge in helping you select the rig that's best for you, help in getting started, availability of service, etc. All of these have value that goes beyond the sticker price of the transceiver.

Twelve and Under

How does $45 sound for a crystal-controlled, single-band HF QRP CW transmitter kit from Ramsey Electronics? Choose a 20-, 30-, or 40-meter model, each of which includes a VCXO circuit that lets you squeeze around several kilohertz above and below the crystal frequency. If you already have an HF shortwave receiver capable of tuning in CW, the 1-watt output literally could work the world on a budget. Also, for another $45 you can go with a Ramsey QRO amplifier with up to 20 watts out, band specific.

Plus, for just $40, Ramsey offers a superhet direct-conversion receiver kit, hot enough to pull in some real excitement on 500 kHz of the selected band of 20, 30, or 40 meters.

You want your kit for receive and transmit all in one box? Oak Hills Research has you covered with transceiver kits for 80, 40, 30, 20, and 15 meters, each covering up to 70 kHz of a single band. The Oak Hills transceiver kit puts out 5 watts, with a superhet receiver, 4-pole crystal IF filter, and a smooth VFO pot with fre-

Market Survey

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

quency index numbers on the front panel. The kit is complete with cabinet and silk-screened and masked printed circuit board. For an added $100, they'll build the first one for you! Kit prices are $150 for each band.

Another kit legend is the NorCal Wilderness Radio, which offers single and multiband low-power transceiver kits in the $200 to $350 range, with its 40-meter transceiver kit a favorite among QRPers. It offers an amazing –137 dBm receiver sensitivity and puts out 2 watts from a very stable VFO. The Sierra model uses plug-in modules to cover specific HF bands.

Nearly everyone knows MFJ equipment; the company's 120-page catalog is also an industry legend. MFJ offers a shortwave regenerative receiver kit, as well as it wired and tested, for a little under and over $100, respectively.

The most popular MFJ $200 assembled single-band stations are all set, ready for 12 volts and an antenna. The CW transceivers put out 5 watts, and the SSB single-banders put out 12 watts. The all-metal cabinet with brushed-aluminum front panel and vinyl-clad cover make this an attractive QRP setup. MFJ also has a package for a manual HF antenna tuner along with the power supply, all set for any HF band you choose. These radios can be enhanced with 10 watts of DSP audio with the bhi DSP amplifier products, from bhi and GAP Antenna Products.

Ten-Tec offers a two-band CW QRP transceiver which covers 40 and 20 meters. The bright LCD display shows frequency, mode, DC volts, S-meter, and a few other operating parameters. The transmitter puts out about 5 watts. Its powerful DDS electronic synthesizer provides general-coverage receive between 5 MHz and 16 MHz, letting you listen to SSB as well as CW.

How about an HF QRP transceiver kit that can grow? With the Elecraft K1 two-band and four-band transceiver kits ($300 and $400, respectively), you can get it on the air and then let them grow with optional features: internal automatic antenna tuner, noise blanker, internal battery adapter, backlight kit, additional band modules, special enclosures, and knobs.

Another Elecraft favorite is the $300 KX1 ultra-portable QRP transceiver kit, which comes with 20 and 40 meters standard, along with options for adding 30 and 80 meters. The kit comes with pre-assembled modular components, and most components are already mounted on their circuit boards. Like all Elecraft transceivers, the KX1 includes built-in test firmware and equipment to make board level checks quickly and easily. "Our microprocessor–based self-alignment firmware speeds up the process of getting kits on the air," comments Elecraft's Eric Swartz, WA6HHQ.

In the $600 to $700 range, things get even more exciting with Yaesu and ICOM in the picture, along with FlexRadio, which owns the market of software-defined radios (SDRs).

The $649 Flex-1500 lets your computer do the majority of the work on all high-frequency bands plus 6 meters, leading to an impressive 80+ dB dynamic range at close-in (2-kHz spacing. The little box itself generates the 5 watts output, and that's plenty to work all over the world. Of course, if your home computer uses a large color LCD display, you can present a waterfall of band activity that becomes quite impressive when looking to see where the activity is hiding.

Next, around $610 will get you the utility of the battery-operated Yaesu FT-817 ND. The "817" offers continuous HF coverage from 100 kHz up, including all HF ham bands, plus transmit on 6 meters, 2 meters, and 440 MHz, multi-mode! I use the 817 for tracking down noise aboard ships and vehicles; since it is all-band and all-mode and all-portable, it is the ultimate "sniffer" for both noise and QRP DX!

ICOM comes in with its IC-718, a 100-watt HF transceiver that will also do the five 60-meter USB channels with a straightforward but delicate diode-ectomy. DSP for receive is built in, and the receiver is plenty tight for contest work. Its non-adjustable automatic limiting control keeps voice power output in constant check, so don't get concerned if your in-line wattmeter doesn't peg at 100 watts PEP. It sounds strong on the air, and ICOM now owns the distinction of the lowest priced continuous-receive HF rig on the market.

Alinco's DX-SR8T

Near this same "in the 600s" category is the Yaesu FT-450AT, 100 watts on HF and 6 meters, but a price breakthrough because of its built-in automatic antenna tuner, which will handle modest tuning excursions if you are trying to load up an off-center-fed Windom or similar antenna. The 450 has a fascinating thin film transistor (TFT) LCD display with a jet-black background and crisp white LCD characters. Digital signal processing is in the IF stage, along with digital noise reduction, IF width, and digital microphone equalization. The main tuning knob is petite—better for grabbing with your fingers than taking a big spin.

Topping out the high 600s is the new Alinco DX-SR8T transceiver, the lowest-priced HF radio with a detachable front panel. "Users enjoy the rig's simplicity, no complicated instruction manual, large bright display characters that can easily be read in bright direct sunlight, great-sounding transmit audio, and a front-facing speaker so audio is not lost in your vehicle's carpet," comment Wayne Wilson, WR5S, with GRE/Alinco. GRE, the scanner radio folks, have taken over the North American distribution of Alinco products. This is a new rig for both Alinco and GRE. Let's see if it garners a following.

Here comes Elecraft again with its K2/100 HF transceiver kit. The K2 is a full-featured HF transceiver, priced just under $700, with two VFOs with multiple memories, split TX/RX operation, full break-in CW, memory keyer, and IF crystal fil-

The Elecraft K2/100

Fly with the EAGLE risk-free for 30 days

HEAR MORE STATIONS. MORE CLEARLY. GUARANTEED.

Introducing the Ten-Tec Eagle – the world's first *Advanced Signal Reception™* Down Conversion HF Transceiver

ASR opens up the airwaves for you
Advanced Signal Reception™ [ASR™] will change forever your ham radio experience. You'll hear more stations, more clearly. You'll have more reliable communications. And your ham radio hobby will be more rewarding than ever.

High performance in a compact package
The new Ten-Tec Eagle is a high-performance HF +6 transceiver with a host of features. The Eagle's small 2.9 x 8.5 x 10.25-inch case (HxWxD) makes it the perfect multi-use radio – use it at home or take it on the road in your car or RV. State-of-the-art Digital Signal Processing chips and proprietary circuits insure maximum transmit and receive performance. According to many reviewers, the Eagle can outperform transceivers costing two to three times as much. See our web site for specifications.

HDTV, Blu-Ray, & ASR
You've seen the improvement HDTV brought to television, you've seen the improvement Blu-Ray brought to DVDs – now it's time to take a look at what Advanced Signal Reception is bringing to ham radio.

Fly with the Eagle risk-free for 30 days
The good news is that it couldn't be easier to be the first on the block to test fly the Eagle ASR transceiver. Here's what to do. Order the Eagle (financing available). Test it for 30 days in your home, shack, car, or club. Compare it to any other amateur radio you or your friends have used. If you do not agree that the Eagle ASR transceiver enables you to hear more stations, more clearly than ever before, simply return the Eagle to us for a full refund of your purchase price. And there's more good news for you "early birds".

The Eagle Early Bird Special
When you order your new Eagle Advanced Signal Reception transceiver, we will include at no additional charge a new Ten-Tec Model 709A desk microphone & stand. **(Our supplies of the microphones are limited, so you will want to order early.)** The microphone and stand are yours to keep – even if you decide to return the radio.

Order Hotline
800-833-7373
or mail the coupon below to take advantage of the Eagle Early Bird special.
Microphone supplies are limited.

I would like to take advantage of your Eagle Early Bird Special. I am placing my order for the new Eagle Advanced Signal Reception transceiver and I would like to receive the free desk microphone and stand.

Name: _____
Address: _____
City, State: _____

Call me to discuss shipping & payment details.
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tering, all assembled by you with completed board modules.

The basic radio comes with low power output, and to boost power to 100 watts you'll need the $400 PA (power amplifier) assembly with serial interface. You can add another $100 for SSB operation, and a host of other great options directly from the manufacturer. You order Elecraft equipment direct and get direct factory attention!

In the mid $700s is the Yaesu 857D, HF plus VHF and UHF, multimode go-anywhere radio, with detachable head. Most dealers include the separation cable as part of their package. The 857D has become a favorite due to the ATAS-120A mobile antenna with full automatic tuning. Just push a button and the Yaesu antenna finds the match from 40 meters and up, including 50, 144, and 430 MHz.

The 857D now includes the five channels for 60 meters, and a built-in DSP unit features a 24-bit high-tech D/A chip for signal processing, along with DSP bandpass filters, DSP auto-notch filter, DSP noise reduction, and a DSP-driven four-position microphone equalizer circuit (Did we mention the DSP?). It features 100 watts on HF and 6 meters; 50 watts on 2 meters, including SSB; and 20 watts on 70 cm, including 432 MHz SSB.

Yaesu, in the mid $800s, continues with its popular FT-897D, a physically larger HF/VHF/UHF all-mode transceiver without a detachable head. However, the FT-897D can take optional internal batteries, and with Yaesu's external battery-charger circuit, it could allow you to go fully portable with 20 watts output. When I took this radio to Christmas Island (T32GW), I opted for a pair of external 7-amp-hour gel-cel batteries, and I found I could run QSOs at 100 watts out for around three hours when playing in the back country.

Speaking of rugged, at just above $1000 is a "Rambo" radio from ICOM America, model IC-7200. This radio simply *looks* tough, offering 100 watts on HF and 6 meters. It has plenty of digital circuits inside, eliminating the need for optional CW and SSB filters. Features include digital twin pass-band tuning, manual notch filter, digital noise reduction, and digital noise blanker. This radio can accept PC control through its USB port, so it might be that perfect rig for a clandestine operation, or one that will certainly garner Field Day oohs and aahs just because of its "Rambo" look.

Just above the $1000 mark is Kenwood with a continuation of its popular TS-480 HF series, where the head is remote from the body. I use the 480 in class up against rigs twice its size, and it holds its own with ease! One model offers 200 watts output, with 100 watts on 6 meters, and the other model gives 100 watts on HF and 6 meters, with built-in automatic antenna tuning.

The 480 receiver is spectacular, featuring a quad-mixer that provides receive dynamic range comparable to my old TS-950, along with PSK-31 compatibility, packet-cluster tune, PC-based control, and optional filters for IF.

ICOM has exhausted the supply of its IC-706 (and will not be building any more), but tells me the IC-7000 is a much better deal, priced in the mid $1200s. The IC-7000 is the same size as the older 706, but offers the exciting Thin Film Transistor (TFT) color display, along with 500 memories. It covers high frequency, 6 meters, 2 meters multimode, and 70 cm multimode. If you're trading out your 706 for a new 7000, you will need to replace the control-head cable. The 7000 cable is different.

On the air, the IC-7000 offers digital IF filters, dual manual notch filters, digital voice recorder, and an internal memory keyer. The noise blanker on the 7000 is awesome—100 digital steps! If you plan to add the Heil headset, there are transmit audio-equalization capabilities, too. You can even adjust the width of your SSB transmit bandwidth with the 7000. The 7000 offers a big-screen option, with a composite video output that can go to any monitor with a yellow input port.

Our last radio seen as "Twelve and Under" is the $1254 Yaesu FT-950 big base. This one really doesn't go in the car, as it is physically *large*. The FT-950 has a triple-conversion receiver, eight bandpass filters in the RF stage, first IF 3-kHz roofing filter, and digital PLL for rock-solid performance. This is a contest HF base, with built-in automatic antenna tuner, five voice-messaging memories, and that large, multi-color, vacuum fluorescent display.

Yaesu tells me much of the 950 innards are similar to those of the FT-DX 9000, yet it carries on the proud tradition of the FT-1000.

If your radio budget is less than $1300, the manufacturers have you well covered!

In the Teens

"Imagine our Kenwood TS-2000 series to be in an HF/VHF/UHF class by itself, not matched by the competition, after nearly 11 years on the market!" comments Phil Parton, N4DRO, of Kenwood USA. Multiple models of the "2000" are available, such as the "black box version" for computer control, or with the optional RC-2000 mobile controller for a small mobile footprint. You can also get the works with the regular TS-2000, offering HF, 6 meters, 2 meters, 440 MHz, and an optional 1200 MHz all-mode band unit.

With the 2000 the digital signal processing on the main band is in the intermediate-frequency circuit to provide precision filtering and interference reduction. Two 16-bit DSP chips, double-precision computing, and a 100-MHz speed CPU, plus 24-bit A/D and D/A converters, allow lightning-speed capability. There's also a built-in TNC for accessing the DX Packet Cluster.

I run my unit in the FCC-permitted Sky Command 2 Plus mode, allowing me to talk on 40 meters while sitting on the beach with my D-7 or D-72 handheld or in the mobile with the D-700 or D-710. Pricing starts at around $1450.

At $1499 is the Elecraft K3 high-performance transceiver kit covering 160 through 2 meters (with the company's new K-144XV option). Of course, the option raises the price, but so does that wonderful Elecraft thin-film transistor color band scope!

The K3 starts out under $1500 as the K3/10 ten-watt transceiver kit, where you are assembling modules rather than laboriously stuffing the boards with micro components. If you want the factory-assembled K3 Elecraft, it's only a couple of hundred dollars more at $1699. If you want the 100-watt version of the K3, you'll be around the two-grand area.

Once you are on the air with the K3, you can continue to grow this legend with accessory modules you install yourself. You can add an internal automatic antenna tuner, a second high-performance sub-receiver, the 2-meter multimode kit, a TCXO for digital work, receive bandpass modules, the legendary P3-F DSP panadaptor for the K3, fully assembled, GaAsfet preamps . . . That's the fun of Elecraft equipment; you get it on the air and let your station grow!

Another great U.S.-made, mid-range HF transceiver comes from Ten-Tec—the Jupiter. The Jupiter offers 100 watts out, optional built-in automatic antenna tuner, and a receiver that offers 39 IF DSP receive filters, 25 choices from 1050–8000 Hz for voice modes, and 14 more for 150 to 900 Hz for digital and CW modes. The Ten-Tec Jupiter also offers 18 different DSP-generated transmit bandwidths, from 900 Hz to

FlexRadio's Flex-3000

3900 Hz, and in the heart of the Jupiter, its processing is stored in Flash ROM.

The new large, multifunction blue/gray LCD graphic panel gives you a clear look at all that's going on out on the airwaves, as well as inside the Jupiter, plus CW decode of received computer-generated CW! The Jupiter is $1595, and with the automatic tuner built in is $1895.

Another 100-watt transceiver comes from FlexRadio—the totally software-defined Flex-3000, HF plus 6 meters, with the tiny hardware containing a built-in automatic tuner and producing 100 watts output. It weighs only 7 pounds, working with your computer and its screen for outstanding digital performance. After all, it is nearly totally digital as a software-defined radio. The Flex-3000 is a direct descendant of the Flex-5000, where new features are easily uploaded as software updates from the internet, thanks to FlexRadio's Power SDR software. This offers versatility, flexibility, and immunity to obsolescence! A single $13.94 FireWire™ is your connection to your computer, suited for the multiple full-duplex data streams necessary to achieve all the capabilities of a true software-defined radio.

Back to Ten-Tec is the Eagle at $1795 directly from the manufacturer. There aren't very many controls on the front panel, but there is plenty inside to back up the analog portion of the radio's double-conversion receiver with IF frequencies of 9.0015 MHz and 22.5 kHz, with third conversion to zero-frequency IF accomplished in the DSP processor. The Eagle offers a combination of DSP and selectable roofing-filter options to tailor reception. Crystal ladder filters eliminate undesirable signals from entering the receiver's first IF stage.

The Eagle's noise blanker offers 320 optional settings to track down and nail almost any type of mobile interference. The Eagle covers 10 HF ham bands plus 6 meters, with generalcoverage receive. Power out is 100 watts.

Our last transceiver priced in the teens is brand new from Kenwood, the TS-590S, HF plus 6 meters, 100 watts output. Sized like the earlier 570, the new TS-590 employs down-conversion for the first IF, having the first IF roofing filter—6 kHz bandwidth—directly after the mixer. The second roofing filter, 500 Hz and 2.7 kHz bandwidth, is a 6-pole MCF, zeroing in on the signal while canceling out any QRM above and below the desired frequency. Digital IF filters for detection and demodulation, plus noise reduction and IF notch, all take advantage of the 32-bit floating-point DSP.

When you spin the big tuning knob on the busy 20-meter band, you can quickly hear the "sharpness" of reception and the immediate fall off of interference as you settle in on the signal you want.

A built-in automatic antenna tuner is very liberal in tuning a variety of balanced antenna systems, including a G5RV that not many autotuners would touch. You can also remote control the 590 with your computer using ARCP 590 radio-control software. This Kenwood holds 110 memory channels, including specified ranges for the visually impaired, plus multiple scan functions. But its most impressive features are its price and contest big-rig features.

21 and Over

We will finish off with "the big boys" in alphabetical order.

Regarding DZKit, "Our DZKit is bringing back the tradition and fun of building complex kits. And our motto is that we will make sure you succeed with the 40 hours that go into (building a) hundred-watt 'Sienna'," comments Brian, WØDZ. His Sienna kit covers 10 kHz through 30 MHz and may cost from $1200 to $4000, depending on how it is configured. The typical 100-watt model with front panel, but without internal PC, starts at $3000. You can also start with a PC-controlled receiver for $1200, and add DZKit modules as your budget allows.

The Sienna is the only high-end kit for which soldering is required. It is also the only one with an optional built-in PC for which an external computer is not required. However, the Sienna is not a software defined radio; it uses analog triple-conversion architecture on receive, and a completely separate transmitter, allowing full-duplex operation.

The all-software-defined Flex-5000 offers HF plus 6 meters (optional internal transverter can add 2 m and 70 cm). It offers a 99-dB dynamic-range receiver, optional second receiver, optional VHF/UHF modules, optional automatic tuner, 100 watts out, and is under $3000, with the options adding up. You provide the computer. One benefit of the Flex radios is that the operating soft-

The Ten-Tec Eagle

Kenwood TS-590S

ware is constantly being refined and updated, so your radio is always up-to-date after a simple download of revised software.

The Hilberling PT-8000 was quite a radio to see at the Dayton Hamvention® last year. German engineering behind this HF/VHF transceiver rates it at a cool 600-watt output (model B) covering all ham bands from 160 meters through 2 meters. It has two independent receivers, transverter capability up to X band (10 GHz), automatic front-end pre-selector and band pass filters, three roofing filters, and, of course, RX and TX DSP equalization.

Also at last year's Dayton, ICOM America previewed its new IC-9100 HF plus 6 and 2 meters, 70 cm, and the 1.2-GHz module, inside a tamper-proof Plexiglas® chamber. It's a heavyweight, nearly 25 lbs, but is reported to take all the successes from previous HF plus VHF/UHF weak-signal and satellite transceivers, with everything now in one nice neat package. An optional D-STAR module for the IC-9100 gets you into this digital mode, too. Optional 3-kHz and 6-kHz first-IF roofing filters top this rig out for serious DX work.

If you are not into satellites or VHF/UHF weak-signal work, but are a dedicated HF DXer with 200 lbs. of aluminum up 100 feet, then consider the ICOM IC-7600, 7700, or 7800 DX machines – priced at $3650, $6640, and $11,900, respectively, all with IF DSP.

The IC-7600 inherits the latest DSP technologies designed for the more expensive 7700 and 7800. It has 100 watts out with DSP equalization for transmit audio, built-in automatic tuner, HF through 6 meters, and three first-IF roofing filters. The 7600 TFT display with long-life LED backlighting is so sharp it looks like a high-definition freeze photo—until you watch the band scope zing into action. There's also built-in RTTY and phase shift keying (PSK) operation from your USB keyboard. No computer needed! Plus, the 7600 offers digital voice memory for incoming and outgoing chatter, triple band-stacking register, and twin displays for same-band dual-watch.

The IC-7700 offers 200 watts out on HF, including a dedicated 6-meter receiver, USB ports on the front panel, every DSP option possible for a rig this size, and the AC power supply is built in. And yes, the IC-7700 offers you an output for a movie-theatre-size color display of the real-time spectrum scope on the rig's front display!

Top-of-the-line for ICOM America is the IC-7800, weighing in a little heavier than the 7700 at 55 lbs! Yes, the power supply is built in here, too. It features HF plus 6 meters, 200 watts out, built-in automatic tuner, and two completely independent receiver circuits, each with digital IF filters and manual notch-filter tuning.

For CW operators, the DSP CW keying circuit allows you to shape your waveform. Of course, there's a built-in keyer. The colorful real-time spectrum scope allows you to instantly capture any station up or down the band.

If you have a chance, find a 7800 live, and spend the best hour you've ever had in front of the ultimate ham radio!

At Ten-Tec, the OMNI VII with built-in automatic antenna tuner comes in just under $3000, but hey, no PC required at the rig to operate remote. Just locate the OMNI VII at any spot where you have wideband internet access, and simply connect its built-in ethernet port to the router with a single connection. Now head out on your business trip and play radio from your hotel.

The OMNI VII offers HF plus 6 meters, 100 watts out, continuous HF receive, dual VFOs, and that fabulous Ten-Tec full-function color LCD display with CFL (cold cathode fluorescent) backlight. The OMNI uses only one level of menu to allow the operator to easily change operation functions, without needing to delve into multi-level keystrokes.

Top-of-the-line from Ten-Tec is the Orion II, with that ultra-bright thin-film transistor color display and the leg-

The DZKit Sienna

Hilberling PT-8000

The ICOM IC-9100

HF Transceivers

Make/Model	DC or AC	Bands	Power Out (watts)	RX Circuitry	Mem. Chs.	External Display	DSP	Roofing Filters	Spectrum Scope	Tuner	Weight (lbs.)	Seen Selling at
Alinco/GRE												
DX-SR8T	DC	All HF	100	Dual	100	Opt. Rmt. Head	—	—	—	Opt. Ext.	8	$649
DZKit												
Sienna	DC	All HF	10 + Opt.	Triple	137	—	IF	Yes	Opt.	Opt.	10	$2700+
Elecraft												
R4020	Int. Batt.	20 & 40	5	Dual	20	—	—	—	—	—	1	$349
K1	DC	Up to 4	5	Dual	VFO	—	—	—	—	—	1	$399+
KX1	DC	20, 30, 40	4	Dual	VFO	—	AF	—	—	—	1	$279
K2	Int. Batt. 12V	All HF	10 & 100	Dual	10	—	IF	—	—	—	1	$700
K3	DC	All HF	10 & 100	Dual	VFO	—	IF	—	—	—	3	$1949
FlexRadio												
1500 QRP	DC	HF + 6	5	SDR	Unlimited	Computer	Yes	Yes	Real Time	Opt.	2	$649
3000	DC	HF + 6	100	SDR	Unlimited	Computer	Yes	Yes	Real Time	Opt.	3	$1699
5000	DC	HF + 6	100	SDR	Unlimited	Computer	Yes	Yes	Real Time	Opt.	4	$2799
Hilberling												
PT-8000	AC	HF++	10–600	Triple	1000+	Computer	IF	Yes	Yes	Int.	30	$20,000+
ICOM												
IC-718	DC	HF	100	Dual	106	—	AF	—	—	Opt. Ext.	8	$600
IC-7200	DC	HF	100	Dual	106	—	IF	—	—	Opt. Ext.	12	$1029
IC-7000	DC	HF/VHF/UHF	100/50/35	Triple	500	Opt. Rmt. Head & Comp.	IF	—	Sweep	Opt. Ext.	5	$1229
IC-7410	DC	160–6	100	Dual	N/A	—	IF	15 kHz (6/3 kHz Opt)	Sweep	Int.	N/A	N/A
IC-7600	DC	HF + 6	100	Dual	101+	—	IF	Yes	Real Time	Int.	22	$3649
IC-7700	AC Int.	HF + 6	200	Dual	101+	Ext. VGA	IF	Yes	Real Time	Int	52	$6639
IC-7800	AC Int.	HF + 6	200	Dual	101+	Ext. VGA	IF	Yes	Real Time	Int.	55	$11,899
IC-9100	Ext. DC	HF/6/VHF/UHF	100 HF-2m	Dual	444	—	IF	Yes	Sweep	HF & 6m	24	$4000
Kenwood												
TS-480	DC	HF + 6	100/200	Dual	100	Rmt. Head	AF	—	—	Int.	8	$1054
TS-2000	DC	HF/6/VHF/UHF+	100	Quad	300	Opt. Rmt. Head	IF	—	—	Int.	17	$1454
TS-590	DC	HF + 6	100	Dual	110	—	IF	Yes	—	Int.	16	$1779
MFJ												
94-xx	DC	Single	12	Dual	VFO	—	—	—	—	Opt. Ext.	2	$259
90-xx	DC	Single	5	Dual	VFO	—	—	—	—	Opt. Ext.	2	$209
NorCal (Wilderness)												
40A	DC	1 (40 CW)	2	Single	VXFO	—	—	—	—	—	2	$185
Oak Hills Research												
OHR 100	DC	Single	5	Single	VFO	—	—	—	—	—	2	$149
Ramsey Electronics												
QRP TX	DC	Single	1	None	VCXO	—	—	—	—	—	1	$40
HR RX	DC	Single	None	Single	VCXO	—	—	—	—	—	1	$45
AMP	DC	Single	20	None	—	—	—	—	—	—	1	$45
Ten-Tec												
QRP CW	DC	2	5	Single	20	—	—	—	—	—	1	$249
Jupiter	DC	HF	100	Dual+	100+	—	IF	Yes	Real Time	—	11	$1595
Eagle	DC	HF + 6	100	Triple "ASR"	100+	—	IF	Yes	Real Time	—	14	$1795
OMNI VII	DC	HF + 6	100	Dual+	100+	Internet	IF	Yes	Real Time	—	15	$2700
Orion II	DC	HF	100	Dual+	100+	—	IF	Yes	Real Time	—	20	$4295
Yaesu												
FT-817	Batt./DC	HF/6/VHF/UHF	5	Dual	208	—	AF	—	—	Opt. Ext.	2.5	$609
FT-857	DC	HF/6/VHF/UHF	100	Dual	200	—	AF	—	—	O[t. Ext.	5	$859
FT-897	Batt./DC	HF/6/VHF/UHF	100	Dual	200	—	AF	—	—	Opt. Ext.	8	$869
FT-450AT	DC	HF + 6	100	Dual	500	—	IF	—	—	Int.	8	$689
FT-950	DC	HF + 6	100	Triple	100+	Opt.	IF	Yes	Opt.DMU Real Time	Int.	21	$1354
FT-2000	AC/DC	HF + 6	100/200	Triple	100+	Opt.	IF	Yes	Opt.DMU Real Time	Int.	33	$2299+
FT-DX 5000	AC	HF + 6	200	Dual Quad	100+	Opt.	IF	Yes	Opt.DMU Real Time	Int.	46	$4999+
FT-DX 9000 Contest	AC	HF + 6	200/400	Triple	400	Opt.	IF	Yes	Opt.DMU Real Time	Int.	53	$5154+

Yaesu's FT-DX 5000

endary Ten-Tec receiver with roofing filters, DSP in the IF, 32-bit ADI SHARC processors, continuous real-time spectrum scope and a separate second receiver! The main receiver offers ham-band pass-band filtering using both crystal and IF DSP filter networks. In the sub-receiver, the filtering is DSP and covers 500 kHz to 30 MHz. The receivers are independent, so you can monitor one band for DX openings while working stations on the other band. The receivers can also dial in to the same signal with separate antennas for diversity reception, and you can program different AGC levels into each of them. I enjoyed the Orion's panoramic stereo receive function: As you dial through the bands, you hear the signals move from one side of the headphone to the other. You can view a sample of this at the Ten-Tec website.

Yaesu's "Over 21" lineup includes the FT-2000, the new FT-DX 5000, and the majestic heavyweight FT-DX 9000, priced respectively at $2279, $4949, and above 10 grand for the 9000 series, all with DSP in the IF. Both the 5000 and the 9000 have three versions, adding to these basic prices.

The FT-2000 can be brought in with either 100 watts or 200 watts of power out, 160 meters through 6 meters, a crystal-clear analog multimeter, and dual receive on the same band. The Yaesu "variable RF tuning" preselector automatically tightens up receive on the selected band. First-IF roofing filters will help minimize buckshot from a strong station nearby (providing *its* transmitter is as clean as this one!)

Have a whistle? You can manually notch it, or let the automatic digital notch filter take it out in a second—with digital-signal-processing digital noise reduction containing 16 different noise analysis parameters to help minimize power-line hash from creeping in.

You will love the over-size main tuning dial; an inside adjustment allows you to create just the drag you want. The optional digital management unit gives you a big-screen spectrum scope along with an audioscope/oscilloscope display setting. You can even track any SWR. The power supply is built-in.

The FT-DX 5000 also keeps the important S-meter/multi-function meter analog for those of us who appreciate this type of meter movement. The 5000 can be brought in with or without that sleek station monitor that sits on top of the unit, and it contains full-fidelity forward-facing stereo speakers. You can keep track of many of your settings by just looking at the color display; it keeps track of how you are tuning in DX.

The 5000 runs 200 watts output with its built-in AC power supply, and two independent receivers keep track of two different bands. Of course, there are roofing filters, a variable CW audio peak filter, and multiple antenna jacks on the back where each VFO and memory channel remembers the antenna settings.

Finally, the Yaesu FT-DX 9000 is available in three configurations with the 200-watt versions building in the switching AC power supply. If you want 400 watts out, the external supply with twin speakers gives you a power boost to help crack that DX without the need for an external amplifier.

All three versions of the 9000 offer HF plus 6 meters, selectable 15-kHz/6-kHz/3-kHz roofing filters, and a three-band parametric mic equalizer, as well as the clean, thin-film transistor display, along with my favorite analog meters, including those for the independent second receiver. Various configurations take the right side of the radio and turn it into a large-display tube of operating parameters. The TFT display is half a foot of operating information, including gray-line readout. Fully loaded, the FT-DX 9000 can weigh up to 65 lbs.

Play Radio!

Make a hands-on decision if at all possible. If you have a ham store nearby, spend some time in front of the working HF radios to get the "feel" of the simplicity or complexity of operation. Eyeball the displays, and listen to the performance when the band is hopping with DX and pile-ups.

Another option is to go to a ham radio convention to get some hands-on time with the gear. All of these manufacturers *encourage* playing with the dials and spinning the knob to get to know their radios at the shows. There is no such thing as a "do not touch" at the ham shows with HF gear on display.

Another choice is to find a ham in your club who may have the piece of equipment you are considering. Most hams will welcome a fellow ham who wants to visit and get familiar with their big piece of HF gear. After all, we are hams, and we like to "show off" our latest hardware.

This is a great year for a new HF radio, whether you are selecting a rig "under 12," a radio mid-priced "in the teens," or going for the contest station "21 and up" category. I hope to hear you on the air on HF soon!

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YAESU FTM-350AR

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Mystery Boatanchor Followup
(and a little "Oops…")

Our November 2010 issue carried an article by Dennis Lazar, W4DNN, entitled "Mystery Boatanchors, War Stories, and the Viet Nam QRP Crow," in which the "mystery boatanchor" was a Heathkit DX-40 transmitter with an additional inscription on it of "Sperry R&D 5100." Author W4DNN, who picked up the rig at a flea market, wondered about its history.

Several readers caught a couple of typos in model numbers (but added to the confusion in the process), and one was able to shed at least a little light on the more recent history of the DX-40 in question. First to the typos…

W4DNN's original photo A showed the DX-40 with the "Sperry R&D" inscription. Note the plastic-cased meter and the "standby" position on the mode switch, both of which differentiate it from the DX-35.

Reader Rod Hogg, KØEQH, wrote:

Got my November 2010 issue today, very nice, great articles, some neat vintage radio stories. But... whoops, a couple of errors. The article by Dennis, W4DNN, has some either misquotes or typos.

Page 29, the black and white photo, photo B, shows author and notes his "DX-40" in the picture. That is NOT a DX-40, but looks very much like it is a DX-20! Note the metal Shurite meter and center knob below meter, and lacks the rotary switches at bottom.

Page 30, photo D, states, "a 1945 Hammarlund HQ125X receiver…" There was NOT an HQ125 that I know of, am sure it should read "HQ-129X."

Interesting issue, some good technical data along with operation stories. Keep 'em coming.

Reader Al Dolgosh, K8EUR, caught the same typo on the Heathkit model number but came to a different conclusion:

Nice article! It brings back a lot of memories.

One of the memories is that the DX-35 had a black metal-cased meter on the front panel while the DX-40 had a plastic meter case. I built a DX-35 in 1957 as my first "commercial" (not homebrew) transmitter. It appears that the Heathkit in the K8TSQ photo from 1960 is a DX-35, not a DX-40. Did the young editor mess that one up?

Mike O'Brien, KØMYW, also caught the error in the Hammarlund model number, plus one on the National receiver seen in photo D:

I truly enjoyed your article in the November 2010 issue of CQ magazine. However, as I'm sure you know, there are a couple of typos in the article regarding the model numbers of some of the vintage gear you describe. It's a Hammarlund HQ-129X, not HQ-126X as it appears on page 28. And that little ol' National novice receiver is an SW-54, not SW-24.

I am confident that you know the above (the errors probably were the result of editing, not your original manuscript). I'm not sure that the CQ editors will think those typos worthy of printing a correction in a future issue, but it would be nice if they did.

Again, I enjoyed your article and am grateful you took the time to write it.

Charles Brody, W2ZBK, also caught the typos and pointed out that the correct model numbers are right on the rigs' front panels, although he did concede that "you might need a magnifier." He said he owned both rigs in his early days.

Author W4DNN replied:

Wow, can't get anything past the sharp-eyed readers of CQ. I am tempted to say that I put those typos in on purpose to learn if anyone was reading the article but, sadly, these errors were in the original manuscript. I studied the old '60s photo again and there it is, a knob right in the middle of the "DX-40" panel, making it in reality a DX-20! I had forgotten that I had a Heathkit AT-1, then a DX-20, and then a DX-40. Lots of swapping going on back in those days. Thanks for the feedback.

But what about the DX-35? To clarify, we consulted the authoritative *Heathkit: A Guide to the Amateur Radio Products, 2nd Edition,* by Chuck Penson, WA7ZZE. Here, briefly, are the differences between the three rigs in question:

The DX-20 (which is the rig shown in photo B of Dennis's article) and the DX-35 both had the black iron vane meter seen in that old photo, while the DX-40 (photo A) had a plastic-cased D'Arsonval-type meter. In addition, the

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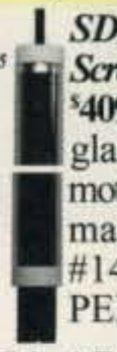
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Dennis's photo B, from 1960, shows a DX-20 in his shack at the time, notable by the two dials in the center as well as the metal-cased meter.

Correct model numbers on the rigs on the left-hand side of W4DNN's photo D are National SW-54 (top shelf) and Hammarlund HQ-129X (center shelf), along with the subject DX-40 on the bottom shelf.

DX-20, a CW-only transmitter, had a bandswitch knob in the center, just below the meter, as well as a variable "loading" control below the bandswitch.

The DX-35 added AM capability and lost the loading control (but added a red "drive" dial, which is also seen on the DX-40), and moved the bandswitch to the bottom of the front panel, just right of center, across from the power/mode switch (Off, CW, Standby, Phone). In addition, the Heathkit logo moved from the upper right of the front panel to the center, just below the meter.

The DX-40 had the same basic front-panel layout as the DX-35 but replaced the metal-cased meter with a plastic-cased one, as noted above, and the power/mode switch included a "tune" position (Off, Tune, Standby, Phone, CW). The rig in Dennis's 1960 photo was definitely a DX-20.

The writers are also correct about the receiver models. The Hammarlund was an HQ-129X and the National was an SW-54 (and your editor is flattered that K8EUR thinks he's still young!).

Unraveling (Part of) the Mystery

The best letter Dennis received, though, came from Dale Schutt, K4HVR:

Dennis,

I opened my latest edition of CQ and there, lo and behold, is the DX-40 I sold you at the hamfest. My friend Emil, WA4FYA, sold it to you out of my booth while I was out walking.

The DX-40 came from an estate sale of Don Gies, K4GIT (his son Charles now has that call), of Melrose, FL. He formerly lived in Jacksonville and somewhere around Miami. Don was not one to carve up equipment with his call sign or anything else, so I believe he picked it up along the way...

Don inherited some stuff from another estate sale and that ham always marked up his manuals with "Sparky," usually in bold felt marker. The penmanship looks familiar with SPERRY, but can't be sure.

I also have a DX-40 and the VF-1 that I had on the air a couple of years ago. It brought back a lot of memories from years ago in my Novice days as KN8JIJ when I built and used one. It was like getting a new car. My first commercial transmitter and I got to build it. Lots of DX on 15m CW.

Thanks for the picture in CQ, Dennis.

73, Dale, K4HVR

So now we know the rig's recent history … but the "Sperry R&D" marking remains a mystery!

Final Word from W4DNN

As we put together this followup, we ran everything past author W4DNN, who commented that maybe mistakes like this aren't always bad:

"I'm sure glad I made those errors," he wrote in an e-mail. "I've been hearing from local hams via repeater and eyeball about those mistakes. It has really opened up a great dialog, because it seems that nearly every ham has had one of those Heathkit transmitters in his distant past. Many still have them on the shelves. If everything was correct, I doubt if we'd have gotten the feedback. One ham here, Al Romanosky, KB3U, commented that he felt like he was reading a Thurberesque story and enjoyed the humor. What a compliment!"

Our thanks to all of our eagle-eyed readers who help keep *CQ* a running conversation among writers, readers, and editors.

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Results of the 2010 CQ WW VHF Contest

BY JOHN LINDHOLM,* W1XX

What is the purpose of a VHF Contest? That is a thread that drew many comments from the Contest Quahogs of Rhode Island (CQRI) on the infamous Quahog Reflector following the 2010 CQ WW VHF Contest of July 17–18. Here's a synopsis of some major points of focus.

Why Contest?

VHF contesting is somewhat different from that on HF in that a major purpose is to simply provide QSOs. Selecting the right band/mode, one can generate a QSO on HF almost any time of day or night. Not so on VHF. In most areas there are long lapses of dead silence. The higher up in frequency you go, the more true this is. On 6 meters we tend to look for openings over longer distances. It's the natural tendency to engage in DXing. Given reasonable propagation conditions, the VHF contest enhances the possibility of making contacts, as everyone is alerted to be on the air at the same time.

The term *contest*, however, implies competition. The CQ WW VHF Contest does indeed promote competition. The true dyed-in-the-wool contester ekes out every QSO possible utilizing all the skills that have been learned in previous contests. Maximizing your score is the objective. In that respect these folks are quite similar to their HF brethren. Their efforts are applauded and sometimes result in winning certificates. Their diligent efforts help the QSO total for everyone else.

However, especially in the CQ WW VHF Contest, there are many more casual entries from those who just want to make a few contacts. Being a 6- and 2-meter only contest emphasizes that point. Thank goodness for their activity, as they really fuel the activity engine for the more serious-minded competitors.

We should also not forget the entrants who find joy in combining VHF contesting with the outdoors. The hilltoppers and other portable stations, often located on mountaintops, find contesting and communing with nature a healthy mix. Rovers do likewise while generating mega-Qs in the process.

I'm sure we haven't covered all the motivations, but those mentioned all are good reasons why VHF contesting is such fun for so many folks.

The CQ version of VHF contesting meets all these criteria and more. First of all, it is the only real *worldwide* VHF contest. It carries a worldwide recognizable name—CQ WW. This looms large on HF and is rapidly becoming so on VHF. To live up to that name, the CQ WW VHF Contest must meet expectations of excellence in every regard. This includes timely contest announcements in several languages available online, timely accurate results reported in *CQ*, certificates from the previous year received prior to the next competition, and most important, contest rules devoid of bureaucratic hurdles to modify – which segues us to a brief discussion of the rules.

The Rules

The present version of the CQ-sponsored VHF Contest, now in its second decade, has been marked by relative consistency in its rules. The only changes instituted under this writer's watch have been the addition of the "hilltopper" category to fill a needed niche and this year's club competition. Both of these have proven popular. Further, rovers have retained the so-called "original" rover rules, which—this being only a two-band affair—has avoided any controversy over any perceived abuses. However, we have now come to a crossroad that demands a modification of the rules to keep the contest in harmony with present-day

JA6WFM used this big 10-element Yagi on 6 meters to again lead all scorers in Japan. Besides working JAs, Hiro also worked HS, XV9, BM, and VR2.

This is precious. Ten-year-old JF1UCV/2 operated in the Hilltopper category from the mid-point of famous Mt. Fuji utilizing available shelter. Yoshiki later rejoined his family for camping at the more temperate 3000-foot level. (Photo by 7L1FPU)

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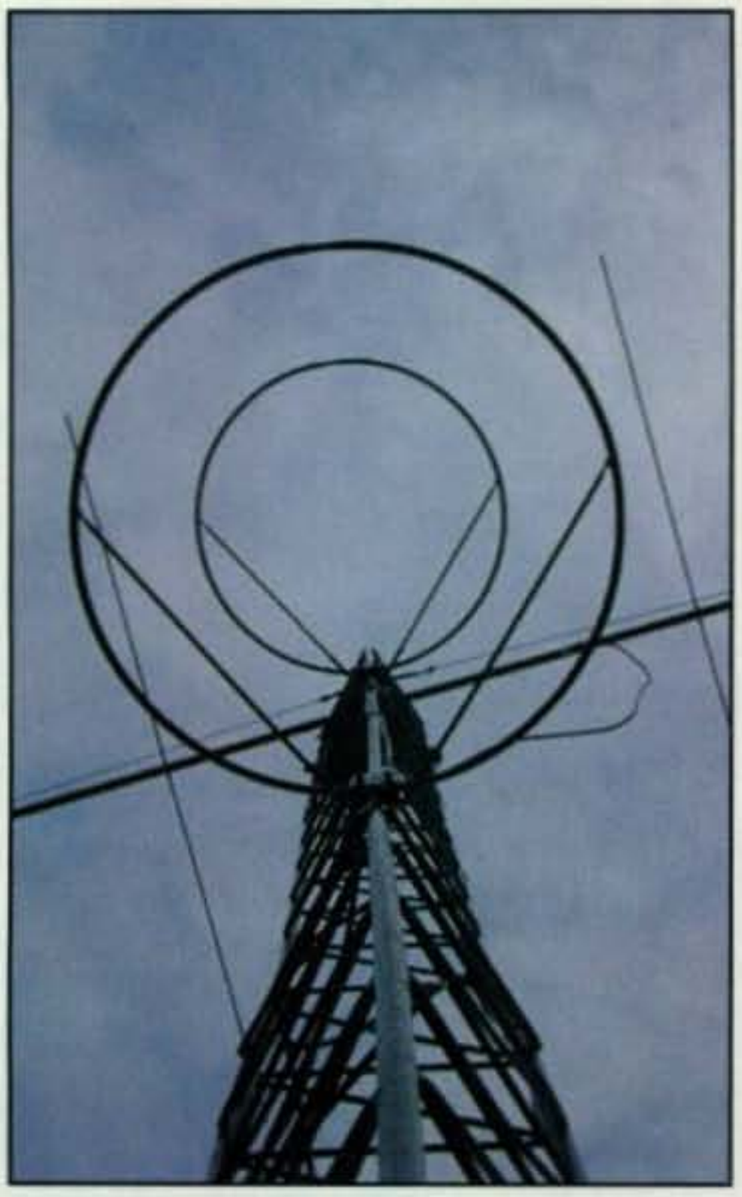

Here's a unique squirrel's view of two KP6KQ stacked loops at W4VHF. Ted, W4VHF, and Gary, K4MQG, teamed up to multi-op at an elevation of 3200 feet in southwestern Virginia (EM96).

TOP SCORES

WORLD

All Band

OK1DC	36,472
EA2TO/1	26,384
TA2AD	22,896
DL2OM	19,488
UY1HY	17,622

6 Meters

EA3AKY	45,619
VE3MMQ	27,548
CT3FQ	18,746

2 Meters

DK5DQ	19,686
HA6VW/P	16,512
E22HUV	6,462

Hilltopper

E22HMR/P	5,902
HA2VR/P	4,192
JF1UCV/2	2,667

QRP

YU2DX	6,256
UT5UUV	1,587

Rover

YO4RYU/MM	79,365
VE3CRU	19,760
US3ITU	17,248

Multi-Op

UT1I	162,162
UR7D	141,576
OK1KIM	87,904
UT7E	29,988
VE3SMA	15,876

USA

All Band

K2DRH	163,415
K1TEO	110,664
W1XX	79,772
W4RX	58,338
WA2FGK	57,378

6 Meters

K1TOL	80,106
K2PLF	44,577
W2MMD	43,066

2 Meters

W3PAW	4,980

Hilltopper

K1ZE	4,128
W9SZ	2,240
WA4A	1,664

QRP

KA1LMR	35,984
K9AKS	11,552
WB2SIH	6,624

Rover

WB8BZK	55,993
K9JK	27,685
K9ILT	23,166

Multi-Op

K5QE	202,224
KA2LIM	103,016
W4MYA	64,155
W3SO	63,246
W4MW	55,440

operating techniques —namely, single operator "assisted."

Especially in HF DX contests, with thousands of entrants, the "assisted" categories exist for single ops using the web-based "cluster" or similar packet-based systems that spot potential contacts. With far fewer entrants on VHF, we have avoided such category proliferation. To date, any such assistance in the CQ WW VHF Contest placed the log in the multi-operator category. These 2010 results, however, reveal a startling figure: The number of such entries exploded with fully one-third of all multi entries really being what could be called single-op assisted. This is a significant break from previous years when only a handful of stations made use of cluster spots.

Many casual operators in this contest have no doubt ventured into making assisted contacts not knowing initially that this placed them in the multi category. After all, this may be their normal modus operandi. Why punish them by placing them in competition with stations that are truly multi-operator? Further, VHF usually demands antennas with narrow beamwidths which must be pointed directly at each other to make the contact. This capability is enhanced by utilizing information posted on the cluster with logging programs that simply allow a mouse click to find the contact. So how do we remedy this situation?

Allowing passive assistance for single ops would keep the contest current with today's common operating practices. This is not breaking new ground in the CQ WW universe of contests. The CQ World-Wide WPX RTTY Contest Rule IV (d) reads in part: "QSO alerting assistance is permitted in ALL categories." The 2011 CQ WW VHF Contest rules will reflect this change, allowing passive assistance with specifics detailed in the contest announcement in the June issue of *CQ*. Unlike HF contests, its impact on VHF contesting probably will be relatively minor.

We think this will not only keep the CQ WW VHF Contest up-to-date with present technology, but also put more QSOs in your log. This has to be a good thing. We hope you approve.

2010 Contest Analysis

Keeping with past tradition, comments on the Quahog Reflector tend to focus on the outstanding scoring achievements that might otherwise be overlooked. Thanks to contest historian and longtime QRP advocate Curt Roseman, K9AKS, for posting these telling observations:

As usual, QRP operations were popular in a number of different countries around the world, but regional and national record scores generally were not attained this time. However, two scores do stand out in the QRP Hilltopper category: HA2VR/P and K1ZE, each over 4K points, posting the 6th and 7th all-time highest scores ever in that time-limited category.

The 2-meter-only category continued to be very popular in Ukraine, European Russia, and Thailand. UT5JCW (6K) posted the highest score ever from Ukraine, while RU3GX (1.8K) did the same from Russia. DK2DQ again dominated the 2-meter EU scores with 29K points. Across the Atlantic in North America, in contrast, activity in the 2-meter category was at a bare minimum. Throughout the history of this contest, few Americans and Canadians have been able to suppress the temptation to operate 6 meters.

This is illustrated by the remarkable consistency of K1TOL's winning scores

QSO LEADERS BY BAND

WORLD

Single-Op 50 MHz

EA3AKY	343
VE3MMQ	284
CT3FQ	182

144 MHz

E22HUV	359
HS4DDQ	298
HS8LUR	283

Multi-Op 50 MHz

UT1I	268
UR7D	196
UT7E	168

144 MHz

HS1EFA	478
HS8KFW	478
HS5WWW	358

USA

Single-Op 50 MHz

K1TOL	507
K2DRH	463
K1TEO	382

144 MHz

K2DRH	171
K1TEO	157
K3CB	100

Multi-Op 50 MHz

K5QE	444
N3MK	355
KA2LIM	342

144 MHz

K5QE	161
W4MW	155
KA2LIM	145

GRID MULTIPLIER LEADERS BY BAND

WORLD

Single-Op 50 MHz

EA3AKY	133
CT3FQ	103
VE3MMQ	97

144 MHz

DK5DQ	51
HA6VW/P	43
UT5JCW	43

Multi-Op 50 MHz

UT1I	146
UR7D	124
UT7E	106

144 MHz

UR7D	80
OK1KIM	73
UT1I	43

USA

Single-Op 50 MHz

K1TOL	158
K2DRH	155
K2PLF	127

144 MHz

K2DRH	48
WA2FGK	41
K1TEO	35

Multi-Op 50 MHz

K5QE	181
KA2LIM	123
N3MK	120

144 MHz

K5QE	83
W3SO	43
KA2LIM	40

over the past six years, ranging from 62K to 91K, except for the block-buster year of 2006 when Lefty scored 358K. This year's 80K was in the middle of that range. Also this time the second and third best scores ever from Africa were posted on 6 meters: CT3FQ with 19K from Madeira and EA8AQV at 11K from the Canary Islands —both great QTHs for fabulous 6-meter propagation.

In general, worldwide, scores in the all-band category were not at record-breaking levels. However, K7ULS broke the 7-land record from Utah with 34K points. OK1DC posted the 4th highest score in contest history from Europe with 36K.

The multi-operator category produced some notable performances. UT1I's winning score of 162K was the third highest ever from Europe. UR7D worked 204 grids, the second highest total ever from Europe, and KA2LIM, with 103K points, broke their own record for the U.S. 2nd call area. K5QE's 264 total grids worked was their highest, except for 2006, and the second highest number any station has ever worked, again except for 2006. Isn't it time for another 2006- type year propagation-wise?

In the on-going worldwide effort for more countries to be QRV on 6 meters, the contest prize was the log from HSØAC, club station for the Radio Society of Thailand. Receiving special one-time authorization to operate the contest, this was the first 6-meter operation from Thailand, resulting in 173 Qs in 34 grids throughout Southeast Asia. FB! A first-time-ever log was received from Vietnam (XV9DT). A harbinger of things to come was the 10 log entries from Japan, following a contest announcement in *JA-CQ Magazine*. CQ WW VHF surges on worldwide. Check the leader boxes and the scores for *all* the contest highlights.

Expanded CQ WW VHF Contest Results

For a listing of the ops and grids activated by the rover stations in the 2010 contest, plus the operators of the multi stations, and "Scatter" comments, go to the contest website at <www.cqww-vhf.com>, select "Latest published results," and then "Expanded Results" for the year 2010. You can also go to the CQ website at <www.cq-amateur-radio.com> and look in the "Contests" section.

Mega-thanks

In just slightly above-average conditions, the 700 log entries were up a record high 18% over the previous year. Clearly the CQ WW VHF Contest is well accepted by the VHF contesting community. Thanks to these amateurs and others unnamed who helped to publicize the contest overseas in advance and/or assist in Cabrillo log submissions: 7L1FPU, DL8EBW, E21EIC, EA3ALV, JA7QVI, LU2UF, PY2ZX, RW6CT, SM3CER, and UT1IC. The log-checking program was run by N8BJQ. K9JK entered all the paper logs using the WA7BNM on-line CabForms, as did many contest entrants. K9JK also prepared all the 2009 certificates for mailing for receipt before the 2010 contest. The log entry robot ran flawlessly thanks to N5KO. The contest website (www.cqww-vhf.com) updates are done by W1PN. Contest records are maintained by K9AKS. Thank you all!

Statistically speaking, the total number of stations reported active was 11,484; total of 55,663 QSOs claimed; total number of grids activated 954. This represents an amazing overall activity increase of 20% over previous highs. CQ WW VHF continues to get better and better.

2011 Contest

Mark your calendar for the 2011 CQ WW VHF Contest, July 16–17. The full announcement will appear in the June issue of *CQ*, on the *CQ* website (www.cq-amateur-radio.com), and on the CQ WW VHF Contest website (www.cqww-vhf. com). A summary of the rules will also appear in various languages on many DX contesting websites. CU all then!

73, John, W1XX

CLUB COMPETITION

(Minimum of three entries required for listing)

UNITED STATES

Club Name	# Entries	Score
Potomac Valley Radio Club	22	486,341
Society of Midwest Contesters	20	304.286
Pacific Northwest VHF Society	18	249,938
North East Weak Signal Group	4	134,824
Carolina DX Association	7	109,258
Badger Contesters	9	96,619
Yankee Clipper Contest Club	9	89,964
CTRI Contest Group	4	82,491
Grand Mesa Contesters of Colorado	4	78,779
Florida Contest Group	8	76,404
Eastern Connecticut Amateur Radio Assn.	3	55,238
Frankford Radio Club	4	27,375
South East Contest Club	6	26,750
Alabama Contest Group	6	20,410
Mad River Radio Club	3	13,230
Western New York DX Assn.	3	8,519
Northern California Contest Club	5	7,937
Tennessee Contest Group	7	7,528
Portage County Amateur Radio Service	6	5,314
Stoned Monkey VHF ARC	3	4,533
Raritan Bay Radio Amateurs	3	2,446

WORLD

Ukrainian VHF International Contest Club	31	185,799
Contest Club Ontario	13	59,521
Black Sea Contest Club	6	52,841
Rhein Ruhr DX Assnn	1	40,768
Maritime Contest Club	4	24,279
Latvian Contest Club	5	16,409
Gyalogradio Club	3	4,890
Ukrainian Contest Club	4	3,375
LU Contest Group	9	985
Siam DX Group	5	880

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

2010 VHF RESULTS
NORTH AMERICA
UNITED STATES

K1TEO	**A**	**110,664**	**539**	**159**	**CT**	**FN31**
W1XX	**A**	**79,772**	**452**	**148**	**RI**	**FN41**
W3EP	**A**	**44,888**	**343**	**124**	**CT**	**FN31**
N8RA	**A**	**37,022**	**285**	**107**	**CT**	**FN31**
W2DAN	**A**	**18,834**	**219**	**73**	**RI**	**FN41**
WV2ZOW	**A**	**15,010**	**162**	**79**	**MA**	**FN32**
W1RZF	A	12,104	143	68	MA	FN42
AD1DX	A	8,640	138	54	MA	FN41
KA1R	A	8,568	131	63	MA	FN42
N1ORK	A	6,250	100	50	CT	FN31
K1VUT	A	5,831	107	49	MA	FN41
KB1JDX	A	4,280	90	40	CT	FN41
W1DYJ	A	3,003	64	39	MA	FN42
K3IU	A	1,972	67	29	RI	FN41
N1VVV	**A**	**1,944**	**48**	**36**	**ME**	**FN43**
KC1MA	A	1,914	50	33	MA	FN51
KK1X	A	1,560	53	26	MA	FN42
KB1MAO	A	870	38	15	RI	FN41
W1PN	A	595	32	17	RI	FN41
KA1C	A	480	23	20	ME	FN54
KB1OTB	A	275	20	11	NH	FN42
W1WIU	A	208	20	8	RI	FN41
K1NPT	A	125	15	5	RI	FN41
K1TOL	**6**	**80,106**	**507**	**158**	**ME**	**FN44**
K1IMI	6	5,355	105	51	ME	FN53
						(Op: N4CW)
K1MVM	**6**	**1,856**	**58**	**32**	**CT**	**FN31**
K1DM	6	152	19	8	CT	FN31
K1DAT/1	6	80	10	8	MA	FN41
K1ZE	**Q***	**4,128**	**84**	**43**	**CT**	**FN31**
AA1I	**Q***	**420**	**23**	**14**	**MA**	**FN32**
N1PRW	Q*	312	26	8	MA	FN42
W1QH	Q*	306	17	9	CT	FN31
W1QK	Q*	225	25	9	CT	FN31
						(Op: KB1STT)
KA1LMR	**Q**	**35,984**	**302**	**104**	**NH**	**FN43**
N2GZ	Q	40	10	4	CT	FN31
KB1DFB	**M**	**46,830**	**340**	**105**	**CT**	**FN41**
N1JEZ	**M**	**20,737**	**206**	**89**	**VT**	**FN44**
NE1B	**M**	**13,104**	**177**	**63**	**NH**	**FN42**
WA1Z	M	2,065	59	35	NH	FN42
N1API	M	1,485	48	27	CT	FN31
W2UDT	**A**	**11,280**	**147**	**60**	**NJ**	**FN20**
WB2LEB	A	10,602	149	57	NJ	FN20
W2EV	**A**	**9,472**	**121**	**64**	**NY**	**FN03**
N2NF	A	9,135	113	63	NJ	FM29
K2OO	A	8,316	101	66	NY	FN03
NA2NY	A	6,039	85	61	NY	FN33
N2SLO	A	5,512	83	52	NY	FN30
KA2CYN	A	5,060	98	44	NY	FN31
WA2BAH	A	4,992	85	52	NY	FN32
KA2OON	A	1,702	60	23	NJ	FN20
W2UAD	A	1,682	43	29	NY	FN13
KA2MCU	A	608	28	19	NY	FN32
WA2NXK	A	480	28	12	NJ	FN20
W2BT	A	264	21	12	NJ	FN20
W2OSR	A	160	15	10	NY	FN30
WB2ZEX	A	133	16	7	NY	FN30
N2NOM	A	63	8	7	NY	FN22
W2MMD	**6**	**43,066**	**353**	**122**	**NJ**	**FM29**
						(Op: N2NRD)
KC2HZW	**6**	**4,800**	**100**	**48**	**NY**	**FN30**
WB2AMU	6	3,525	75	47	NY	FN30
W2JCN	6	850	34	25	NY	FN21
K2DER	6	774	43	18	NY	FN30
K2XC	6	180	15	12	NY	FN34
W2DXE	6	140	14	10	NY	FN02
N2MPU	6	90	10	9	NJ	FN20
W2CVW	6	65	13	5	NJ	FN20
WB2ABD	6	63	9	7	NY	FN02
K2RLW	6	44	11	4	NJ	FN20
KC2JRQ	**2**	**32**	**4**	**4**	**NY**	**FN30**
WB2SIH	**Q**	**6,624**	**106**	**48**	**NY**	**FN31**
K2SSS	Q	1,125	45	25	NY	FN13
W2JEK	Q	112	16	7	NJ	FN20
KA2LIM	**M**	**103,016**	**487**	**163**	**NY**	**FN12**
N2LID	M	9,932	160	52	NY	FN12
N1IBM	**M**	**9,300**	**117**	**62**	**NJ**	**FM29**
W2YR	M	2,343	57	33	NJ	FN20
WA2FGK	**A**	**57,378**	**345**	**131**	**PA**	**FN21**
						(Op: K2LNS)
K3ZO	**A**	**55,176**	**371**	**132**	**MD**	**FM18**
K3CB	**A**	**50,760**	**323**	**120**	**MD**	**FM18**
K3ISH	A	14,196	154	84	PA	FN21
W3ZZ	A	9,955	136	55	MD	FM19
N3UM	A	9,165	119	65	MD	FM18
W3TDF	A	4,444	92	44	PA	FN20
K1DS	A	3,150	69	35	PA	FN20
K3SX	A	2,343	58	33	MD	FM19
K3MD	A	2,040	44	34	PA	FN10
W3GNQ	**A**	**1,680**	**44**	**30**	**DE**	**FM28**
N3CR	A	819	32	21	PA	FN20
KC9QJR	A	168	19	7	MD	FM19
KB3LNM	A	77	10	7	MD	FM19
K2PLF	**6**	**44,577**	**351**	**127**	**MD**	**FM19**
W3BD	**6**	**6,345**	**135**	**47**	**PA**	**FM19**
W3LDG	6	936	39	24	MD	FM29
W3TEF	6	558	31	18	PA	FN00
WA3G	6	126	14	9	MD	FM19
W3PAW	**2**	**4,980**	**83**	**30**	**PA**	**FM19**
W3SO	**M**	**63,246**	**353**	**127**	**PA**	**FN00**
N3IQ	**M**	**32,076**	**265**	**99**	**MD**	**FM19**
K3WW	M	4,452	106	42	PA	FN20
N1SZ	M	3,555	79	45	MD	FM19
W4RX	**A**	**58,338**	**365**	**126**	**VA**	**FM19**
W4WA	**A**	**31,694**	**274**	**106**	**GA**	**EM84**
KN4SM	A	26,880	206	105	VA	FM16
N3LL	**A**	**21,018**	**207**	**93**	**FL**	**EL86**
K4QI	**A**	**18,786**	**160**	**93**	**NC**	**FM06**
N4QV	A	15,225	181	75	FL	EL96
NJ2F	A	12,110	162	70	FL	EL96
W4AS	A	10,921	149	67	FL	EL95
K4FJW	A	4,200	81	42	VA	EM86
KE4TWI	**A**	**3,572**	**90**	**38**	**TN**	**EM66**
W4FRA	A	2,479	57	37	NC	FM15
K4FTO	A	2,025	59	25	VA	FM18
KS4YX	**A**	**1,980**	**54**	**36**	**SC**	**EM84**
N4AVV	A	1,705	44	31	SC	FM03
WA4QYK	A	1,550	46	25	TN	EM86
N4MM	A	1,500	45	25	VA	FM09
KI4FIA	A	1,100	31	22	FL	EL99
W2WAS	A	966	36	23	NC	FM05
N1LF	A	851	34	23	AL	EM63
AI4GR	A	741	29	19	NC	EM85
W1LVL	A	680	26	17	FL	EL99
K1KC	A	540	27	15	GA	EM73
KE4PT	A	465	29	15	FL	EL96
K8YC	A	153	14	9	NC	EM95
WA2EMF	A	90	10	6	SC	EM94
K4KAY	A	63	8	7	NC	EM95
W4WNT	A	54	7	6	NC	FM05
KG4QEN	A	12	4	2	NC	EM95
W4SO	**6**	**13,275**	**177**	**75**	**FL**	**EL96**
K4WI	**6**	**12,935**	**199**	**65**	**AL**	**EM62**
K4SN	6	10,824	164	66	FL	EL96
N4LR	**6**	**10,065**	**165**	**61**	**GA**	**EM73**
N4PN	6	7,137	117	61	GA	EM82
K9IL	**6**	**6,897**	**121**	**57**	**TN**	**EM56**
N4NX	6	5,886	109	54	GA	EM84
N4BP	6	4,704	98	48	FL	EL96
K4OMG	6	4,144	112	37	TN	EM66
WX4MM	6	3,744	96	39	AL	EM72
KU8E	6	3,192	76	42	GA	EM72
NU4Y	6	2,849	77	37	FL	EM90
W4PV	6	2,016	63	32	TN	EM86
W6UB	6	1,995	57	35	TN	EM75
N4ZQ	6	1,914	58	33	FL	EL88
K3KO	**6**	**1,770**	**59**	**30**	**NC**	**FM06**
KR4F	6	1,656	69	24	AL	EM64
N2WN	6	1,219	53	23	TN	EM86
AB4SF	**6**	**1,176**	**42**	**28**	**VA**	**FM17**
KM4H	6	1,080	45	24	TN	EM75
N4NM	6	987	47	21	AL	EM64
K3TW/4	6	987	47	21	FL	EL88
W4HRC	6	888	37	24	TN	EM75
WF4R	6	480	24	20	VA	FM16
K4BAI	6	294	21	14	GA	EM72
KN4Y	6	272	17	16	FL	EM70
W4BK	6	220	22	10	TN	EM66
WB5NMZ	6	180	15	12	AL	EM62
KD4QMY	6	176	16	11	GA	EM82
WA4JQS	6	150	15	10	KY	EM77
KW7R	6	121	11	11	FL	EL87
N4DTF	6	110	11	10	TN	EM55
KA5VZG	6	80	10	8	TN	EM56
N4IJS	6	15	5	3	KY	EM79
K4PG	6	8	4	2	FL	EL96
WA4A	**Q***	**1,664**	**45**	**26**	**VA**	**EM96**
N9TZL	**Q***	**294**	**18**	**14**	**KY**	**EM78**
KC8KSK	**Q***	**90**	**10**	**6**	**NC**	**EM96**
N4TZH	Q*	30	6	5	FL	EL96
NZ1D	Q	240	20	12	FL	EL98
W4MYA	**M**	**64,155**	**387**	**141**	**VA**	**FM07**
W4MW	**M**	**55,440**	**373**	**105**	**NC**	**EM96**
W4VHF	**M**	**49,362**	**339**	**114**	**VA**	**EM96**
W4NH	**M**	**46,332**	**334**	**117**	**GA**	**EM84**
N3MK	**M**	**42,600**	**355**	**120**	**VA**	**FM27**
W6SAI	**M**	**11,748**	**167**	**66**	**AL**	**EM63**
K1HTV	M	10,430	138	70	VA	FM18
W4YCC	**M**	**10,017**	**142**	**63**	**SC**	**EM94**
K4MM	**M**	**9,792**	**125**	**72**	**FL**	**EL97**
K4RFT	**M**	**9,184**	**164**	**56**	**TN**	**EM56**
W4APP	M	7,504	134	56	VA	EM87
N4JQQ	M	6,960	145	48	TN	EM55
K4NAU	M	912	38	24	SC	FM02
WA4EWV	M	648	18	18	FL	EM70
N4AU	M	368	23	16	AL	EM62
N4BCD	M	300	20	15	AL	EM64
K5GZR	**A**	**10,656**	**116**	**74**	**TX**	**EM20**
K5WPN	**A**	**9,333**	**102**	**61**	**OK**	**EM14**
WB2FKO	**A**	**6,643**	**87**	**73**	**NM**	**DM65**
W5TV	A	4,399	80	53	TX	EM21
W5UOK	A	3,840	77	48	TX	EM11
W8FR	**A**	**1,421**	**43**	**29**	**MS**	**EM54**
AF5Q	A	780	29	20	OK	EM04
NØRQ	A	432	23	18	TX	EM13
N5UWY	A	204	14	12	OK	EM15
KC5MVV	A	56	10	4	TX	DM93
WD5K	**6**	**37,146**	**302**	**123**	**TX**	**EM12**
W5KI	**6**	**5,253**	**103**	**51**	**AR**	**EM36**
KE5NYZ	6	3,344	76	44	TX	EM00
W5KFT	6	1,296	54	24	TX	EM00
K5RPD	6	1,170	45	26	AR	EM35
K3TD	6	1,160	40	29	TX	EM10
KD5J	6	1,098	61	18	AR	EM45
AC5O	**6**	**1,050**	**42**	**25**	**LA**	**EL49**
KB5LE	6	936	36	26	LA	EM32
K5GM	6	736	32	23	TX	EM10
AB5C	6	575	25	23	TX	EM12
WA5TRX	6	391	23	17	LA	EM40
AD5OW	6	255	17	15	MS	EM52
NI5F	6	168	14	12	MS	EM42
WØZW	6	12	4	3	NM	DM73
WA5ZEK	**Q***	**176**	**14**	**11**	**AR**	**EM35**
WA5BUC	Q	42	7	6	TX	EL29
KC5WA	Q	36	6	6	LA	EM32
K5QE	**M**	**202,224**	**605**	**264**	**TX**	**EM31**
KC5MVZ	M	12,168	146	78	TX	DM93
AJ6T	**A**	**5,513**	**112**	**37**	**CA**	**CM87**
AF6RR	A	4,743	118	31	CA	CM87
KC6ZWT	A	1,827	62	21	CA	CM98
W6OMF	A	1,518	48	23	CA	CM98
K6EL	A	1,134	39	21	CA	CM99
K6OAK	A	48	11	4	CA	CM97
K6CSL	6	40	10	4	CA	CM97
KD6LZV	**Q***	**4**	**2**	**1**	**CA**	**CM87**
K6MI	**Q**	**540**	**36**	**10**	**CA**	**DM06**
K6EMI	**M**	**882**	**45**	**14**	**CA**	**DM13**
K7ULS	**A**	**34,348**	**268**	**124**	**UT**	**DN41**
K7TOP	**A**	**16,920**	**171**	**90**	**AZ**	**DM34**
KC7I	**A**	**4,484**	**94**	**38**	**OR**	**CN84**
KD7UO	**A**	**4,400**	**82**	**40**	**WA**	**CN97**
K7AWB	A	1,860	48	31	WA	DN17
N6KW	A	1,037	42	17	WA	CN87
W7MY	A	736	27	23	WA	DN06
N7DB	A	576	32	12	OR	CN85
W7MTL	A	290	22	10	OR	CN84
N7EPD	A	220	16	10	OR	CN74
W6LLP	A	72	8	8	WA	DN17
K7CW	**6**	**13,650**	**182**	**75**	**WA**	**CN87**
KS7S	**6**	**13,120**	**160**	**82**	**WY**	**DN71**
K7BG	**6**	**6,572**	**106**	**62**	**MT**	**DN47**
KD7DCR	6	720	30	24	MT	DN35
K4XU	6	522	29	18	OR	CN94
KB5HMU	6	280	20	14	MT	DN25
WB7FJG	6	230	23	10	WA	CN87
KI7BP	6	216	18	12	ID	DN13
W7YAQ	6	216	18	12	OR	CN94
WØOGH	6	63	9	7	AZ	DM43
W6NF	6	35	7	5	NV	DM09
KG0AL	6	4	2	2	MT	DN76
KI7JA	**2**	**816**	**34**	**12**	**OR**	**CN85**
KG7HQ	**Q***	**225**	**17**	**9**	**WA**	**CN88**
N6LB	**Q**	**1,206**	**42**	**18**	**WA**	**CN88**
W7RDP	Q	52	10	4	WA	CN87
N7IR	**Q**	**459**	**27**	**17**	**AZ**	**DM43**
W7RV	**M**	**3,132**	**71**	**36**	**AZ**	**DM43**
W7RN	**M**	**1,809**	**55**	**27**	**NV**	**DM09**
K7TJ	**M**	**1,053**	**37**	**27**	**WA**	**DN18**
K8WFN	**A**	**13,578**	**147**	**73**	**OH**	**EN90**
N8BI	A	10,168	141	62	OH	EN91
K8CC	**A**	**7,672**	**117**	**56**	**MI**	**EN82**
N8LIQ	A	5,529	79	57	MI	EN56
W8KEN	A	3,605	82	35	OH	EN91
KB8U	A	2,924	75	34	MI	EN71
KT8X	A	1,953	51	31	MI	EN82
K8DXR	A	1,344	42	28	OH	EN90
K8AB	A	1,260	47	21	OH	EN91
W8KNO	A	936	33	24	OH	EN91
WB2DFC	A	592	34	16	OH	EN91
W8IDM	A	490	26	14	OH	EN91
NX8G	A	248	20	8	OH	EN90
K8WW	**6**	**4,752**	**99**	**48**	**OH**	**EN81**
KB8UUZ	6	2,812	74	38	OH	EN91
N8II	**6**	**1,682**	**58**	**29**	**WV**	**FM19**
N8BJQ	6	957	33	29	OH	EN80
WB8LCD	6	656	41	16	OH	EN91
WT8E	6	546	26	21	OH	EM89
K8YTO	**6**	**500**	**25**	**20**	**MI**	**EN82**
N8PPF	6	192	16	12	OH	EN80
N8AGU	6	84	12	7	OH	EN91
N8OFS/P	6	10	10	1	OH	EN91
W8IDW	6	6	3	2	WV	EM99
N8QE	**Q**	**70**	**14**	**5**	**OH**	**EN91**
W8PGW	**M**	**2,349**	**60**	**29**	**MI**	**EN82**
KG9Z	M	247	19	13	OH	EN90
KD8NZG	M	96	12	8	OH	EN90
AA8LL	M	4	2	2	OH	EM79
K2DRH	**A**	**163,415**	**634**	**203**	**IL**	**EN41**
KC9BQA	**A**	**31,185**	**230**	**105**	**WI**	**EN63**
W9GKA	A	13,725	162	75	IL	EM58
N9LB	A	6,780	98	60	WI	EN52
KA9UVY	A	3,696	69	48	IL	EM58
NT9E	A	3,240	70	36	IL	EN52
W9GA	A	3,120	73	30	WI	EN53
W9THD	**A**	**2,394**	**60**	**38**	**IN**	**EN71**
K9CT	A	1,482	42	26	IL	EN50
W9HQ	A	988	30	26	WI	EN43
KC9ELU	A	861	29	21	IN	EM79
KA9RSL	A	299	14	13	IN	EN71
N9NFB	A	276	18	12	WI	EN53
KB9OWD	A	273	17	13	IL	EN53
W9ZB	A	266	16	14	IN	EM69
N9NDP	A	260	14	10	WI	EN62
N9LYE	A	180	12	10	IL	EN51
KG9N	A	60	9	6	IL	EN50
WO9S	**6**	**11,160**	**155**	**72**	**IL**	**EN61**
W9SE	6	7,080	118	60	IL	EN50
W9ZRX	**6**	**7,076**	**116**	**61**	**IN**	**EN60**
W9LX	6	2,860	65	44	IL	EN51
K9GS	**6**	**1,792**	**56**	**32**	**WI**	**EN52**
W9ILY	6	720	36	20	IL	EN61
W9VA	6	576	36	16	IL	EN62
WI9WI	6	195	15	13	WI	EN53
KB9YGD	6	48	8	6	IN	EN61
K9KJ	6	9	3	3	IN	EN61
W9SZ	**Q***	**2,240**	**51**	**32**	**IL**	**EN50**
K9AKS	**Q**	**11,552**	**131**	**76**	**IL**	**EN41**
N9TF	Q	2,688	61	32	IL	EN52
KO9A	Q	1,909	59	23	IL	EN52
N9YH	Q	336	20	12	IL	EN52
W9RVG	**M**	**22,134**	**224**	**93**	**IL**	**EM57**
N2BJ	M	3,913	74	43	IL	EN61
N7MB	M	1,540	55	28	IL	EN50
W9AWE	M	300	16	15	IL	EN40
KØNR	**A**	**32,944**	**270**	**116**	**CO**	**DM78**
KØSIX	**A**	**31,110**	**235**	**122**	**MN**	**EN35**
KBØHH	**A**	**30,250**	**221**	**121**	**KS**	**EM06**
NØKE	A	28,336	245	112	CO	DM69
KØAWU	A	12,600	137	84	MN	EN37
NØGZ	**A**	**11,935**	**141**	**77**	**IA**	**EN31**
KV1E	A	7,564	111	62	IA	EN41
WVØH	A	5,044	91	52	CO	DM79
W6OAL	A	1,372	44	28	CO	DM79
WØPPF	A	1,053	38	27	IA	EN41
WAØVPJ	A	703	27	19	MN	EN35
NØAX	A	35	6	5	MO	EM49
KBØYH	**6**	**20,056**	**218**	**92**	**CO**	**DM79**
WØRIC	**6**	**17,487**	**201**	**87**	**CO**	**DM79**
WØHBH	**6**	**7,260**	**132**	**55**	**MO**	**EM48**
KØPK	6	4,959	87	57	MN	EN37
NDØC	**Q**	**6,527**	**107**	**61**	**MN**	**EN23**
W6GMT	Q	2,220	54	37	MN	EN37
WBØNRV	Q	182	14	13	KS	EM17
KIØG	Q	12	3	3	CO	DM69
W9BNO	Q	1	1	1	CO	DM79
KDØBJS	M	180	15	12	CO	DM79

Rover

WB8BZK	**55,993**	**300**	**133**	**6**
K9JK	**27,685**	**165**	**113**	**6**
K9ILT	**23,166**	**159**	**99**	**8**
WØBL	**9,792**	**126**	**64**	**3**
K9GY	**6,804**	**98**	**54**	**5**
KB3TSL	**6,300**	**84**	**50**	**2**
N2SLN	**5,605**	**74**	**59**	**4**
AF4OD	**4,134**	**69**	**53**	**2**
K9TMS	**4,107**	**77**	**37**	**2**
N6ZE	**3,192**	**91**	**24**	**2**
W9YOY	3,036	65	33	4
AA5JG	**2,944**	**56**	**46**	**3**
N1KPW	**2,808**	**60**	**39**	**6**
KD5IKG	**2,520**	**50**	**42**	**4**
VE3ZV/W	**2,296**	**47**	**41**	**13**
N6ORB	**1,892**	**64**	**22**	**3**
W9DLN	**1,872**	**52**	**36**	**4**
AD4IE	**1,680**	**42**	**30**	**3**
KR5J	**1,440**	**39**	**30**	**5**
K3HQI	1,196	37	23	2
NV6C	**1,134**	**37**	**21**	**4**
NØUD	920	36	23	5
K7MDL	675	33	15	3
KJ6GZF	495	22	15	3
K6LMN	270	22	10	3
KC9MMM	90	10	5	2
NE8I	81	9	9	2
WØETT	72	9	8	2

CANADA

VE1SKY	**A**	**8,866**	**141**	**62**	**NS**	**FN74**
VE2HAY	**A**	**1,711**	**55**	**29**	**QC**	**FN35**
VE2DWA	**6**	**620**	**31**	**20**	**QC**	**FN25**
VE3KZ	**A**	**8,512**	**115**	**64**	**ON**	**FN03**
VE3VCF	A	200	18	10	ON	FN25
VE3MMQ	**6**	**27,548**	**284**	**97**	**ON**	**FN14**
VE3EJ	6	2,244	66	34	ON	FN03
VE3RCN	6	1,040	40	26	ON	FN03
VE3EK	6	667	29	23	ON	FN03
VE3GFN	6	286	22	13	ON	FN03
VE3UTT	6	187	17	11	ON	FN04
VE3OBU	6	100	10	10	ON	FN03
VA3PC	6	80	10	8	ON	FN06
VE3TLT	**Q**	**260**	**17**	**13**	**ON**	**EN92**
VE3CW	Q	132	12	11	ON	FN02
VA3RKM	Q	3	3	1	ON	FN25
VE3SMA	**M**	**15,876**	**158**	**84**	**ON**	**FN05**
VE3HHT	M	1,829	44	31	ON	EN92
VE3CRU	**R**	**19,760**	**135**	**104**		**7**
VE4EAR	**6**	**2,552**	**58**	**44**	**MB**	**EN19**
VE4KX	**6**	**1,715**	**49**	**35**	**MB**	**EO00**
VE6CPP	**6**	**42**	**7**	**6**	**AB**	**DN39**
VE7DXG	**A**	**16,077**	**176**	**69**	**BC**	**CN88**
VE7DAY	A	1,764	54	28	BC	CO70
VE7WWW	A	18	6	2	BC	CO90
VA7ST	**6**	**12**	**4**	**3**	**BC**	**DO00**
VE7JRX	**2**	**12**	**3**	**2**	**BC**	**CN89**
VE7NI	2	2	1	1	BC	CO90
VE7JP	**M**	**900**	**35**	**18**	**BC**	**CN88**
VE9ZX	**6**	**6,322**	**109**	**58**	**NB**	**FN65**
VE9MY	6	4,641	91	51	NB	FN75
VE2PIJ/VE9	**R**	**108**	**12**	**9**		**2**
VY2SS	**A**	**4,450**	**88**	**50**	**PE**	**FN76**

MEXICO

XE2NS	**A**	**5,252**	**100**	**52**	**DL95**
XE2MVS	A	234	17	13	DL95
XE2WWW	**6**	**14,141**	**179**	**79**	**EL06**
XE1GZU	6	209	19	11	DL80
XE1FZE	6	66	11	6	DL80
XE2WK	**M**	**13,114**	**158**	**83**	**EL03**

TURKS AND CAICOS

VP5OV	**6**	**7,102**	**134**	**53**	**FL31**
					(Op: W5CW)

AFRICA
CANARY ISLANDS

EA8AQV	**6**	**10,934**	**142**	**77**	**IL28**
EA8ACW	6	4,536	81	56	IL28

MADEIRA ISLAND

CT3FQ	**6**	**18,746**	**182**	**103**	**IM12**
CR3L	**6**	**11,929**	**151**	**79**	**IM12**
					(Op: DJ6QT)
CT3BD	6	352	22	16	IM12
CT3DZ	**2**	**320**	**20**	**8**	**IM12**
CT3KY/P	2	204	17	6	IM12

MOROCCO

CN8KD	**6**	**7,956**	**117**	**68**	**IM63**

ASIA
ASIATIC RUSSIA

RZ9CJ	**2**	**6**	**3**	**1**	**MO06**
RV9CQ/P	**Q***	**4**	**2**	**1**	**MO06**
UA9CBB	**Q**	**4**	**2**	**1**	**MO06**

ASIATIC TURKEY

TA2AD	**A**	**22,896**	**181**	**106**	**KN51**
TA7OM	**6**	**3,264**	**64**	**51**	**KN90**

CHINA

BA4TB	**6**	**175**	**25**	**7**	**PM01**
BG7NFM	**6**	**30**	**6**	**5**	**PM02**

CYPRUS

C4N	**M**	**13,468**	**148**	**91**	**KM65**

CYPRUS – UK SOV. BASE AREAS

ZC4LI	**6**	**1,908**	**53**	**36**	**KM64**

HONG KONG

VR2XLN	**6**	**1,890**	**90**	**21**	**OL72**

JAPAN

JA6WFM	**6**	**2,465**	**85**	**29**	**PM52**
JA4EPE	**6**	**2,204**	**76**	**29**	**PM53**
JA1BK	**6**	**144**	**12**	**12**	**PM95**
JA7IC	**6**	**96**	**12**	**8**	**QM07**
JI1HFJ	6	30	6	5	PM95
JA6DIJ	6	9	3	3	PM52
JF1UCV/2	**Q***	**2,667**	**84**	**21**	**PM95**
JA2MWV	**Q**	**162**	**18**	**9**	**PM84**
JF2MBF	**Q**	**49**	**7**	**7**	**PM85**
JP1HUJ	Q	4	2	2	PM95

THAILAND

HS0AC	**6**	**5,882**	**173**	**34**	**OK03**
					(Op: HS2JFW)
E22HUV	**2**	**6,462**	**359**	**9**	**OK03**
HS4DDQ	**2**	**5,364**	**298**	**9**	**OK03**
HS4FYJ	**2**	**5,022**	**279**	**9**	**OK03**
HS8LUR	**2**	**3,962**	**283**	**7**	**NJ99**
E29MFJ	**2**	**2,660**	**190**	**7**	**OK03**
HS8LLS	**2**	**1,776**	**148**	**6**	**NJ98**
HS4NOR	**2**	**1,566**	**87**	**9**	**OK16**
HS9FNY	**2**	**960**	**120**	**4**	**OJ06**
HS8JYX	**2**	**910**	**91**	**5**	**NJ98**
HS8JNF	**2**	**890**	**89**	**5**	**NJ98**
HS4NGK	**2**	**864**	**54**	**8**	**OK17**
E27BZJ	**2**	**512**	**64**	**4**	**OJ07**
E21EIC	2	490	49	5	OK03
HS3LSE	**2**	**464**	**29**	**8**	**OK14**
HS3NWD	**2**	**240**	**30**	**4**	**OK14**

THE NEW 6M-1000 SOLID STATE AMP

The 6M-1000 represents the culmination of many years of solid state amplifiers designed by Ken Holladay, K6HCP (KLM, Mirage and RF Concepts). Physical size and weight are the smallest ever for this kW amp. When combined with a lightweight switching power supply at 7-10 lbs, the 6M-1000 is perfect for DXpeditions and field day operations. It will make a great addition to any home station as well. EME and Meteor scatter usage are capable with either CW or the very popular JT6M & JT65A. Full power output of 1 kW for 50 seconds using JT65A should be possible for hours. Two temperature controlled whisper fans cool the finned heat sink and will cycle on and off as needed. If external preamp and relays are used, the amp supplies 12VDC and also sequences a N.O. key line.

COMING SOON 2 METER 1KW AMPLIFIER !

THE NEW 10-30LP12 LOG PERIODIC

The 10-30LP12 removes the concern many share regarding the complexity and cost of other multiband antennas. This Higher Performance log periodic covers every frequency..instantly, from 10 to 30 MHz ! Just one feedline is all you need to access this flawless feature. From moments after it was installed at the M2 test facility on the West Coast, U.S.A., stations in Europe were contacted using just 100W on 17M, 15M and yes, 12M. This antenna is definitely a band opener.

M2 has done everything possible to keep cost down and performance up. This standard version is built for 80 plus MPH winds and years of no maintenance, trouble free performance. For those who don't need 30M, we designed it without the rear element and boom section. It becomes the 13-30LP11 with the same specifications, less 30M on a 37 ft. boom. An optional kit will add the boom and rear element if you need the full coverage.

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E21YDP	2	186	31	3	OK03
HS0XNO	2	88	22	2	OK03
HS1JNB	2	76	19	2	OK03
E21QEB	2	60	15	2	OK03
HSØEHF	2	40	10	2	OK03
E22HMR/P	**Q***	**5,902**	**227**	**13**	**OK04**
E2ØXMG/P	**Q***	**12**	**6**	**1**	**NK94**
HS5WWW	**M**	**12,888**	**358**	**18**	**OK04**
HS1EFA	**M**	**11,472**	**478**	**12**	**OK03**
HS3AB	**M**	**10,526**	**277**	**19**	**OK14**
HS8KFW	**M**	**8,604**	**478**	**9**	**NJ99**
E22FVA	**M**	**6,754**	**307**	**11**	**OK04**
HS3VCQ	**M**	**5,588**	**254**	**11**	**OK16**
HS4AK	**M**	**4,928**	**224**	**11**	**OK16**
HS4RWY	**M**	**4,848**	**202**	**12**	**OK16**
HS1IWX	**M**	**4,796**	**218**	**11**	**OK03**
HS7AT	**M**	**4,224**	**264**	**8**	**OK03**
HS3TOT	**M**	**4,108**	**158**	**13**	**OK06**
HS8SGG	**M**	**3,828**	**319**	**6**	**NJ98**
E2BYXF	**M**	**3,094**	**221**	**7**	**OK03**
HS3QGB	M	2,672	334	4	OK03
HS9MMM	**M**	**2,508**	**209**	**6**	**OJ07**
HS9UHZ	**M**	**2,292**	**191**	**6**	**OJ07**
HS8YRY	M	1,708	122	7	OK03
HS3AS	**M**	**1,692**	**94**	**9**	**OK14**
HS9OYG	**M**	**1,630**	**163**	**5**	**NJ99**
HS3TWH	M	1,442	103	7	OK14
HS4UXB	M	708	118	3	OK03
HS8VZW	M	498	83	3	NJ98

WEST MALAYSIA

9M2COC	**2**	**12**	**6**	**1**	**OJ06**

EUROPE

AUSTRIA

OE4VIE	**A**	**6,612**	**88**	**58**	**JN87**
OE1SOW	**2**	**648**	**28**	**16**	**JN88**
OE1CWA	**Q***	**528**	**24**	**11**	**JN78**

BELGIUM

ON6NL	**M**	**5,336**	**75**	**58**	**JO21**

BULGARIA

LZ2SC	**6**	**672**	**28**	**24**	**KN33**

CROATIA

9A3QB	**A**	**3,219**	**57**	**37**	**JN95**
9A6AIB	A	162	15	6	JN85

CZECH REPUBLIC

OK1DC	**A**	**36,472**	**233**	**97**	**JN69**
OK1KZ	**A**	**2,109**	**64**	**19**	**JO70**
OK1FRG	**6**	**10,062**	**129**	**78**	**JN79**
OK1DRX	6	609	29	21	JN79
OK1KIM	**M**	**87,904**	**379**	**134**	**JO60**
OK1KNG	**M**	**9,765**	**126**	**63**	**JN69**

ENGLAND

GØLGS	**A**	**231**	**18**	**11**	**IO81**
G4JSR	**Q**	**432**	**28**	**9**	**IO82**

ESTONIA

ES2BH	**6**	**952**	**34**	**28**	**KO29**
ES5NHC	**2**	**2**	**1**	**1**	**KO38**
ES1WST	**Q**	**169**	**13**	**13**	**KO29**
ES5EC	**M**	**8,777**	**112**	**67**	**KO38**

EUROPEAN RUSSIA

RU3GX	**2**	**1,880**	**47**	**20**	**KO92**
RA6A	**2**	**1,406**	**37**	**19**	**KN96**
RW7A	**2**	**918**	**27**	**17**	**KN95**
RL3DO	**2**	**726**	**33**	**11**	**KO85**
RV6BK	**2**	**504**	**21**	**12**	**LN05**
UA4API	**2**	**504**	**18**	**14**	**LO20**
RX6DM	**2**	**462**	**21**	**11**	**KN85**
RX6DX	2	360	18	10	KN95
RN6CG	2	132	11	6	KN95
UA4AQL	2	98	7	7	LO20
RX6CW	2	64	8	4	KN95
RN3QRY	**2**	**40**	**5**	**4**	**KO91**
RA4FER	**2**	**36**	**6**	**3**	**LO23**
RU3XK	**2**	**12**	**6**	**1**	**KO73**
UA4BI	**2**	**8**	**2**	**2**	**LN28**
UA6LP	**Q***	**456**	**19**	**12**	**KN97**
UA3RUF	**Q**	**952**	**34**	**14**	**LO02**
RA6HHT	**Q**	**864**	**27**	**16**	**LN05**
RW6AH	Q	360	18	10	LN05
UA7C	**Q**	**324**	**18**	**9**	**KN95**
RC6LA	**Q**	**48**	**6**	**4**	**KN97**
					(Op: UA6LPR)
RK6ARD	**M**	**520**	**20**	**13**	**LN05**
RK9CZQ	**M**	**6**	**3**	**1**	**MO06**

FINLAND

OH3DP	**6**	**1,140**	**38**	**38**	**KP10**

GERMANY

DL2OM	**A**	**19,488**	**158**	**84**	**JO30**
DK5DQ	**2**	**19,686**	**193**	**51**	**JO31**
DL1DBR	**2**	**728**	**26**	**14**	**JO41**
DH5MM	**Q**	**270**	**16**	**15**	**JO52**
DL1ET	**Q**	**208**	**14**	**13**	**JO31**

GREECE

SV2FLQ	**6**	**9**	**3**	**3**	**KN10**

HUNGARY

HA1ZH	**A**	**6,784**	**91**	**53**	**JN86**
HA3DX	**6**	**14,880**	**160**	**93**	**JN96**
					(Op: HA4XH)
HA7LW	**6**	**1,813**	**49**	**37**	**JN97**
HA6VW/P	**2**	**16,512**	**192**	**43**	**JN97**
HA2VR/P	**Q***	**4,192**	**76**	**32**	**JN87**
HA5OT/P	**Q***	**2,160**	**60**	**18**	**JN87**
HA5CQZ/P	**Q***	**1,638**	**63**	**13**	**JN97**
HA5AZC/P	**Q***	**1,463**	**44**	**19**	**JN97**
HA5TI/P	**Q***	**1,092**	**39**	**14**	**JN97**

KALININGRAD

RU2FM	**2**	**98**	**7**	**7**	**KO04**
UA2FL	**Q**	**8**	**2**	**2**	**KO04**

LATVIA

YL3DR	**A**	**3,243**	**56**	**47**	**KO26**
YL2NS	A	750	28	25	KO26
YL2FZ	**6**	**7,208**	**106**	**68**	**KO37**
YL2TQ	6	2,880	60	48	KO37
YL2CP	**6**	**1,968**	**48**	**41**	**KO27**
YL2PJ	**6**	**1,110**	**37**	**30**	**KO36**
YL2EC	**6**	**154**	**14**	**11**	**KO06**

LITHUANIA

LY3M	**6**	**891**	**33**	**27**	**KO25**
LY2SA	**6**	**672**	**28**	**24**	**KO14**
LY2FN	**Q**	**520**	**26**	**20**	**KO14**

MARITIME MOBILE REGION 1

YO4RYU/MM	**R**	**79,365**	**387**	**195**	**6**

MOLDOVA

ER1LW	**6**	**5,782**	**98**	**59**	**KN46**
ER1DA	**6**	**1,107**	**41**	**27**	**KN47**

MONTENEGRO

4O3A	**A**	**1,026**	**34**	**27**	**JN92**

NORWAY

LA2OKA	**6**	**165**	**15**	**11**	**JP53**

POLAND

SP7VC	**6**	**224**	**16**	**14**	**JO91**
SN3R	**M**	**8,364**	**102**	**41**	**JO71**

PORTUGAL

CT1HAR	**A**	**1,012**	**39**	**23**	**IN51**
CR5M	**Q**	**234**	**17**	**13**	**IN61**
CT1DZY	**6**	**572**	**26**	**22**	**IN51**

ROMANIA

YO8DDP	**A**	**2,046**	**53**	**33**	**KN36**
YO4HAB	**6**	**464**	**29**	**16**	**KN45**
YO6ADW	**6**	**49**	**7**	**7**	**KN36**
YO4BTB	**6**	**1**	**1**	**1**	**KN34**
YR5T	**M**	**488**	**24**	**17**	**KN27**
					(Op: YO5CBX)

SERBIA

YU7TRI	**2**	**4,060**	**70**	**29**	**KN04**
YU2DX	**Q**	**6,256**	**86**	**46**	**KN04**

SICILY

IT9BLB	**6**	**910**	**35**	**26**	**JM68**
IT9VDQ/9	**2**	**4,256**	**76**	**28**	**JM68**

SLOVAK REPUBLIC

OM9ACA	**A**	**3,977**	**60**	**41**	**JN88**
OM4XA	**6**	**825**	**33**	**25**	**JN98**

SLOVENIA

S53N	**6**	**12,865**	**155**	**83**	**JN65**

SWEDEN

SA1A	**6**	**1,160**	**40**	**29**	**JO97**
					(Op: SM1TDE)
SM5QU	**6**	**320**	**20**	**16**	**JO99**
SM5DQE	**6**	**156**	**13**	**12**	**JO89**
SM0FM	6	49	7	7	JO99
SM5CSS	6	36	6	6	JO89
SK6HD	**6**	**1**	**1**	**1**	**JO68**
					(Op: SM6FKF)
SM7I	**2**	**4**	**2**	**1**	**JO65**
SM6WET	**M**	**357**	**21**	**17**	**JO68**

SPAIN

EA2TO/1	**A**	**26,384**	**180**	**97**	**IN83**
EA3AKY	**6**	**45,619**	**343**	**133**	**JN11**
EA5GF	**6**	**12,768**	**168**	**76**	**IM98**
EA2ARD	**6**	**10,395**	**135**	**77**	**IN93**
EA5YU	**6**	**9,230**	**130**	**71**	**IM97**
EA5DIT	**6**	**3,763**	**71**	**53**	**IM99**
AM3TC	**6**	**168**	**14**	**12**	**JN01**
					(Op: EB3TC)
EB1EWE	**6**	**81**	**9**	**9**	**IN53**
EA3FHP	**6**	**25**	**5**	**5**	**JN11**
EA4CWN	**6**	**1**	**1**	**1**	**IM89**
EB2RA	**6**	**1**	**1**	**1**	**IN92**
AO1GHE	**Q***	**608**	**32**	**19**	**IN62**
EA3MM	**M**	**7,638**	**114**	**67**	**JN11**

THE NETHERLANDS

PA5WT	**6**	**2,976**	**62**	**48**	**JO22**
PA1W	**6**	**36**	**6**	**6**	**JO21**

UKRAINE

UY1HY	**A**	**17,622**	**153**	**99**	**KO60**
UY5QO	**A**	**2,176**	**46**	**34**	**KN77**
UT8IM	**A**	**1,836**	**44**	**36**	**KN87**
UT2UU	A	396	20	11	KO50
UZ7U	**6**	**12,665**	**149**	**85**	**KO50**
UT4UO	6	4,785	87	55	KO50
UT7UW/P	**6**	**2,795**	**65**	**43**	**KN58**
UT5ERP	**6**	**2,106**	**54**	**39**	**KN77**
UWØK	**6**	**744**	**31**	**24**	**KO30**
UU6JJ	**6**	**504**	**24**	**21**	**KN75**
UT1IA	**6**	**399**	**21**	**19**	**KN87**
UT5JCW	**2**	**6,450**	**75**	**43**	**KN64**
US8ZAL	**2**	**4,550**	**65**	**35**	**KN66**
UT5DV	**2**	**2,700**	**54**	**25**	**KN18**
UR3EE	**2**	**2,688**	**48**	**28**	**KN88**
UR5UI	**2**	**1,302**	**31**	**21**	**KN59**
UR4QZZ	**2**	**1,224**	**36**	**17**	**KN77**
UT3EK	**2**	**936**	**26**	**18**	**KN78**
URØEQ	2	520	20	13	KN78
UZ2HZ	**2**	**280**	**14**	**10**	**KN69**
UT3LL	**2**	**270**	**15**	**9**	**KO80**
UR5IOT	2	250	25	5	KN88
UR5LX	**2**	**240**	**12**	**10**	**KO70**
UR7INK	2	230	23	5	KN88
UR6EC	2	176	11	8	KN78
US5ID/P	**Q***	**270**	**27**	**5**	**KN98**
UU6JF/P	**Q***	**8**	**2**	**2**	**KN85**
UT5UUV	**Q**	**1,587**	**37**	**23**	**KO50**
UT5ST	**Q**	**1,428**	**34**	**21**	**KN28**
UT2IJ	**Q**	**536**	**35**	**8**	**LN08**
UT5IZ	**Q**	**231**	**18**	**7**	**KN88**
UT6IO	**Q**	**168**	**13**	**8**	**KN97**
UU7JR	**Q**	**40**	**5**	**5**	**KN74**
UTØIC	**Q**	**6**	**2**	**2**	**KN87**
UX2SB	Q	456	19	12	KN28
US7IIZ	**Q**	**384**	**32**	**6**	**KN98**
UT3IK	Q	360	30	6	KN98
US5IVL	Q	312	26	6	KN88
UY2IW	Q	288	24	6	KN98
US7IL	Q	270	27	5	KN98
UX7IT	Q	260	26	5	KN98
US5IW	Q	240	24	5	KN88
UY2ID	Q	230	23	5	KN98
US1IJ	Q	210	21	5	KN97
UY9IA	Q	190	19	5	KN98
URØIM	Q	180	18	5	KN88
US7IPJ	Q	170	17	5	KN87
US5IFL	Q	90	15	3	KN98
UR3IU	Q	72	9	4	KN88
US5MPO	Q	66	11	3	KN98
UX2IO	**Q**	**48**	**6**	**4**	**KN86**
UR4IN	Q	40	5	4	KN86
UR3IDY	Q	12	3	2	KN88
UR5EEA	**Q**	**12**	**3**	**2**	**KN78**
UR5IBB	Q	12	3	2	KN88
US8ITS	Q	12	3	2	KN98
US2IR	Q	4	2	1	KN98
UT1I	**M**	**162,162**	**563**	**189**	**KN98**
UR7D	**M**	**141,576**	**445**	**204**	**KN18**
UT7E	**M**	**29,988**	**203**	**126**	**KN78**
UT1IWF	**M**	**5,580**	**98**	**30**	**KN88**
UZ2I	**M**	**3,621**	**71**	**51**	**KN86**
UT4UWR	**M**	**3,569**	**65**	**43**	**KN77**
UZ2E	M	2,100	42	25	KN78
US3ITU	**R**	**17,248**	**154**	**56**	**9**
US6IF	R	600	23	15	4

SOUTH AMERICA

ARGENTINA

LU1BJW	**6**	**4**	**4**	**1**	**GF05**
LU8ADX	6	3	3	1	GF05
LU2UF	**2**	**28**	**7**	**2**	**FF73**
LU1UBJ	2	4	2	1	FF73
LU1UDD	**2**	**2**	**1**	**1**	**FF83**
LU5UBI	**Q***	**2**	**1**	**1**	**FF73**
LU2UE	**Q**	**2**	**2**	**2**	**FF73**
LU2MCA	**R**	**320**	**17**	**10**	**6**

BRAZIL

PY2NF	**A**	**245**	**22**	**7**	**GG66**
PY2LCD	A	180	18	6	GG66
PY2REK	**A**	**33**	**6**	**3**	**GG65**
PV8AZ	**6**	**8**	**4**	**2**	**FJ92**
PU8TEP	**Q**	**2**	**2**	**1**	**FJ92**

CHECK LOGS

The following submitted check logs: HA7PL, K7RXC, K9JU, KA1RI, KB1RDE, LU1UAB, NØJK, OK1XC, SP7AWG, UR7IM, US2IEP, US5IRC, UTØLWW, UT2IV, UT7IL, UX1IW, UY3IO, VE7HLW, WA3AAN, XV9DT, YO3FOU.

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Announcing:

The 2011 CQ World-Wide WPX Contest

SSB: March 26–27 **CW: May 28–29**

Starts: 0000 GMT Saturday **Ends: 2359 GMT Sunday**

I. Objective: For amateurs worldwide to contact as many amateurs and prefixes as possible during the contest period.

II. Period of Operation: 48 hours. Single Operator stations may operate 36 of the 48 hours—*off times must be a minimum of 60 minutes* during which no QSO is logged. Multi-operator stations may operate the full 48 hours.

III. Bands: Only the 1.8, 3.5, 7, 14, 21, and 28 MHz bands may be used. *Observance of established band plans is strongly encouraged.*

IV. Terms of Competition for All Categories:

(a) All entrants must operate within the limits of their chosen category when performing any activity that could affect their submitted score. Only the entrant's callsign may be used to aid the entrant's score.

(b) A different callsign must be used for each entry.

(c) Entrants must not exceed 1500 watts total output power, or the maximum output power of their country, or the power limit of their entry category, whichever is less, on any band.

(d) Self-spotting or asking other stations to spot you is not allowed.

(e) Use of QSO alerting assistance is limited to the Single Operator Assisted and Multi-Operator categories. QSO alerting assistance is the use of any technology or outside method that provides callsign and frequency information regarding any other station to the operator. It includes, but is not limited to, use of DX cluster, packet, local or remote call and frequency decoding technology (e.g., Skimmer), Internet chat rooms or websites, and operating arrangements involving other individuals.

(f) All operation must take place from one operating site. 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.

(g) The entry location of a remote station is determined by the physical location of the transmitters, receivers, and antennas. A remote station must obey all station and category limitations.

V. Entry Categories:

A. Single Operator Categories: Only one person (the operator) can contribute to the final score during the official contest period. Only one transmitted signal is permitted at any time. QSO alerting assistance of any kind places the entrant in the Single Operator Assisted category (see subsection B below).

(a) Single Operator High (All Band or Single Band): One person performs all of the operating and logging functions. QSO alerting assistance is not permitted. Total output power must not exceed **1500 watts.**

(b) Single Operator Low (All Band or Single Band): One person performs all of the operating and logging functions. QSO alerting assistance is not permitted. Total output power must not exceed **100 watts.**

(c) Single Operator QRP (All Band or Single Band): One person performs all of the operating and logging functions. QSO alerting assistance is not permitted. Total output power must not exceed **5 watts.**

B. Single Operator Assisted Categories: All operating and logging functions are performed by one person (the operator). Only one transmitted signal is permitted at any time. Entrants in this category may use QSO alerting assistance.

(a) Single Operator ASSISTED High (All Band or Single Band): Total output power must not exceed **1500 watts.**

(b) Single Operator ASSISTED Low (All Band or Single Band): Total output power must not exceed **100 watts.**

C. Single Operator Overlay Categories: Single Operator entrants may *also* submit their log for *one* of the categories shown below by adding an additional line in the Cabrillo log file header called CATEGORY-OVERLAY.

(a) Tribander/Single Element (TB-WIRES): During the contest an entrant shall use only one (1) tribander (any type, with a single feed line from the transmitter to the antenna) for 10, 15, and 20 meters; and single-element antennas on 40, 80, and 160 meters.

(b) Rookie (ROOKIE): To enter this category the operator must have been licensed as a radio amateur three (3) years or less on the date of the contest. Indicate the date first licensed in the SOAPBOX field.

D. Multi-Operator Categories (All Band, High power only): More than one person can contribute to the final score during the official contest period. Select category based on number of transmitted signals. **Total output power of each transmitted signal must not exceed 1500 watts.**

(a) Single-Transmitter (MULTI-ONE): Only one transmitted signal is permitted at any time. A maximum of ten (10) band changes may be made in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters counts as two band changes. Use a single serial number sequence for the entire log.

(b) Two-Transmitter (MULTI-TWO): A maximum of two transmitted signals is permitted at any time on different bands. Either transmitter may work any and all stations. A station may only be worked once per band regardless of which transmitter is used. **The log must indicate which transmitter made each QSO** (column 81 of CABRILLO QSO template for CQ contests). Each transmitter may make a maximum of eight (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 counts as two band changes. Use a separate serial number sequence for each band.

(c) Multi-Transmitter (MULTI-UNLIMITED): No limit to transmitters, but only one transmitted signal (and running station) allowed per band at any time. Use a separate serial number sequence for each band.

VI. Exchange: RS(T) report plus a progressive contact serial number starting with 001 for the first contact. *Note:* Multi-Two and Multi-Multi entrants use separate serial number sequences on each band starting with serial number 001.

VII. 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.

VIII. Prefix Multipliers: The prefix multiplier is the number of valid prefixes worked. Each PREFIX is counted only once regardless of the band or 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, LY1000, etc. Any difference in the numbering, lettering, or order of same shall count as a separate prefix. A station operating from a DXCC country different from that indicated by its call sign 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, /AD8, 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.

(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.

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

(a) Single-Operator:

(i) All-Band score is total contact points from all bands multiplied by the number of different prefixes worked.

(ii) Single-Band score is total contact points on the band entered multiplied by the number of different prefixes worked on that band only.

(b) Multi-Operator: Scoring is the same as Single-Operator, All-Band.

X. Awards: Only logs submitted in electronic format are eligible for awards. A single-band log will be eligible for a single-band award only.

(a) Plaques are awarded to recognize top performance in a number of categories. View the current list of plaques and spon-

sors at <http://www.cqwpx.com/plaques.htm>.

A station winning a World plaque will not be considered for a sub-area award. That award will be given to the runner-up for that area if the number of entries justifies the award.

(b) Certificates will be awarded to the highest scoring station in each category listed under Section V . . .

(i) In every participating country.

(ii) In each call area of the United States, Canada, Australia, Russia, Spain, and Japan.

(iii) At the discretion of the contest director second- and third-place awards may be made.

XI. Club Competition: A plaque will be awarded each year to the club that has the highest aggregate score from logs submitted by its members. To be listed in the results, a minimum of three logs must be received from a club.

(a) The club must be a local group and not a national organization (e.g., ARRL or DARC).

(b) Participation is limited to members residing in or operating from a local geographic area defined as within a 275 km radius from center of club area (exception: DXpeditions specially organized for operation in the contest and manned by members).

(c) Single-operator entries can only contribute to one club. Multi-operator scores may be allocated to multiple clubs as indicated with the entry. Please spell out the full club name in your entry.

XII. Instructions for Submission of Logs: We would appreciate receiving all logs in electronic format. Electronic submission of logs is **required** for anyone competing for an award and for all who use a computer to log the contest or prepare contest logs.

(a) The log MUST show the following for each contact: correct time in GMT, frequency (or band), call, serial number sent, and serial number received. A log without all required information may be reclassified to checklog.

(b) Single band entrants are required to include all contacts made during the contest period, even if on other bands. Only contacts made on the band specified in the Cabrillo header or summary sheet will be considered for scoring purposes.

(c) The CABRILLO file format is the standard for logs. For detailed instructions on filling out the CABRILLO file header, see the WPX Contest website <www.cqwpx.com>. Failure to fill out the header correctly may result in your entry being placed in the wrong category or reclassified as a checklog. *Note:* U.S. stations must indicate the location of where you operated from in the CABRILLO header (e.g., LOCATION: OH).

(d) E-mail is the expected method of log submission. SSB logs in CABRILLO format should be sent to <ssb@

cqwpx.com>. CW logs in CABRILLO format should be sent to <cw@cqwpx.com>. Include only your call sign in the "Subject:" line of your e-mail. 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 <www. cqwpx.com>.

(e) Instructions for NON-CABRILLO electronic logs: If you are not able to submit a CABRILLO format log, please contact the Contest Director for assistance with submitting another format.

(f) Instructions for paper logs: Paper logs may be mailed to CQ WPX Contest, 11 Hollis Street, Uxbridge, MA 01569 USA. Each paper log 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. Indicate SSB or CW on your envelope.

XIII. Rule Violations: Violation of amateur radio regulations or the rules of the contest; unsportsmanlike conduct; taking credit for excessive unverifiable QSOs or multipliers; use of any non-amateur means of communication to SOLICIT, ARRANGE, or CONFIRM any contacts during or after the contest will be deemed sufficient cause for disqualification.

An entrant whose log is deemed by the Contest Committee to contain rule violations may be issued a Yellow or Red card depending on the seriousness of the infraction. If the entry is in a multi-operator category, all listed operators are so affected.

YELLOW card: Any entrant or operator issued a yellow card is not eligible for an award and will be listed at the end of the published results.

RED card: Any entrant or operator issued a red card is not eligible for an award, will be listed at the end of the published results, and will be ineligible for any CQ-sponsored contest award for a period of one year beginning with the publication of the violation in *CQ* magazine.

XIV. Declaration: By submitting an entry in the CQ WPX Contest you agree that: 1) you have read and understood the rules of the contest and agree to be bound by them, 2) you have operated according to all rules and regulations of your country that pertain to amateur radio, 3) your log entry may be made open to the public, and 4) all actions and decisions of the WPX Contest Committee are official and final.

XV. Deadline: All entries must be emailed or postmarked NO LATER than 28 days after the contest (April 25, 2011 for SSB section and June 27, 2011 for the CW section). All logs, including e-mail entries, are subject to these deadlines. Logs postmarked after the deadline may be ineligible for any awards.

Questions pertaining to the CQ WPX Contest may be e-mailed to the WPX Contest Director, Randy Thompson, K5ZD, at <k5zd@cqwpx.com>.

Most hams we know who own a classic Bird Model 43 wattmeter wouldn't even consider replacing it. But how about updating it with a digital readout? AD5X takes a look at one such offering.

CQ Reviews:

Array Solutions AS-43A Digital Conversion Kit for the Bird Model 43 Wattmeter

BY PHIL SALAS,* AD5X

Nearly since it was introduced in 1952, the Bird Model 43 wattmeter has been the de-facto power-measuring standard in commercial and ham radio environments. Also, since its introduction the Bird 43 has not really experienced any major changes in design, even retaining its analog meter. However, today's accurate power meters employ digital readouts to eliminate analog interpolation and parallax reading uncertainties. This seemingly leaves the Bird 43 behind the competition. This deficiency has been corrected, though, with the introduction of the Array Solutions AS-43A digital readout conversion kit.

Photo A– Bird 43/AS-43A (left) vs Bird 43/analog meter (right). Which do you prefer to read?

The AS-43A

The AS-43A is a self-contained LCD digital readout that fits into the analog-meter position in the Bird 43 (see photo A). It converts the normal Bird 43 element analog readout to a 3-digit digital display on a large, easy-to-read screen. Power is provided by an integrated battery holder that holds four AA batteries. Just three buttons are included on the AS-43A: Power (On/Off), Backlighting (Light), and element power selection (Scale). Repeatedly pushing the "Scale" button cycles through all Bird element power levels, and the selected element power level is displayed in the lower left corner of the digital display. The backlighting, normally not needed except in low-light conditions, comes on when the AS-43A is first turned on but automatically shuts off after 90 seconds. Backlighting can be turned on or off anytime by pressing the "Light" button. The entire unit shuts off automatically after 90 minutes. The expected life with alkaline AA cells is 400 hours with the backlight off and 50 hours with the backlight on.

Installation details can be reviewed prior to obtaining the AS-43A by downloading the manual from the Array Solutions site, <www.arraysolutions.com>. The installation manual is very detailed and includes plenty of pictures for clarification. Installation requires no more than a Phillips-head screwdriver and a small adjustable wrench (or pliers) and will take the average ham less than 30 minutes. There are also instructions included for modifying the AS-43A so you can easily adjust the calibration of an out-of-calibration element, or trim the calibration of an element for best accuracy at your normal power level—such as improving accuracy of a 100-watt reading on a 250-watt element. However, adjusting the calibration on one element will undoubtedly throw off the calibration of other elements. Therefore, I would recommend this modification only if you have a single element that you use most of the time, and you have an accurate detector so you can precisely calibrate the AS-43A readout.

Testing Results

My home lab includes a MiniCircuits PWR-6GHS+ power sensor which is calibrated against NIST standards and has a typical measurement uncertainty of ±0.1dB from 1–3000

*1517 Creekside Dr., Richardson, TX 75081
e-mail: <dpsalas@tx.rr.com>

Band	MC	Bird 43	MC	Bird 43	MC	Bird 43	MC	Bird 43
80m	100	97	50	48	10	10	5	6
40m	100	99	50	49	10	10	5	6
20m	100	100	50	50	10	10	5	6
15m	100	100	50	50	10	11	5	6
10m	96	95	50	49	10	10	5	6

Table I– Minicircuits PWR-6GHS+(MC) vs Bird 43/AS-43A readings. Bird 100H 100-watt element. Power is in watts.

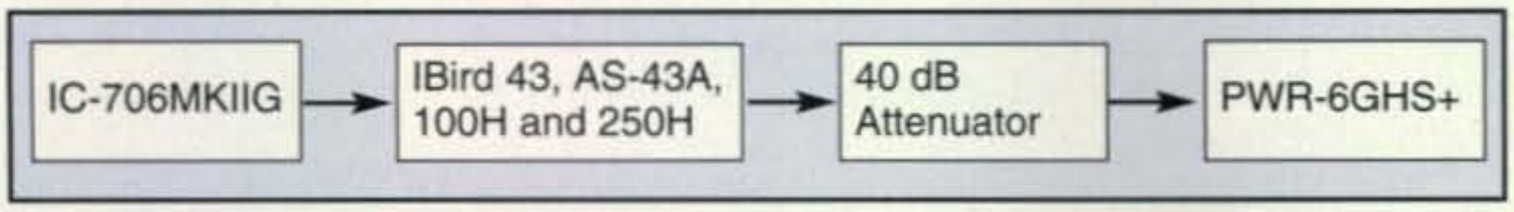

Fig. 1– Block diagram of power-measuring setup.

Band	MC	Bird 43	MC	Bird 43	MC	Bird 43
80m	100	94 (97)	50	48(52)	20	20(21)
40m	100	96(99)	50	49(53)	20	20(21)
20m	100	97(100)	50	52(53)	20	21(21)
15m	100	98(101)	50	52(54)	20	21(21)
10m	97	96(98)	50	53(54)	20	21(22)

Table II– Minicircuits PWR-6GHS+(MC) vs Bird 43/AS-43A readings. Bird 250H 250-watt element. Power is in watts. Figures in parentheses indicate revised readings after recalibrating the element (see text).

MHz, or about ±2.3%. Using this power sensor I've calibrated attenuators necessary for accurate power measurements up to 150 watts from 1 MHz to 1050 MHz. Using my precision measuring setup shown in fig. 1 and photo B, I checked the readings of the AS-43A using 100H 2–30 MHz 100-watt and 250H 250-watt Bird elements.

The data for the 100 watt element are shown in Table I. I was very surprised to see just how accurate the AS-43A readings were across the 100H Bird element range, even at a low-power level of 5 watts.

The data for the 250-watt element are shown in Table II. After the initial measurements, I modified the AS-43A with the adjustment pot and recalibrated the meter reading at 100 watts on 20 meters so as to attempt to make the readings slightly more accurate at my normal power level. The measured power of the modified AS-43A is shown in parenthesis. Again, note the accuracy of the AS-43A readings across the 250H Bird element range from 100 watts to 20 watts. The recalibration slightly improved the accuracy at my 100-watt power level, but very slightly degraded accuracy at the lower power levels. Thus, as you can see, in most cases this modification is not really necessary unless you have an out-of-tolerance element.

Summary

The Array Solutions AS-43A digital meter upgrade kit turns the Bird 43 analog-reading wattmeter into an accurate digital-reading wattmeter. Is it worth the price? Certainly if you have a Bird 43 with a damaged analog meter, the AS-43A really makes sense. However, even if you have a good analog meter in your Bird 43, it just might be time to put that analog meter in storage and convert your Bird 43 to a digital readout. You'll be very happy with the results.

The AS-43A is available from Array Solutions, 2611 North Beltline Road, Suite 109, Sunnyvale, TX 75182; telephone 214-954 7140; fax 214-954 7142; web: <www.arraysolutions.com>. Price: $189.

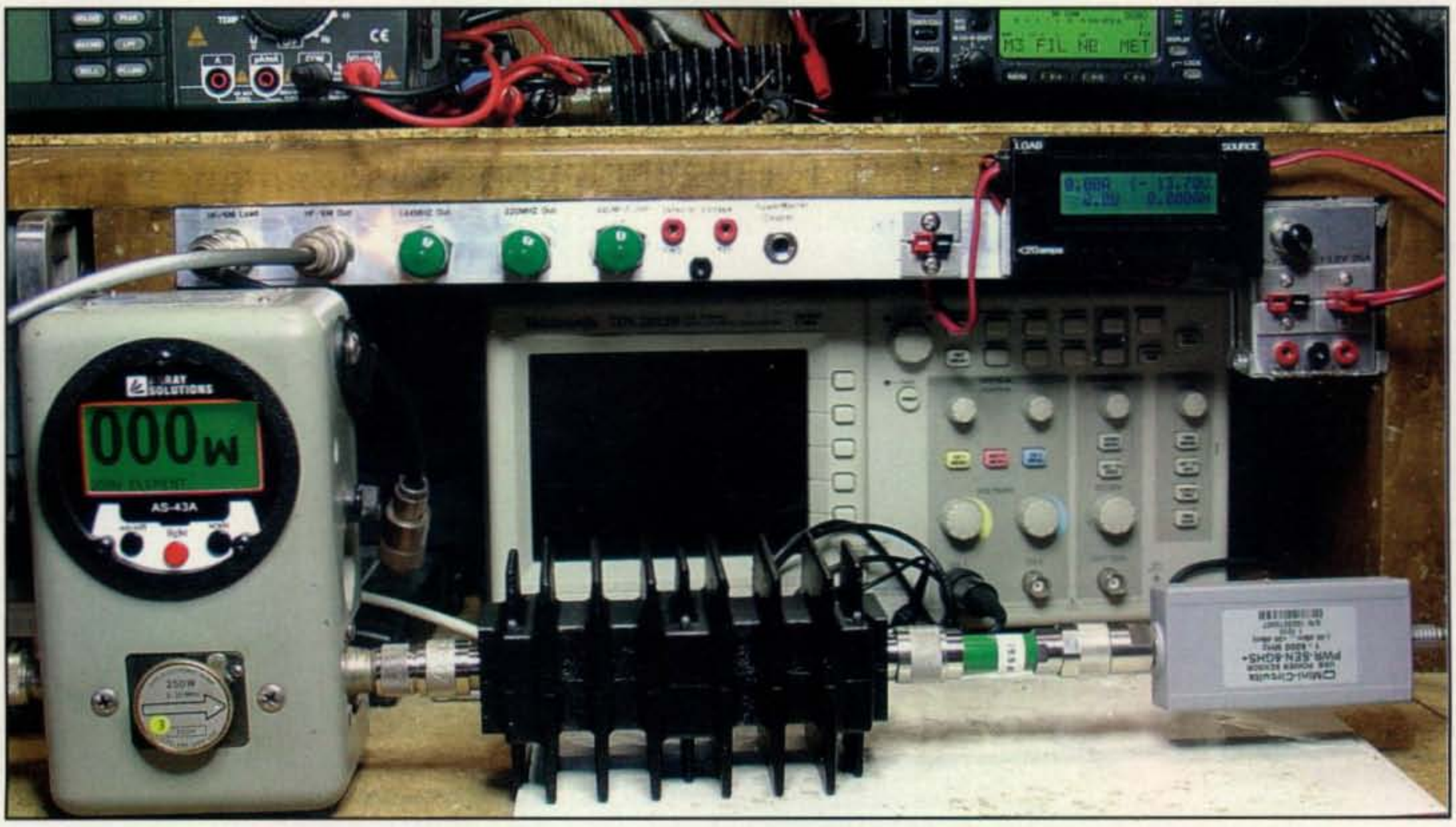

Photo B– The author's test setup.

What You've Told Us...

Our September survey asked about your level of activity on 6 meters, and specifically 6-meter DXing, now that most HF rigs include the band as standard coverage. Nearly two-thirds of the readers who responded (61%) identify themselves as DXers, and 81% currently have a radio that is capable of operating on 6 meters. Interestingly, only 68% have an antenna for 6 meters. Just about half of the respondents (49%) say they currently operate on 6, while 21% have used the band in the past and 28% have never tried it. Of those who do operate on "the magic band," 27% do so occasionally, 42% occasionally and 28% rarely. Nearly everyone, though (86%), knows what grid square they're in.

Being a DXer who operates on 6 meters doesn't necessarily guarantee that you'll be able to work DX on the band, though, as only 39% of the respondents say that they have made international contacts on 6, while 59% have not (and 1% isn't sure). "Wallpaper" for 6-meter accomplishments is also rare, with 84% reporting that they have not earned any operating awards on the band, while 10% have earned VUCC (VHF-UHF Century Club), 2% have 6-meter DXCC and 1% have 6-meter WAZ (not surprising, since only 99 of these have ever been issued). Another 8% report earning a 6-meter award not listed above.

Finally, we asked those not currently active on 6 meters whether they are interested in getting on the band, and those results were encouraging, with 78% answering yes, 22% not sure, and only 16% said no.

This month's free subscription winner is Bob Peterson, ABØWU, of Harvey, North Dakota, who *is* currently active on 6 meters.

Reader Survey February 2011

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 incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

(With our annual Market Survey in this issue, we'd like to know a little more about how you make your ham radio buying decisions.

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

1. How recently have you purchased a piece of ham gear?
- Within the past year....31
- 1–5 years ago....32
- 6–10 years ago....33
- More than 10 years ago....34
- Never....35

2. Where did you make your most recent ham gear purchase?
- At a store....36
- At a hamfest....37
- On the phone....38
- Online....39
- At another ham's home....40
- Other....41

3. From whom did you make your most recent purchase of ham gear?
- A ham dealer....42
- Direct from manufacturer....43
- Private purchase from another ham....44
- Other....45

4. What is your *primary* consideration in deciding which radio to buy (choose only one)?
- Features....46
- Price....47
- Brand reputation/experience....48
- Dealer recommendation....49
- Friend recommendation....50
- Other....51

5. What is your *primary* consideration in deciding what dealer to buy a radio from (choose only one)?
- Dealer reputation....52
- Dealer friendliness....53
- Dealer knowledge about equipment....54
- Dealer inventory....55
- Ease of ordering....56
- Price....57
- Service after the sale....58
- Do not buy from dealers....59
- Other....60

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

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■ **PK-232 RS-232-to-USB Adapter***
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Leaky capacitors can cause equipment failure, especially in older radios. This article provides a simple method of protecting caps from over-voltage breakdown, as well as a computer program to calculate specific values needed.

Protecting Capacitors in Series

BY WILLIAM RYNONE,* Ph.D., P.E.

A friend of mine volunteers at a local radio/electronics museum. Part of his responsibility there is the repair of equipment. He recently investigated the cause of a failure of a Viking Adventurer transmitter. Capacitors often fail due to excessive leakage and that was the situation for the Viking. Specifically, the electrolytic capacitors C15 and C16 were leaking (see fig. 1).

The use of a pi filter network (fig. 2) is common in linear power supplies. When high voltages are supplied to the output stage of a transmitter, the pi network may utilize high working-voltage rated capacitors. In some applications, each leg may consist of a single or two capacitors connected in series (fig. 3).

The decision as to whether to use a single capacitor, or two (or more) connected in series in each leg, is both an economic and technical trade-off. Some considerations are the total cost of a single high-voltage cap versus two caps each rated at half the working voltage and twice the capacitance of the single unit.[1]

When two caps are connected in series, if one becomes more leaky than

*c/o Rynone Engineering, Inc., P.O. Box 4445, Annapolis, Maryland 21403

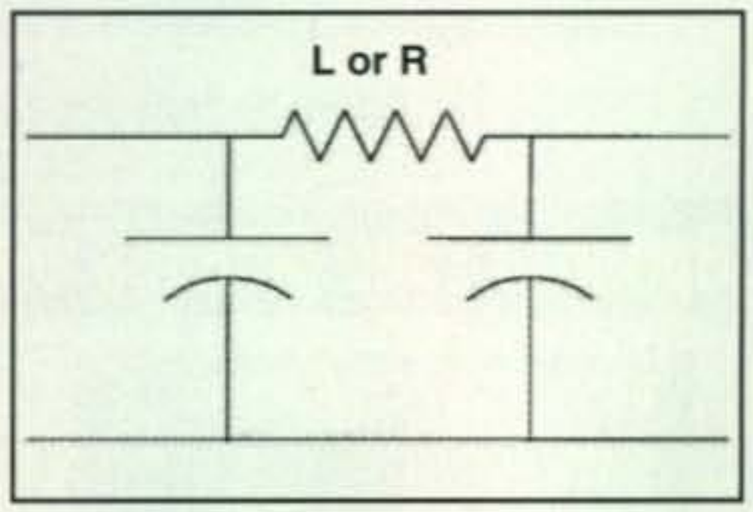

Fig. 2– The use of pi networks is very common in linear power supplies (the combination of the two capacitors and the resistor resembles the Greek letter π, or "pi," thus the name)

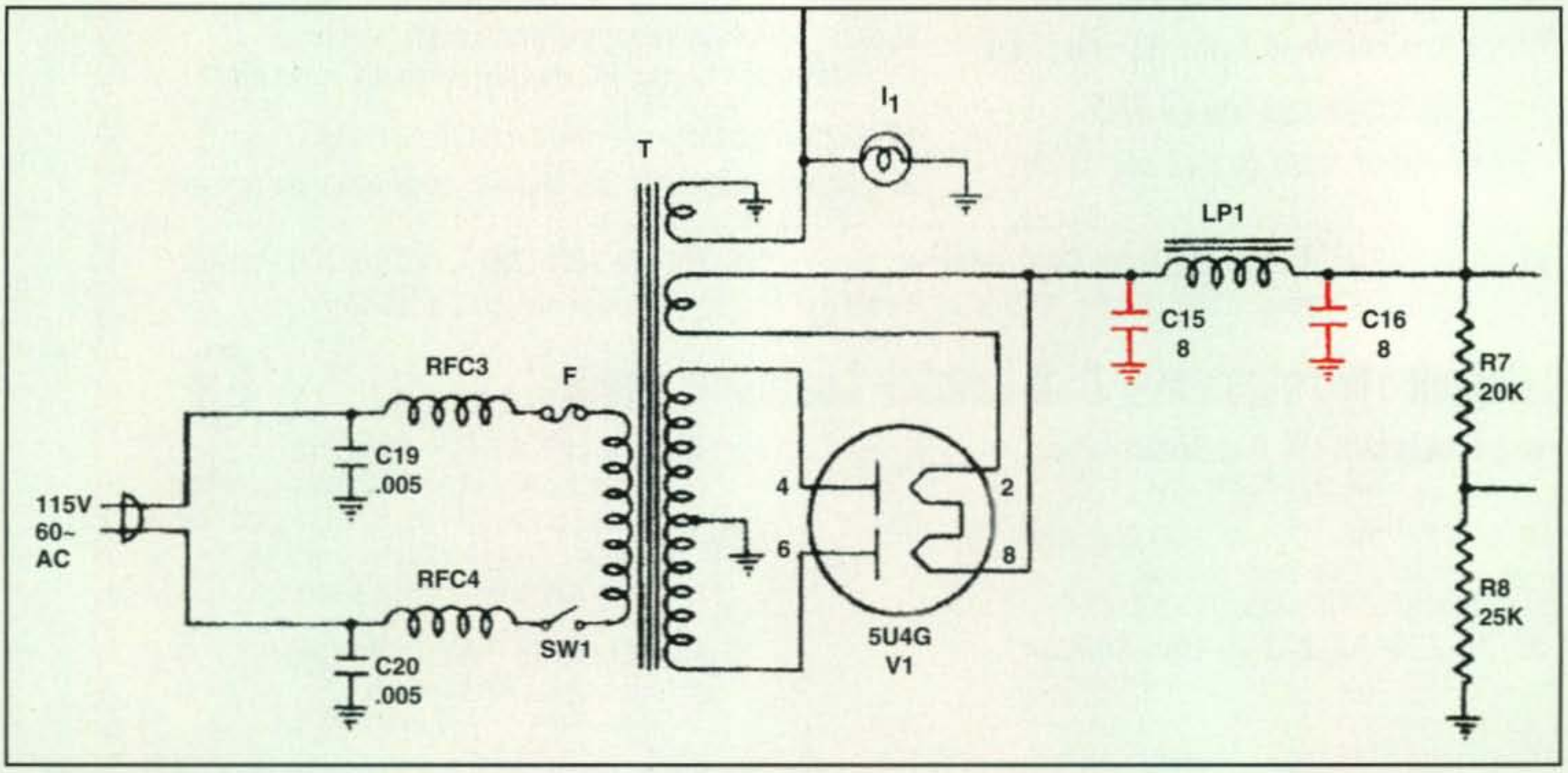

Fig. 1– Partial schematic of the Johnson Viking Adventurer transmitter showing the two capacitors (C15 and C16) that had failed due to leakage.

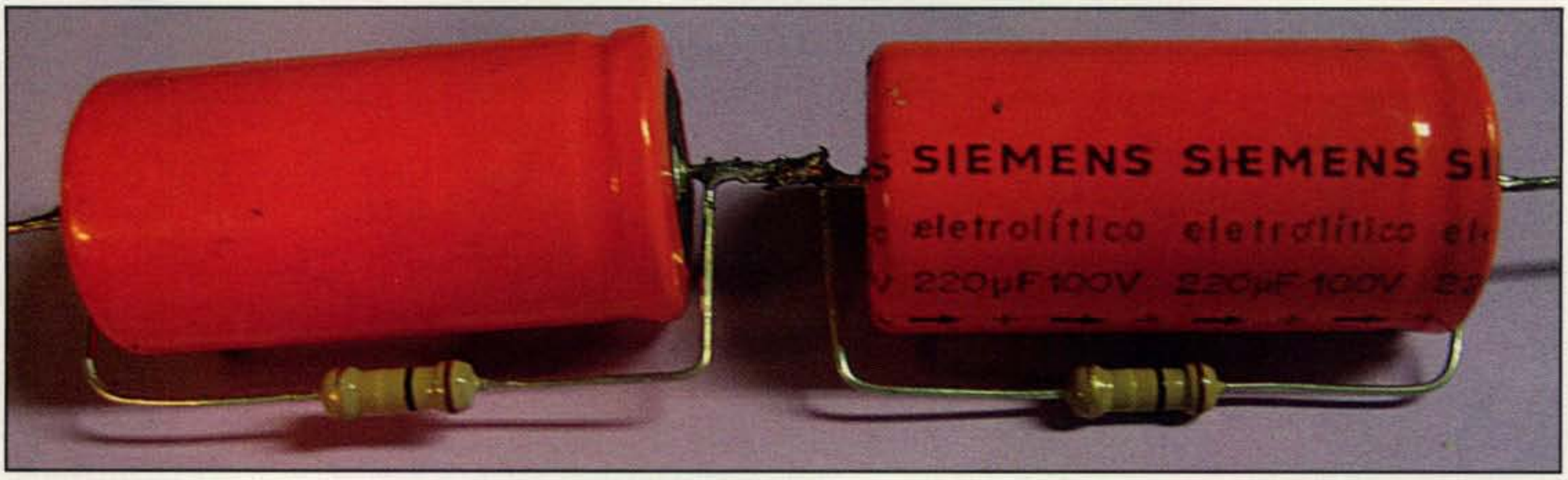

Photo A– Two capacitors connected in series, with "balance" resistors attached. These resistors may also be used to protect rectifier diodes in series, as sometimes used in high-voltage power-supply applications.

X	MULT	R	Vtop	Vbot	IR1	IR2	PR1*	PR2*
1	1	25.0E+06	329	471	0.132E–04	0.188E–04	0.00	0.01
2	2	12.5E+06	352	448	0.282E–04	0.358E–04	0.01	0.02
3	5	50.0E+05	376	424	0.751E–04	0.849E–04	0.03	0.04
4	10	25.0E+05	387	413	0.155E–03	0.165E–03	0.06	0.07
5	20	12.5E+05	393	407	0.314E–03	0.326E–03	0.12	0.13
6	50	50.0E+04	397	403	0.794E–03	0.806E–03	0.32	0.32
7	100	25.0E+04	399	401	0.159E–02	0.161E–02	0.64	0.64

** PR1 & PR2 represent the power dissipation in resistors R1 and R2, respectively.*

Table I– Effect upon the voltage regulation and power dissipated in R1 and R2 for various values of the current multiplier.

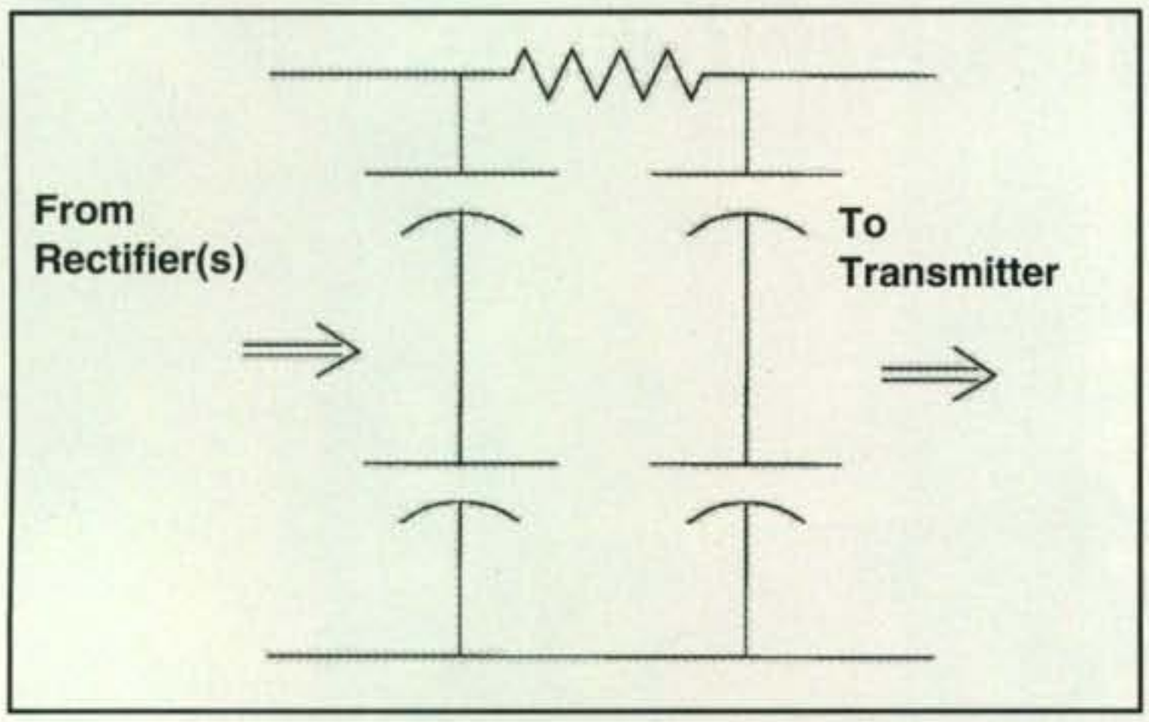

Fig. 3– Some pi networks include two or more capacitors in series on each "leg." If one of the capacitors becomes leaky, it may result in uneven voltages across the pair, which may lead to component failure.

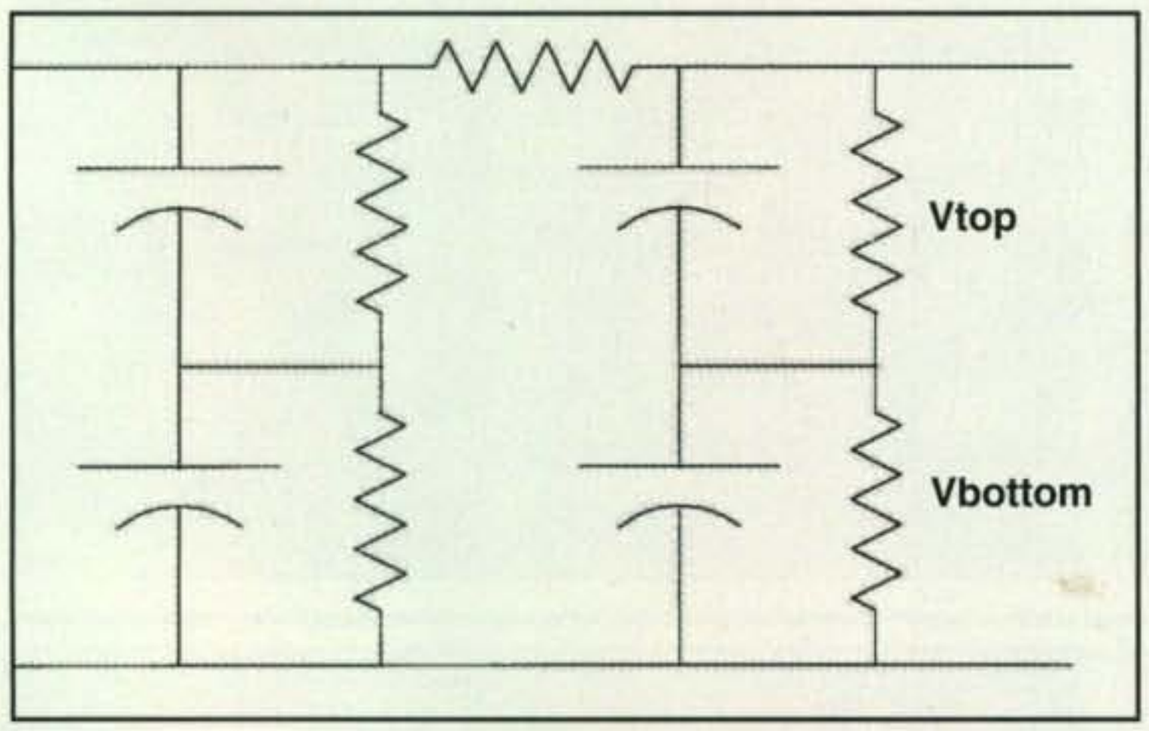

Fig. 4– Adding resistors in parallel with the capacitors in a pi-network can help prevent over-voltage damage. Also see photo A.

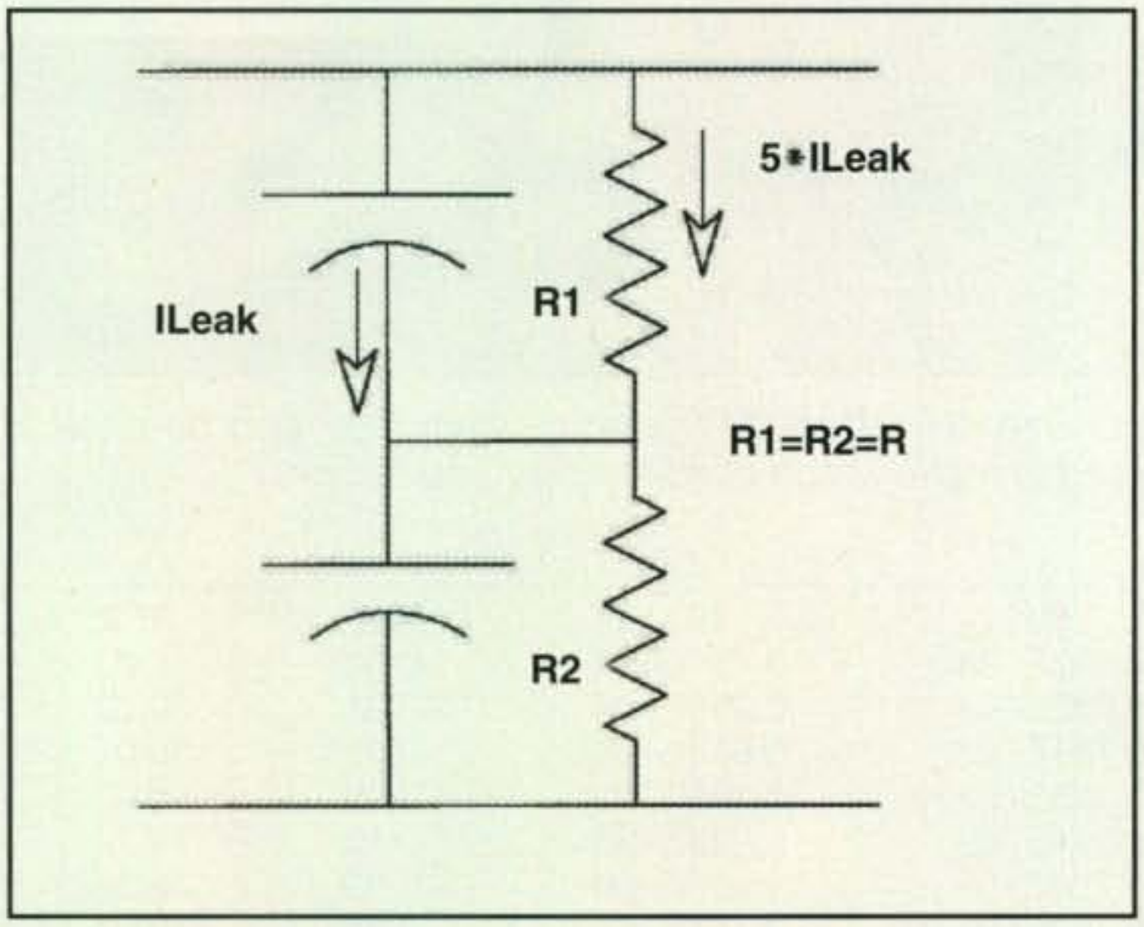

Fig. 5– The value chosen for the resistors is a compromise between reduced voltage across the capacitors and increased power demand/heat dissipation for the overall circuit. See Table I and computer program for different options.

The function of the resistors is to minimize the change in voltage appearing across each cap due to increasing cap leakage.

the other, the rectifier voltage will unequally be divided between the two caps. Specifically, the leaky cap will have a lesser percentage of the rectifier voltage across it than its companion. In a severe leakage environment, the voltage appearing across the low-leakage cap may exceed its working voltage rating, resulting in component failure.

To ameliorate this possibility, it is common to connect a resistor in parallel with each cap with both resistors having identical values (see fig. 4 and photo A). The function of the resistors is to minimize the change in voltage appearing across each cap due to increasing cap leakage.[2] The lower the resistor value, the less effect that leakage current will have in changing the voltage appearing across each cap. However, the result of use of low-value resistors is to increase the power dissipated in each resistor and also increase the current that must be supplied by the rectifier(s) and transformer (fig. 5). Thus, it is important to take these matters into account in determining the best resistor values for your situation.

Table I displays the effect upon the voltage regulation and power dissipated in R1 and R2 for various values of the current multiplier. These data were compiled via a computer program run where V Line-to-Line was 800 volts, the leakage of the top cap was 24×10^{-6} amp and the leakage of the bottom cap was 12×10^{-6} amp. This simple program will allow you to calculate the resistor values needed for your specific application. Free copies of the computer program are available from the author on a compact disc, or may be downloaded from the *CQ* magazine website.[3] For a CD, send a stamped, self-addressed envelope to the author at the address listed on the first page of this article.

My thanks to Mr. Oscar Ramsey for his testing and data acquisition.

Notes

1. Remember that capacitors in series are like resistors in parallel, with values derived from the formula:

$$\frac{1}{\frac{1}{C1}+\frac{1}{C2}+\frac{1}{C3}\ldots \text{etc.}}$$

For only two capacitors, an easier formula is:

$$\frac{C1 \times C2}{C1 + C2}$$

If the values are identical, two capacitors in series have half the capacitance of each of the two alone.

2. These "balance resistors" may also be used to protect rectifier diodes connected in series, as is sometimes done in high-voltage power-supply applications.

3. To download the computer program TST_CAP, go to <http://www.cq-amateur-radio.com>, click on the cover of the current issue to see the issue highlights (or go to back issue highlights if you've delayed reading this), then click on the link for the program).

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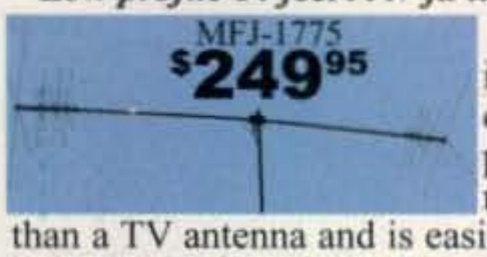

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Can a dedicated CW enthusiast ever have too many "bugs"? Apparently not. N6GND tells us not only about his collection, but how he learned the art of sending with these sometimes frustrating devices.

Infested with Bugs

BY MIKE FERRO,*N6GND

This is about a radio operator mechanical desk infestation. I renewed my interest in amateur radio at the end of last April when I took the exam for a Technician license. It had been 50 years since I'd pounded any brass or tried to make sense of faint dits and dahs wearing headphones and turning knobs on the Hallicrafters S-38D I used as a Novice and beginning General Class licensee back in the late 1950s.

I still remembered the code pretty well, and it was not long before I had a straight key and a practice oscillator and began to practice sending CQs and responding to calls. I remembered that at some point in my earlier Morse code career I'd bought a J-36 bug made by Lionel during the World War II. I remember getting the J-36 home, taking it apart, removing the shorting lever (which I couldn't imagine ever using) as well as another part or two which seemed unnecessary to me, putting it back together, and fiddling with it until it seemed like it was working. I can't vouch for the quality of my "fist" with that first bug, but I do remember getting an occasional compliment on my straight-key sending and being quite aware of the difference between elegant and easily understandable code, and, let us say, all the rest.

With my new bug I was determined to be among the top ops. After passing my exam to return to ham radio, I bought a CW transceiver kit and started thinking about getting a new bug. I identified (only) three that I thought might be necessary to have, given my reborn infatuation with the music of Morse. First there was the Begali Intrepid. This bug is quite expensive, made in Italy (where my grandparents also were "made"), impressive in appearance *come tutte le cose italiane* (like all things Italian), fabulously adjustable with rare earth mag-

N6GND, who returned to ham radio in 2010 after a 50-year absence, is now the proud owner of three distinctively different bugs.

nets instead of springs, and, last but not least, weighing in at a magnificent five pounds—nearly equivalent to a six-pack (cans), and thus very unlikely to skitter about the desk. Next there was the 90-degree VIZBUG handmade by Tom Desaulniers, K4VIZ. This one is very different in looks, compact in size, and according to most reviewers, a favorite bug, also very reasonably priced. Then, of course, there was my old J-36. I got one on eBay in the guise of a Vibroplex Lightning made in the early '70s.

As one bug begat another on my operating desk and began to spit out Morse that was possibly more noise than music, I realized that there was much more to setting up and using a bug than I had imagined. Thus, I sought advice everywhere I could find it on the internet. I also kept notes of my experience and my progress toward more confident and effective self-expression and communication. I came to accept that there is no single, authoritative, source of information about bug technique. I also realized, in part through listening to operators on the air, that there are many people who would like to master the bug but who find it a daunting task. If you've found that bugs bug you (in whatever way), I hope that my observations may be helpful.

An Expressive Dance

A bug may be more difficult to master than an electronic keyer because a bug is more physically demanding than a keyer. Using a bug is like pounding brass with a straight key. It's an expressive dance requiring considerable energy, and any bug will make some mechanical, as well as electrical, music. Bugs allow a wide and subtle range of expressiveness such that individual "fists" can be clearly recognized and still stay within the limits of absolute clarity and beauty of expression. Overall speed of send-

*e-mail: <fagiolaio@comcast.net>

ing with a bug can also be varied within perhaps a five-words-a-minute range with a single dit speed setting, with dit/dah spacing and spacing between characters adjusted as needed.

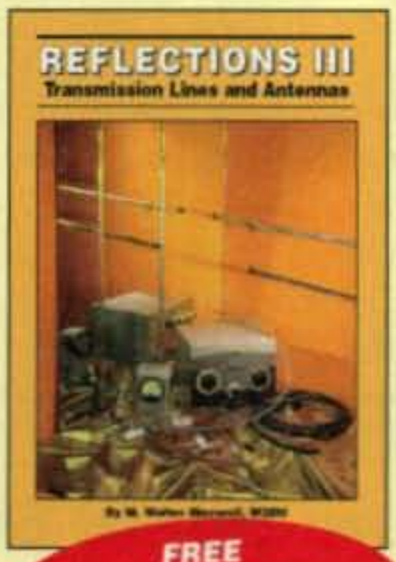
My first experience with my first new bug, the Begali Intrepid, was revealing. This bug has eight, that is *eight*, adjustment screws, each having a large-diameter (8 mm), a very fine thread, and a spring to prevent settings from drifting. In venerable Italian style, I didn't read the instructions (Germans read instructions and follow them, the French read the instructions and throw them away, and the Italians just throw them away) and set about to try to make the bug send well at the slowest possible speed with a minimum of throw distance in either the dit or the dah direction. When I finally read the instructions, I found them to be very detailed and clear, but they didn't help me to either slow down this bug as much as I wanted or decide what amount of dit or dah travel might work best for my purposes.

The Begali is indeed extremely adjustable, and I was able to get it to work at small throw distances (about 1/32 inch). I assumed that a smaller throw distance would be best for sending with quick transitions between dits and dahs within the same character. For example, I found that my "f" didn't sound right to me and that "x" was difficult to send properly. I was to discover that my assumptions about throw distance were probably mistaken, but my main difficulty was trying to slow down the Begali Intrepid to below about 18 wpm, or 6 dits per second. Given the complex, folded-back-upon-itself and closely spaced design of the Intrepid, I could discover no simple way to add weight to the pendulum or to extend it.

I next began to wonder about getting another bug which I could slow down so that I could perfect my sending technique at the same 12- to 14-wpm speed that I was able to copy easily. I searched on eBay for a used Vibroplex Lightning. I knew that Vibroplex sold a "Vari-Speed" pendulum extender that could slow down to 10 to 12 wpm. I also read about Tom Desaulniers' 90-degree VIZBUG, and some reviewers noted that this bug could be slowed down to 10 or 12 wpm.

I ordered a VIZBUG from Tom and received it within a few days. I plugged it into my practice oscillator and adjusted it according to my instruction-free notions and found that it worked very well, but that its slowest speed was again about 18 wpm. Accordingly, I went to my nearby hardware store and bought two sizes of brass tubing, the larger of which fit perfectly over the end of the pendulum on the VIZBUG and the smaller of which fit perfectly into the larger size. The smaller size had the same diameter as the pendulum. I cut the larger tube so that when it was placed on the pendulum, it extended just beyond the end of the VIZBUG's base. I then soldered a piece of the smaller tube inside it, just long enough to provide a place for attaching the weight. This worked perfectly to slow down the VIZBUG to about 10 wpm, or 4 dits per second. I found that what I liked about Tom's bug, compared to the Begali, was how easy it was to slow it down and its simplicity of adjustment.

The Begali Intrepid and the VIZBUG are almost complete opposites in design. The Begali is a high-tech device, made using complex casting and machining processes and many different metals and other materials (Begali's main business is manufacturing aircraft parts) with the widest possible range of subtle adjustments. The VIZBUG is made mostly of brass, with stainless flat springs for the pendulum and dit contact and silver contacts. The VIZBUG's



design is highly refined and focused ,and it performs beautifully with a minimum of fussing. It has only five adjustments, which are very straightforward and minimally interactive. One interesting comparison between the two bugs is the number of dits each will produce before the pendulum runs out of energy. The Begali produces about 20 properly spaced and weighted dits, which are plenty; 10 are all that are required for sending. The VIZBUG just goes on and on, producing about 70 dits. I think this reflects Tom Desaulniers' careful refinement of his design.

I later discovered that the VIZBUG can be adjusted to send slowly without modification. It will slow down to about 12 wpm if the damper adjustment screw is backed out so that the weight can be moved to the end of the pendulum. The damper screw is then adjusted so that it touches the weight rather than the pendulum. The plastic bumper on the end of the damper screw can be trimmed to allow a greater range of adjustment or it can be removed entirely. Tom told me that originally he did not use a bumper; the bumper further quiets the already very quiet VIZBUG.

The Vibroplex Lightning is not a quiet bug; it's the "cucaracha" of my collection. The clanking noise of my old J-36 was what I remembered about it from 50 years ago. I found my Lightning on eBay and it cost half of what my VIZBUG cost, which in turn was less than half the cost of my Begali. After my winning eBay bid, I ordered a Vari-Speed from Vibroplex. Without the Vari-Speed, the Vibroplex Lightning at its slowest setting produced dits appropriate for about 22 wpm, the fastest of my bug infestation. Soon the Vari-Speed arrived, and I installed it to find that I could easily adjust my Lightning down to about 12 wpm (5 dits per second).

So how does one adjust a bug? With a Begali, at every whim. There is an amazing range of "feel" with a Begali Intrepid. There is also a unique adjustment which both slows down the pendulum and lengthens the dits with a magnet that attracts the end of the pendulum in the same direction as the dit contact. This adjustment works in the opposite direction of the usual pendulum "damper" adjustment (which the Begali also has). With a VIZBUG, you just adjust it once and it works perfectly. The adjustment screws, locknuts, and posts are all brass and Tom says that this is why the adjustments are very secure. Vibroplexes, in whatever version or design, also are simple enough to get to work very well.

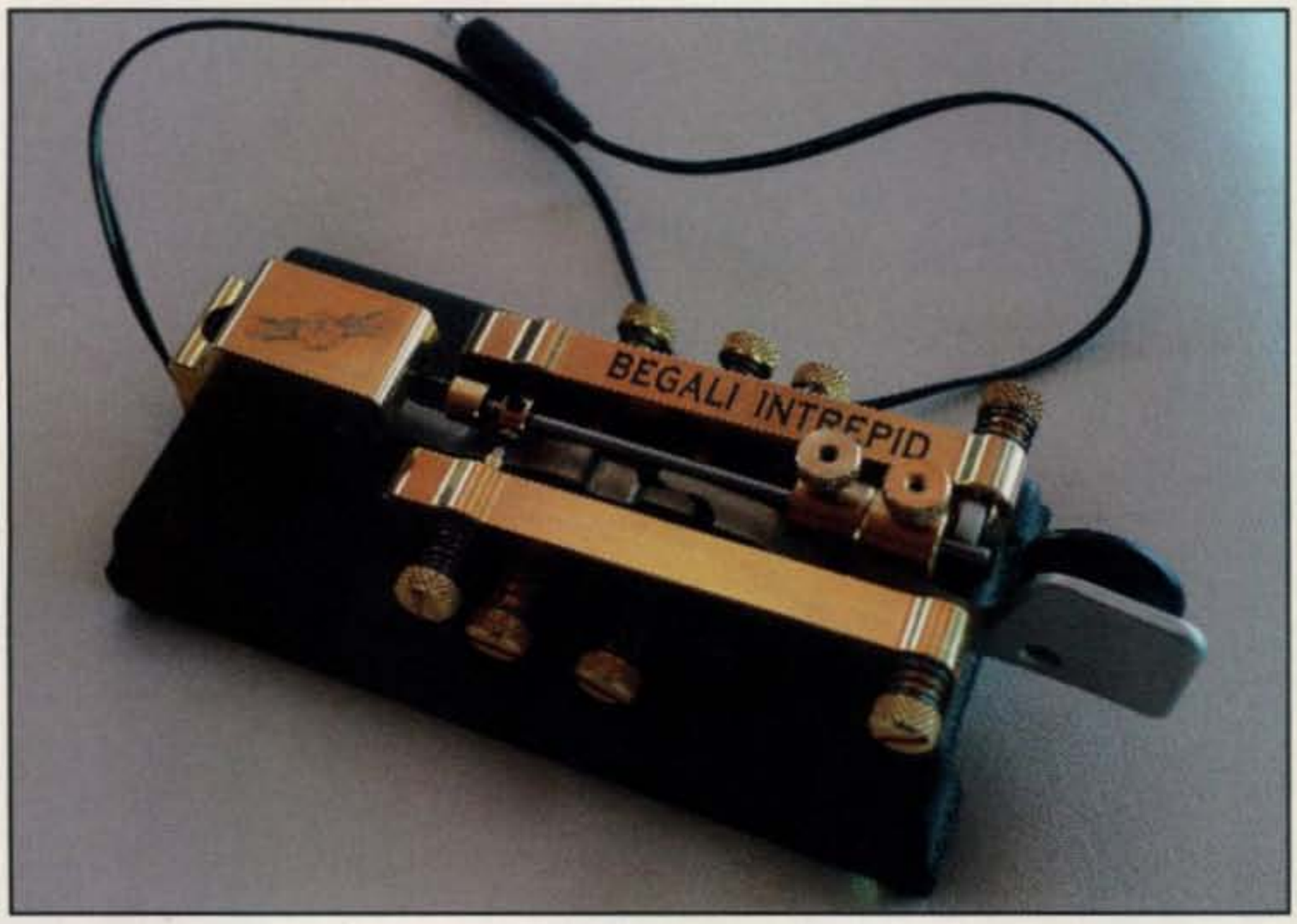
Bugs on the Internet

I found the first useful suggestion about how to adjust a bug properly on the "CW Bugs" Yahoo group, written by David Ring, N1EA, a former commercial radiotelegrapher. Ring suggests that the contact gaps in a properly adjusted bug should be wide and that the spring tension adjustments should also be firm. This was a surprise to me, as I had been working on exactly the opposite assumptions. Therefore, I widened my gaps to discover that more dit throw could help to slow down a bug. By opening the dit throw on my Begali to 1/8 inch or slightly more, I could slow it down to about 12 wpm, compared to the 18 wpm with a much narrower throw. Ring points out that dits sound best, and communicate best, when they are nice and fat. Ring also notes that for properly weighted dits, the (usually "u"-shaped) dit spring needs to compress slightly when the dit contacts meet.

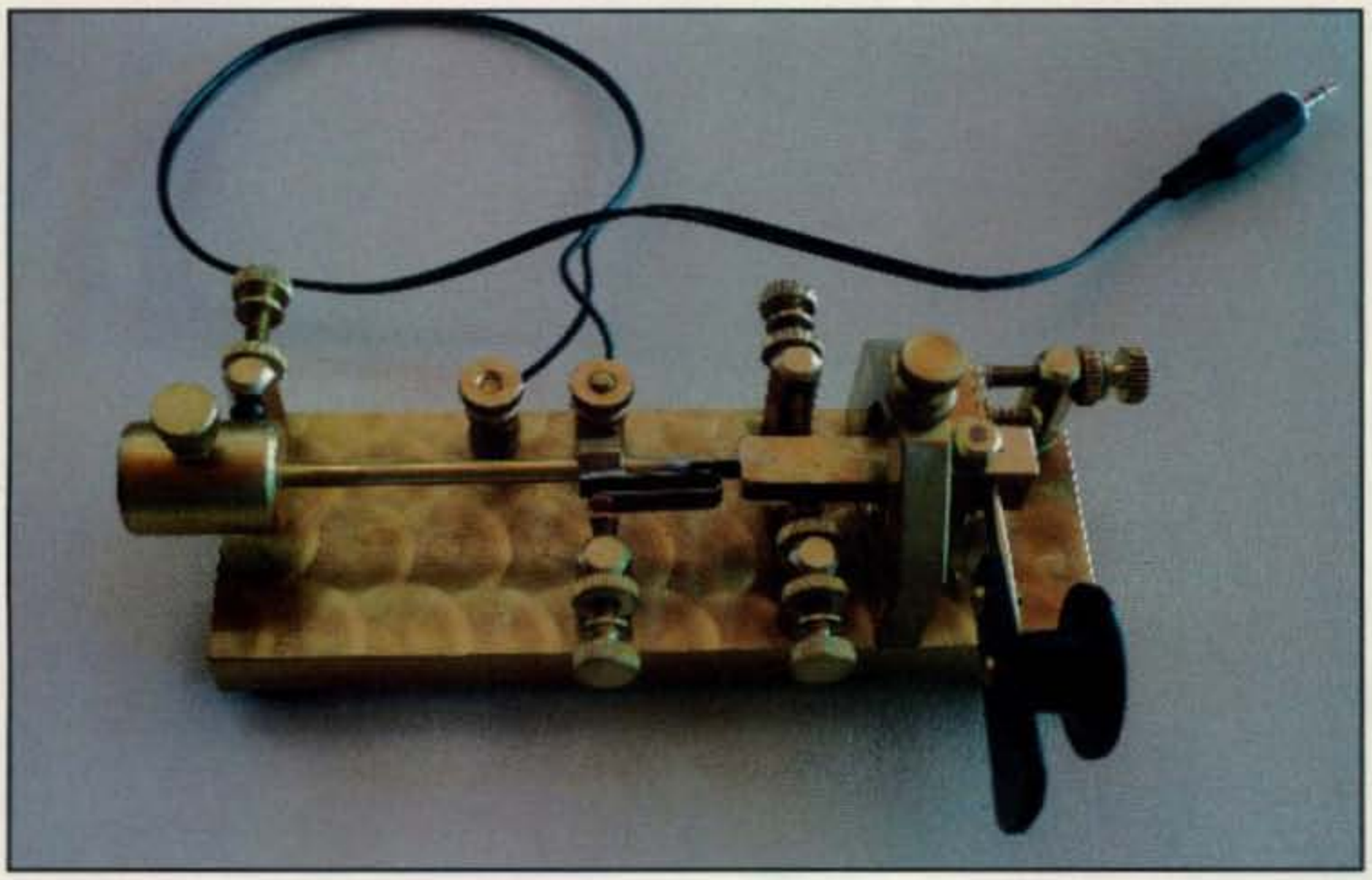
Opening up the dit throw on my bugs also pointed out something else to me—that using a bug requires an effort unlike using a paddle with an electronic keyer. There are no doubt different sets of

muscles used for working a bug than a keyer. I recalled my piano teacher's advice about learning to play scales rapidly: "Go slow to go fast." If you set your bug so that it makes dits slowly and you set its throw so that there is enough side-to-side movement, you then provide the conditions in which you can learn to form your code characters properly. You will have a greater challenge in learning these skills if you begin using a bug which is set at too high a speed or with paddle motions too constricted.

The best advice on bug adjustment I received came from Tom Desaulniers. Tom says that the first thing he does is to set the dit and dah paddle travel distances and then make all the other adjustments to accomodate these primary settings. Tom suggests that the dah contact distance be set at "the thickness of a thick business card," which is about 1/32 inch. On his VIZBUG this puts the dah travel distance at about 1/16 inch. Tom then sets the dit paddle travel distance at about 1/16 inch. His bug works very well at these throws, as do my other bugs. I have found that I prefer a dah throw which is about half the dit throw.



The high-end Begali Intrepid was Mike's first bug. It features no less than eight different points of adjustment.



The VIZBUG, whose paddle is turned 90 degrees from traditional design, has a minimum of adjustments. Mike needed to add some tubing to the pendulum to slow it down to a comfortable speed for him.

I suggest that new bug users try dit paddle travel distances of 1/8 to 3/16 inch. This will allow the bug to run at its slowest speed. Spring tensions should be high enough that the paddles return quickly and crisply to their central positions. In a QSO on CW I monitored recently, an operator complained that he had tried many times to master a bug but could not. I wonder whether he ever adjusted his bug so it sent slowly. Once again, you learn to go fast by going slow.

The Vibroplex Lightning is just like the J-36 bug that Mike had when he was a Novice back in the 1950s. He found this one on eBay.

Marine Radio Historical Society

On a recent weekend I visited the Marine Radio Historical Society in Bolinas, California. The society has a site at the old maritime commercial radio station KPH in what is now the Pt. Reyes National Seashore, an hour north of San Francisco. If you are a radio bug or a bug bug, you should visit. The society's very informative website is at <www.radiomarine.org>.

The best part of visiting the society building was meeting Richard Dillman, W6AWD, and Denice Stoops, KI6BBR, who are commercial radiotelegraph operators as well as amateurs. Denice was the first female radiotelegrapher to work at the former KPH, and Richard is likely to be the person working the bug on a Saturday on KSM or K6KPH. A contact with Richard as operator is a demonstration of CW at its best. He sends beautifully clear code at a speed that reflects perfectly the speed you send, and his fist is recognizable as uniquely his. Perhaps needless to say, Denice and Richard are both bugs about bugs and quite willing to engage in bug talk.

At the KSM/K6KPH operating and receiving site, a few miles from the transmitter site in Bolinas, there is a collection of bugs, mostly Vibroplexes and Les Logans, that still carry in their mechanical settings a critical part of bug tradition. Richard has carefully and respectfully left the bugs adjusted exactly as they were set by their original commercial operator-owners years ago, adjusted to perfection. I was privileged to be able to put my hand to a couple of these bugs, to discover that the character of their adjustments was very much as Tom Desaulners recommended—about a 1/16-inch dit throw, but with a smaller, perhaps 1/64- to 1/32-inch dah throw. I did notice a range of differing spring tensions from medium to quite light.

I asked Denice for her thoughts about learning to use a bug. She gave a very interesting reply, agreeing that the best way to learn is to go slow. I've heard this advice with regard to learning many different sorts of skills: To go fast you need to learn to go slow.

Denice also pointed out that when she began her career as a radiotelegrapher in the Coast Guard, and later in her career as the first female commercial radiotelegrapher for RCA (RCA was the last owner of KPH), she always wanted very much to be "one of the boys." This meant using a bug for sending and having her very own bug perfectly adjusted for her individual sending style. Electronic keyers were just not the way things were done by the pros. In the Coast Guard, any operator was allowed to use an electronic keyer without restriction. Being permitted to use a bug required a "Speed Key Endorsement."

Denice began her radiotelegraphy career using a keyer and ended up with a bug. Maybe you will, too!

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Sometimes not knowing which band will be open when, and to which part of the world, is part of the fun of ham radio. Sometimes when you need a little more certainty, though, a propagation prediction program can be very helpful. VE4KZ introduces us to one popular program, ACE-HF Pro.

QRZ?

Using a Propagation Prediction Program

BY BILL KARLE,* VE4KZ

If you have operated on the high-frequency (HF) bands for one or more solar cycles, then you probably have a "feel" for how propagation influences the likelihood of contact with another location. Print and online propagation resources are great aids for both new and experienced operators.

This article is about using computing software in order to predict when and how well a distant location will discern your signal. The article applies the program ACE-HF Pro (version 2.06.2) to some amateur telecommunication challenges.

Brief Overview of the Software

ACE-HF Pro provides propagation predictions in the 1.8- to 30-MHz frequency range. ACE stands for "Animated Communications Effectiveness," a concept used to portray complex coverage information by displaying a sequence of maps or graphs, a sort of movie result. The user can determine if a given band is likely to be open, as well as refined information such as signal-to-noise ratio (SNR), signal strength (S-units), maximum usable frequency (MUF), and so on.

Fig. 1 maps the coverage area of VE4KZ operating CW with 80 watts at the terminals of a quarter-wave vertical antenna on 20 meters. The coverage area is the "undimmed" part surrounded by the white line. The sub-solar point, grey-line, and day/night zones are depicted. Imagine a series of images showing how coverage varies by time of day. Optimal conditions can be identified and selected for use by the operator.

The software may be used in amateur radio mode (the ham mode) or in the shortwave listener (SWL) mode. Many antenna models are provided, including a set by L. B. Cebik, W4RNL (SK). The user is also able to create customized antenna models.

ACE-HF Pro, conceived by R. P. Buckner, P. Eng., uses the Voice of America Coverage Area Program (VOACAP), which applies empirical data from more than 50 years of research, in order to provide estimates of circuit quality. In a Windows® program, the writer is using the software on a MacBook with *Parallels*.

Challenge 1: Earn WAC

Assume that the goal is to earn the International Amateur Radio Union's (IARU) Worked All Continents (WAC) Award by confirming a two-way QSO with at least one station on each continent. Is it possible with an 80-watt CW station and a simple antenna?

Consider the telecommunications circuit. It consists of the transmitting, propagation and receiving conditions.

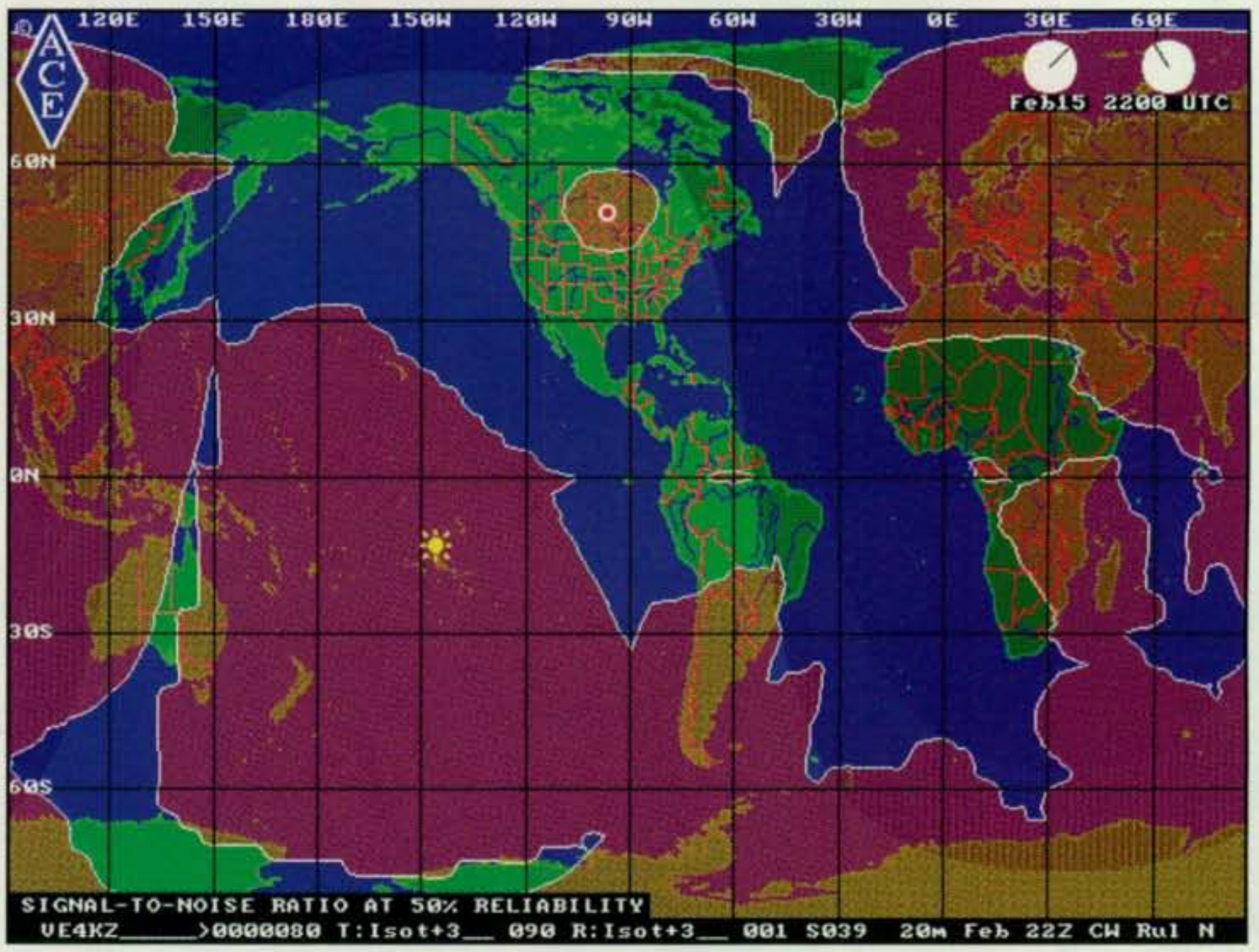

Fig. 1– Coverage area of VE4KZ. (See text for conditions.)

**P. O. Box 4, Belair, Manitoba, Canada, R0E 0E0*
e-mail: <ve4kz@yahoo.ca>

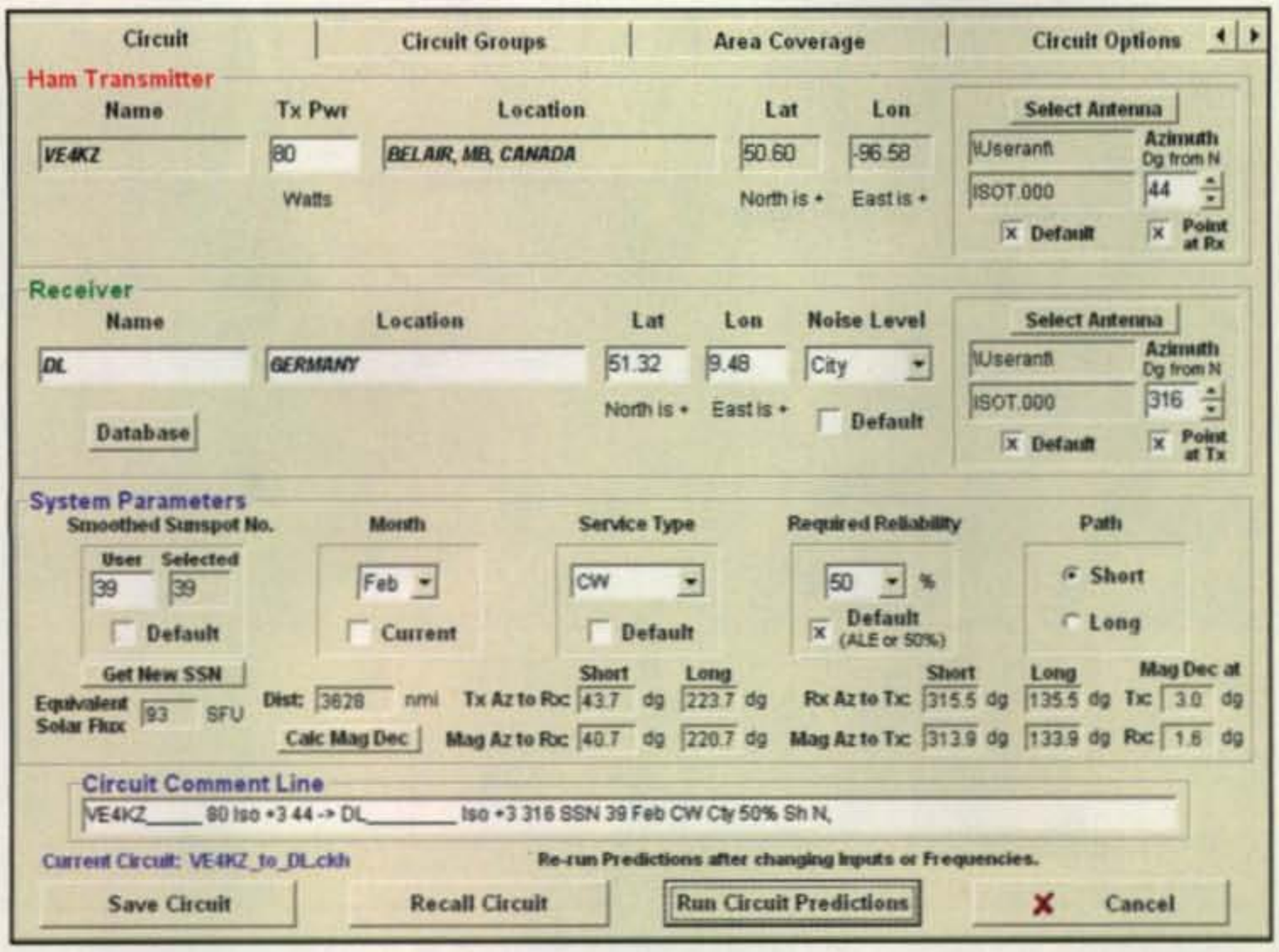

Fig. 2– Input screen setting up for circuit between VE4KZ and Germany (DL).

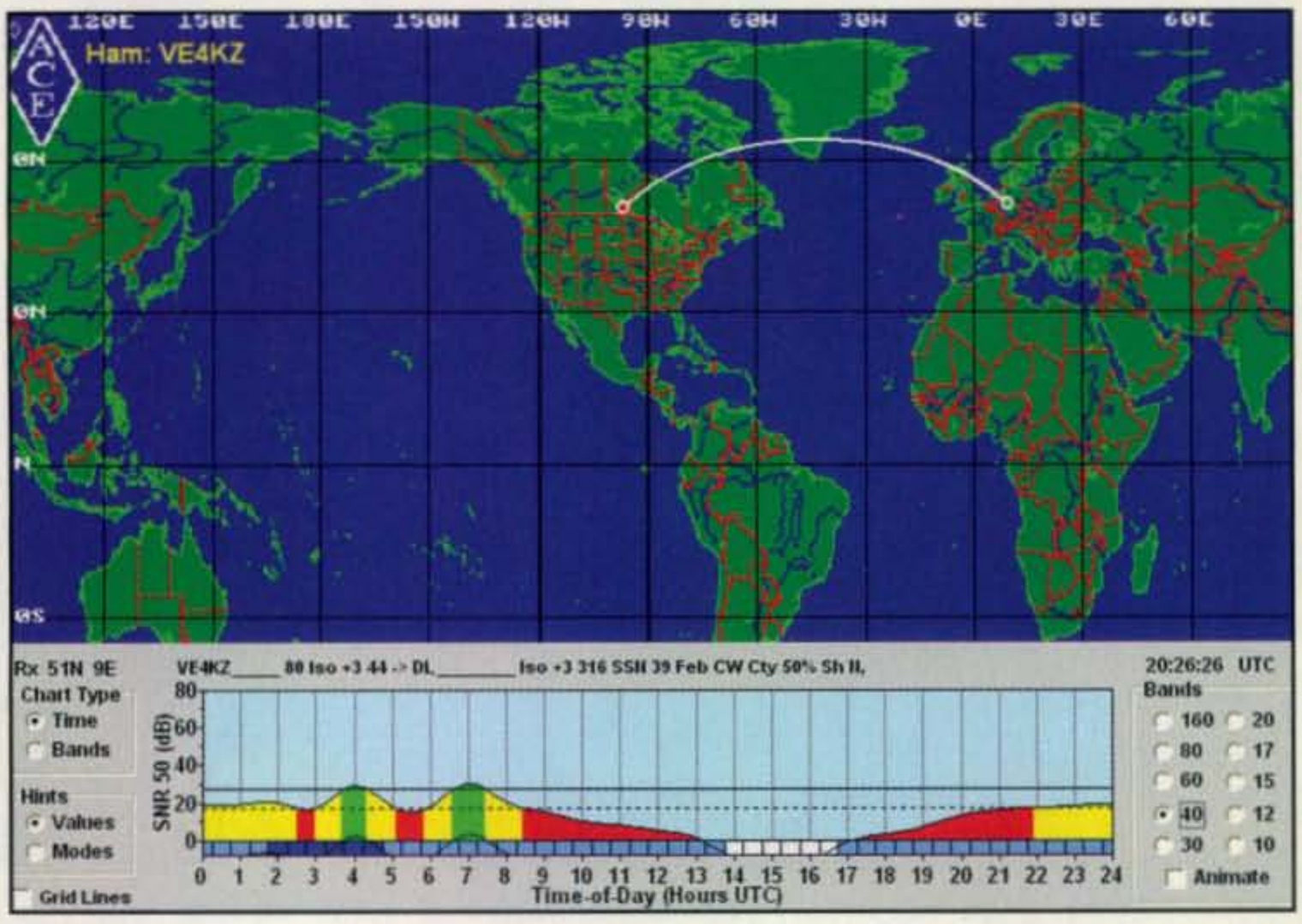

Fig. 3– Signal-to-noise ratio (SNR) throughout the day on 40 meters for the VE4KZ to DL circuit.

The ACE-HF Pro input frame is shown in fig. 2.

The latitude and longitude of the transmitting station, in this case VE4KZ, are pre-programmed. Should you go on a DXpedition or have a second operating location, an alternate coordinate set may be obtained from the vendor.

The power at the antenna terminals is the power output of the transmitter minus losses (principally transmission-line and mismatch losses). Assume 90 watts into the transmission line that has total losses of 10 watts, not a good setup, but okay for discussion. Therefore, 80 watts is the "TX Pwr."

The receiving QTH, Germany (DL), is entered by using the internal database or by other methods not discussed here. This QTH represents the European continent for WAC.

There are choices for the noise condition (industrial, city, rural, or remote) at the DL receiving site; the "city" noise level is selected. ACE-HF Pro computes SNR using signal algorithms and total noise power from internal models. Galactic, atmospheric, and human-

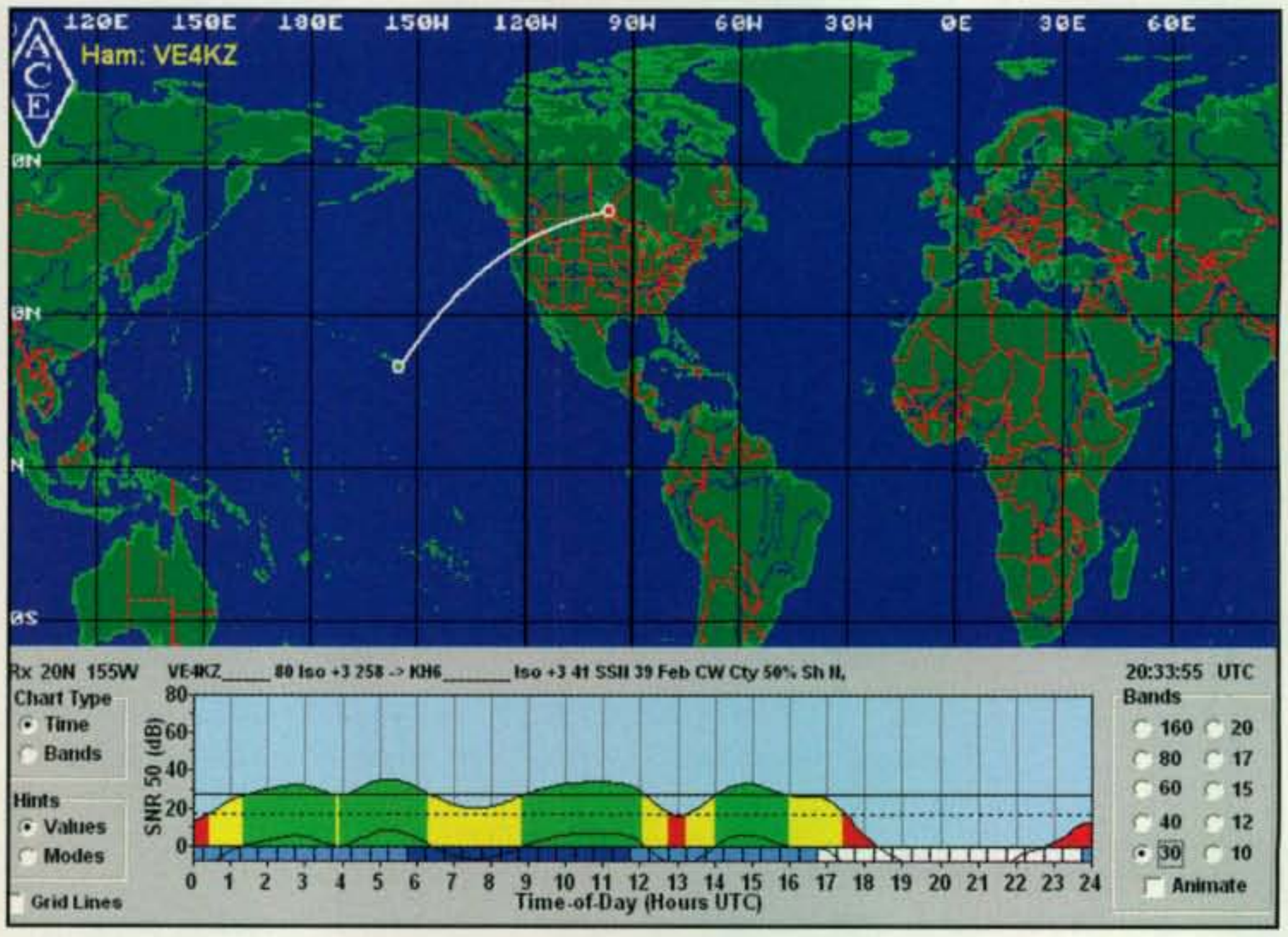

Fig. 4– The Hawaii circuit SNR on 30 meters.

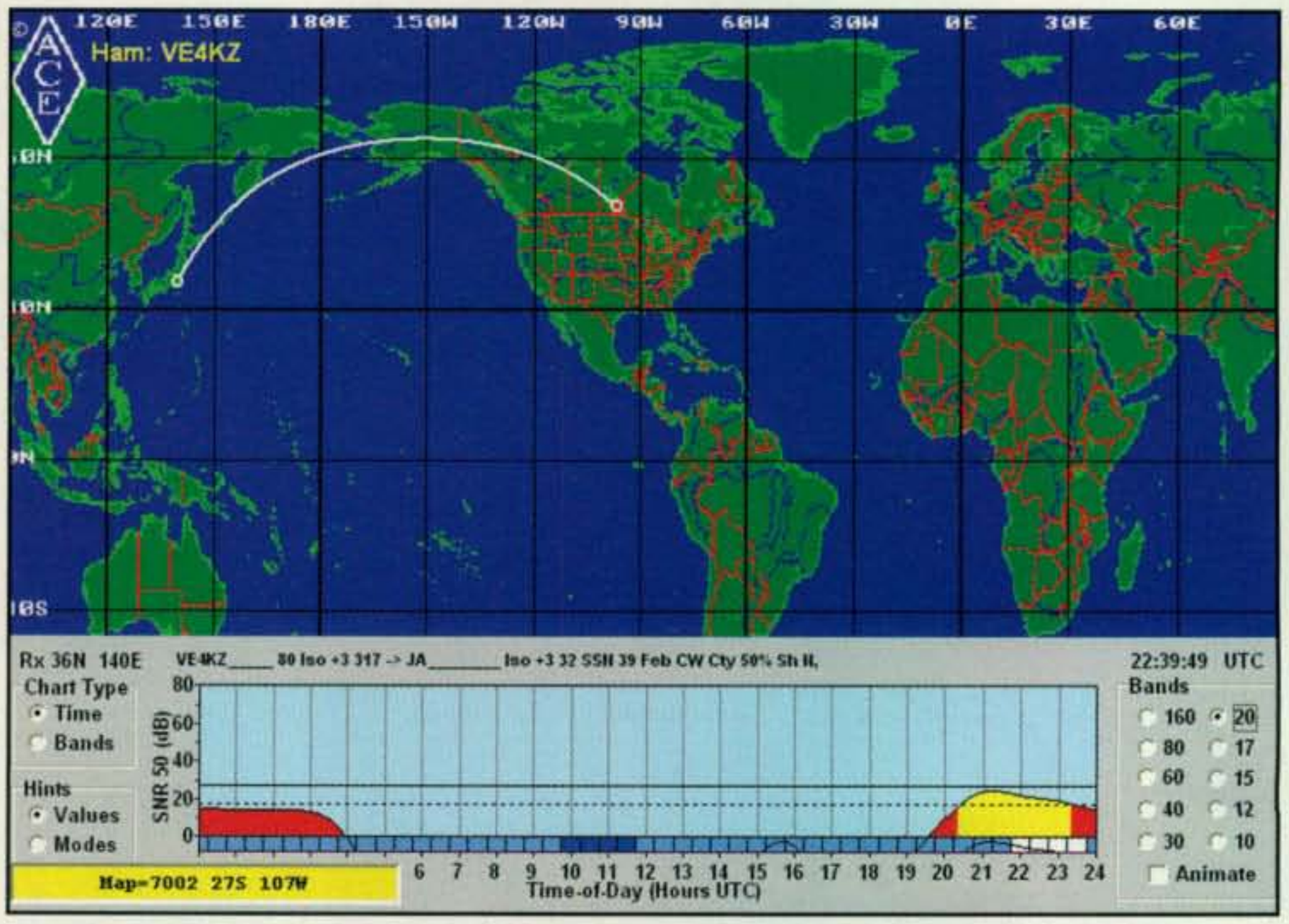

Fig. 5– The circuit to Japan on 20 meters is not promising.

made noise values are combined. Only the latter can be adjusted by the user.

Fictitious antennas are used for this demonstration. At each end, there are modified isotropic antennas that are non-directional but have 3 dB of gain due to ground reflection. This acknowledges that nothing is known about the receiving end, and to place near worst-case constraints on both ends. Isotropic antennas do not have a main lobe. However, if using directive antennas, the main lobes may be set to point at one another.

The Smoothed Sunspot Number (SSN) and time of year are entered. The SSN value of 36 is realistic for the early part of the present solar cycle (February 2011). The program has a button for obtaining current SSN. The National Geophysical Data Center provides historical and predicted values for those interested (see references). ACE-HF Pro, via its VOACAP engine, accounts for geomagnetic conditions. *A*- or *K*-indices are not needed.

Next, the required *reliability* is selected. Reliability means the predicted monthly time availability for each hourly computation. For example, 50-percent reliability means that the circuit, at the selected time, would be available on at

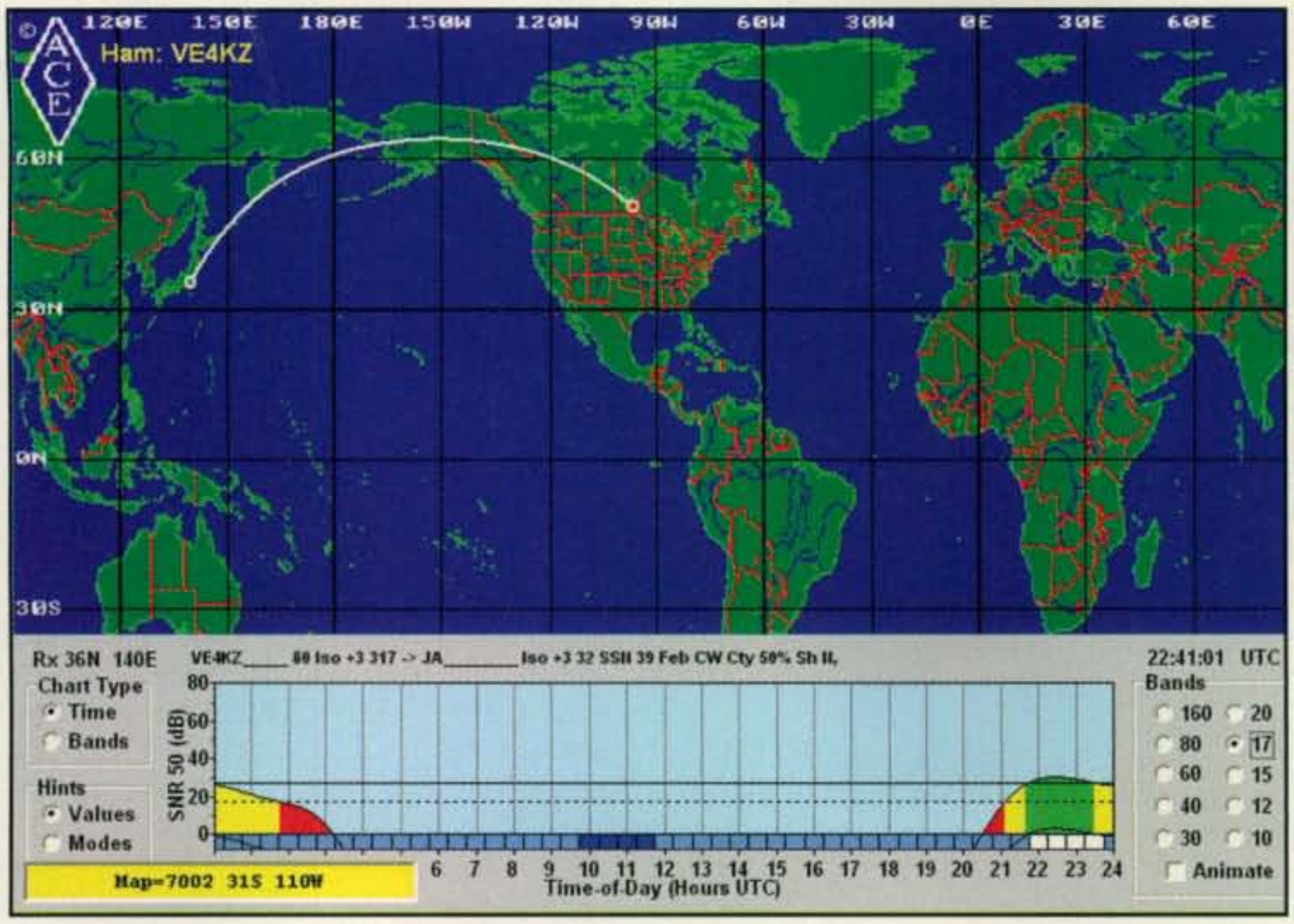

Fig. 6– The Japan circuit is more promising on 17 meters.

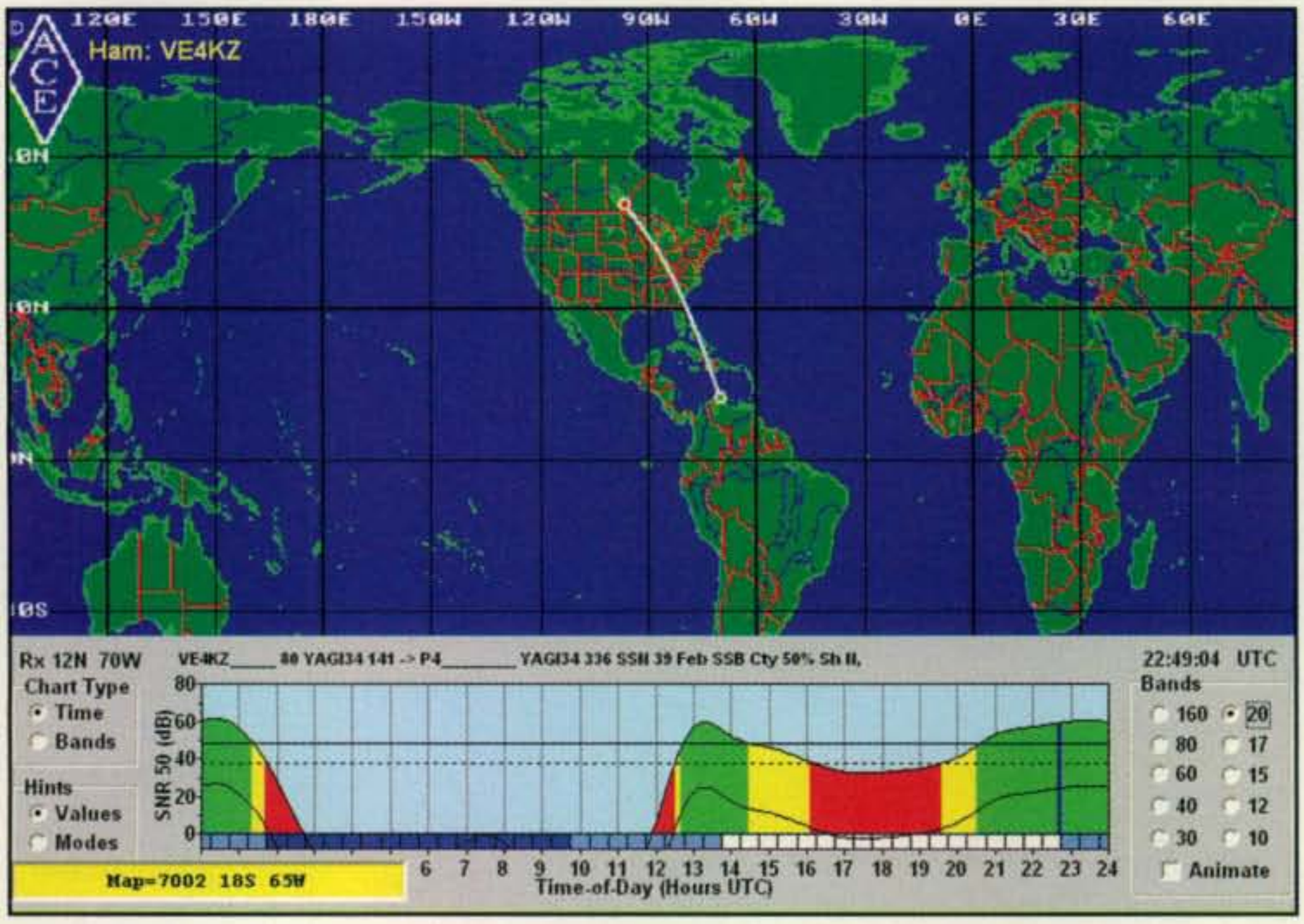

Fig. 7– Working the "snow-birds" in Aruba on 20 meters.

least 15 days of a 30-day month at the Required SNR (RSN).

When the mode, in this case "CW," is selected, the program employs a user-defined RSN and bandwidth. The default bandwidth for CW is set at 500 Hz and the RSN at 27 dB/Hz. The user can stipulate a lesser or greater RSN based on skill level. For example, a new operator might set a higher RSN, while an experienced contester might set a lower value. The program documentation discusses such matters.

With these input values, the program may be run. Fig. 3 shows the link from VE4KZ to Germany. The software is predicting the quality of the transmitted signal at the receive location using the 40-meter band. Amateur operator belief in the reciprocity of communications suggests that a German signal might be detected at VE4KZ, if all things are equal. In some cases, this will be true. One can simulate DL to VE4KZ by switching from the "ham" to the "SWL" mode. When done, the circuit conditions are closely similar.

The graph illustrates how the link varies in SNR (vertical axis) during the day (horizontal axis). SNR is the pri-

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The LDG AT-600Pro will handle up to 600 watts SSB and CW, 300 on RTTY (1.8 – 30 MHz), and 250 watts on 54 MHz. It will match virtually any kind of coax-fed antenna and will typically match a 10:1 SWR down to 1.5:1 in just a few seconds. You can also use the AT-600Pro with longwires, random wires and antennas fed with ladder line just by adding a balun. It has two antenna ports with a front-panel indicator, and separate memory banks for each antenna. Easy to read LED bar-graph meters showing RF power, SWR and tuner status, tactile feedback control buttons and an LED bypass indicator. Operates from 11 – 16 volts DC at 750 mA. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $359.99***

radio not included

AT-897Plus for the Yaesu FT-897

If you own a Yaesu FT-897 and want a broad range automatic antenna tuner, look no further! The AT-897Plus Autotuner mounts on the side of your FT-897 just like the original equipment and takes power directly from the CAT port of the FT-897 and provides a second CAT port on the back of the tuner so hooking up another CAT device couldn't be easier. ***Suggested Price$199.99***

- ***RF Sensing***
- ***Tunes Automatically***
- ***No Interface Cables Needed***

AT-100ProII

This desktop tuner covers all frequencies from 1.8 – 54 MHz (including 6 meters), and will automatically match your antenna in no time. It features a two-position antenna switch with LEDs, allowing you to switch instantly between two antennas. The AT-100ProII requires just 1 watt for operation, but will handle up to 125 watts. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $229.99***

Z-11ProII

Meet the Z-11ProII, everything you always wanted in a small, portable tuner. Designed from the ground up for battery operation. Only 5" x 7.7" x 1.5", and weighing only 1.5 pounds, it handles 0.1 to 125 watts, making it ideal for both QRP and standard 100 watt transceivers from 160 - 6 meters. The Z-11ProII uses LDG's state-of-the-art processor-controlled Switched-L tuning network. It will match dipoles, verticals, inverted-Vs or virtually any coax-fed antenna. With an optional LDG balun, it will also match longwires or antennas fed with ladder-line. Includes Icom interface cable, DC power cable and coax jumper.
Suggested Price $179.99

radio not included

Z-817

The ultimate autotuner for QRP radios including the Yaesu FT-817(D). Tuning is simple; one button push on the tuner is all that is needed - the Z-817 takes care of the rest. It will switch to PKT mode, transmit a carrier, tune the tuner, then restore the radio to the previous mode! 2000 memories cover 160 through 6 meters. The Z-817 will also function as a general purpose antenna tuner with other QRP radios. Just transmit a carrier and press the tune button on the tuner. Powered by four AA internal Alkaline batteries (not included), so there are no additional cables required. A coax jumper cable is also induced for fast hook up.
Suggested Price $129.99.

Z-100Plus

Small and simple to use, the Z-100Plus sports 2000 memories that store both frequency and tuning parameters. It will run on any voltage source from 7 to 18 volts; six AA batteries will run it for a year of normal use. Current draw while tuning is less than 100ma. The Z-100Plus now includes an internal frequency counter so the operating frequency is stored with tuning parameters to make memory tunes a blazingly fast 0.1 seconds; full tunes take an average of only 6 seconds. Includes Icom interface cable, DC power cable and coax jumper.
Suggested Price $159.99

*To receive your free SP-200, simply fill out the rebate form available at www.ldgelectronics.com and mail to LDG along with a copy of your dated sales receipt. All rebate forms must be received by LDG before March 31, 2011. Limit one per household, valid worldwide.

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The #1 Line of Autotuners!

AT-1000Pro

The AT-1000Pro has an Automode that automatically starts a tuning cycle when the SWR exceeds a limit you set. Operates at any power level between 5 and 1,000 watts peak. RF Relay protection software prevents tuning at greater than 125 watts. Tunes from 1.8 to 54.0 MHz (inc. 6 meters), with tuning time usually under 4 seconds, transmitting near a frequency with stored tuning parameters, under 0.2 seconds. 2000 memories. 2 Antenna connections. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $599***

- ***RF Sensing***
- ***Tunes Automatically***
- ***No Interface Cables Needed***

AT-200Pro

The AT-200Pro features LDG's new "3-D memory system" allowing up to eight antenna settings to be stored for each frequency. Handles up to 250 watts SSB or CW on 1.8 – 30 MHz, and 100 watts on 54 MHz (including 6 meters). Rugged and easy-to-read LED bar graphs show power and SWR, and a function key on the front panel allows you to access data such as mode and status. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $249***

NEW! YT-450

LDG's newest tuner is specially designed for Yaesu's newest 100 watt radios. The YT-450 interfaces directly with the Yaesu FT-450 and FT-950 radios, making integration easier than ever. Simply connect the tuner to the radio with the supplied cables and you are ready to operate. DC power and all control is done through the interface cable. Just press the tune button on the tuner and the rest happens automatically: mode and power are set, a tune cycle runs and the radio is returned to its original settings. It will quickly match nearly any kind of coax fed antenna with an SWR of up to 10:1. 2000 memories recall settings in an instant! An extra CAT port on the back allows seamless connection to a PC. You have the newest radio, now get the newest tuner to go with it!
Suggested Price $249.99

IT-100

Matched in size to the IC-7000 and IC-706, the new IT-100 sports a front panel push-button for either manual or automatic tunes, and status LEDs so you'll know what's going on inside. You can control the IT-100 and its 2000 memories from either its own button or the Tune button on your IC-7000 or other Icom rigs. It's the perfect complement to your Icom radio that is AH3 or AH-4 compatible.
Suggested Price $179.99

KT-100

LDG's first dedicated autotuner for Kenwood Amateur transceivers. Easy to use - just right for an AT-300 compatible Kenwood transceiver (except TS-480HX). The KT-100 actually allows you to use the Tune button on the radio. The LEDs on the front panel indicate tuning status, and will show a match in seconds, or even less of you've tuned on or near that frequency before. Has 2,000 memories for instant recall of the tuning parameters for your favorite bands and frequencies. If you have an AT-300 compatible Kenwood radio, you can simply plug the KT-100 into your transceiver with the provided cable; the interface powers the tuner, and the Tune button on the radio begins a tuning cycle. The supplied interface cable makes the KT-100 a dedicated tuner for most modern Kenwood transceivers.
Suggested Price $199.99

YT-100

An autotuner for several popular Yaesu Radios. An included cable interfaces with your FT-857, FT-897 and FT-100 (and all D models) making it an integrated tuner, powered by the interface. Just press the tune button on the tuner, and everything else happens automatically: mode and power are set, a tune cycle runs, and the radio is returned to its original settings. It's the perfect complement to your Yaesu radio.
Suggested Price $199.99

Meters!

FT Meter 2.5" face with calibrated scales for signal strength, discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit, all selectable from the radio's menu. ***Still Only $49***

FTL Meter For Yaesu FT-857(D) and FT-897(D). 4.5" face with calibrated scales for signal strength, discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit, all selectable from the radio's menu. ***Suggested Price $79.99***

NEW! M-7600 For IC-7600. It will display S-meter on receive, or power out, SWR, ALC level or supply voltages, all selectable from the radio's menu. What's more, the M-7700 and the virtual meter on your radio can work together.
Suggested Price $79.99

NEW! YT-847

YT-847 Autotuner is an integrated tuner for the Yaesu FT-847. An included CAT/Power cable interfaces with your FT-847. Just press the tune button on the tuner and everything else happens automatically! The mode is set to carrier and the RF power is reduced, a tune cycle runs and the radio is returned to the original settings. Also includes coax jumper cable. ***Suggested Price $249.99***

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mary measure of circuit quality. SNR, in dB/Hz, is the ratio in dB between the signal power and the noise density (expressed as the amount of noise power per Hertz). The SNR does not include the receiving equipment's noise level, since it is unknown. It is not necessary, since except at the higher HF bands, atmospheric noise power is greater than receiver noise.

The chart shows two SNR values. The solid black curve at the top of the time-of-day chart is SNR in dB/Hz. The lower black curve is SNR in dB for the mode in use, CW, or that which was manually entered in the input frame. The color-coding shows at a glance whether a band is closed (red), open (green), or marginal (yellow).

It is clear that there are about three hours per day when the signal will be received at, or above, the Required SNR on 50 percent or more of the days in February. Assuming a QSL is received, Europe will be in the WAC bag!

How about working Oceania? Hawaii counts for this "continent." After setting up the input screen as before, but with the target being Hawaii, and running the program, fig. 4 shows the results for 30 meters. Clicking on "20" would show the conditions on 20 meters. It is likely that Hawaii can be "won" for WAC on either band.

Working Asia from central Canada can be done when one knows when to try. Using the same basic conditions, but Japan (JA) as the target, yields the 20-meter band results in fig. 5. It is not an optimistic story. The chart shows only closed or marginal band conditions.

What might one do? First, don't panic. Second, consider a different band. Fig. 6 shows that Japan *can* be worked on half of the days in February on 17 meters with about three hours in a day when the SNR is above "marginal." Third, be willing to wait for a 20-meter opening to JA. Statistically, some days will be better than portrayed simply because the solar flux will be greater than estimated.

Using the software for the remaining continents shows that WAC can be achieved under the conditions given and, of course, once the coveted QSLs are in hand.

Challenge 2: Contact a Vacationing Friend

Come winter, the snowbirds wend their way to warmer climes, some carrying ham radio.

Assume that your ham radio friend is in Aruba for the winter month of February. Can he/she hear you if you are using single sideband (SSB), 20 meters, and 80 watts at the terminals of

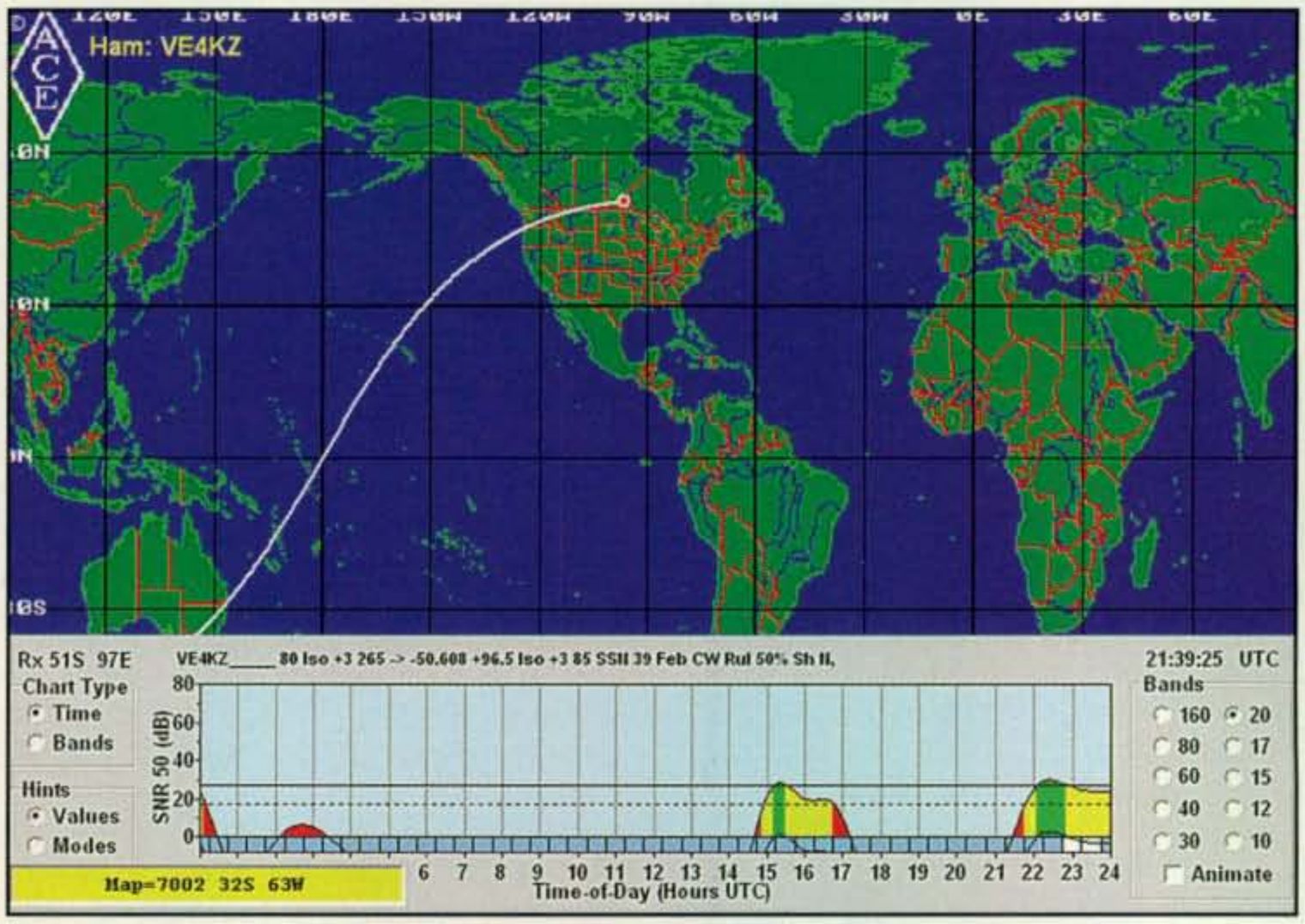
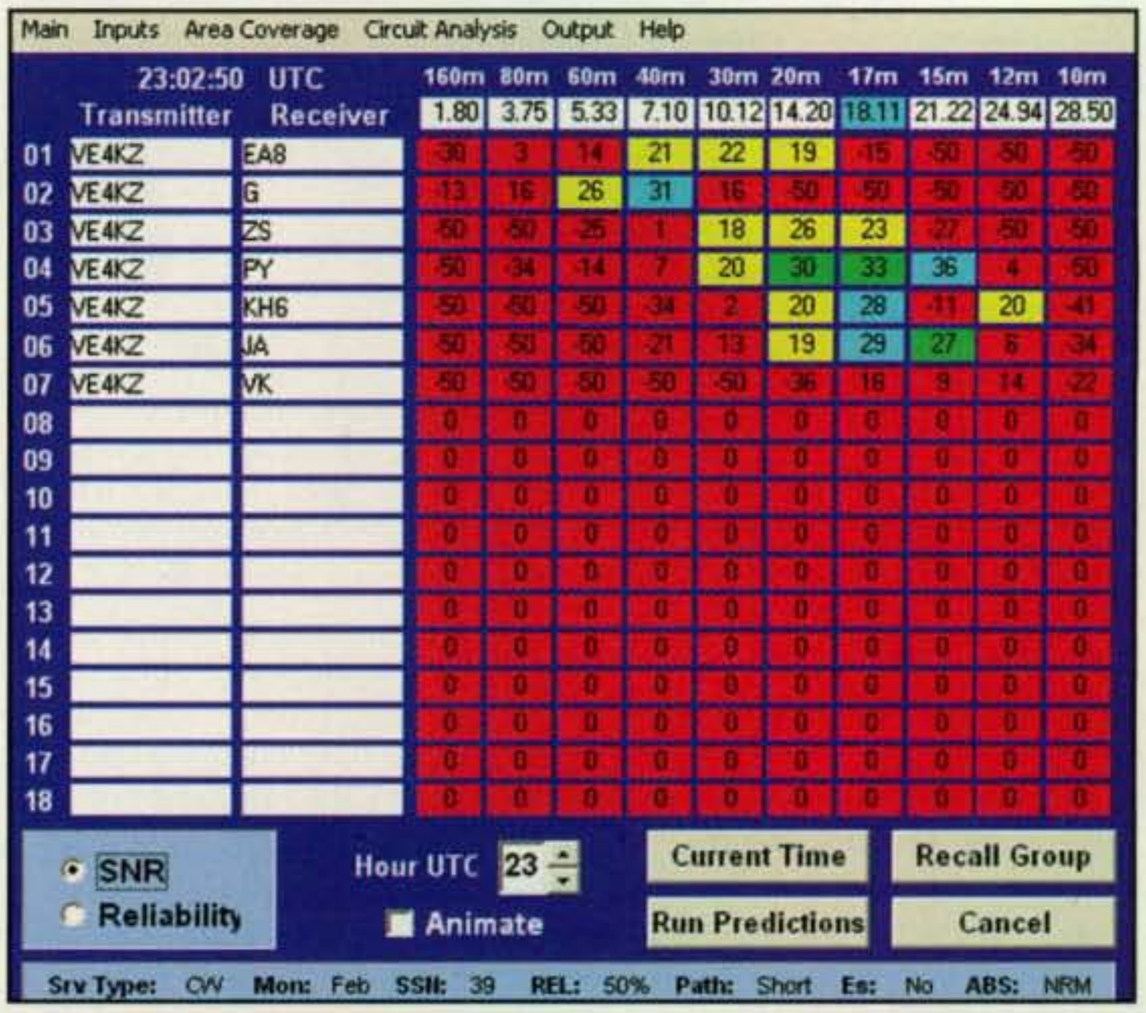


Fig. 8– The VE4KZ antipode can be worked on 20 meters.

Fig. 9– Keeping an eye on openings. ACE-HF Pro can also be configured to predict conditions on multiple paths, as many as 18 at once.



a Yagi-Uda antenna? Your friend is in an urban setting, also using a Yagi. Both antennae are a half-wave above ground and pointed at one another.

The program run shows that contact is likely (see fig. 7). Using 15 meters with appropriate antennas shows that contact also is probable, but on fewer hours of each day.

Challenge 3: How Far Can You Go?

Did you ever wonder if you could reach the other "side" of the Earth from your QTH? This is the *antipode*, a place on Earth diametrically opposite another given place. For example, the antipode for VE4KZ is at 50.60 degrees *south* latitude and 096.58 degrees *east* longitude, in the Indian Ocean. Notice that rare DX entities are nearby.

Working this area looks possible given the power, antenna, solar flux, and so on (see fig. 8). It is interesting to compare this figure with the coverage area in fig. 1.

The examples used the short path from VE4KZ to the target. It is instructive, but not demonstrated here, to model the long path as well. Similarly, the reliability was set at 50 percent. The results are different if the reliability value is changed. For example, the antipode circuit shows more openings during a given day when the reliability is reduced to 10 percent of the month's days. The rub is that these openings statistically will occur on only three of 30 days rather than on 15 of 30 days. Still, DXers know how to wait!

Challenge 4: Band Selection in a Contest

Veteran contesters know when to work a specific band and when to shift to another. Experience, propagation information, prediction programs, and spotting sites (if allowed) each may play a role. The ACE-HF Pro program produces an animated chart of band versus time versus condition to show if a band is open.

The previous examples used one circuit at a time (i.e., VE4KZ—DL). For this analysis, the user sets up a group of circuits; up to 18 circuits may be viewed simultaneously. The DXer might make circuits for parts of Europe, parts of Africa, parts of the Middle East, or for different zones. Saving the circuits as a group allows the group to be recalled and analyzed for any hour. The table shows a green box if the circuit allows a SNR greater than that needed by the specified mode. The table can be animated for each hour of the day, providing advance planning. See the still image in fig. 9.

Conclusion

Propagation-prediction software, such as ACE-HF Pro, can calculate and display the likely situation of a telecommunications link under given conditions.

Other programs are available. W6ELProp is one that the author has used. It currently provides tabular rather than graphic output. Some might want to try VOACAP, DXPROP, or PROPHF.

Telecommunications requires a systematic approach. The operators, transmitters, receivers, antennas, transmission lines, effective grounds, local terrains, skip-point terrains, terrestrial magnetic conditions, and ionospheric conditions are just some of the variables affecting the probability of an interaction occurring. Propagation modeling software, wisely used, is a powerful tool for systematic amateur radio planning and operation.

References

ACE-HF Pro: Richard P. Buckner, P. E. The ACE-HF Pro users guide manual. For a free download, see <http://mygeoclock.com/acehf/help.pdf>. The software includes extensive built-in helps.

A marketing page is at <http://www.mygeoclock.com/acehf>. Click on "Ordering."

A discussion about reciprocity in telecommunications by Tomas Hood, NW7US, "It's all about the noise ..." is at <http://hfradio.org/ace-hf/ace-hf-reciprocal.html>.

DXPROP and PROPHF: Information and download are at <http://www.dxzone.com/cgi-bin/dir/jump2.cgi?ID=7969>.

SNR: An overview of atmospheric noise is at <http://en.wikipedia.org/wiki/Atmospheric_noise>. A thorough discussion is at: <http://www.spawar.navy.mil/sti/publications/pubs/td/2813/>.

Smoothed Sunspot Number (SSN): The software uses a specific set of SSN data. It is available from the U.S. National Geophysical Data Center as an ftp file at <ftp://ftp.ngdc.noaa.gov/STP/SOLAR_DATA/SUNSPOT_NUMBERS/sunspot.predict>.

VOACAP: George Lane. Signal-to-noise predictions using VOACAP, a users' guide. Rockwell-Collins. The book is available on CD from Rockwell-Collins for a shipping fee. Contact the firm at 1-800-321-2223.

W6ELProp: Information and download is at <http://www.qsl.net/w6elprop/>.

math's notes

BY IRWIN MATH,* WA2NDM

Interfacing with the Outside World

Last month we spoke about protection of high-impedance circuits, which reminded me of a topic that might be of interest to the experimenters in our midst.

Often various parts of a circuit that we are designing need to be brought out to the "outside world." This could be a logic port, a high-impedance audio input, or something else along these lines. The way to do this safely is our topic for this month. However, before beginning, I just want to indicate that the approaches given here are greatly simplified, but the main idea is to get you thinking when designing your circuitry.

As an example, fig. 1 is an input (to a TTL logic inverter) from a push-to-talk switch (or relay) in a circuit that one might quickly be able come up with. When the external switch is closed, 5 volts are present and the gate operates properly. When the switch is open, however, the input floats and sometimes doesn't know whether to turn on or off. With a CMOS logic device the input is at a very high impedance and noise on a nearby conductor, stray RF, or even spikes from a nearby AC line can easily cause the gate to mistrigger. The solution is simply to add a pull-down or pull-up resistor, depending on whether you want the output of the inverter to be in a high or low state.

*c/o CQ magazine

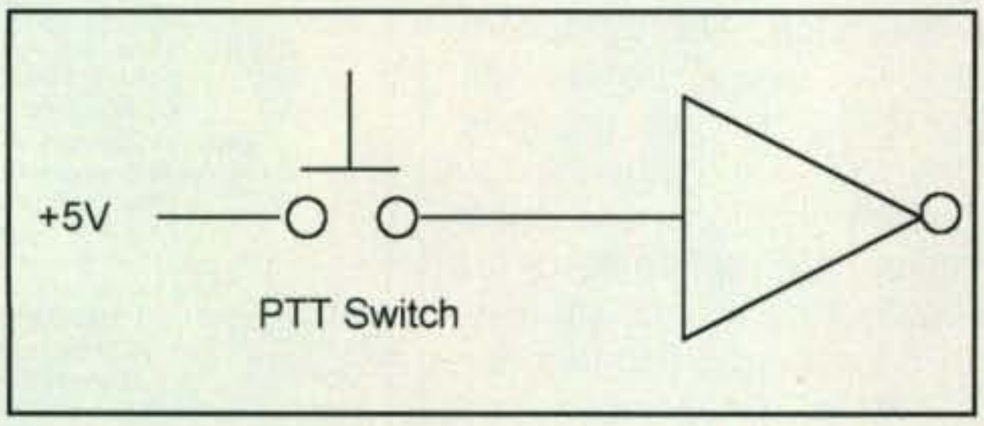


Fig. 1– Simple unprotected input.

Figs. 2A and 2B show both approaches. In fig. 2A, with the switch open the input to the inverter is connected to a "hard" ground and does not mistrigger. The only other consideration here is that when the circuit is closed, there will be a voltage across the resistor. In fig. 2B, when the switch is closed there will be a voltage across the pull-up resistor. Obviously, the choice of resistor value here is determined by how much voltage is actually present and by how much extra current you can spare. For normal TTL circuits Vcc is usually 5 volts and resistor values from1K to 10K usually suffice.

Sometimes the input is not a logic device, but a simple transistor switching circuit. Fig. 3 shows how to handle this situation. The 10K resistor effectively "clamps" the base to ground (with no input), while the 1K resistor limits the current to the base. Such a circuit will work with inputs of between 1 to 10 volts. Note that these values can be easily changed to meet your specific needs.

In the case of an analog input (such as an audio circuit) a similar approach can be used. Fig. 4 shows a simplified line-level audio input to an op-amp. The capacitor blocks any DC component but allows AC to pass easily. The 600-ohm resistor matches the standard line-level impedance, and the 10K resistor assures that the capacitor will not hold a residual charge if the input is disconnected. The gain of the stage will be based on the value you choose for RF. If RF is 1.2K the gain will be 2, while if RF is12K the gain will be 10, and so on.

Now let's take a quick look at outputs. Here the task is to provide a valid output signal but with adequate protection from accidental short circuits. Fig.

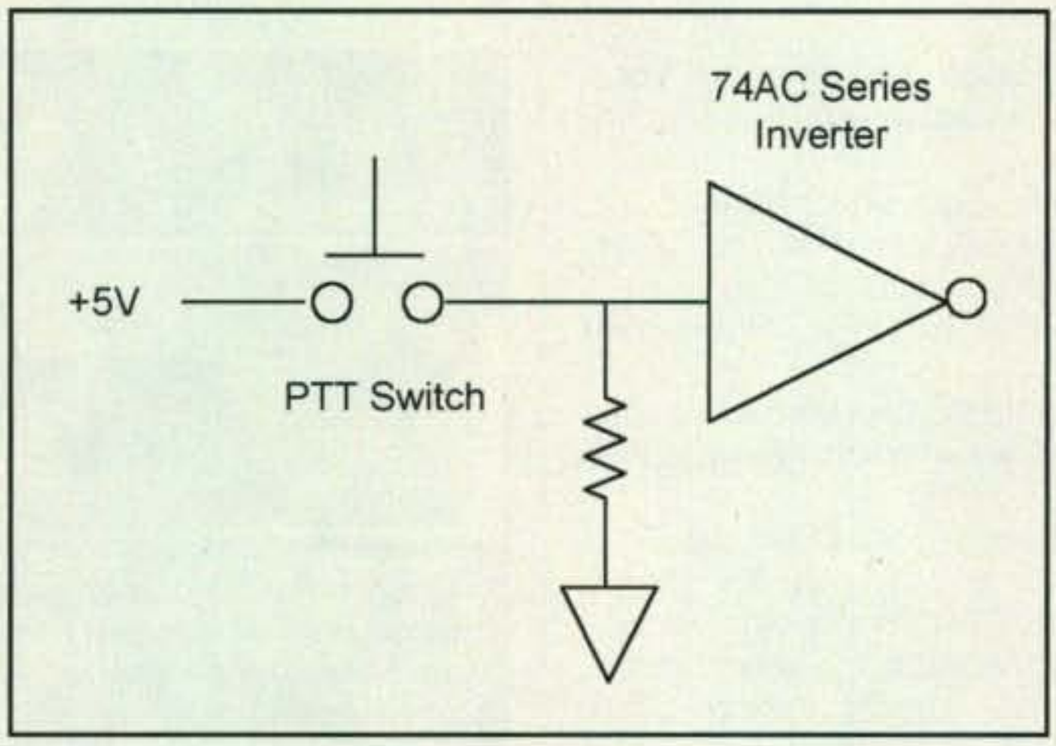


Fig. 2A– Pull-down resistor to protect input.

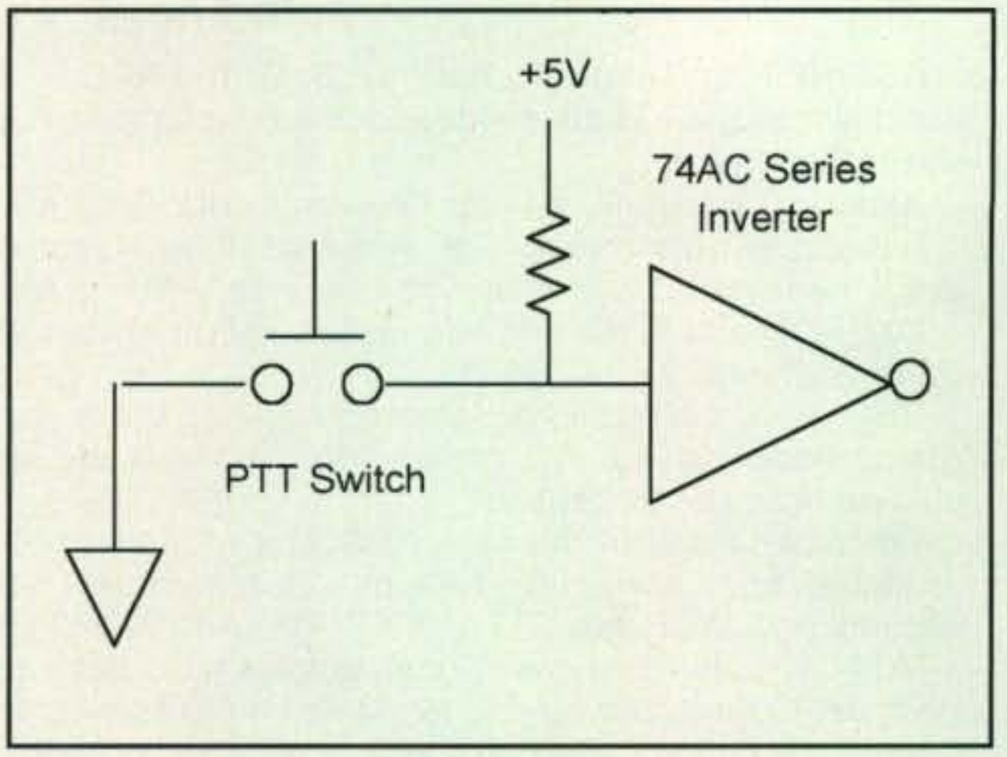


Fig. 2B– Pull-up resistor to protect input.

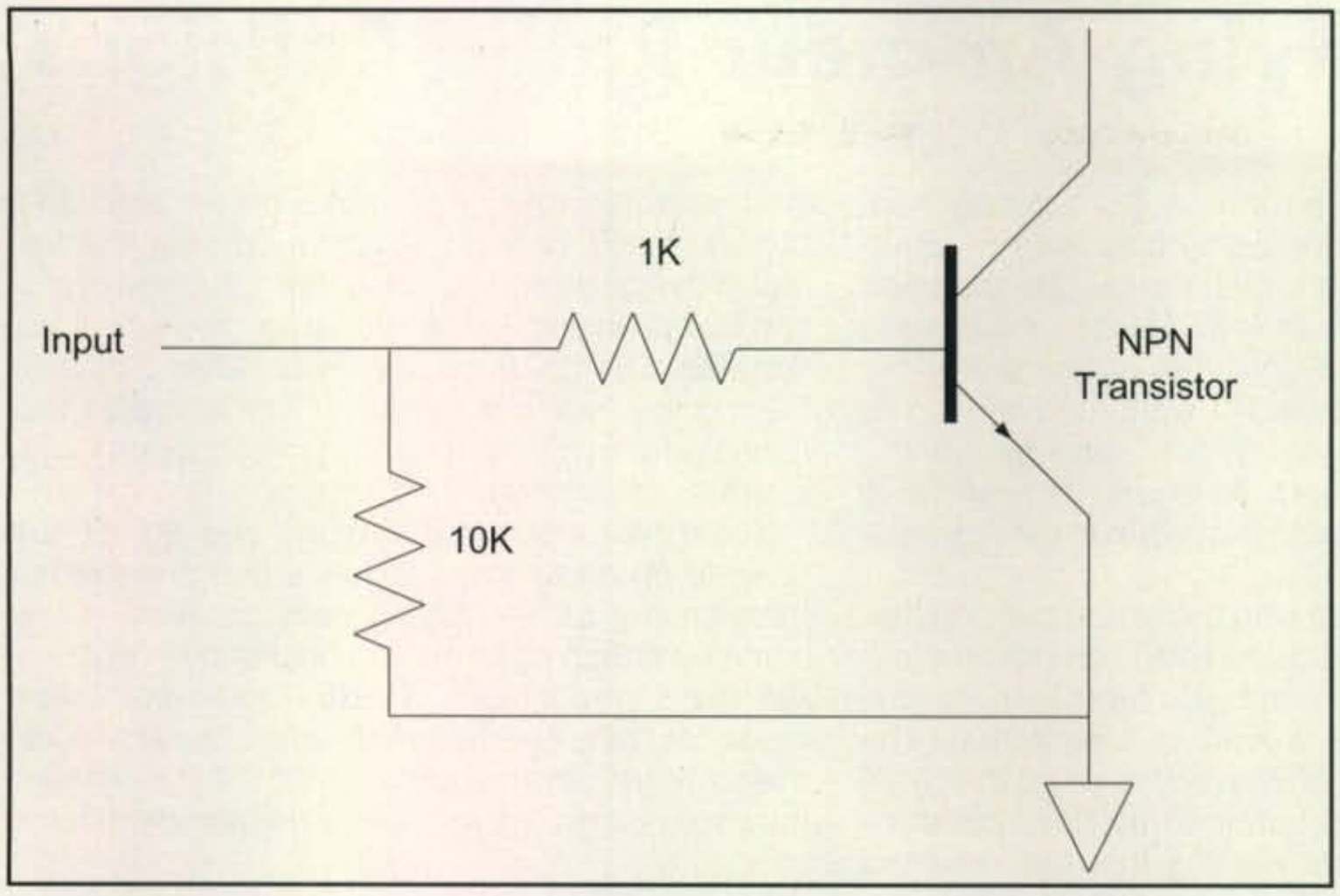


Fig. 3– Protected transistor input.

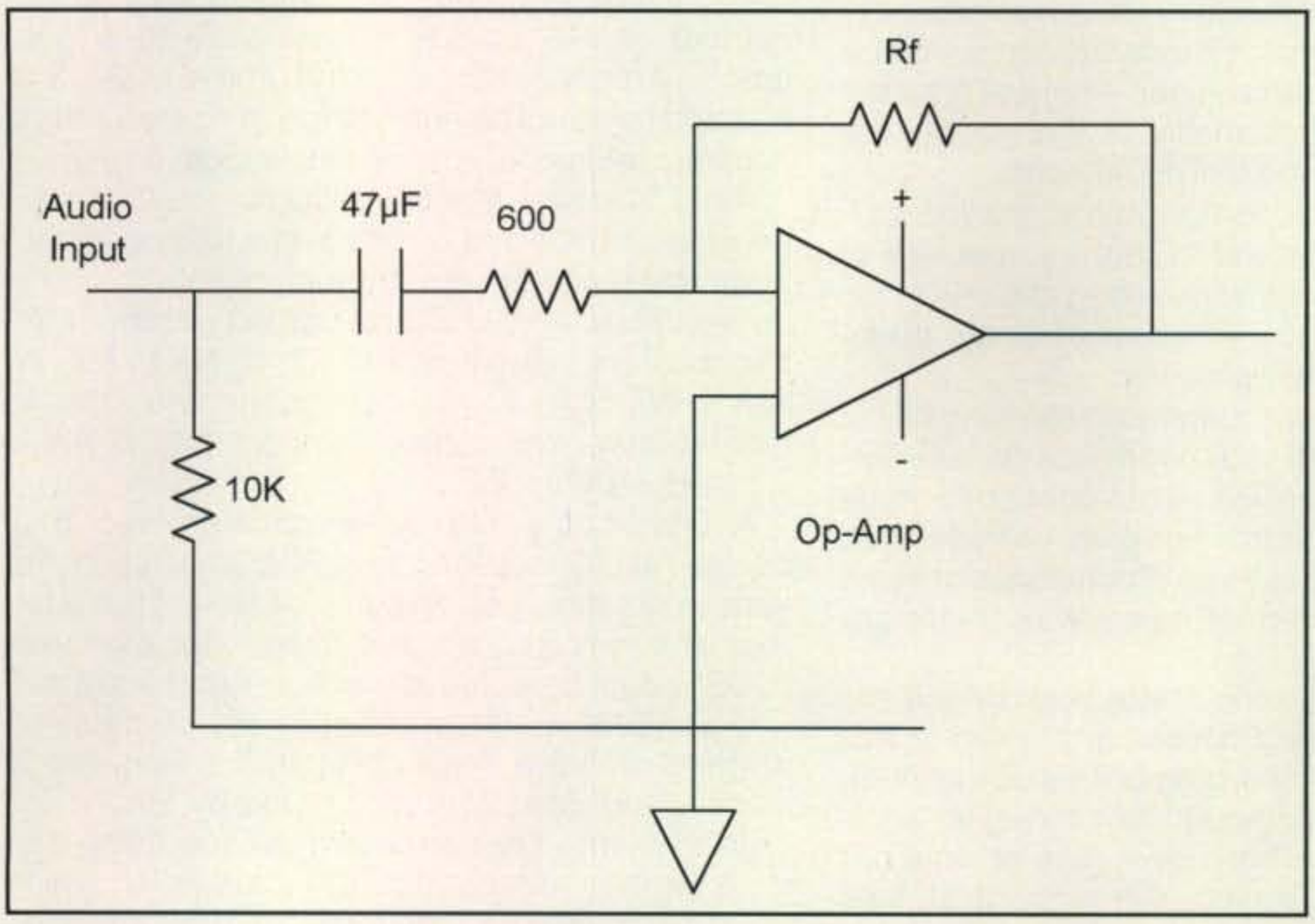


Fig. 4– Protected audio input stage.

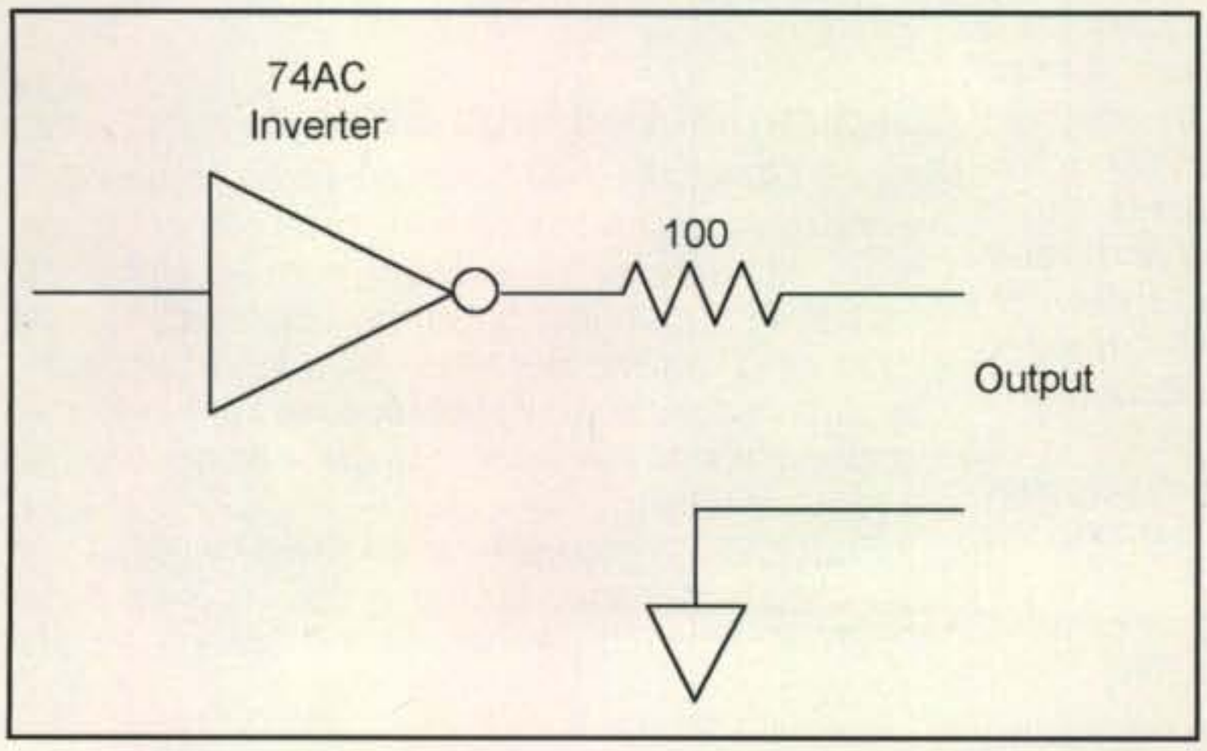


Fig. 5– Protected logic-gate output.

5 shows how to do this with a common inverter. The 100-ohm series resistor will not significantly drop the output voltage to another logic gate (due to its high input impedance), but in the event of a short, a maximum of 20 milliamps will flow. This also happens to be the maximum output load current rating for many 74AC logic devices. This value can easily be changed if required, but it must be high enough to limit the current to a safe value.

A similar method can be used with an analog output simply by adding a suitable resistor in series with the output that can handle the short-circuit current of the output device. In the case of our 600-ohm audio example, it would be another 600-ohm resistor. This means that the amplifier would have to provide twice the audio (or 6 volts pp), but an accidental short circuit will not damage the stage.

There are more elaborate methods, to be sure, but these are beyond the quick look we are providing this month. If this type of topic is of interest to you, please let me know and we will try to cover more in future columns.

73, Irwin, WA2NDM

Washington readout

BY FREDERICK O. MAIA,* W5YI

Demystifying Amateur Radio Callsigns

We received an inquiry from a new ham who was thoroughly confused by amateur radio callsigns. He said he had been listening to the ham bands and had heard all sorts of station callsigns. Some had different lengths, numerals, and prefixes. He wondered why there were so many different "types," who gets them, and who assigns them. In short, he wanted to know "What is the callsign system in the Amateur Radio Service?"

We can sympathize with the writer; callsign procedures are complex. Let's try to sort out amateur radio callsigns this month, as there's more to it than you realize. However, in a sentence: The number and format of characters used in a ham radio callsign are determined by the operator's license class, his/her mailing address, and the availability of number/letter combinations.

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. All callsigns—not just amateur radio—identify the nationality of the station, the type of station, and the individual station.

The single most important role of station callsigns, however, is to aid in the enforcement of radio regulations. Most transmitting stations in the world are required to periodically identify themselves when they are operating.

The use of ham radio identifying letters is as old as radio itself. All early radio work was done in telegraphic 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 was informally adopted before 1915.

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 pair (sometimes three) letters—for example, 8MK. (There were nine original call districts. The 10th district, with numeral Ø, was later split from the 9th district.)

To curtail harmful interference to emerging radio services, all ITU[1] member countries had to revise their radio station callsigns in 1927 by adding a national prefix. The alphabet was apportioned among the various nations with blocks of up to three prefix characters being allocated to each country.

The ITU agreed that the United States would use prefixes beginning with N, K, and W and would share the letter "A" with other countries. The emergence of new countries, or countries that needed additional callsigns, necessitated the allocation of prefix blocks that contained a number.

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 with an added numeral, its location. Section §2.302 of the FCC Rules indicates the required composition of all types of radio stations under FCC (Federal Communications Commission) jurisdiction.[2]

Some types of radio stations and 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, radio-controlled model aircraft, and two-way radios aboard recreational boats) and do not receive callsigns. Instead they self-assign their station a unique identifier.

Amateur Radio Callsigns

Amateur radio callsigns throughout the world normally consist of a one- or two-character prefix, a number (which usually corresponds to a geographic area within the country), and a 1-, 2-, or 3-character suffix. The number following the prefix is normally (but not always) a single digit (Ø to 9).

All U.S. amateur radio callsigns must contain three elements: one or two prefix letters, a geographical numeral (zero through nine) and one to three suffix letters. U.S. amateur service prefix letters must be either K, KA to KZ, N, NA to NZ, W, WA to WZ or AA to AL. A single numeral (zero to nine) follows. The suffix letters are A to Z, AA to ZZ, and AAA to ZZZ.

Amateurs may hold only one callsign which may be used at any location under FCC jurisdiction. For various reasons, certain combinations of suffix letters and callsigns are not used. (For example, "SOS" might be confused with a distress signal.)

U.S. amateur station callsigns can be obtained in three different ways: through the Sequential, Vanity, and Special Event ("One-by-One") Call Sign Systems. You can determine how these systems work by accessing FCC information online at: <http://www.fcc.gov/wtb/amateur/amateur.html> and clicking on "Amateur" under "Wireless Services" on the right side of the next page. Then click on "Call Sign Systems" on the left side.

Sequential Call Sign System

As of 1978, 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.

Four callsign groups—called simply A, B, C, and D—were established for the various license classes. This came to be known as the Group Call Sign System.

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e-mail: <w5yi@cq-amateur-radio.com>

There are currently three different license levels issued by the FCC: Technician, General, and Amateur Extra Class. However, there are also another two classes (Novice and Advanced) which are no longer issued but can be renewed indefinitely by their holders. Thus, there are really five different license classes in existence today.

All callsigns fall within the four "format groups." The Novice Class qualifies for a (Group D) 2-by-3 format —that is, two prefix letters, a district numeral, and three suffix letters. Technician and General Class operators qualify for (Group C) 1-by-3 callsigns; Advanced Class: (Group B) 2-by-2; and Extra Class for (Group A) 1-by-2, 2-by-1, and 2-by-2 format callsigns beginning with the letters AA to AL.

The higher class license holders qualify for the shortest callsigns. Any ham operator may also hold a callsign from a lower group. (For example: an Extra Class level amateur may hold a Group B, C, or D format callsign.)

Anyone upgrading or changing his or her radio district may either keep his/her present callsign or be assigned the next sequential one from the appropriate group. When all callsigns from a specific group are assigned, the next assignments are made from the next lower group.

You may also change your callsign "sequentially" at any time simply by filing an online application. You are never required to change your callsign, even if you move to a different callsign area or upgrade to a higher license class. There is no charge for a new sequential callsign.

You will receive the next available callsign from the alphabetized block authorized for your license class. To receive a specific callsign, you must make a request under the "vanity" callsign program.

Nearly all beginners start at the Technician level. Newly licensed amateurs always get a Group D callsign with a numeral appropriate for their mailing address.

Amateur radio operators with mailing addresses outside of the lower (contiguous) 48 United States qualify for special prefixes. These prefixes are AL, KL, NL, and WL (Alaska); AH, KH, NH and WH (Pacific area locations such as Hawaii or Guam); and KP, NP, and WP (for Caribbean stations such as Puerto Rico and the U.S. Virgin Islands.)

A club license is granted to a person designated by an amateur radio club to be its license trustee. A military recreation station license is issued to a person who has been designated as the custodian of an amateur radio station on a military installation. Club and military ham station licenses must be requested through an FCC-approved Club Station Call Sign Administrator (CSCSA). Their first callsign will be a sequentially issued 2-by-3 format callsign.

Vanity Call Sign System

In 1993, the U.S. Congress authorized the FCC to establish a Vanity Callsign System for amateur radio operators. A vanity callsign is one that has been chosen by the applicant, subject to certain restrictions.

It may be requested once a callsign has already been assigned; it may not be your first callsign. You can even get back a station callsign that you previously held or one belonging to a deceased relative or club member if it has not been reassigned.

You simply submit a list of callsigns you are interested in (and, more importantly, qualified for) to the FCC to get a specific station callsign. The first available one is issued to you or your club. RACES (Radio Amateur Civil Emergency Service) and military recreation stations are not eligible for vanity calls.

The vanity callsign must be a callsign that is appropriate for your callsign group. This same rule applies to club stations. The club trustee's callsign group determines which callsign the club is eligible for. In other words, a club with a General Class level trustee could not apply for a Group "A" (1-by-2) callsign available to Extra Class hams.

There are many different eligibility rules that apply to the Vanity Call Sign System. Unlike all other ham station callsigns, vanity callsigns are not free. There is a nominal "regulatory fee" that must be paid to the FCC, currently $13.30 for a new (or renewed) ten-year term. You may request a vanity callsign online using the Universal Licensing System or by submitting paper application Form 605 and Form 159 Remittance Advice to the FCC.

There are rules concerning obtaining a callsign you formerly held, or one of a deceased relative or club member. Although there are exceptions, no callsign is available for reassignment unless it has been inactive for two years plus one day. You may only request a callsign from the specific "Group" that coincides with your license class.

Special Event Call Sign System

FCC rule Section §97.119(d) authorizes an amateur station, "when trans-

Callsign Block	Excepted Prefixes	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, KA2AA–KA9ZZ, KG4AA–KG4ZZ, KC6AA–KC6ZZ	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	Tech., General, Advanced, Extra
KH, NH, WH (by two)	—	Pacific	C	Tech., 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, Tech.' General, Advanced, Extra
NA1AAA–NZØZZZ, AA1AAA–ALØZZZ	—	None	N/A	Not allocated to any class

Table I– Station callsigns available to amateurs holding certain license classes in various locations.

mitting in conjunction with an event of special significance to the amateur service community, to substitute for its assigned callsign a special event callsign as shown for that station on a data base coordinated, maintained, and disseminated by the special event callsign common data-base coordinators."

One-by-one format special event callsigns (such as W1A) have been available since 1997 for temporary use by any radio amateur to commemorate some sort of "special event." You determine what the short-term "event" is. Examples include a wide variety of celebrations such as conventions, festivals, dedications, and anniversaries; even local and neighborhood events qualify. The program is administered by volunteer coordinators who are chosen by the FCC to approve and post user-selected 1-by-1 callsign reservations to an online database.

A 1-by-1 callsign consists of a single prefix letter (K, N, or W), the region number (Ø to 9), and a single suffix letter A to W, Y, and Z. (Section §2.302 of the FCC rules does not permit the assignment of 1-by-1 amateur station callsigns containing the suffix letter X.) There are 750 such callsigns.

Amateurs of any license class may reserve a 1-by-1 callsign for up to 15 days. A special event callsign does not authorize the user any additional operating privileges. It simply allows an already-licensed station to temporarily use a different callsign in the identification announcement to bring greater attention to an event being celebrated.

Once you reserve the callsign, you simply substitute the 1-by-1 callsign for your FCC-assigned callsign. Once an hour you must also transmit your FCC-assigned callsign. Your selection is posted to a publicly available online database.

The One-by-One Database allows you to determine which 1-by-1 callsigns are available during specific dates. The purpose of the database is to avoid the same callsign being used by more than one station during the same day. The database indicatesthe time period the 1-by-1 callsign is being used and who is using it.

You can apply for a 1-by-1 callsign by going to the database at <http://www. 1x1callsigns.org/> and clicking on "Coordinators." Be sure to read the FAQ (Frequently Asked Questions). There is no cost to reserve a 1-by-1 callsign.

Foreign Amateurs Operating in the U.S.

In addition to the primary license for an individual, there are also two licenses issued to non-U.S. citizens by foreign countries that are recognized by the U.S. The CEPT radio amateur license is issued by a country belonging to the European Conference of Postal and Telecommunications Administrations.

An IARP (International Amateur Radio Permit) is issued by a (Caribbean, Central or South American) country that is a member of the Inter-American Convention. CEPT and IARP stations may operate in areas under FCC jurisdiction by appending their home callsign with a U.S. geographical identifier. For example, Brazilian radio amateur PY2AAA operating in Virginia would use W4/PY2AAA as his station callsign.

Canadian radio amateurs are considered to be automatically licensed in the U.S. and vice versa under a 50-year-old treaty arrangement. They use their Canadian callsigns in the U.S. with a letter-numeral designating the station location included *after* the callsign (such as VE1ABC/W5.)

Radio amateurs licensed in countries with which the U.S. has a multi-lateral or bi-lateral recprocal arrangement may also operate here using their home callsign with the appropriate U.S. geographical letter-numeral *before* their callsign (such as W3/G1ABC.)

The FCC rules (Section §97.3-25) also allow any FCC-licensed ham to append his/her callsign with a unique identifier. These can be "...words, letters, or numerals appended to and separated from the callsign during the station identification." Examples of these are repeater or beacon stations, or stations in a digital forwarding network.

We hope this brief explanation has helped answer some of the most common questions about amateur radio station callsigns.

73, Fred, W5YI

Notes

1. The International Telecommunication Union (ITU) is the United Nations organization that oversees worldwide radio.

2. FCC Rules, Part 2 Section 302 (§ 2.302) indicate 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 call sign when upgrading operator privileges or changing his/her mailing address to a new callsign area. When all callsigns in a specific group are assigned, callsigns are then selected from the next lowest group. Some 3-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.

A Small Club, a Small City, and a Big Emergency Ops Center

BY RICHARD FISHER,* KI6SN

Time and again radio amateurs have shown the critical role the Emergency Operations Center plays in keeping communications chaos at arm's length. When things get ugly, the EOC is the center of a nervous system whose efficiency—or lack of it—literally can mean the difference between life and death.

It isn't easy providing a platform for radio amateurs, police, fire, government, and disaster-relief authorities to communicate with one another. However, it's vitally important. And while we often associate inter-agency EOCs with major regions and municipalities, there is a lot to be said for developing comprehensive EmComm systems at every community level. Regardless of the size of an area's footprint, the need is no less.

This month we have the story of how dedicated hams in Hermosa Beach, California—a town whose total population couldn't come close to filling a National Football League stadium—recognized the need for an EOC, thought *big*, and made a huge contribution to public safety communications in this Pacific Coast community near Los Angeles.

It began in 2007 when Ken Hartley, K6KAH, founded the Hermosa Beach Amateur Radio Association (HBARA) with the support of Hermosa Beach's Emergency Preparedness Advisory Commission and Neighborhood Watch.

A 2008 photograph shows the degree of demolition as existing cabinetry, plumbing, tile, and lighting were being removed. (Photographs courtesy of K6KAH unless otherwise noted)

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e-mail: <ki6sn@cq-amateur-radio.com>

The HBARA EOC demolition crew, from left, included Ken Hartley, K6KAH; Dorothy Forba-Hartley; Matthew Cruse, N6MDC; Steve Silver, KF6DIS; Dr. John Kovac, KØVAC; Kelly Kovac-Reedy, KI6MNL; George Ziegler, K6GHZ; and Al Benson. Mordy Benjamin, WA6SXE, was also a member of the original crew. (Courtesy of WA6SXE)

"Chuck Lobb, KN6H, of Torrance, California, was beyond helpful to us to get off the ground," Ken said. They sent letters to the more than 70 radio amateurs in the 1.3-square-mile town of 20,000 residents. Out of that, we heard from about seven people who were interested," K6KAH said. "Our current leadership is me, as President; Dr. John Kovac, KØVAC, Vice President; George Ziegler, K6GHZ, Trustee,; and general members. We total about 14 members."

A small club in a small city. The city manager let the group use a long-forgotten room in the community center. "It had once been used as a home-economics room—it's an old school building—and then it was a training room with a couple of ham radios stored in cabinets, but was in serious disrepair and had not been used for more than ten years.

"When our ham guys walked into the room, even though it was in horrible shape, their eyes lit up at its size, which is 28 × 48 feet." With little money to work with, "we started looking online to see if we could find anything useful in the price range of *free*. We were amazed at what we were able to get," Hartley said.

"First, we received 16 sets of office cubicles free from a company two towns over, and 15 gallons of paint from ICI Paints. This alone was very inspiring. As we continued on, the city purchased some radio equipment for 2 meters, 220, 440, Pactor, and a new Comet CX-333 to replace a broken 2-meter Ringo Ranger (antenna) that was already

A Kenwood TS-940S high-frequency transceiver with power supply, MFJ antenna tuner, Swan SWR bridge, and a computer terminal populate one of three HBARA operating positions in the new EOC. The police and fire departments have communications stations there, as well.

on the roof. It also purchased a 25-kW generator so we would have backup power."

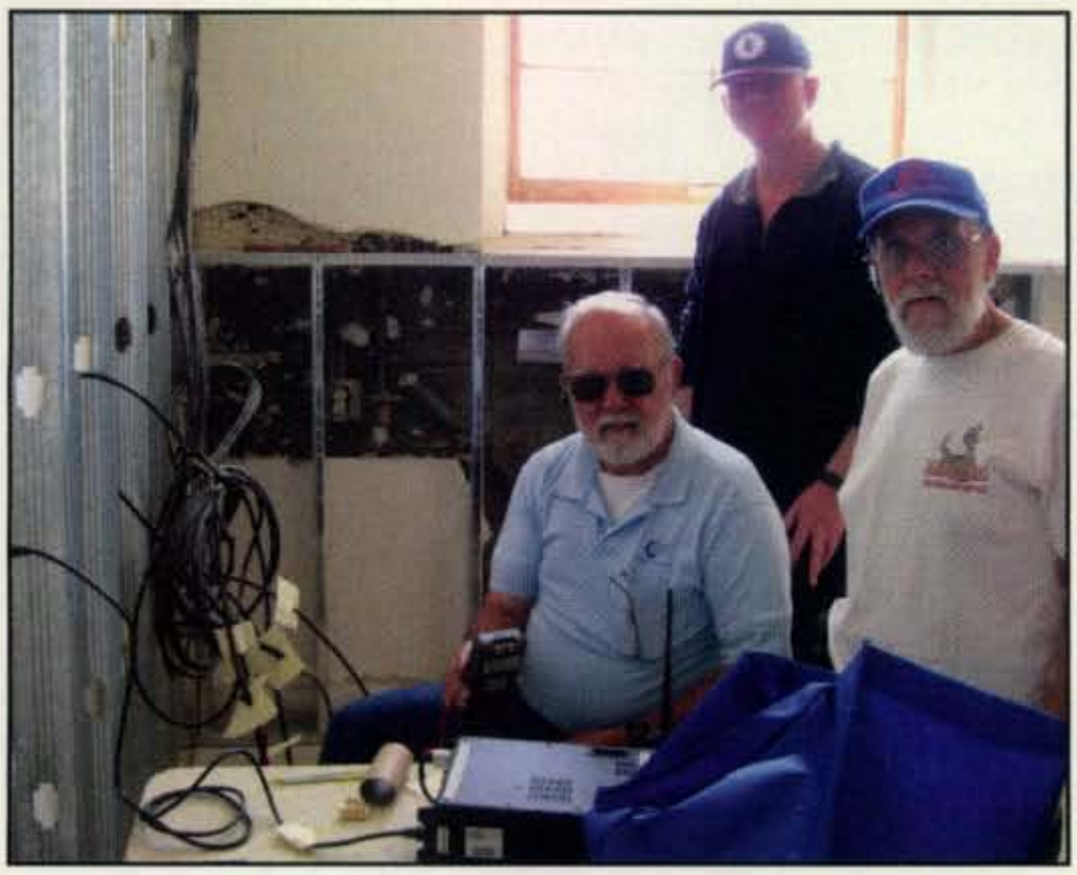
With momentum building, Hartley said, "We continued to completely renovate the room and turn it into not only the HBARA club room, but the city Emergency Operations Center and training facility for our police and fire departments and public safety groups. Once we expanded our goal to completely renovate, we had local non-profits step up to help us out with cash donations: $2500 from the Hermosa Beach Kiwanis; $4000, Hermosa Arts Foundation; $1000, Hermosa Beach Fire Association; and $1000, Hermosa Beach Police Officers' Association.

"CIA Design & Construction, a local construction company, put in many hours along with our volunteers at little to no cost for its skilled labor."

Being that he's still a "green" ham and an entry-level Technician class licensee, Hartley said, "I had to rely on the help of others when making some decisions. Other area club members were very helpful to us with their time, equipment to test things, and insight. Members of the South Bay Amateur Radio Club <http://www.w6sba.org/> and Palos Verdes Amateur Radio Club (PVARC) <http://www.palosverdes.com/pvarc/index.htm> were really helpful."

Using seed money from the city and its fund-raised money, HBARA "opted to replace all walls with new steel studs and sheetrock, a completely new electrical system and panel, new drop ceiling, energy-efficient lighting, and carpeting," K6KAH said.

"As we grew ever closer to finishing the project, more people came in to see how we were making out. Schlage, the lock people, donated $2500 worth of proximity locks for the main door and side-door entrance, a hand-held computer that reads the audit trail of the lock, and about 15 proximity cards. A local movie studio listed a computer rack on



Testing antennas and cabling in May 2009 were Ray Grace, WA6OWM, (South Bay Amateur Radio Club); Matthew Cruse, N6MDC (HBARA); and Bill Klatskin, N6ES (SBARC). (Courtesy of WA6SXE)

New Group of Skywarn® Lookouts is "On the Spot" in Florida

Twenty-one storm spotters were welcomed into the Lake County, Florida Skywarn® program last fall after receiving training in weather reporting covering tornadoes, hail, damaging winds, and other severe conditions.

The class, sponsored by the Lake County Amateur Radio Emergency Service®, Lake Amateur Radio Association, and the National Weather Service prepared students to feed information to the NWS office in Melbourne.

"Because radar cannot always see what is going on in specific neighborhoods at ground level," Lake County ARES® public information officer Ted Luebbers, K1AYZ, said, "the NWS depends upon trained Skywarn Storm Spotters to help fill in those gaps. The volunteers are taught what to look for and exactly how to report that information to their regional NWS office."

The course was presented by NWS meteorologists Arlena L. Moses and Jonathan Guseman from the Melbourne office. "They were able to boil down a very technical subject and make it easily understood by beginning weather reporting volunteers," Luebbers said.

The students included local radio amateurs, public service personnel, and members of the general public. "All those who attended qualified for their Skywarn® Spotter Card and are now ready for action," said Luebbers.

(For more photographs of the Lake County Skywarn® training class, visit the CQ Public Service website: <http://www.CQPublicService.blogspot.com>*—ed.)*

Rick Butz, N7WE, Assistant Emergency Coordinator for ARES®, helped with the plans for the spotter course.

The well-attended Skywarn® Spotter course was held in the Lake County (Florida) Emergency Operation Center last fall. (Photos courtesy of Lake County ARES®)

Arlena Moses, one of the NWS meteorologists conducting the Lake County training, explains the reporting system to students.

Craigstlist.org—*free*—and we were able to pick that up and install it into the EOC," he said.

"A resident of the city donated a new $600 battery backup system for our computer server rack. Another donated almost $5000 of computer network routing, switching, and wireless Cisco equipment. Three 55-inch LED televisions were purchased, and underutilized U-shaped modular tables were brought in from the city.

"Our ham guys spent countless weekends and evenings getting all of these items together," Hartley said. "Skechers is currently working on donating a computer server to us."

Hartley said Hermosa Beach Kiwanis was given a tour "to see our progress and made an additional $2000 donation. We purchased a Davis wireless weather system with APRS with this money."

After almost three years of effort, the grand opening was held August 11, 2010, "a great day, indeed," K6KAH said. "We had more than 75 people attend, including the local newspapers, a TV news crew, and Clear Channel Radio Network.

"We're still setting up equipment. We also have three Kenwood TH-F6 144/220/440-MHz transceivers. The city purchased much of our non-HF equipment to help get us started," Hartley said. "The three HTs will be distributed to our schools. Our school system is training 30 people, about 20 kids and 10 adults, to pass the FCC test. That training is being done by Walt Ordway, K1DFO, who is a fantastic instructor."

Hartley said the group is now "wrapping up some fiber-optic cabling being run by Verizon into our EOC/club room to give us internet, television, and telephone access. The city is purchasing new laptop computers for its workstations and ran a drill with the 2010 Great California Shakeout."

"All of this said," Hartley added, "there were pitfalls along the way—for example, disagreements among HBARA members on how certain things should be done. However, we came together as a group, voted, and moved on. No hard feelings.

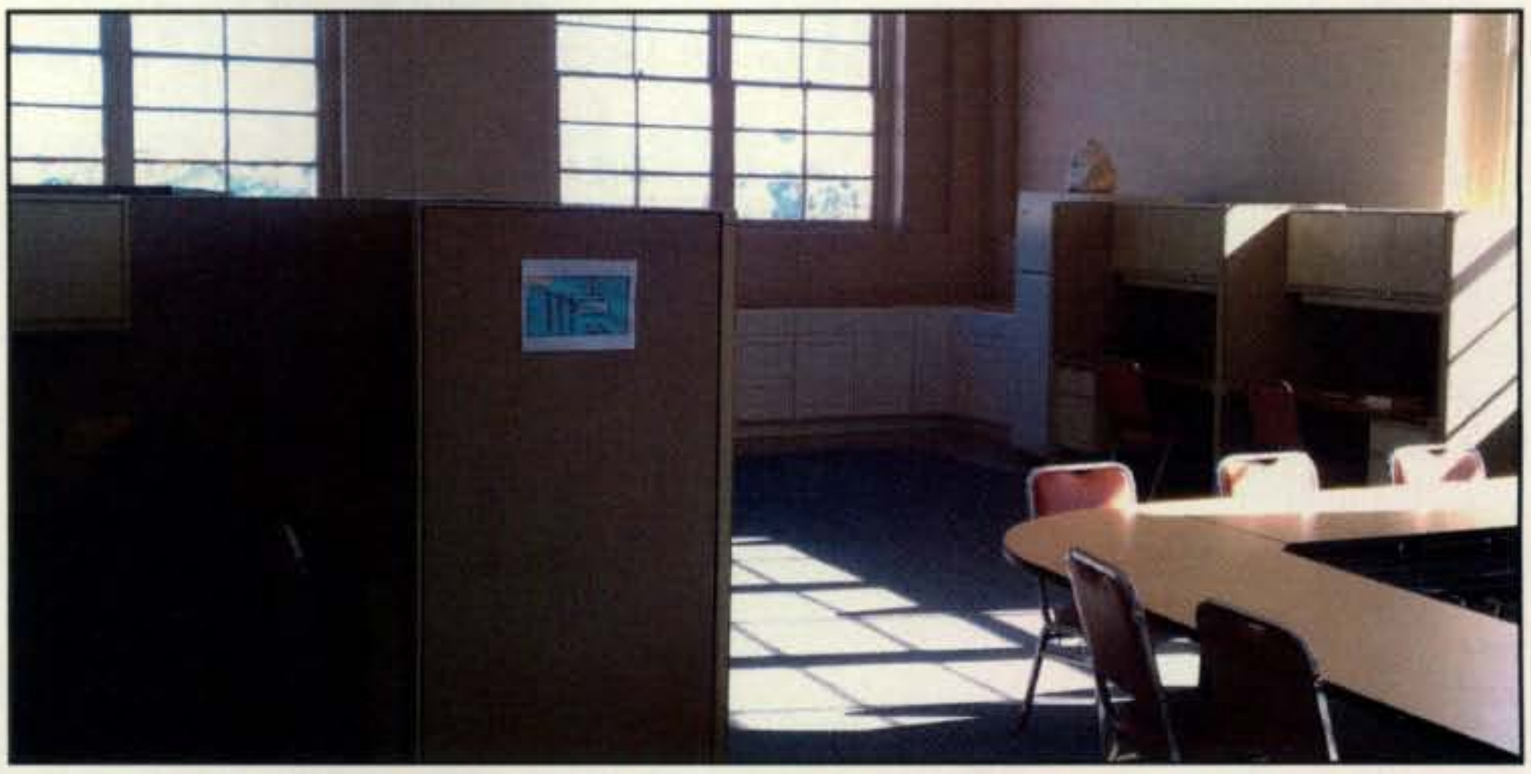
"Our group worked hard to better the community. After all, it really is about helping one another, and this has been one

of the most rewarding projects I have ever been a part of," he said.

"I must thank all of the HBARA members for their countless hours of help and support. Without them, the City of Hermosa Beach would be less prepared for disaster and would have no ham radio club," Hartley said.

"A motto on our Community Center says it all: *Where there is no vision, the people perish,"* Hartley said. "It is obvious the people of Hermosa Beach have a vision."

(For more photographs and links to videos of the HBARA and Hermosa Beach Emergency Operations Center, visit the CQ Public Service website: <http://www.CQPublicService.blogspot.com>—ed.)



Finishing touches on construction in July 2010 prepared the way for the EOC's grand opening in August.

APCO EmComm Course Focus: Disaster Ops and the Comm Center

The Association of Public-Safety Communications Officials International (APCO) Institute is offering the training course *Disaster Operations and the Communications Center* "to educate the public safety telecommunicator on a wide range of man-made and natural disasters, their effects on the community and its infrastructure, and the response and recovery needs of each."

Information on overall emergency management and homeland security, and guidance on continuity of operations for the Communications Center "in the face of a multitude of disaster situations" is covered as well.

APCO Institute noted the importance of teaching public safety personnel "on their role and the role of the Communications Center in disaster operations. . . . there is a defined role for public safety communications in every element of disaster response and recovery. As public safety's ability and need to address disaster situations evolves, the telecommunicator needs to be familiar with all types of disasters—man-made and natural—and how those events can impact the communications function."

Course elements being examined include Homeland Security and Emergency Management at the federal, state, regional, and local levels; and natural disasters with emphasis on hurricanes and typhoons, tornadoes, tsunamis, severe weather and temperatures, severe heat, earthquakes, floods, and wild land or forest fires.

For complete information and prerequisites, visit the APCO Institute at: <http://bit.ly/i2xXIn>.

Wanted: Your EmComm Stories

Do you or your emergency preparedness group have a story to share with *CQ* readers?

Like this month's Hermosa Beach EOC feature, it can focus on developing EmComm infrastructure, or participation in community event support, disaster training, or providing communications during *the real thing.*

We look forward to hearing from you. Drop an e-mail to: <ki6sn@cq-amateur-radio.com> and we'll get the ball rolling. High-resolution digital photographs are always welcome. They can help put faces to the names and callsigns cited in your narrative. They give readers an inside look at your accomplishments, as HBARA's did this month.

Share your public service achievements, challenges, and lessons learned with others in the EmComm community. We all benefit. 73, Richard, KI6SN

Reporter Kit Sammy of Westwood One/ Metro Networks interviews Ken Hartley, K6KAH, and Fire Captain Mike Garofano at the EOC grand opening last August. (Courtesy of Cheryl Cross)

mobiling

BY JEFF REINHARDT,* AA6JR

Mobile Installations: Hams Helping Hams

Kudos to the avid readers of "Mobiling," as there has been a super response to our call for sharing your photos of mobile installations. As we've said before, this format is probably the best example of "hams helping hams" in the finest tradition of our hobby. We have a lot to share, along with photos, so let's get right into it.

What's the Best Installation?

Beginning with the basics, the best installation is "one that works." While that may sound like a flippant response, consider "what works" to mean an installation that's safe to operate, electrically sound with good RF characteristics, and harmonious with the vehicle in which it is installed.

A good example of a basic, functional installation comes from Bud, AD5SK, whose Yaesu mobile is putting out good signals from a 22-year-old mobile that may just now be getting "broken in" (photos A and B):

> Here some pictures of my Yaesu FT-1900 installed in my 1988 F-150. I ran the coax from the 5/8 mag mount under the cab and up through a hole in the floor behind the driver's seat. A split grommet, filled with silicone seal, protects it from rubbing against the metal.
>
> The power leads run from the transceiver, under the carpet, along the underside of the dash, and out the side panel, using the existing hole for the wires going to the right door. There is plenty of space between the inner and outer fenders to run the leads directly to the battery.
>
> Everything works fine, with all controls near at hand. The only thing I am going to change is the microphone hanger. As it is now, it's too hard to hang up without taking my eyes off the road.
>
> *73, Bud Garretson, AD5SK*

Thanks, Bud. I appreciate your pointing out the measures you took to be sure the power leads were protected from sharp metal edges. While the insulation on wires may seem substantial, time, friction, and sharp metal can cut through a wire's protective covering in no time!

Taking it Up a Notch

From Evan, K9SQG, is another approach that's quite popular—an installation that can easily be removed to keep the rig with its rightful owner (photos C and D). However, I'll dispute his description as "bland." It's quite nicely done!

*5904 Lake Lindero Drive, Agoura Hills, CA 91301
e-mail: <aa6jr@cq-amateur-radio.com>

Photo A– Fingertip convenience, a solid mount, and protected wiring —all the "basics" are in place for AD5SK's mobile. The mobile platform may be old, but the signals sounds like a million dollars! (AD5SK photo)

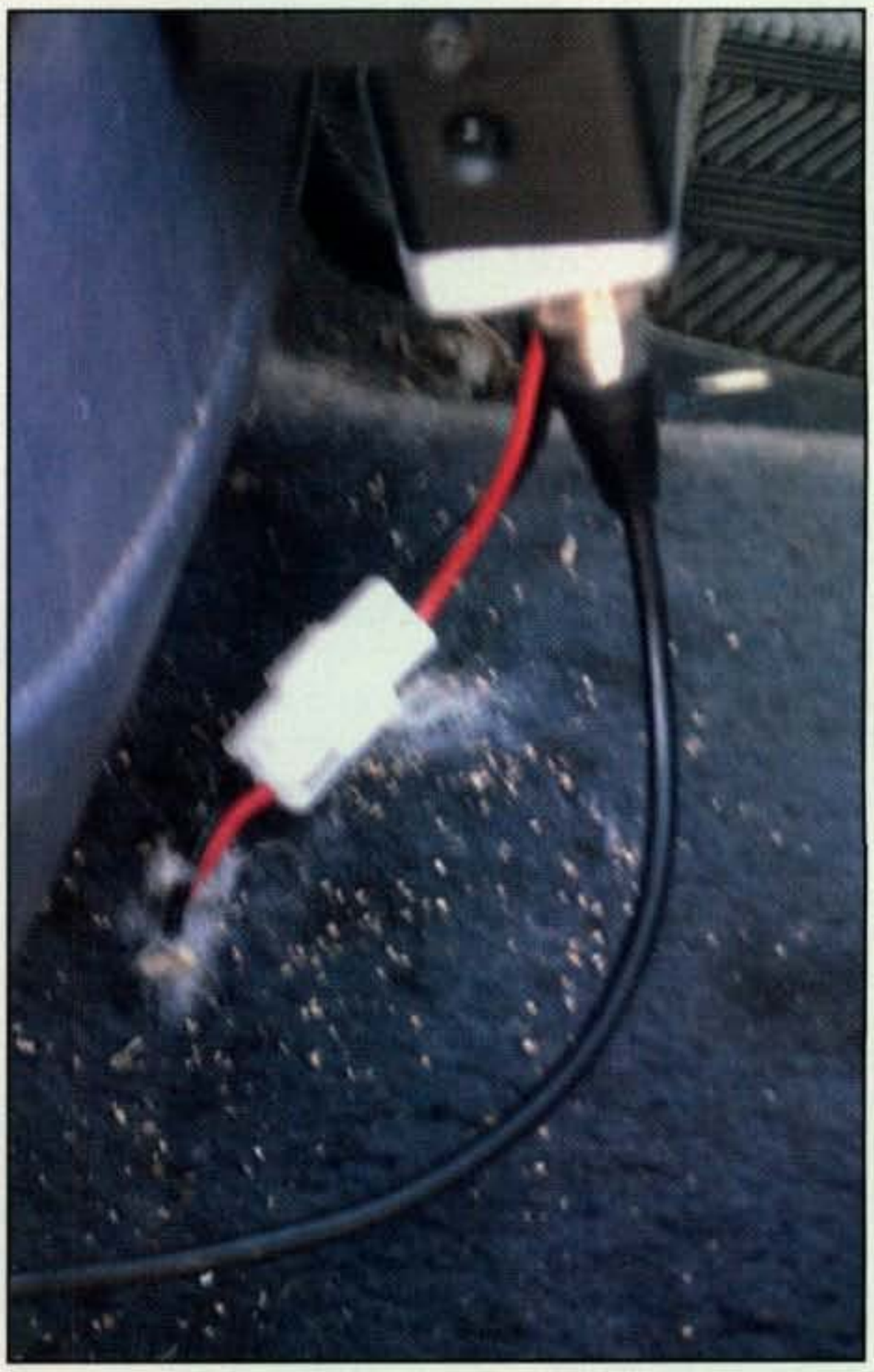


Photo B– One nice feature about older vehicles is that you can drill a hole where one is needed. AD5SK installed protective grommets and silicone sealer to protect the power leads and coax. (AD5SK photo)

MFJ *Balanced Line* Antenna Tuner

Superb balance . . . Very wide matching range . . . Covers 1.8-54 MHz . . . Cross-Needle SWR Wattmeter . . . Handles 300 Watts . . . Compact size . . .

The MFJ-974HB is a* fully balanced true *balanced line antenna tuner. It gives you superb current balance.

Johnson Matchbox

For decades, the Johnson Matchbox has been the standard of comparison for balanced line antenna tuners. But, it had a severely limited matching range and covered only 80, 40, 20, 15 and 10 Meters.

***The** MFJ-974HB is its successor*. It meets today's needs and even surpasses the Johnson Matchbox outstanding performance.

Everything You Need

The MFJ-974HB gives you excellent current balance, very wide matching range(12-2000 Ohms) and covers 1.8 through 54 MHz *continuously* including all WARC bands, 160 Meters, 6 Meters and the new 60 Meter band. Handles 300 Watts SSB PEP and 150 Watts CW.

Tuning is fast and easy - - just three tuning controls. You can adjust for highly efficient broadband low-Q operation or use higher Q when you encounter extreme loads.

A large three-inch lighted Cross-Needle SWR/Wattmeter lets you read SWR, peak or average forward and reflected power *all at a glance* on 300/60 or 30/6 Watt ranges.

A ground post is provided to ground one output terminal so you can also tune random wires and coax fed antennas.

Compact 7½Wx6Hx8D in. fits anywhere.

Tunes any Balanced Line

The MFJ-974HB tunes any balanced lines including 600 Ohm open wire line, 450/300 Ohm ladder lines, 300/72 Ohm twin lead - - shielded or unshielded.

Superb current balance minimizes feedline radiation that can cause troublesome TVI /RFI, painful RF bites, mysterious RF feedback problems and radiation pattern distortion.

Excellent Balance, Excellent Design

The MFJ-974HB is a *fully balanced* wide range T-Network. *Four* 1000 Volt air variable capacitors are gear driven. A high-Q air wound tapped inductor is used for 80-10 Meters with separate inductors for 6 and 160 Meters. The tuning components are mounted symmetrically to insure electrical balance.

MFJ-974HB
$209.95

A 1:1 *current* balun is placed on the low impedance 50 Ohm input side to convert the balanced T-Net-work to un-balanced operation. An efficient balun is made of 50 ferrite beads on RG-303 *Teflon*™ coax to give very high isolation. It stays cool even at max power.

Balanced Line = Extremely Low Loss

Balanced lines give extremely low loss.

Doublet, horizontal loop, vertical loop, quad, double extended Zepp, Lazy H, W8JK antennas all give efficient multi-band operation when fed with balanced lines.

6-80 Meter Balanced Line Tuner

MFJ-974B
$189.95

MFJ-974B, $189.95. Same as MFJ-974H but for 6-80 Meter operation (no 160 Meters).

160-6 Meters All Band Doublet Antenna

MFJ-1777, $59.95. 102 feet doublet antenna covers 160-6 Meters with balanced line tuner. Super strong custom fiberglass center insulator provides stress relief for 450 Ohm ladder line (100 feet included). Authentic *glazed ceramic* end insulators. Handles 1500 Watts.

MFJ 1500 Watt *Fully Balanced* Antenna Tuner

Fully balanced MFJ-976 handles 1500 Watts legal limit . . . Extra-wide 12-2000 Ohms matching range . . . continuous 1.8 to 30 MHz coverage including all WARC bands . . . Four separate 500 pF in two gangs gives you a total of 2000 pF capacitance . . . Heavy duty 1:1 current balun . . . more!

MFJ-976
$499.95

The MFJ-976 is a 1500 Watt Legal Limit *fully balanced* antenna tuner.

You get *superb* current balance, very wide matching range (12-2000 Ohms) and *continuous* 1.8-30 MHz coverage including all WARC bands. Handles *full* 1500 Watts SSB *and* CW.

You can tune *any* balanced lines including 600 Ohm open wire line, 450/ 300 Ohm ladder lines, 300/72 Ohm twin lead -- shielded or unshielded. Also tunes random wires and coax fed antennas.

MFJ's *fully balanced* extremely wide-range T-network gives you simple, fast three knob tuning. No complicated switching between high and low impedance and switching in additional capacitance of L-networks.

Four separate 500 pF in two gangs gives you a total of 2000 pF for highly efficient low loss operation on 160 Meters.

You get superb 10 Meter performance due to MFJ's low minimum capacitance and exclusive *Self-Resonance Killer*™ high-Q *AirCore*™ roller inductor with silver plated contacts.

Heavy duty 1:1 current balun gives you *superb balance* and stays cool even at 1.5kW.

True *active* peak reading lighted Cross-Needle SWR/Wattmeter lets you read SWR, *true peak* or average forward and reflected power all at a glance on 300/ 3000 Watt ranges. 12Wx6Hx15¾D inches.

Ladder line, Twin lead, Insulators, Copper wire . . .

Super-strong fiberglass 450 Ohm ladder line insulators

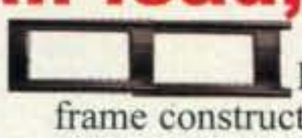
MFJ-16D01, $8.95. *Center* insulator. Double weave ladder line stress-relief. Strong wire tie points. Hang hole.

MFJ-16E01, $9.95. Feedpoint *End* Insulator. Double weave ladder line stress relief. Built-in SO-239 connector.

MFJ-16F01, $8.95. *Middle* insulator. High-strength coax connection at mid-point with SO-239, quadruple weave-through ladder line stress relief.

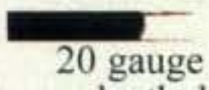
MFJ-16C06, $4.56. Authentic *glazed ceramic* Insulator, 6-pack.

450 Ohm Ladder Line



Extremely low loss, open-frame construction. Heavy duty black polyethylene. Solid 18 gauge wire. MFJ-18H050, **50 Ft.**, $19.95. MFJ-18H100, **100 Ft.**, $34.95. MFJ-18H250, **250 Ft.**, $89.95.

300 Ohm Twin-Lead



20 gauge stranded copper wire. Black polyethylene. MFJ-18T050, **50 Ft.**, $24.95. MFJ-18T100, **100 Ft.**, $44.95. MFJ-18T250, **250 Ft.**, $99.95.

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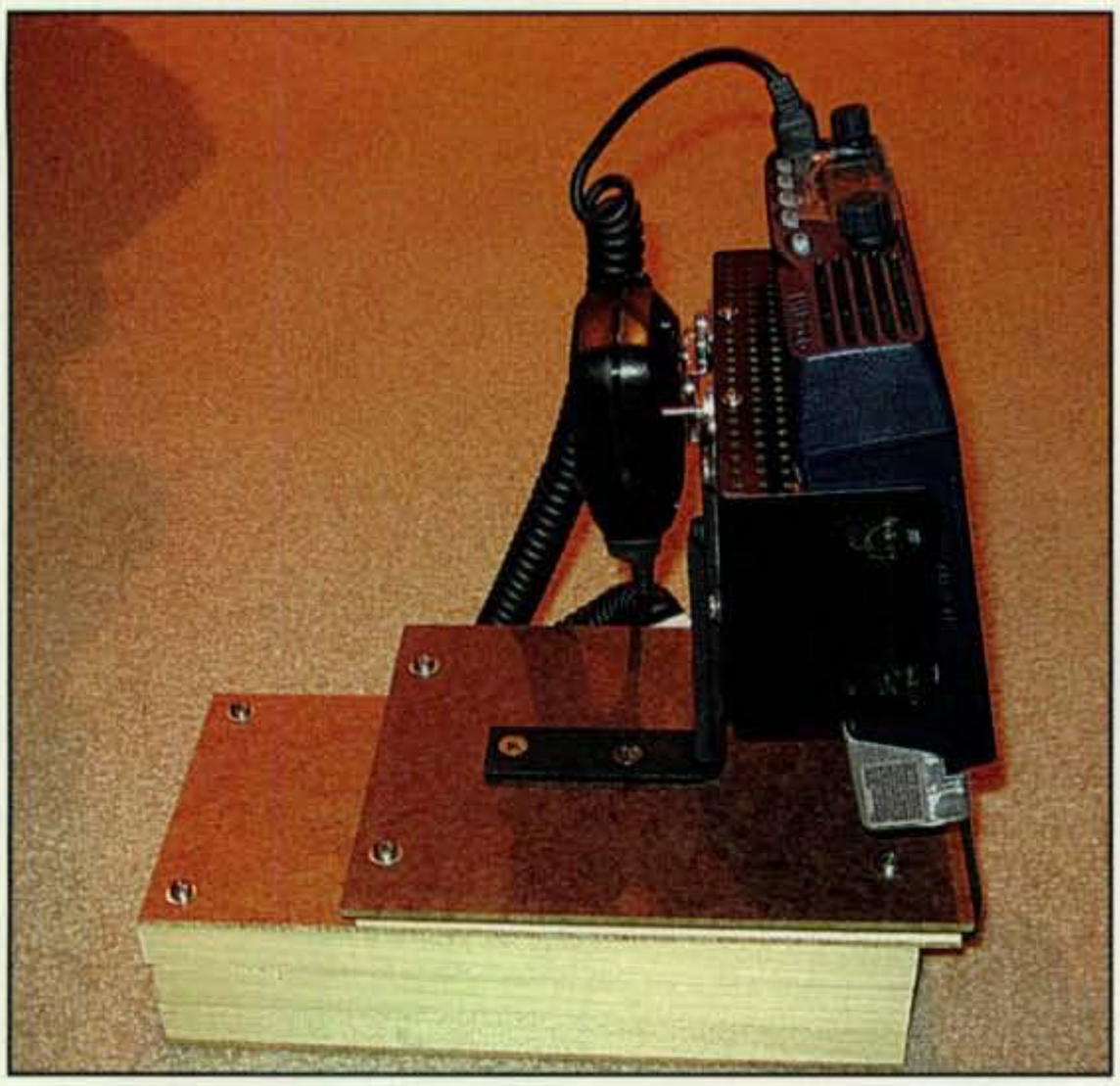


Photos C & D– Here's K9SQG's clean design for a "drop-in" modular mobile that's easily installed and then secured in a safe place with a minimum of fuss. When installed, it's in a convenient location, away from air-bag deployment zones and it doesn't interfere with vehicle controls. (K9SQG photos)

Per your request in *CQ*, I'm sending some bland pics of my mobile installation. I basically wanted to install my Kenwood TM-271A so that it was easily installed/ removed and didn't shout "ham radio inside, please steal me!" So I devised a simple way of installing the radio in my Lexus RX-300 SUV. It consists of several layers of wood, a top layer of Masonite/fiberboard, with everything held together with screws and glue. Everything was given two coats of clear polyurethane to make sure it would resist stains. I installed two miniature fans that could be off, in series, or in parallel via a convenient switch for cooling the heatsink if needed. An L bracket and the Kenwood mobile mount allowed me to get the right angle for convenient installation and access. The power for the rig is obtained via the accessory outlet facing the rear seats and a standard coax connector attaches to the back of the radio. I can slide the radio into/out of the center console drawer in about two minutes and hide it in the cargo area. This is convenient for removing the radio when I park the vehicle in a public location.

The antenna is a standard 1/4-wave whip, black color, that is attached to one of the luggage-rack rails with the coax going through the rail, down a groove for the luggage rack, and then through the hatchback area into the vehicle. Since the antenna is thin and black and the black mount is unobtrusive, the antenna virtually disappears from a distance or if there is a complex background such as trees, etc. The antenna quickly unscrews when I take the vehicle to the car wash. Not a very unique installation but it's mine, and I'm sticking with it.

As a side note, I always do enjoy your articles!

73, Evan, K9SQG

Thanks, Evan. The utility of your design is readily apparent and it's visually pleasing. I'm a bit uneasy about using factory power ports (cigarette-lighter outlets) unless the operator is foresworn to using low-power output from the transceiver. On HF rigs, it's also an open invitation to noise and blown fuses, but for VHF/UHF it should be okay in most cases.

A "Relay" of Mobile Photos

This may be a first: I received a relay of one ham's mobile photos via two other hams.

It's an interesting twist going back to the roots of our hobby and it gave me a chuckle. Moreover, check out this "first class" installation and the excellent design (photos E through I). Thanks to Phil Hamilton, K7RZS, and Tom Coughlin W7USR for the "relay" of photos that feature K7KKP's superb rig.

The mobile belongs to Jack, K7KKP, of Auburn, Washington. Because Jack is in a highly restricted area with killer CC&R he has gone to a "killer" mobile: antenna Hi-Q, 5-160 coil; rig TS-B2000; amp ALS-500M Ameritron AC power supply, Ameritron 90 amp; truck Chev2500/Duramax Diesel.

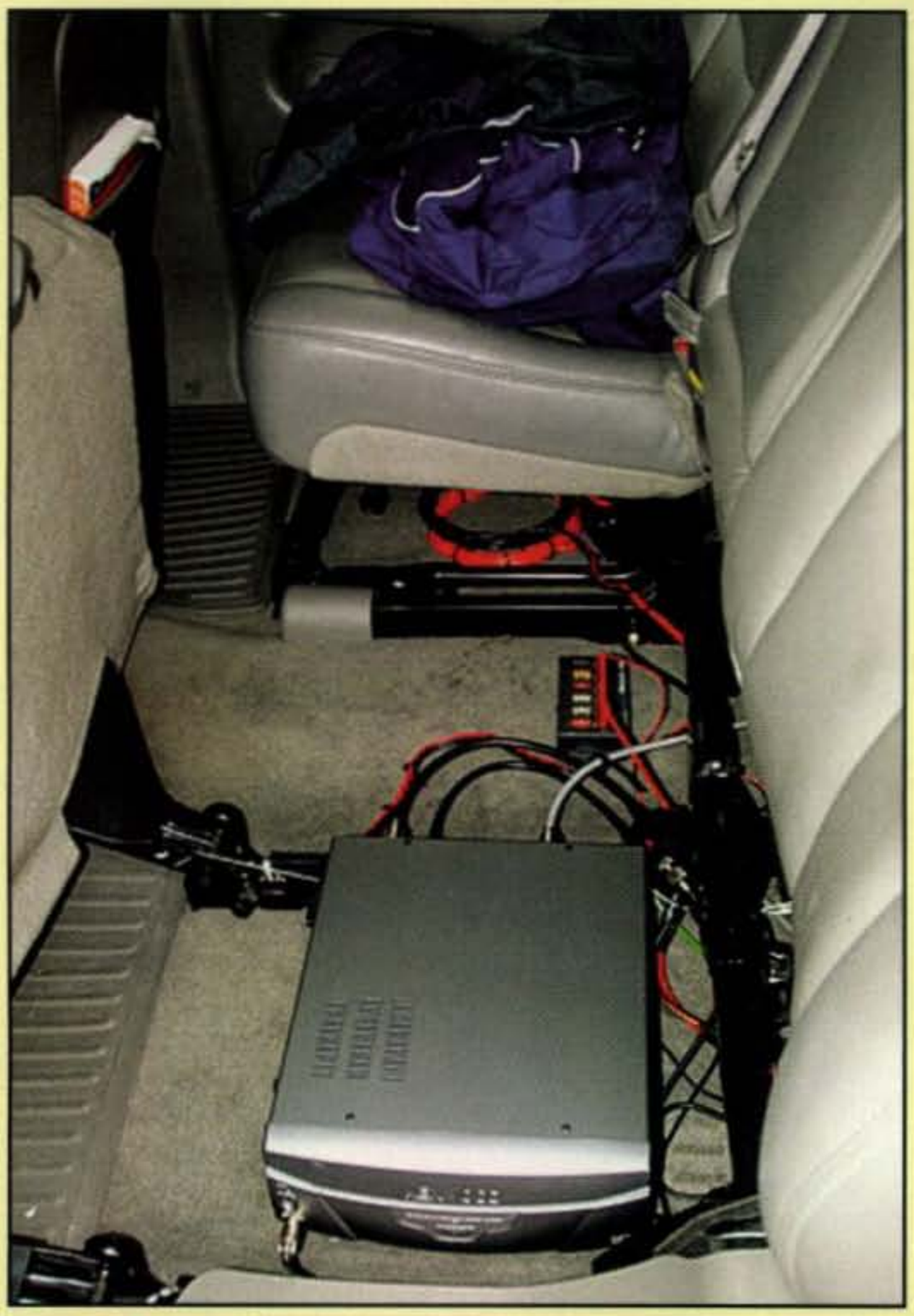
The entire rig, including truck may be connected to commercial mains, hence the power supply. Also, it may be connected to an on-board 3000-watt Honda generator using the power supply.

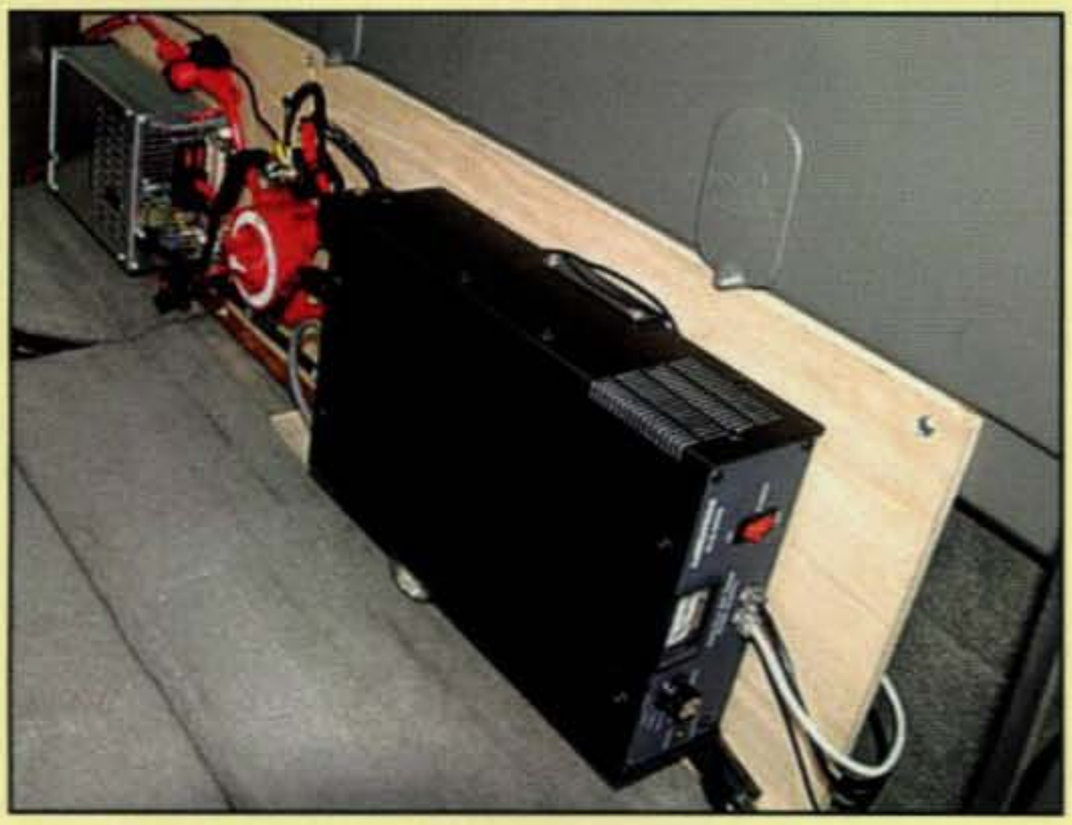
When operating full mobile, Jack uses his huge alternator to power the system, leaving the AC power supply out of the circuit.

Big signal on all bands, SSB, Packet, PACTOR (SCS PCTII), and APRS. Also, Jack is operating via Sky Command and/or Wi-Fi remote via a LAN from the shack using the ARCP-2000.

73, Tom Coughlin, W7USR

Photo E– Want to work the world? You can from K7KKP's mobile rig! (KK7KKP photo)





Photos F, G, & H– Now you see it, now you don't. K7KKP makes excellent use of space beneath and behind the second row of seats in his Chevy Silverado. (K7KKP photos)

Because it can be plugged into the mains, but also carries its own 3K generator, K7KKP's setup sounds like a forerunner to the much smaller Chevrolet Volt that's just been introduced! However, I'd call this a different type of "hybrid" installation that combines operating versatility with the power of a base installation in the convenience of a mobile package that's "off limits" to restrictive homeowner association covenants.

More Photos Please!

As you can see, a little thinking and some careful installation can render a mobile unit that yields enjoyment, safety, and versatility throughout the year. Please send your photos via e-mail to the address shown on this first page of this column along with a brief description of your mobile installation so that we can expand the body of knowledge shared via "Mobiling."

Coming Up: What's Up With the Auto Industry?

In a future column I'll try to get new info from the auto manufacturers pertaining to mobile radio installations. Since our last roundup, there have been many changes in auto technology, especially in the electronics packages. Is there a risk of voiding your new car warranty? How can a mobile be safely installed in some of the newer cars, especially hybrids? We'll ask the manufacturers and report to you.

Until next time, happy mobiling!

73, Jeff, AA6JR

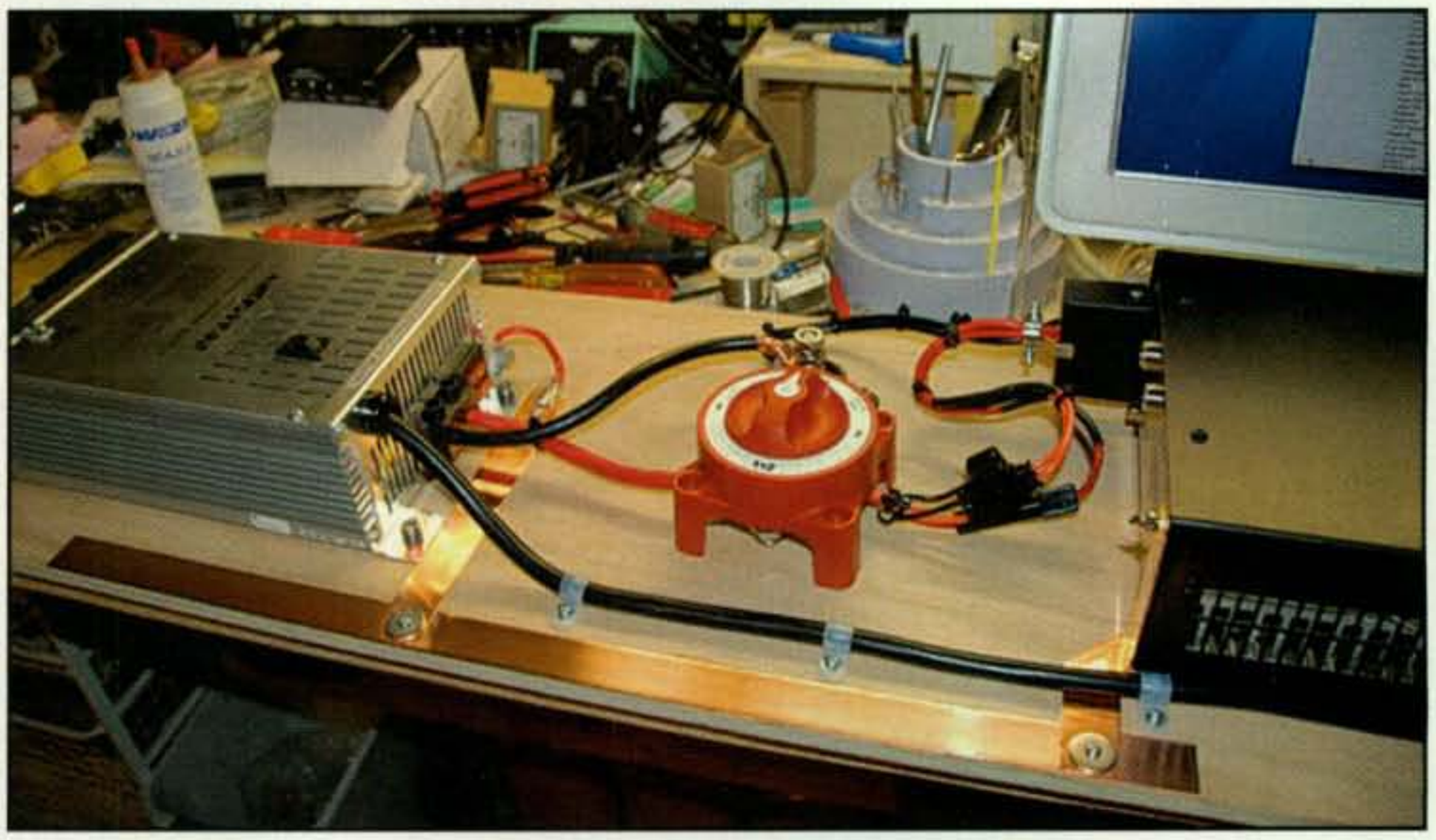


Photo I– K7KKP rig prior to installation. Note the heavy copper ground strap for bonding the equipment. Mounting on a wood platform in the shop is much easier than installing each component into a truck's sheet metal. (K7KKP photo)

On the Cover

Richard Schwenke, N8GBA, of Marquette, Michigan, checks his antenna after one of the Upper Peninsula's frequent winter snows. The Butternut HV-6 multiband vertical, to which he has added four 100-foot radials and fifty 50-foot radials, has served him well for some 25 years. Richard says he uses this antenna for about 90% of his contacts. On a 48-foot tower not visible in the photo, Schwenke also has a 160-meter dipole; a Moseley beam for 30, 17, and 12 meters; additional beams for 6 and 2 meters; and a 6m/2m/70cm vertical. Inside, his rigs include a Yaesu FT-1000 and an FT-847.

A semi-retired general contractor, Schwenke is also a Volunteer Examiner and ARRL Emergency Coordinator for Marquette County. He particularly enjoys helping provide communications, along with other members of the Hiawatha Amateur Radio Association, for various outdoor events held each winter in Michigan's Upper Peninsula. Highlights include the UP200, a 240-mile sled dog race (to be held this month) and the Noquemanon Ski Marathon, which features some 1200 skiers competing over either 25- or 50-kilometer courses.

Richard has been a ham since 1984, with an Extra Class license since 1987. His favorite band is 160 meters in the wintertime, mostly on voice. He also enjoys 20, 17, 15, and 10 meters. Richard says his main interests are special events, such as the races described above, and ragchewing. "I enjoy sitting down and having a conversation," says Schwenke, "meeting people, rather than a one-transmission QSO."

(Cover photo by Larry Mulvehill, WB2ZPI)

Sketching an Arduino

BY DON ROTOLO,* N2IRZ

In December's column, I mentioned my MPGuino, a fuel economy gauge built around an Arduino platform. This month, we'll take a closer look at the Arduino development boards and map out a project.

In past columns we've established that fewer hams are building things these days. My assertion is that while this may be true for hardware, more people are getting their creative juices flowing with software than ever before. There are dozens of nice microprocessor platforms available for experimenters, each having its advantages. However, for this project I've selected the Arduino *Uno* board (photo A).

Arduino is an open-source hardware and software platform developed in Italy and assembled around Atmega168 processors. Other systems I considered were the BASIC Stamp and the Propeller (from Parallax) and the Rabbit (from Rabbit Semiconductor). All of these platforms (and a few others I haven't mentioned) are well-supported and have an easy-enough programming process that caters to beginners; I don't think you can go wrong with any of them. Being of Italian descent and wanting to support open-source projects, though, Arduino seemed like a nice fit.

The Design Process

The first step in any design is to clearly identify the problem you are trying to solve. This is more important than it seems, since a solution to a different problem will be disappointing. In my case, I had built a massive antenna rotator (being far too cheap to actually buy a commercial unit) and needed some way of controlling it.

What I built is based upon a 33:1 worm-gear right-angle reduction drive with one-horsepower capacity, bought on eBay for $75 including shipping. I then found a power-window motor from a high-end luxury car to drive it. The motor came from a car that had auto-up and auto-down windows, using a pair of Hall-effect sensors in quadrature to measure speed and direction, all operating on 12 volts, of course.

A Hall-effect sensor is a solid-state device that senses magnetic fields. In my motor, two of them are mounted next to a magnetized toothed wheel in such a way that one of the sensors detects a "tooth" before the other. One sensor can be used to count teeth, thus deriving motor speed and position, while the second sensor can be used with the first to determine the direction of rotation. Looking at fig. 1, if sensor A sees the tooth before sensor B, rotation is clockwise, while if B comes before A, rotation is counter-clockwise. The sensors in my motor have drive and output circuitry that delivers a nice, clean square wave, simplifying the interface.

I fabricated a shaft adapter so the motor could securely turn the worm drive input shaft along with a simple motor mount. I bought a used antenna rotator at a hamfest for $10 (not working) for the mast adapter casting, and the result is shown in photo B.

Now that we know what problem I needed to solve—the basic purpose of my project—the next step in the design process was to make a list of the functions or capabilities my device required. First, I needed to be able to power a 12-VDC motor that could draw up to two amps under load (I measured it) both forward and backward. Second, I needed to be able to read two Hall-effect sensors, specifically counting the number of pulses from one of them, and detecting the leading edge of the output pulses from both of them. It was not allowed for any pulse or leading edge to be "missed": The counting had to be 100% reliable. Third, I needed a way to control the motor from my shack, and last I needed some kind of display to show where the antenna would be pointing.

Implementing a Design

Now I needed to figure out exactly what I would need to implement those capabilities. I had a microprocessor, so the inherent capabilities were there.

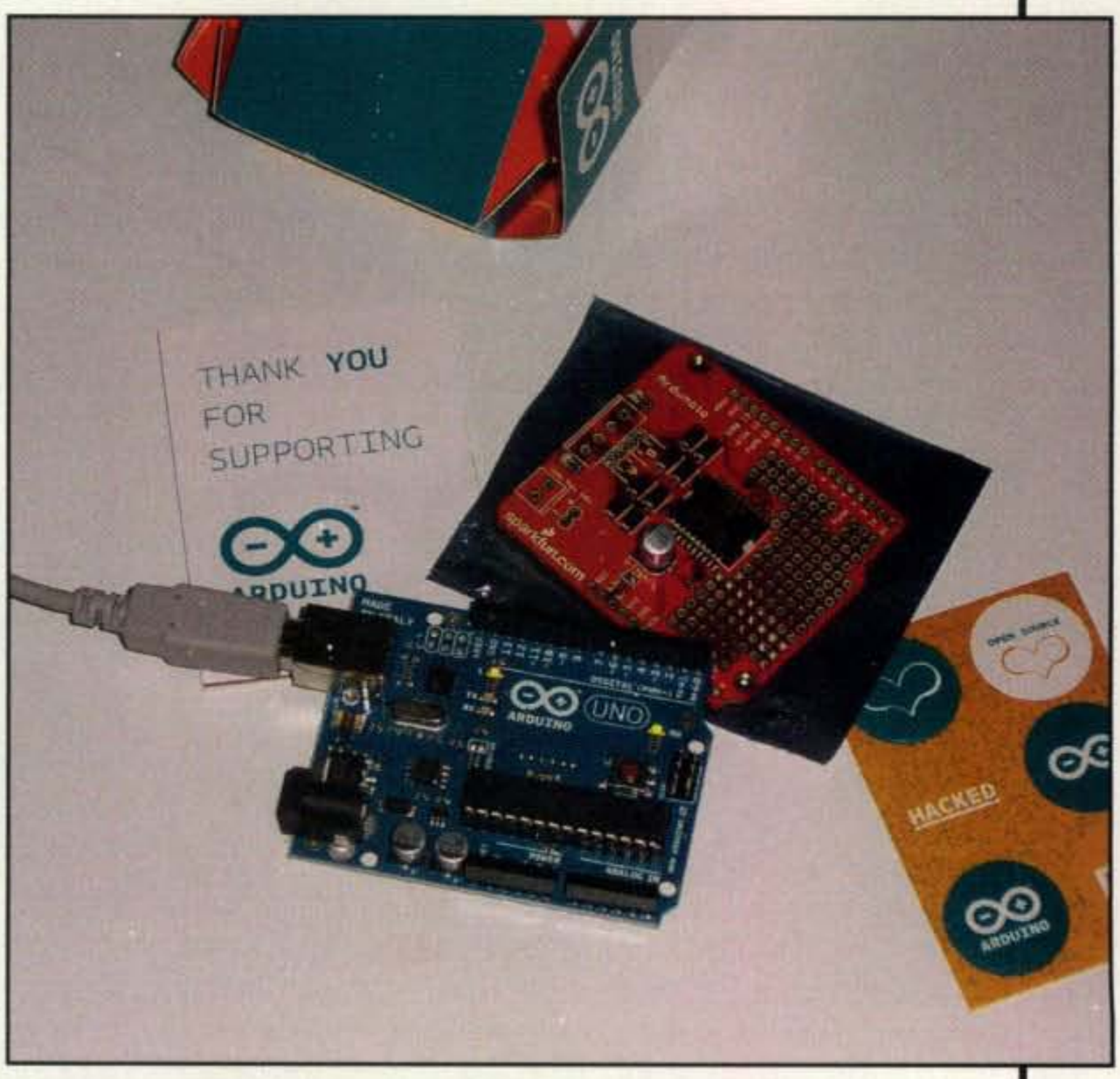


Photo A– An Arduino Uno board and motor driver shield. At this point, I needed to solder the stackable header connectors to the shield so it could be set atop the Uno. During development, the Uno board was powered by the USB cable, which was convenient. Note the yellow LED lit up near Pin 13 (to the upper left of the Arduino symbol), a result of running the "Blink" example sketch (see text).

*P.O. Box 114, Park Ridge, NJ 07656
e-mail: <n2irz@cq-amateur-radio.com>

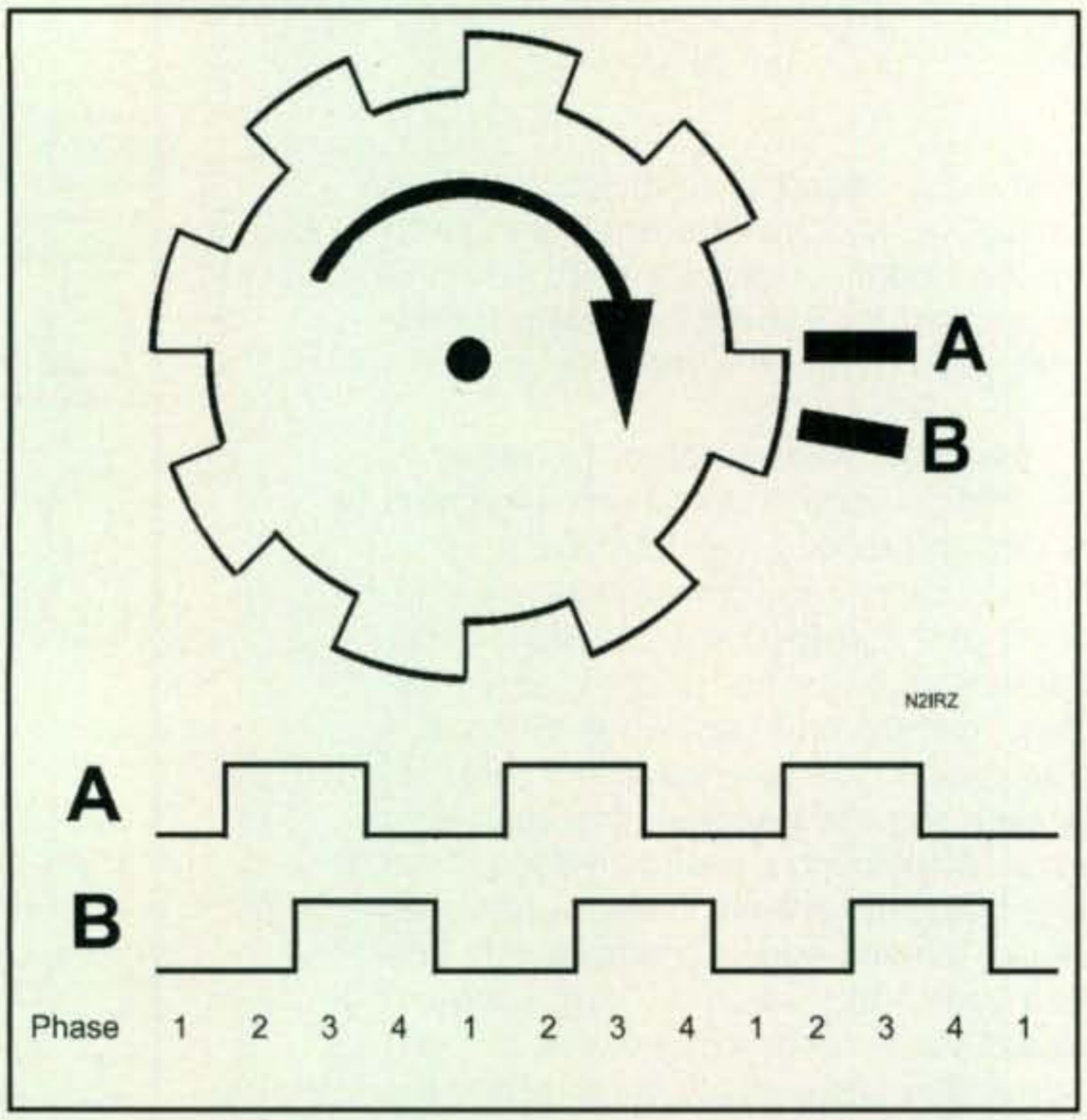


Fig. 1– A rotary encoder uses two sensors arranged in quadrature to sense rotation direction. Since sensor A sees the gear tooth before sensor B, it must be rotating clockwise. This gear is shown just at the end of Phase 3.

To drive the motor, I needed some kind of motor driver, since no MPU can drive a motor directly. Sparkfun sells a Motor Shield for the Arduino, with two channels of variable output in both directions, capable of handling 2 amps per channel. I suppose I could have built a motor driver (using, for example, a National Semiconductor LMD18201 chip), but for $25 I bought the off-the-shelf solution and used only one of the two drivers.

I needed a 12-VDC power source for the motor, so I tapped off shack power that already existed at the base of the tower, and for the 5 VDC to power the Arduino board, I used a simple LM7805-based power converter.

To read in the motor speed and direction, I just used the nice, clean square-wave outputs from the Hall-effect sensors and brought down the tower via shielded cable. The sensors also needed 12 volts and ground to operate, which would be sent up the tower in the same wire bundle. However, a significant issue was the 100% reliability requirement: Just using the analog inputs to the Arduino wouldn't guarantee that pulses would not be missed. The answer was to use interrupts, which I'll explain in a moment.

A display of antenna direction can take several forms. The easiest to implement was a circular pattern of eight LEDs, one or two lit to show (within 22 degrees) where the antenna was pointing. However, since I'd have access to the motor pulse count, I'd know the exact direction down to a fraction of a degree. Thus, I chose to use an LCD display to show the direction in degrees. (In reality, the antenna system isn't mechanically sensitive enough to adjust in fraction-of-a-degree increments, but we'll gloss over that inconvenient fact.)

Controlling the whole contraption would take the form of two buttons—clockwise and counter-clockwise. Simple and reliable. Maybe in the future I'll develop a set-and-forget system with which I can dial in the direction and let the system take care of movement, or perhaps even interface with a logging program for completely automated pointing. However, for now simple is where I was headed headed.

The Details

The last step of the design was to write out the specific hardware and software details. Unfortunately, if we were to get deeply into that, I'd need several times more space on these pages than I can have. So instead, let's cover some of the background for those of us who are fairly new to all this.

Arduino Platforms: The Arduino comes in several types (see <http://arduino.cc/en/Main/Hardware>), depending on what exactly you need. The *Uno* board is the latest revision of its general-purpose development board, replacing the *Duemilanove* (meaning "2009" in Italian) board, which is still available and also not a bad choice. If you need more processing power, memory, and input/output pins, Arduino has a few versions of its Mega board. The *Diecimila* ("10,000") runs on 3.3 V instead of 5 V, and the innovative *Lily Pad* is a stripped-down version with a circular circuit board, intended to be sewn into clothing for wearable processing applications. The *Nano* is very small, the *Fio* and *Bluetooth* are intended for wireless applications, and the *Pro* and *Pro Mini* are bare-bones, full-power systems intended for embedded applications. There are several other variations on these, as well as many older and out-of-production boards, so have a look at the website for details.

Peripherals: Also available, from both Arduino and several others, are so-called "Shields." These are daughterboards that provide specific functions. For example, I bought the *Motor Shield* so I could easily control my rotator motor. Other examples include an *Xbee Shield* for wireless communication using Xbee, an *Ethernet Shield* for connecting to the internet, and a *Sensor Shield* to accommodate several different available sensor sub-boards to sense just about any physical thing

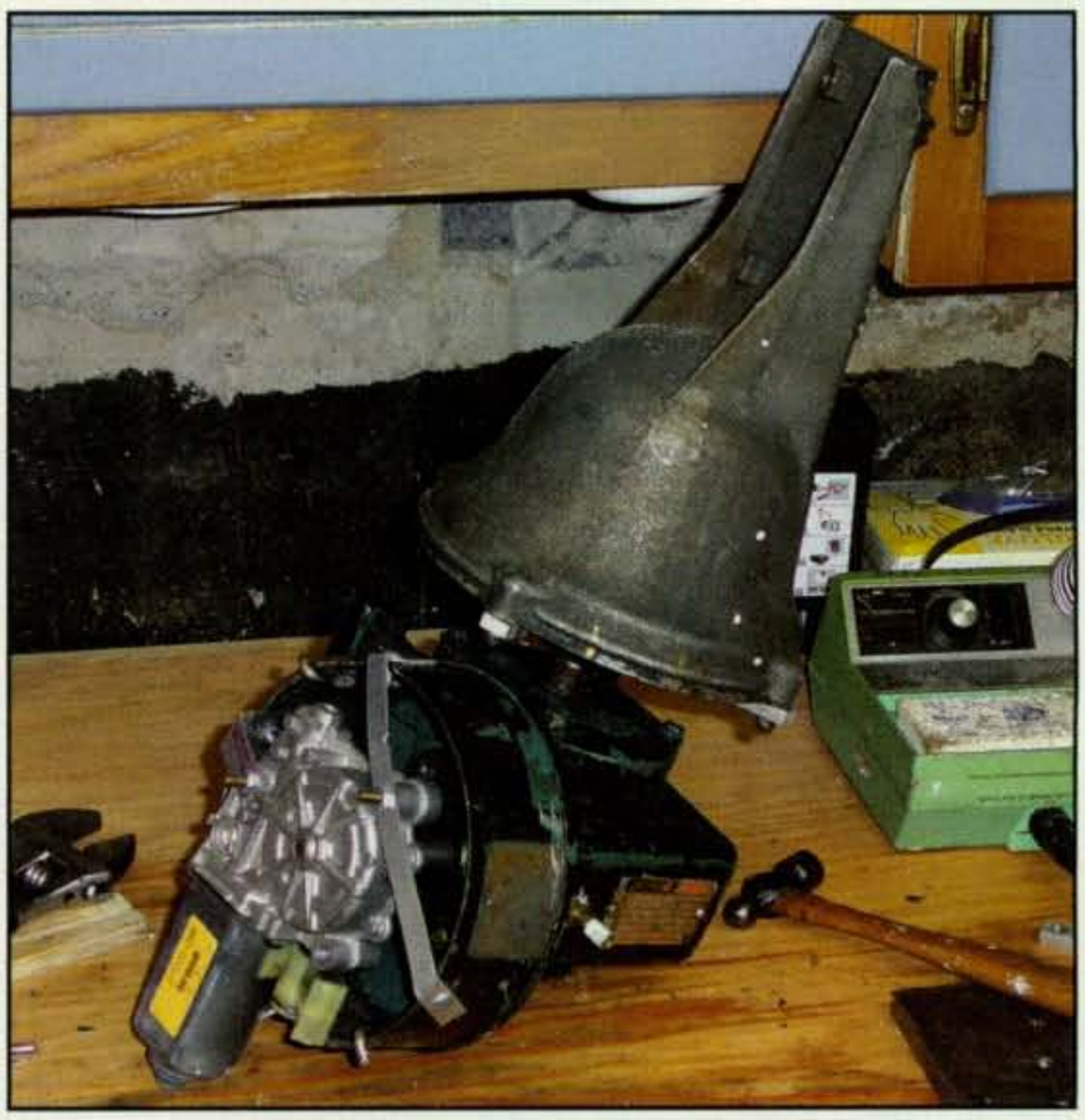


Photo B– My super-duty homebrew antenna rotator uses a car power-window motor, an old rotator's mast-mount casting, and a super heavy-duty worm-gear reduction drive. I'm using an Arduino Uno board to control the motor and sense where the antenna is pointed.

there is (temperature, pressure, light, distance, etc.). Search on eBay for "Arduino Shield" to see what I mean; just remember *Caveat Emptor* when buying items from overseas.

Programming: One nice thing about the Arduino is the "Learning" section of its web page. After getting my Arduino *Uno* in the mail, I downloaded the programming environment from the Arduino download page (<http://arduino.cc/en/Main/Software>) and unzipped the package into its own directions, making sure I preserved the directory structure. I started the programming environment, selected the type of Arduino board I had, connected it up (via USB, which also powers the board), and started following the tutorials.

My first "Sketch" (a program for the Arduino is called a Sketch) had the on-board LED blinking once per second (fig. 2). I fooled with that for a while, changing the blink speed and reloading it onto the board each time to see what would happen. I then realized that during the 1000-millisecond (1-second) delay period, the processor couldn't do anything else; it was focused on waiting. I then tried the Blink Without Delay sample Sketch, which approached the problem differently: Instead of waiting, it would periodically check the value of the on-board timer, and when it increased by 1000 milliseconds, it caused the LED to blink. By doing it this way, other tasks could run while we were waiting for the next second to start.

This simple example starts to hint at the nuances of programming. While both examples could blink an LED every second, the latter example did it while preserving the ability to perform other tasks.

My Program

Now on to my task-specific Sketch. Controlling the motor was actually very simple: I'd read in the values of both switches (which switched a 10k-ohm pull-up resistor to ground) and turned the motor depending on which switch was pressed. If both switches were pressed, I'd stop the motor, just as if neither switch was pressed. Simple enough, right? However, then the problems started.

While a switch was being pressed, the processor focused on that task alone and couldn't detect the pulses from the Hall-effect sensors. Therefore, I decided to use interrupts. An interrupt is a hardware-based signal that actually interrupts the program, no matter what it is doing at the moment, to perform some task while the interrupt is active. Of course, I couldn't interrupt the program for long or things would stop happening, so I wrote some code that, when the interrupt became active, added (or subtracted, depending on the motor direction) "one" to a counter and immediately popped back into the main program. This took only a few milliseconds (if that), so the main program ran smoothly despite the interrupt. I used two counters, one for each sensor, although one would have been enough.

I also added some logic to the counting module to determine which interrupt line (there was one for each Hall-effect sensor) became active first and stored that information as "direction." (I also verified that measured direction was the same as that commanded by the buttons. If there was a discrepancy, the motor was stopped.)

For the display, I included a module in the programming library that made using an LCD display very easy: You just "write" the text value to a certain output line and it magically works. In each run-through of the main Sketch (the program runs continuously in a loop) I read in the value of counter #1, divide by a number corresponding to the number of pulses to turn the rotator output shaft by one degree, round off the value to a whole number, and write that to the display.

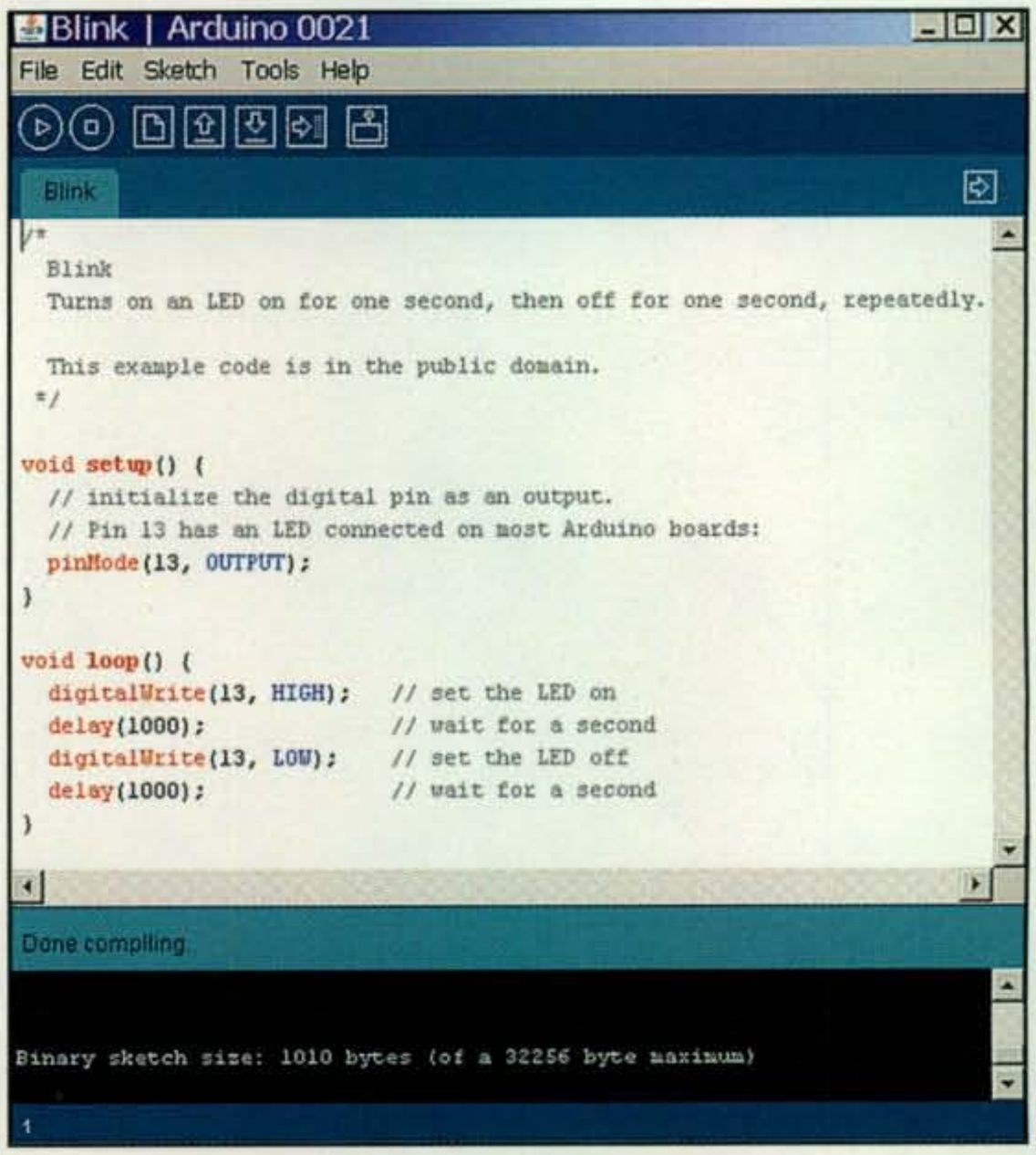


Fig. 2– The sample "Sketch" (program) called "Blink" makes the LED connected to Pin 13 of my Uno board blink on and off every second (1000 milliseconds). Several example Sketches, along with many online resources, ease the task of learning how to program an Arduino.

The last task was some error management. I didn't want the rotator to turn more than about 1.1 rotations, so I put in some code to stop the motor and disable the switch for that direction when the count increased to a number representing 1.1 turns, or decreased to zero. I also decided to put in a limit switch at the zero point; whenever the rotator reached zero, the counter would reset to zero no matter what it actually was. I also put a note on the display whenever this happened, since it meant that my counting was not working properly.

Some might argue that I really need a brake function to protect the worm gear, but I haven't figured out how to do that on the rotator. That's another task for the future, just like actually mounting it to the tower, weatherproofing it and installing an antenna. I'm waiting for the next ice storm for those tasks…

Conclusion

That's Arduino in a nutshell. To get started, first go buy an Arduino (visit <http://arduino.cc/> for a list of distributors) , download the programming environment, and start playing with it. Make LEDs blink, read in switches and potentiometers (there's an example Sketch for that), and start dreaming of some practical application. Start off simple and easy (e.g., don't try to build a TNC), and make use of the help resources such as the online forums (where others are happy to help) to make things happen. Do that, and soon you'll be breadboarding in a new way.

Until next time, when I'll share what David Levine K2DSL, taught me about working the ISS (International Space Station), happy programming!

73, Don, N2IRZ

Opening Bands with One Watt

BY CAM HARTFORD,* N6GA

This month we'll spend some time exploring opposite ends of the radio communication spectrum. One end involves using a hand-operated switch to make dots and dashes while at the other end we use a couple of million transistors to the same end. This is just a little example of the diversity of pursuits we encounter daily in our hobby!

SDR is More Than Just Receiving

One morning I marched into the shack determined to get on the air instead of on the computer. As the current lament goes, these days we spend too much time at the keyboard and not enough time doing what this hobby is all about.

The radio was set on 20 meters. Spinning the dial around 14.060 netted a dead band, and farther up in the land of PSK there were only a few pitiful little traces. What the heck, I thought; I'll give it a shot. After a couple of calls I caught the attention of Gerry, KC5XW, in Benton, Arkansas. After the first few obligatory exchanges, Gerry told me I had an intermod of 27 dB, which in PSK talk means a pretty clean signal. He was surprised to learn that I was running only one watt from a homebrew rig. We eventually continued our conversation through e-mail; it turns out Jerry wanted to know more about the rig I was running. He'd had a PSK QSO with a ham in Canada running a half watt to a log periodic and became convinced that PSK and QRP were good bedfellows. I couldn't agree more.

A couple of days later I marched into the shack determined to repeat my success. Once again, 20 meters appeared down for the count, dead as a door nail. No problem, thought I. This time I'll give a go on CW. After about three calls I was rewarded with a response from Ray, W5XE, in El Paso. I can't remember when I last worked Ray, but I do remember him as being one of the regulars on the 20-meter CW Transcontinental Net way back when. Ray had a very good signal, and I was surprised when he gave me a 589. Once again, one watt from a homebrew rig comes through to light up an otherwise dead band.

There are a few common threads running through these two QSOs. First is that if you don't hear anyone else, it doesn't mean the band is dead. I called CQ with my puny one watt and got a 599 signal back in reply. Second is that there are interesting people out there to chew the rag with, and you can't get together with them by only listening. But then, you already know all this.

The third common element between these Qs was the rig I was using—a Softrock Ensemble RXTX Transceiver. This is the latest creation by Tony Parks, KB9YIG, purveyor of the Softrock line of SDR (software-defined radio) kits, and it's the third Softrock I've built. The first was the Lite II receiver, which I turned into a panadapter driver for my K2 (*CQ*, October 2010, page 74). The second was the 6.3 Transceiver, a multi-band transceiver which relies on plug-in band modules for both the transmitter and receiver. This latest iteration, the Ensemble, uses the basic circuitry of the 6.3 transceiver but adds refinements such as multi-band operation and frequency control directly from the software, no plug-ins needed. Another upgrade is that all connectors are mounted on the board. Photo A shows the transceiver board mounted in one of my cheap-as-dirt PC board chassis.

A word about the software-defined radio world of today is needed here. The SDR river runs deep and is very wide. The field of players grows almost daily and includes offerings that range from the tiny Softrock Lite II kit at $20 to the kilo-buck, full-featured rigs offered by FlexRadio. In between there is a multitude of players making SDR radios of varying prices and capabilities. In the homebrew slice of this pie, the Softrock radios are an excellent way to stick your toe in the water. They are not very costly, easy to build for someone who's done some building in the past, and an excellent platform for learning what SDRs are all about. One warning, however: Bet you can't build just one!

There are three websites you should know about before diving in. Tony sells his kits on his website, (kb9yig.com). That's all he does there, and when you dial it up you'll see the three currently available kits listed, followed either by a shopping cart entry box or the words "Check back soon." Most of the time, the "Check back soon" message will be displayed because Tony puts these kits togeth-

Photo A– The SoftRock Ensemble RXTX Transceiver kit, assembled. See text for details.

*1959 Bridgeport Ave., Claremont, CA 91711
e-mail: <qrp@cq-amateur-radio.com>

Photo B– SoftRock Ensemble transceiver, Creative SoundBlaster X-Fi USB soundcard, and laptop running Rocky, all wired up and on the air with a mighty one watt.

er in batches, lists them on the site as being available, and they sell out in a matter of hours. No kidding, Sherlock. He's sold over 15,000 of these kits. A person has to check the website frequently. People have been known to write software to keep tabs on this website and sound an alarm when something gets listed for sale.

The next site you'll need to visit is that of Robby, WB5RVZ (wb5rvz.com/sdr/). Robby has written (very) detailed step-by-step building instructions for each of these kits. The instructions are written so that you test each section as you build it, thus ensuring that the chances of the radio working right off the bat are very good.

And finally, as with every brand of radio made today, there's a Yahoo group. The folks who inhabit the Softrock40 group are your friends, always there in case you find yourself swept away down the SDR river.

I chose to build my Ensemble to cover 40, 30, and 20 meters. You can choose any of five different band groupings as explained on the WB5RVZ website. All of the necessary parts for all of the bands are included, so you don't have to decide which bands you want to cover before ordering. Construction went well, considering the kit uses a combination of SMD (surface-mount) and through-hole parts, as well as some of the tiniest toroids I've ever seen. A great feature of the new Ensemble kits is that all of the connectors are board-mounted, eliminating all of the fussy connector wiring that used to stand between you and a finished rig.

Once completed, the radio needs to be interfaced with a computer and some software. Daunting as this process may seem, there's plenty of help on Robby's website and at the Yahoo group. Here in the N6GA lab, I tried the Ensemble with four different computers and several different software packages. As a rule of thumb, the more computer horsepower, the better. Most people start out playing with the receiver for a long time before diving into transmitting. You can receive with almost anything as long as it has a reasonable sound card and a stereo sound input. Many laptops don't have stereo inputs. To be able to transmit, a second sound card is needed, preferably an outboard USB type. The reason is that one sound card handles the IQ signal-handling duties while the other handles the audio input and output.

In photo B you'll see one of the setups that worked for me. The laptop is an older T41 ThinkPad running XP at 1.6 GHz. The outboard soundcard is a Creative XFI, which is at the lower end of the soundcard scale. This is probably the minimum hardware setup with which you can get on the air. The IQ signals to and from the transceiver go to the outboard soundcard, which attaches to the laptop via a USB connection. Headphone audio comes from the laptop audio out connector. I haven't tried SSB yet, but if I were to, I'd plug the microphone into the mic input on the laptop. The transceiver also needs to be connected to the laptop through a USB port for control purposes, so the computer needs a minimum of two USB ports.

The software I use is Rocky, available free at <www.dxatlas.com/Rocky/>. It looks deceptively simple but provides extensive capabilities. It has an iambic CW keyer built in as well as a rudimentary PSK31 modem. CW operation is a bit clunky because there's no break-in keying arrangement. If you're used to QSK, you'll have to get used to poking the mouse for T/R changeovers.

Once you've mastered the basics of your SDR radio, it's only natural to want to start moving up the scale. There's more sophisticated software such as PowerSDR, which, in turn, requires a more powerful soundcard, which necessitates a faster computer. ... You get the picture. Taking that first step down the SDR rabbit hole can be quite a challenge but it's also a gift that keeps on giving.

Yet Another Take on the End-Fed Center-Fed Dipole

Readers of *WorldRadio Online* will recognize the antenna in fig. 1 as one that's gotten plenty of press in recent months. First it was Kurt N. Sterba in his "Aerials" column for August 2010 (page 48) who answered a reader's question regarding the antenna. (Yes, "end-fed center-fed" is correct. As you can see in the figure, the feedline comes in from the end, but remains shielded until it reaches the center of the dipole, which becomes the actual feedpoint.)

Richard Fisher, KI6SN, editor of *WorldRadio Online*, thought the antenna had great trail-friendly potential, so he built one and wrote a column about it in the October 2010 issue (page 14). Then the ball bounced back into Krusty ole Kurt's court. In his November 2010 column (page 50) a reader recalled seeing an early version of this antenna in an electronics text from 1948, lending credence to the old adage that "there's nothing new under the sun"—or at least under the sun-spotted, ionized ionosphere.

I was thinking this would make a slick 20-meter vertical for trailside use, one that needed only one support. Some-

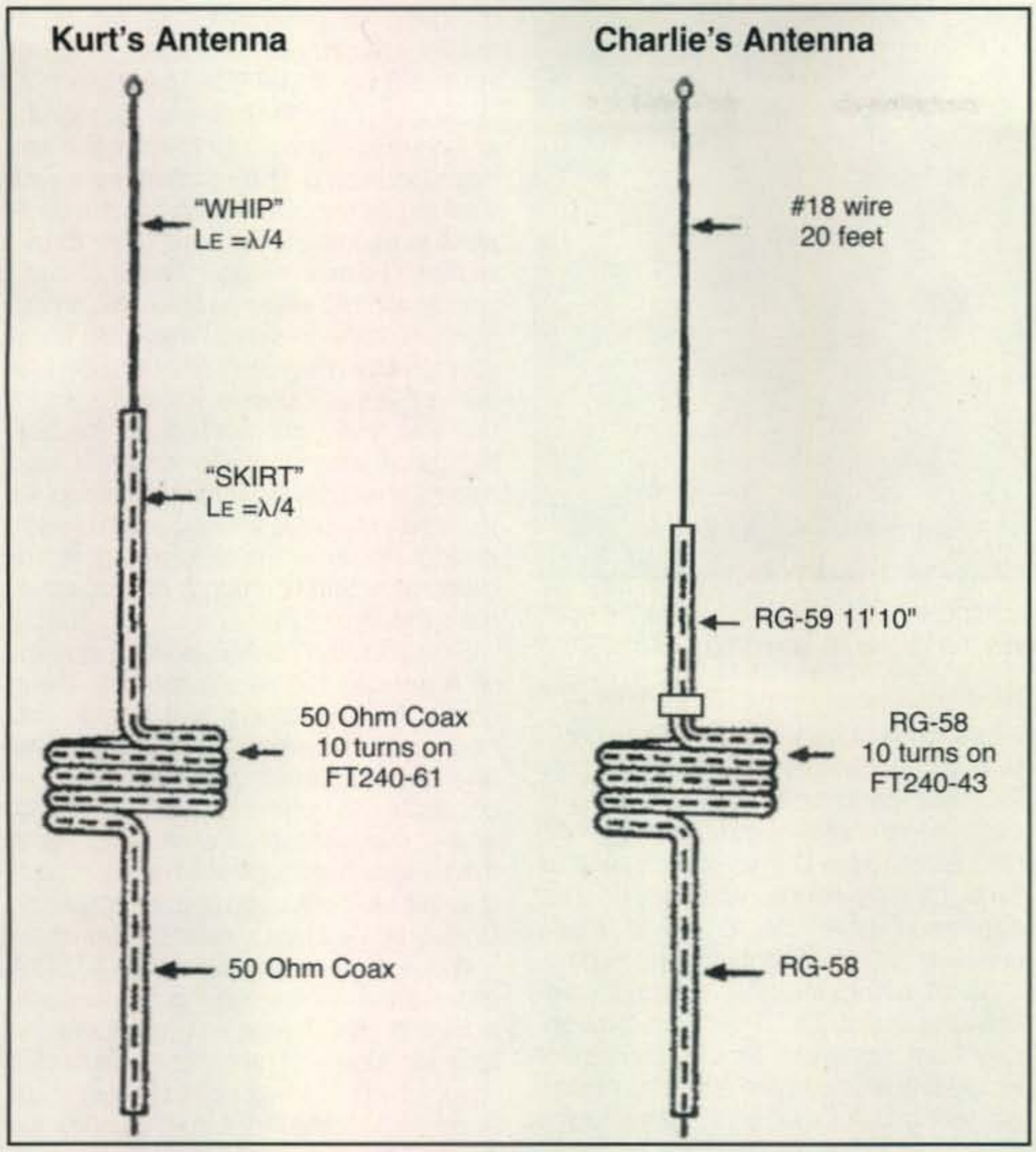


Fig. 1– On the left, the original End-Fed, Center-Fed Halyard Antenna as written about by Kurt N. Sterba in WorldRadio Online. *On the right, an interesting variation by Charlie Lofgren, W6JJZ.*

times a great operating location presents itself but only offers one tree as a support, or maybe offers plenty of trees but no two the proper distance for a dipole. A simple vertical dipole might just be the answer.

A root through the garage netted the necessary wire, a 30-foot remnant of RG-58 and a variety of toroids, none of which were the approved size or specification. Diz at <kitsandparts.com> sent a variety of larger size ferrite toroids and the fun began. At this point I'm going to fast forward through a couple of weeks of frustration as I trimmed wire, slid toroids up and down the coax, and emitted expletives because I just couldn't get it tuned correctly. No matter what I did, I couldn't get the SWR down below 1.9:1. One of the compelling features of this antenna design is that it would have a low SWR so there'd be no need to carry a tuner. However, it needed to be lower than 1.9.

At this point in an antenna escapade, I usually punt and send off an e-mail to Charlie Lofgren, W6JJZ, aka Charlie Tuner. His simple answer was posed in the form of a question: "Have you modeled the antenna in EZNEC yet?" Well of course I hadn't, so I did. It turns out that rotating the antenna 90 degrees so it becomes vertically polarized causes the impedance to rise to the vicinity of 80 to 85 ohms, depending on all the usual variables. No amount of trimming or tuning will bring the SWR down to what I was looking for.

A few days later I heard from Charlie again. He'd been pondering the antenna and thought he had a solution. It involved RG-59 and off-center feeding the dipole. The theory is that the feedpoint impedance of a dipole rises as you move away from the center. If you move the feedpoint far enough to raise the impedance to 100 ohms, you can use a quarter wavelength of 75-ohm coax to transform that impedance down to 50 ohms. The quarter-wave section of coax, also known as a Q-section, is often used to transform the 100-ohm impedance of a quad loop down to 50 ohms to make a good match for 50-ohm coax.

A Q-section of RG-59 with solid dielectric is about 11.5 feet long, while one with foam dielectric would be about 13.5 feet long, due to the different velocity factors. If you were to try to use the foam-core stuff, at least part of the choke would have to be wound with it, and bending foam core that much is definitely not recommended. So that left us with the solid-core coax, and as luck would have it, Charlie found a 12-foot jumper of RG-59 in his garage. It had PL259s on the ends which he didn't want to whack off, so he used it as-is for the bottom half of his dipole. For the top part of the dipole he used 20 feet of #18 wire. An FT240-43 served choking duties, wound on the RG-58 just below the junction of the RG-58 and RG-59 (see photo C).

We hoisted this antenna into position with a support at the local antenna testing range (a tree in my front yard) and attached our lab-grade testing gear to run it through its paces. Its SWR had settled down to a rather peaceful 1.2 to 1 and it is quite broadbanded, the 2:1 SWR points coming at 13.5 and 14.95 MHz. The choke appears to work because

Photo C– The bottom half of Charlie's vertical dipole, made of RG-59, is on the right. It attaches to the RG-58 feedline just above the choke wound on an FT240-43.

grabbing the coax or the antenna analyzer box with both hands has negligible effect on the SWR. Thus, moving along through the testing procedures, the next step appears to be a walk in the woods with new antenna and radio gear. Sounds like good QRP radio fun.

KK1 Precision Straight Key

I'll be the first to admit that I have a lousy fist. I've never sent anything intelligible with the straight key. Looking back on my Novice days, it seems miraculous I ever made it to General. One Christmas, a Lionel bug showed up under the tree. It might have been my dad's way of saying some improvement was needed, but all this did was enable me to make lousy code faster. It wasn't until I built an Accu Keyer and discovered Bencher paddles that I was able to make meaningful communication with CW. Even today I avoid events such as Straight Key Night, wherein I'd feel enormous pressure to try to make sense with the straight key once again.

All of which makes it seem inconceivable that a KK1 Precision Straight Key from American Morse Equipment would follow me home from the Norcal gathering last October. It came to me as a door prize. There were plenty of other items in the door-prize pile which I knew I needed—transceivers, antennas, and the like—so I'm assuming there's a karmic message attached to this gift. It sat in its little plastic bag on my desk for several weeks, talking to me like Audrey in "The Little Shop of Horrors." Build Me! Use Me!

So I did. All of the little parts fit together and in about an hour I had a finished key (I'm slow). The whole time I was thinking up ways to attach it to the desk so it wouldn't slip around, and then I realized I was thinking in terms of dual-paddle iambic keyer paddles which get banged side-to-side. This one is a straight key which only needs to be stable in the vertical axis. It's small and it has four sticky rubber feet on the bottom so it sits still quite nicely. It also makes a nice, solid little clack when it's keyed and unkeyed. The paddle is wide enough to accommodate a couple fingers. Its action is smooth and positive. I like the feel of it.

Doug Hauff, W6AME, is the proprietor of American Morse Equipment. Doug uses CNC machinery to drill, mill, and hog-out the bits that go into his paddles and boxes. Looking at the lineup of products he offers on his website, www.americanmorse.com, one gets the feeling that these solid-looking paddles will still be around and kicking when Wall-E comes by to shovel them up.

A few years back, I built an ATS-3A transceiver, which most guys house in Altoids® tins. These tins just looked a little too flimsy to protect my electronic work of art, so I installed mine in an American Morse AA-1 box, also known as the Altoids Alternative. Ditto the Mity Box, which now houses scores of Rockmites. One gets the feeling you'd be able to back over one of these boxes with your Hummer and the box would just dust itself off and walk away. The same is true with Doug's paddles. They have a muscular, machine-shop look about them whereas other paddles can look, well, sculptured.

It sounds like the next step for me is connecting this keyer to a code practice oscillator and giving it a go. After that, who knows. If you should happen to run across some slow, rusty-sounding CW with a distinct Lake Erie swing emanating from the West Coast late some night on 40 meters, you'll know that this little KK1 Straight Key has worked its karma on me.

Photo D– The KK1 Straight Key kit from American Morse Equipment.

Signing Off

Did Santa bring you a little radio something this past Christmas? If so, please write to me and let me know. I'd be happy to feature it in an upcoming column. Meanwhile, keep those tales of QRP success coming. They always make inspiring reading.

72/73, Cam, N6GA

Building a Heathkit – Part I

BY JOE EISENBERG,* KØNEB

One of the biggest treasures a kit builder can have fun with is an unbuilt Heathkit. Heathkit was known for its extremely clearly written and well-thought-out manuals. The step-by-step instructions had you mounting parts in groups on the board, and then soldering them as a group. The instructions also had numerous detailed pictorials showing the orientation of certain parts. The company's slogan was "we won't let you fail," and the way the manuals were written set the standard for today's kits.

I started out building smaller kits by Heathkit in the 1970s, working my way up to the HW-7 QRP CW transceiver. There are a number of unbuilt Heathkits stashed away in attics and basements, and as they become available, they present an opportunity for a unique learning and building experience. I am very fortunate to have acquired an unbuilt Heathkit from the late 1970s. The kit I am building is the IG 5280 RF Oscillator. It is actually an AM/CW signal generator with an AM modulator producing a 1-kHz audio tone as the modulation source. This makes it very useful for performing tests on kit radios I have built and plan on building, so it is a valuable, yet simple piece of test equipment.

It was a sad day in 1992 when Heathkit ceased marketing kits and went out of the amateur radio market. For decades these kits were the standard that every other kit maker looked up to. I was one of many hams swarming around the Heathkit booth at the Dayton Hamvention® when the company liquidated its entire stock of remaining kits, and enjoyed days of building after I got home that year. Thus, it is with both great pleasure and nostalgia that I am building this simple signal generator and taking a look back on the Heathkit legacy.

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Unpacking the Box

Modern kits typically come with most parts in one large bag and other specialized parts in smaller bags packed inside the main bag. Heathkits had the parts divided up into related parts by type, packaged in small paper envelopes to be opened at the proper step in the process. Some parts came in plastic bags as well. Removing the front panel, packed on top of the package (see photo A), reveals all of the parts still packaged neatly and ready to go (photo B). Notice that Heathkit even supplied a roll of solder and the correct tuning tool needed to perform the alignment once the kit was completed. The only thing not supplied with this kit is the pair of 9-volt batteries needed to power it once completed. With the far advanced capacity of modern alkaline 9-volt batteries, today this sig-

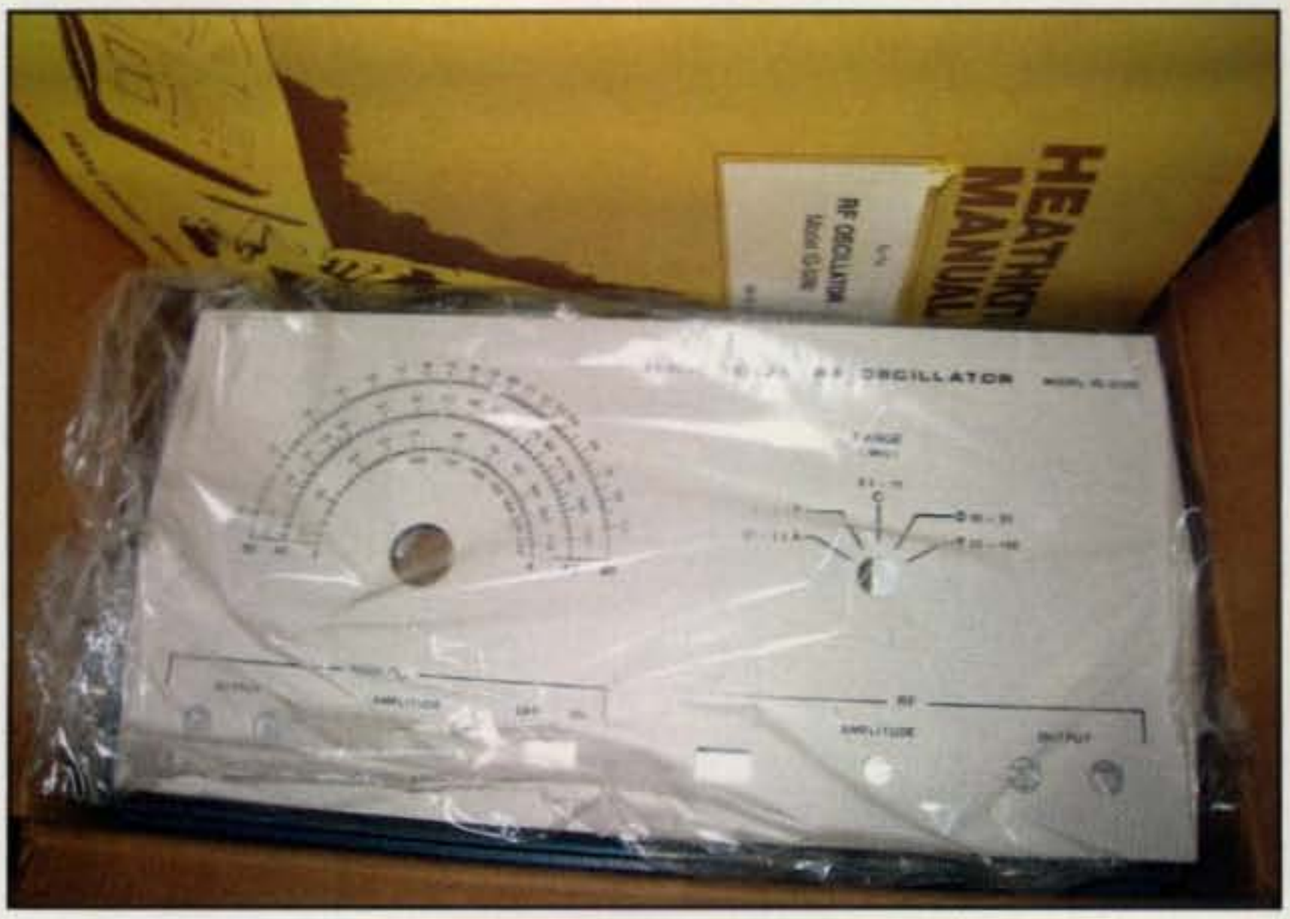

Photo A– New Heathkit RF oscillator kit still in the box.

Photo B– Kit packaged as it was in the 1970s. Note that the tuning tool is included. →

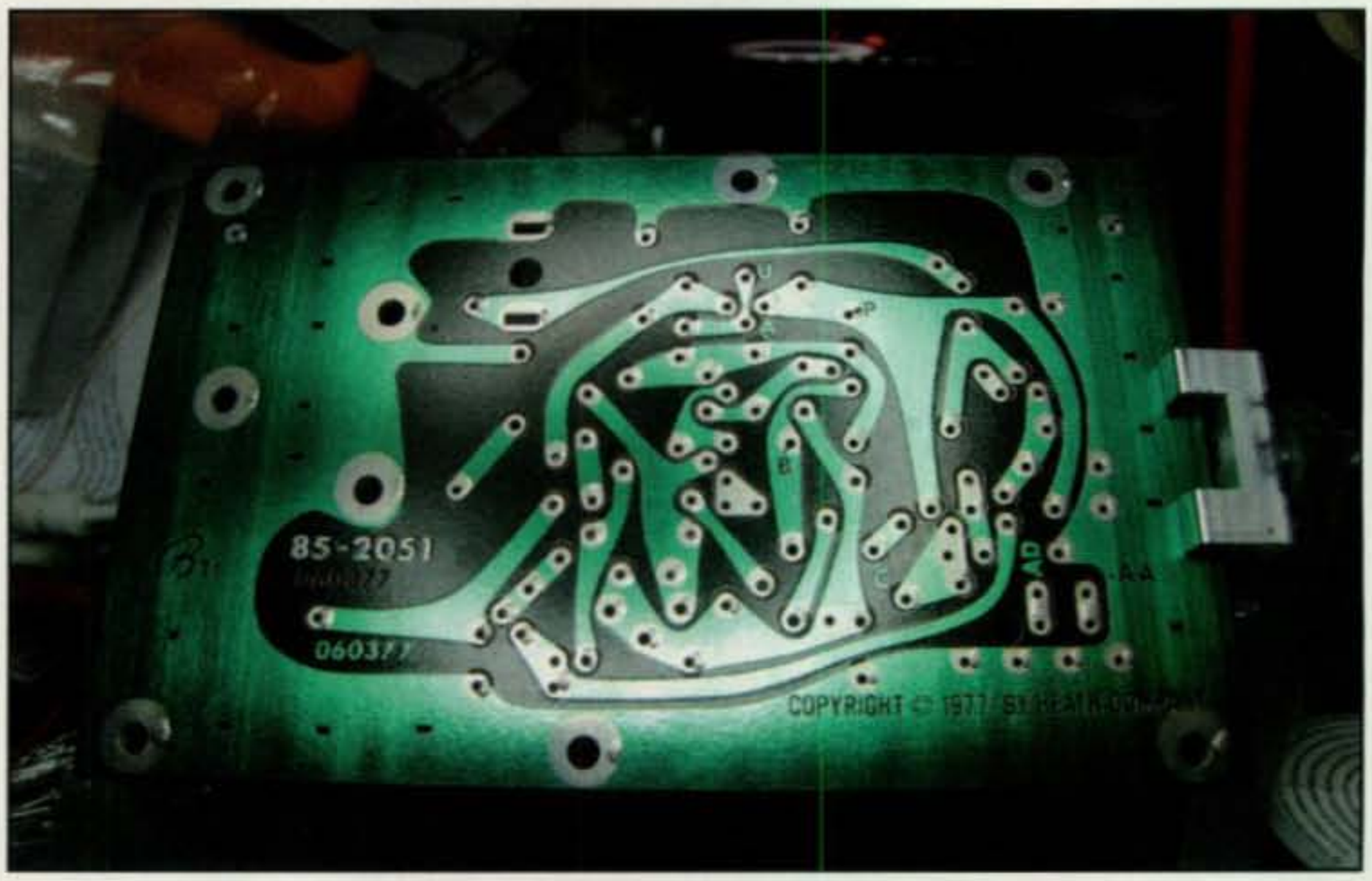

Photo C– Solder side of the PC board. Notice the extra-large spacing between contacts and the larger component holes than you typically see today.

nal generator should last a lot longer on batteries than it might have in the late 1970s using the zinc/carbon-type batteries most common back then. The custom molded case along with the custom-made chassis on which the board is mounted make for a rugged enclosure.

Getting Started

As with most Heathkits, the manual has the builder install and solder just one part, often a resistor, to get the ball rolling. The rest of the parts are done in groups, mostly similar parts such as resistors, capacitors, etc. The board in this kit is a single-sided board with very large copper lands and pre-tinned pads (photo C), much larger than we are accustomed to in current kits. The manual cautions against making solder bridges, which reminds me of having a much larger tip on my soldering iron in the 1970s, the cause of many solder bridges. Using a modern iron with a smaller tip, I find myself taking a bit longer to complete a connection, as the

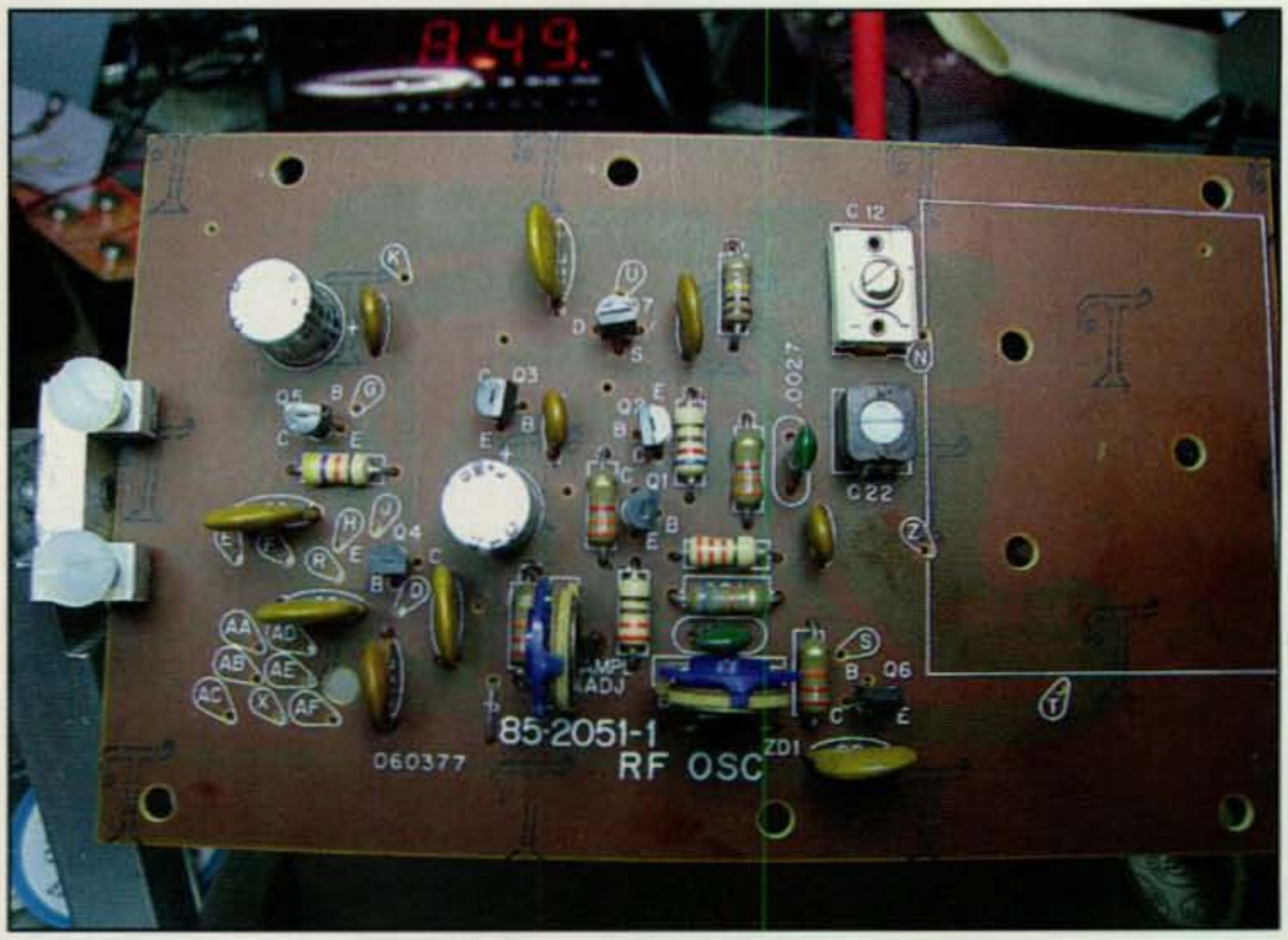

Photo D– The PC board finished and ready for the next step—mounting on the chassis and addition of the controls.

part leads are thicker and the pads are much larger. Solder bridges are much more difficult to produce, which is a good thing.

The resistors, for example, are all 1/2 watt, something generally rare in current kits, which most often use 1/4-watt resistors; some kits even use 1/8-watt resistors. With their larger size and much thicker leads, it takes a bit longer to adequately heat them to solder them in place and uses a bit more solder as well. The capacitors in this kit are also larger than current parts and have thicker leads. The trim pots on the main board (photo D) are a lot larger than those we most often see today. There are no ICs in this kit, but there are seven transistors and a 5.6-volt zener diode making up the semiconductor parts. Compared to many current kits, this one has a smaller parts count, but uses more rugged parts.

The rotary switch comes partly preassembled, with the slug-tuned coils mounted on the switch and the high-frequency coil wound and ready to put in place. The plastic tuning tools needed to perform the alignment of the coils are supplied and will come in handy later.

Next month, we will complete the signal generator and enjoy the finished product. We also will take a look at building something very affordable that can be useful for many kit builders, and you can get the parts for it at most hardware stores!

Velleman Kits

When searching for new kits to build, I sometimes stumble upon a treasure trove. This time they are the products of Velleman. You can view its huge selection of affordable kits at <http://www.vellemanusa.com>. The selection of kits is wide-ranging, and although the company does not have any specifically made for amateur radio, many of its kits are very appropriate to train new kit builders in soldering. The quality of the supplied instructions varies widely from kit to kit, with some having very basic pictorial directions to those with a lot more details. I have built a few and have had fun with them. As with all kits, be careful with parts placement and double-check polarity. Many of the Velleman kits can be ordered through Ramsey Electronics at <http://www.ramseyelectronics.com>.

With the spring hamfest season approaching, remember to keep an eye peeled for bargains on unbuilt kits and parts! 73, Joe, KØNEB

learning curve

BY RICH ARLAND,* K7SZ

The Listening Side of Radio

What got you into the amateur radio hobby? Think about it for a few minutes. Something triggered your interest in radio. What was it? For me, and thousands of other baby-boomers, it was our experiences listening to distant AM broadcast stations, or, quite possibly, shortwave stations from exotic locales.

The radio bug bit me early on in life. When I was around 10 years, old I got a kick out of listening to shortwave (SW) broadcast (SWBC) stations on my dad's Arvin console radio. Mom and Dad had fun watching *me* have fun with that old 1930s receiver. This was also during the era of low-band police and fire radios, so the old Arvin allowed us to monitor our county sheriff and the local volunteer fire departments, as well as the shortwave bands.

Then add to this the guidance of my Uncle Guy Ripley, an avid MW (medium-wave)/BC band DXer, and you begin to get the idea that my early exposure to radio was *not* an accident! Uncle Guy helped infect me with the BC DX bug, since that was fairly easy to do equipment-wise. The difficulty came in separating the stations at night. The AM BC band is very crowded. It takes skill and good selective antennas, in the form of loops, to separate and null out the local stations in the search for that rare one a thousand miles away. All of this Uncle Guy imparted to me over several years. He even helped me develop a boiler-plate QSL letter to AM broadcast stations to hopefully garner a needed confirmation of reception report.

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My first kit project was the Heathkit GR-81. This super-regen receiver is a chore to use but it definitely gives one the "flavor" of the good old days!

Then, as today, many AM stations do not have QSL cards, nor do they have the staff available to field reception reports from BCB DXers. It is an imposition for most station managers and engineers to sit down and confirm a reception report from a BC DXer, so a form-letter-style report is always helpful in obtaining that needed AM QSL.

SW DXing is similar to AM BC DXing in that you need to gather specific information on the SW transmission, including an accurate cut on its transmit frequency and program content, in an attempt to get the target SW station to respond to your reception report. With SW DXing it is important not only to record the times and frequency of transmissions, but program content, language, and station identification (IDs), as well. Accurate time logging of the things heard on the SW station is a must. Therefore, an accurate clock, set to Zulu or GMT time, is a *must have* for the active SWL. A complete SW DX reception report can range from one to three pages in length, depending upon the detail of reporting done by the listener.

My First Steps in Radio and Onward

Against this background I started my first stumbling steps in the radio hobby. Thankfully, my parents were whole-heartedly in favor of my newly found hobby. Mom, in particular, was really intrigued by SW DXing, and together we tore up the SW bands, logging all sorts of "rare" DX! To this day, I remember my first SW QSL: HCJB in Quito, Ecuador, featuring a picture of an Ecuadorian boy with his llama on the front and the details of my QSL report on the reverse side.

This was the early 1960s. *Popular Electronics* magazine was offering a monitoring callsign in exchange for registering as one of its "monitoring stations." My call was WPE7BYR, and I still have the original certificate on my wall.

The Arvin console gave way to a brand-new Heathkit GR-81 long-wave/medium-wave (LW/MW) and SW super-regenerative receiver kit that started my love affair with the Heath Company. I built the kit by myself, and it actually worked the first time I applied power! I still have that receiver, and every now and then I fire it up and get a feel for "the good old days."

Over the intervening years I have had many receivers, all of them improvements upon the previous ones. My favorite ham-bands-only receiver is the Drake 2B. In my humble opinion, there has never been a better CW or SSB receiver ever produced. This 1960s relic is still a "hot" performer on today's amateur and SW bands due to the attention to detail that the Drake design team of engineers saw fit to include in this old warhorse. The 2B, coupled with the companion 2BQ Q-multiplier and speaker, makes this radio a super performer for the 21 st century—all of this without the cascaded IF crystal filters, roofing filters, and dig-

ital signal processing (DSP) found on many of today's radios. The Drake 2B is truly a "radio man's" receiver in every sense of the word.

For sure there are other "whiz-bang" receivers out there that are favorites of other folks, but for my money, the Drake 2B is the one on which I will stake my reputation for a ham-bands-only receiver. I use mine (recently acquired from Gary Harmon in Texas) for QRP CW work, as well as a secondary receiver for working contests along with general SW listening.

The Drake 2B not withstanding, there is one receiver after which I have always lusted, and that is a Kenwood R-1000.

The Drake 2B and 2BQ: Over the years I have owned four of these receivers and none has ever disappointed me. The soft glow of the vacuum tubes and the outstanding performance makes this an ideal receiver for CW or SSB even by today's standards.

The Kenwood R-1000

This receiver was marketed by Kenwood in the late 1970s through the mid 1980s and was a real eye-catcher! The R-1000 was a red-hot performer for those of us who wanted/needed a synthesized SW receiver that also would do a respectable job on the AM broadcast band, in addition to LW and the ham bands. Apparently designed and marketed to directly compete with the Yaesu FRG-7, the R-1000 quickly carved out a niche for itself in the radio listening/DXing world. Today it has what could be called a "cult following." Owners of the R-1000 are an enthusiastic bunch that defends the rig's honor!

The styling on the R-1000 was "space age," for its time, to say the least. The color-scheme and panel back-lighting made for a very "sexy" looking radio. Ergonomically, the controls on the R-1000 were efficiently laid out to allow the operator to concentrate on the target signal as opposed to "tweaking" knobs and switches. As a matter of fact, the controls on the R-1000 were rather sparse compared to many other receivers of that era. That's OK: The R-1000 is a thoroughbred performer and any added bells and whistles are just not needed.

The receiver had selectable IF filters and exhibited outstanding performance in decoding SSB and CW signals thanks to a very stable VFO and product-detector circuitry. The synthesized VFO was rock-stable, enabling the operator to work CW and digital modes with ease.

Thanks to Alan Johnson, an old friend and fellow SW DXer, I procured my R-1000 at an extremely good price. *(Editor's note: R-1000s can be procured for between $200 and $250 on most of the popular on-line auction sites.)* Alan had done several mods to the receiver, all of which improved its overall performance. The most significant mod that Alan performed was the replacement of the wide AM IF filter with a much narrower filter which greatly increased the AM selectivity of this receiver.

Unfortunately, my R-1000 came with the dreaded "35.525 MHz" display problem. Although intermittent, the problem became annoying, since I had to soundly rap the side of the receiver several times to get the display to function properly. Finally I got tired of this mating dance and decided to do some minor surgery inside the receiver to rectify the problem. This is where the R-1000 group on Yahoo.com came in so very handy. The R-1000 receiver group on Yahoo (http://groups.yahoo.com/ group/ R-1000/) has a worldwide following and includes a wealth of information on this Kenwood marvel. Various members have contributed their time and skills to add to the information pool so those just starting out with their first R-1000 can have their questions answered in short order.

Basically, the display problem can be traced directly to the power-supply PC board (PS PCB) on the underside of the R-1000 chassis. The fix, thanks to the Yahoo R-1000 group reflector, is to remove the PCB and reheat connections around two of the transistors that are on that board. In reality, it is a good idea to reheat ALL the solder connections on that PC board, which is exactly what I did. The result: The display behaves like it should, and I now have a near-mint R-1000 that plays very, very well!

Since I had the "hood up," I took a look around on the inside of the receiver and found a massive burn spot on the underside of the cabinet top. This location corresponded to an area just above the coaxial cable coming in from the medium-wave antenna input port. There were also two new resistors soldered in place on the PC board. It seems that my R-1000 was the unlucky recipient of a close lightning strike, or some stray RF energy was allowed to flow into the MW antenna port at some time in the past.

In looking things over, I decided to bypass these resistors using a mod available on the R-1000 list to increase sensitivity on the MW and LW bands. Both of these bands have a serious mismatch thanks to a couple of resistors in series with the antenna ports. Once bypassed, the MW and LW performance noticeably improved. Although I don't have the test equipment available to accurately determine the overall increase in performance, I believe it to be on the order of 6 to 9 dB, which translates to 1 to 1.5 S-units on the S-meter. This mod is definitely worth doing!

The Kenwood R-1000 fully solid-state receiver with digital readout is a solid performer. Although almost 30 years old, it works very well, has no nasty traits, and I use it all the time to monitor the SW bands, listen to local and DX MW stations, and even pair it up with a homebrew QRP transmitter to do some 30- and 40-meter CW!

Summary

I hope you have enjoyed our little foray into the world of SW and MW DXing. We've barely scratched the surface of this subject, so we will return to it occasionally to pique your interest.

SW and BCB DXing can be a lot of fun. It is a facet of the hobby that does not involve tests to obtain a license for transmitting. Good receivers such as the Kenwood R-1000, the Yaesu FRG-7700, and the ICOM R-71 and R-75 are readily available on the used market at reasonable prices. In addition, once you become involved with SW DXing you will be able to obtain world news from a wide variety of different perspectives.

There are a lot of SW stations still on the air, but sadly many of the "big guns" in SW broadcasting have shut down their megawatt transmitters in favor of audio streaming over the internet. That doesn't mean that there is nothing of import to listen to on SW. Quite the contrary; with the huge multi-kilowatt/ megawatt transmitters silenced, the smaller regional SW outlets are much easier to hear and they make for some very interesting listening. Many broadcast in English several times per day, so give it a try.

One facet of the SW hobby I have neglected to mention is that of Utility Listening (UTEs). This involves seeking out commercial, ship-to-shore and military communications channels and listening, real-time, to what is happening on their respective frequencies. UTE listening can be extremely rewarding. Listening to USAF "Airways" or flight-following transmissions can sometimes yield conversations "in the clear" (unencrypted). The only way to find out is to listen to the SAM (Special Air Mission) frequencies. Try 11176 USB for starters!

Antennas? Try a wire out a window! Seriously, most of these SW receivers will work very well with an end-fed wire between 20 and 50 feet long tossed into a nearby tree. If you really want a challenge, try using a regenerative receiver like my old Heathkit GR-81. These radios work very well with only a short wire antenna of less than 25 feet. See . . . and you thought that this would be hard work!

Until next month, try something new. Listen to the SW bands or try some MW DXing and let me know what you think.

73 Rich, K7SZ

China Enters the U.S. Ham Market with Low-Cost HTs

BY JOHN WOOD,* WV5J

Okay, my fellow hams. Here is a brief review of one of the major news events of the past year. Chinese radios have hit the U.S. amateur market, and they come with both solid capabilities and attractive prices. Given that, why don't we spend a little time and take a look at a couple of the Chinese front-runners?

Photo A– Wouxun's KG-UVD1P dual-band HT is just one of the new radios from China entering the U.S. amateur radio market.

Wouxun is Here

If you've been monitoring your local repeaters, chances are you've heard some of the hams talking about the new radios from China—HTs, and soon a mobile rig that comes with dual-band capability but sells for close to a single-band mobile rig price. The Chinese HTs are available in the U.S. and have been making appearances at some of the more recent hamfests.

I first saw the Wouxun dual-band HT, designated the KG-UVD1P (photo A), at the Huntsville Hamfest back in August. Before that, I noticed the radio was being sold from China via a listing on eBay. For me, the temptation was too great to resist. Recently, we've witnessed a resurgence in 222–224 MHz activity in the Memphis, Tennessee area, and since one of the Wouxun models available has 2-meter and 222–224 MHz capability, I took the plunge so I could monitor and talk with my buddies.

After waiting more than a week for the radio to arrive, the package finally came, containing an HT about 4 inches tall, not counting the knobs, as well as a 7.4V, 1400mAh Li-Ion rechargeable battery with a spring belt clip, a 56-page owner's manual, a drop-in charger base, a wall-wart charger, a 12V cord that connects to the charger base for charging the radio from a cigarette -lighter receptacle, a rubber-duck antenna, and an earpiece speaker microphone.

Since I was one of the first in my area to order a Wouxun (pronounced "O Shing" according to a recording on the wouxun.us website), I wasn't sure what I would get for my U.S. dollars, but I was pleasantly surprised with what the postman delivered. This is an HT that has a quality feel to it.

Wouxun now has a number of U.S. distributors including the HAMPROS—Associated Radio, Universal Radio, Lentini Communications, Austin Amateur Radio Supply and Radio City—and Total Radio Service of Alabama. Possibly more U.S. dealers will begin stocking the Wouxuns in the near future.

On-the-air and bench testing proved to me that the Wouxun unit I received performed as advertised and worked 2-meter and 224 repeaters alike, earning excellent signal reports. I had no trouble reading the manual to find out what buttons to push to set up the radio for operation in my area and for my local repeaters.

As I mentioned, my choice of Wouxuns was the KG-UVD1P which covers the 2-meter band (Wouxun specifies 136 to 174.995 MHz) and the 224-MHz band (Wouxun specifies 216 to 279.995 MHz) and transmits 5 and 4 watts per band, respectively. Other models are available for different countries or areas to cover 144–146 and 430–440 MHz, along with models that cover various public service and other land mobile bands (for which Wouxun has FCC Part 90 certification). Be sure to specify the band you want when ordering to avoid any disappointment.

Like some of the higher-priced HTs, mine can receive local FM commercial-band broadcasts (76–108 MHz) but will automatically mute that signal when a signal is received on the preset ham frequencies. This HT will also receiveeither sokit band or same band on its two VFOs; send out an SOS signal for you; transmit DTMF, CTCSS, and DCS tones; transmit with its own internal VOX circuitry; scan memory frequencies as set by the

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e-mail: <wv5j@cq-amateur-radio.com>

owner; and it can double as a flashlight and a stopwatch, among many other features. It can also talk to you in your choice of English or Chinese.

One other thing to keep in mind about the Wouxun KG-UVD1P is that the accessories for this radio also work with most Kenwood units.

Therefore, if you're looking for dual-band capabilities in an HT but have to insist on an affordable price, take a look at some of the new radios coming to the U.S. from China.

PSR-700 EZ-Scan SD

Another Chinese radio—and this one was definitely an attention-getter at the 2010 Dayton Hamvention®—is the PSR-700 EZ-Scan SD portable scanner (photo B) from GRECOM.

Sold here in the U.S. by GRE America, this scanner seems to be a perfect match for the radio amateur who doesn't want to waste time plugging in local frequencies. It should also be of interest to the ham who travels a lot but likes to listen in on what is going on in the area no matter what city or town he or she might be in. What makes it so appealing to such varied camps? The fact is this scanner comes with the entire radio U.S. frequency database already on board. The frequencies that you might spend hours inputting from a front-panel keyboard on other scanners are already programmed into this small, lightweight scanner and is probably the reason why this scanner was designed with no front-panel keyboard. It does have one squelch knob on top of the radio and on the front panel, a six-line LCD display, and six buttons—on/off, skip, select or pause, local NOAA weather, menu—and a four-position joystick-like button that controls volume up or down, plus left and right choices from the displayed menu.

Technically, this radio covers the following frequency bands: 25–54, 108–136.99166, 137–174, 216.0025–512, 764–781.996875, 791–796.996875, 806–960 (excluding cellular bands), and 1240–1300 MHz. But the good news is you don't need to know frequencies to enjoy listening to the PSR-700 EZ Scan SD. All that needs to be done after turning on this scanner is to browse the library for the groups you want to monitor (the library is primarily organized by U.S. states and then by counties/independent cities), pick the specific services you want to monitor, and then import them into a Scanlist that will be selected by you to scan whenever the scanner is turned on.

The PSR-700 also comes with a CD containing programming software for your PC so that you can update your scanner and also update your frequency library from the internet. GRE America makes this easy for you to do by including a cable to connect the scanner to your computer via a USB port.

Retail price for the PSR-700 is $229.99. For more information about this unique pocket portable, visit <www.greamerica.com>.

Uniden Home-Patrol

One other recently released scanner takes a similar approach to programming, and that is the Uniden Home-Patrol, which simply asks the user to input a city/state name or Zip code, and then the unit monitors all applicable local systems. With programming like this, it's easy to see that manufacturers are trying to make scanning easier for everyone to enjoy.

For details about the HomePatrol, go to <www.unidendirect.com>. Its MSRP is $599.99.

2011 Element 3 General Class Question Pool

Among other news items, the Question Pool Committee (QPC) of the NCVEC released the 2011 General Class (Element 3) Question Pool as of December 6, 2010. The question-pool file was released into public domain and is now available on the <www.ncvec.org> website as a pdf file and in Microsoft Word® .doc and .txt formats. Section G7A of the pool requires the use of a schematic drawing identified as G7-1. This drawing file is published separately and is available in .jpg and .pdf format at <www.ncvec.org>.

As always, users of the question pool are free to correct minor typographical and punctuation errors, including obvious minor omissions. Such corrections must not cause a change in the meaning of a question or any of the proposed answers to that question. Also, since rule citation references are not part of the question itself but are included only to assist instructors and students when looking up the applicable section of the rules, errors in the reference identifiers are not considered adequate reason for removal of a question from the pool.

The NCVEC QPC wishes to thank the QPC members for their long hours and dedication to this task, and especially Nancy Hallas, W1NCY, for her invaluable editorial assistance and Jim Nowotarski, N3GOO, for his assistance in drafting the diagram.

(This notice originated from Rol Anders, K3RA, who is chairman of the NCVEC QPC, and the other members of the committee: Perry Green, WY1O; Mike Maston, N6OPH; Larry Pollock, NB5X; and Jim Wiley, KL7CC.—ed.)

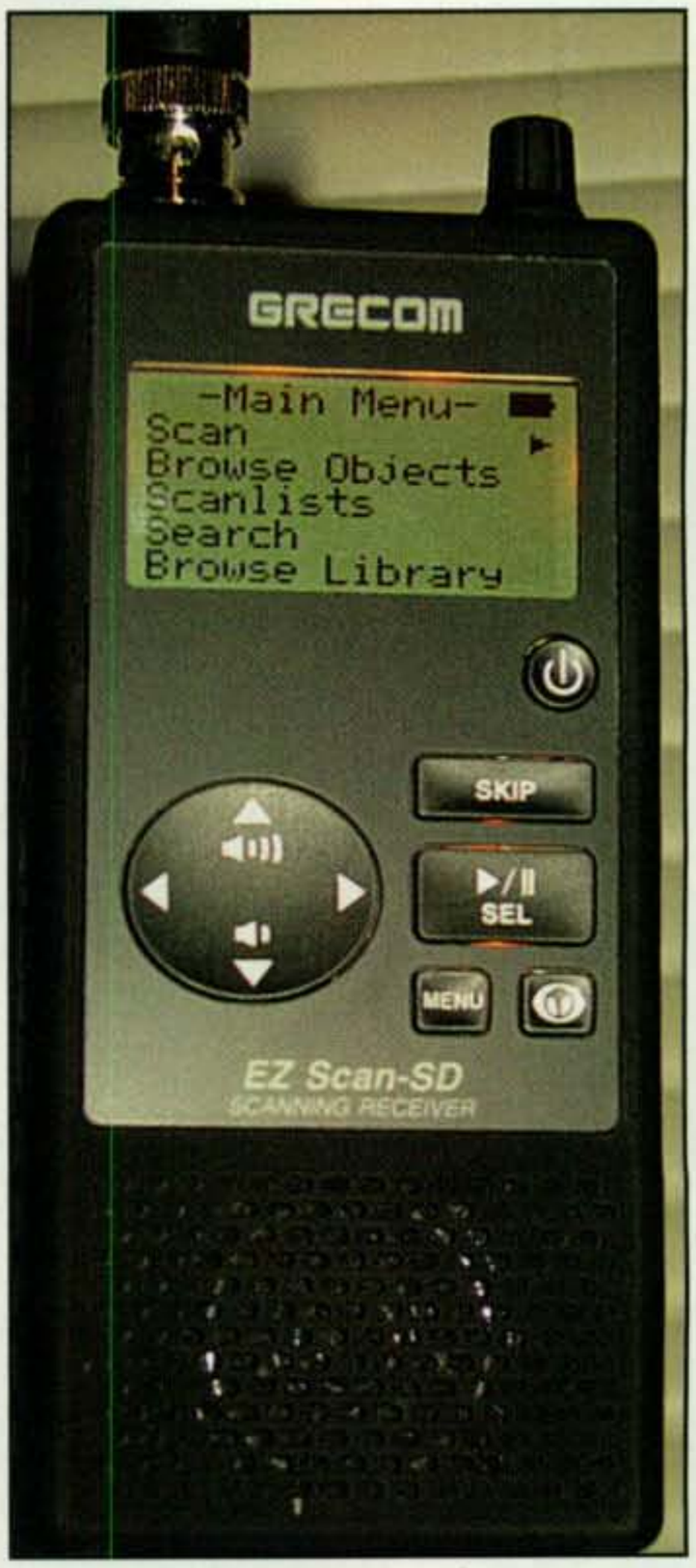


Photo B– GRE America is now selling its PSR-700 EZ Scan HD scanner that's easy to use because it contains the entire U.S. frequency database, and it can be updated via the internet.

Book Corner

The following books are now available from the ARRL (see photo C) at <www.arrl.org> or by phoning the League at 860-594-0200.

ARRL Guide to Antenna Tuners. If you've found that antenna tuners are a big help in getting your signal to the antenna but you're not exactly sure how they accomplish this, then you might want to thumb through the *ARRL Guide to Antenna Tuners*, a new publication from the ARRL that is described as "a radio amateur's guide to antenna matching." This book may give you a new understanding and appreciation of how antenna tuners do their job and possibly answer some of the more common questions about them, such as: Why might I need an antenna tuner?

What is a typical configuration? How do they work? How do they help? How do internal antenna tuners work?

The *ARRL Guide to Antenna Tuners* also addresses other related topics such as transmission lines and line losses, balanced versus unbalanced lines, balanced antenna tuners, and antennas that work well with tuners. The book even looks at baluns, ununs, and chokes, and also provides you with a survey of tuners available in the amateur radio market.

ARRL Antenna Compendium. Gathered together in this the eighth edition of the *ARRL Antenna Compendium* are 60 articles from *QST* magazine that feature practical ideas, tips, and antenna projects. The ARRL tells us that this publication has something for every antenna enthusiast and looks at topics such as HF portables, HF directionals, HF omnidirectionals, VHF/UHF portables, VHF/ UHF portables, VHF/UHF omnidirectionals, and VHF/UHF directional antennas.

Specifically, this book looks at innovative antenna designs such as the Handy Yagi antenna, a compact 40-meter HF loop antenna, and 20- and 40-meter verticals. Interested in HF and VHF beams? You'll find information about these also in the *ARRL Antenna Compendium.*

Antenna Towers for Radio Amateurs. Sure, you've seen towers and you have an idea you could use one for your station, but how do you know what type to buy and how do you install it?

Answers to these and other questions you may have about antenna towers can be found in the ARRL's *Antenna Towers for Radio Amateurs*, a book written by Don Daso, K4ZA. Drawn from the author's years of experience as a professional tower climber, topics covered in this edition include: an introduction to towers, basic tower types, the realities of climbing, tower bases and guy anchors, installing the tower, installing tower accessories, getting antennas up in the air, coaxial cables and connections, and inspections and maintenance. The book also looks at getting insurance for your tower, putting it all together, plus tips on how to work with tower professionals.

Therefore, if you're ready to buy and install an antenna tower, you might want to take a look at this book for practical information about the project you are considering.

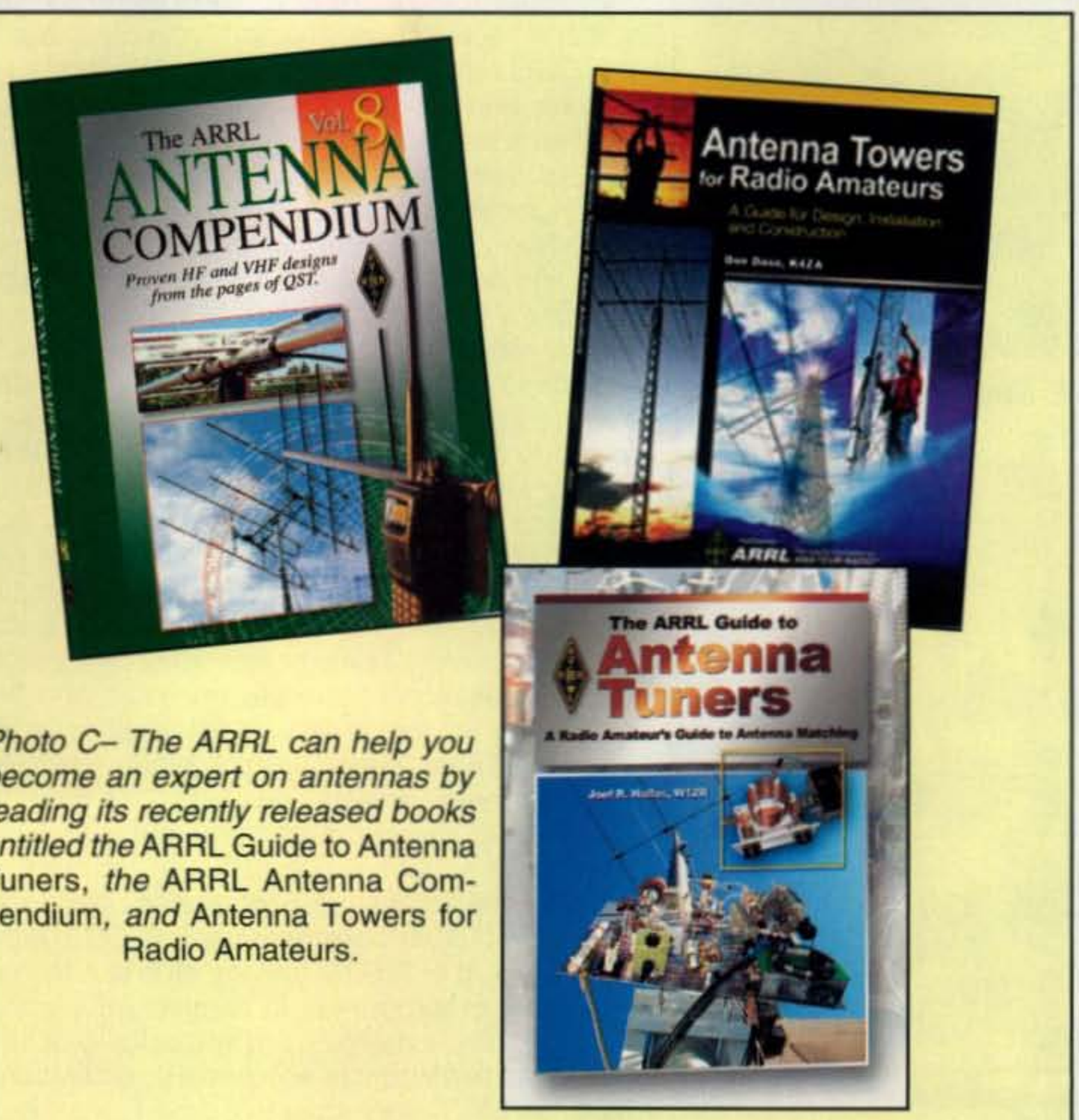


Photo C– The ARRL can help you become an expert on antennas by reading its recently released books entitled the ARRL Guide to Antenna Tuners, *the* ARRL Antenna Compendium, *and* Antenna Towers for Radio Amateurs.

Well, that's about it for this month. The new year is under way, and it's a good time to check the schedule to determine which hamfests you would like to attend to get a first-hand look at some of the items that are sure to be covered in future editions of this column. So start making plans or simply plan on reading "What's New" throughout 2011 to keep up with new products in the amateur radio marketplace.

73, John, WV5J

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.*

BY JOE LYNCH,* N6CL

The Ease of Getting Started on EME

The following is excerpted from Howard Sherer, AE3T's article on getting started on 2-meter EME (Earth-Moon-Earth), which appeared in the Fall 2010 issue of *CQ VHF* magazine. It is reprinted here courtesy of the author.

My Experience Getting Started on 2-meter EME

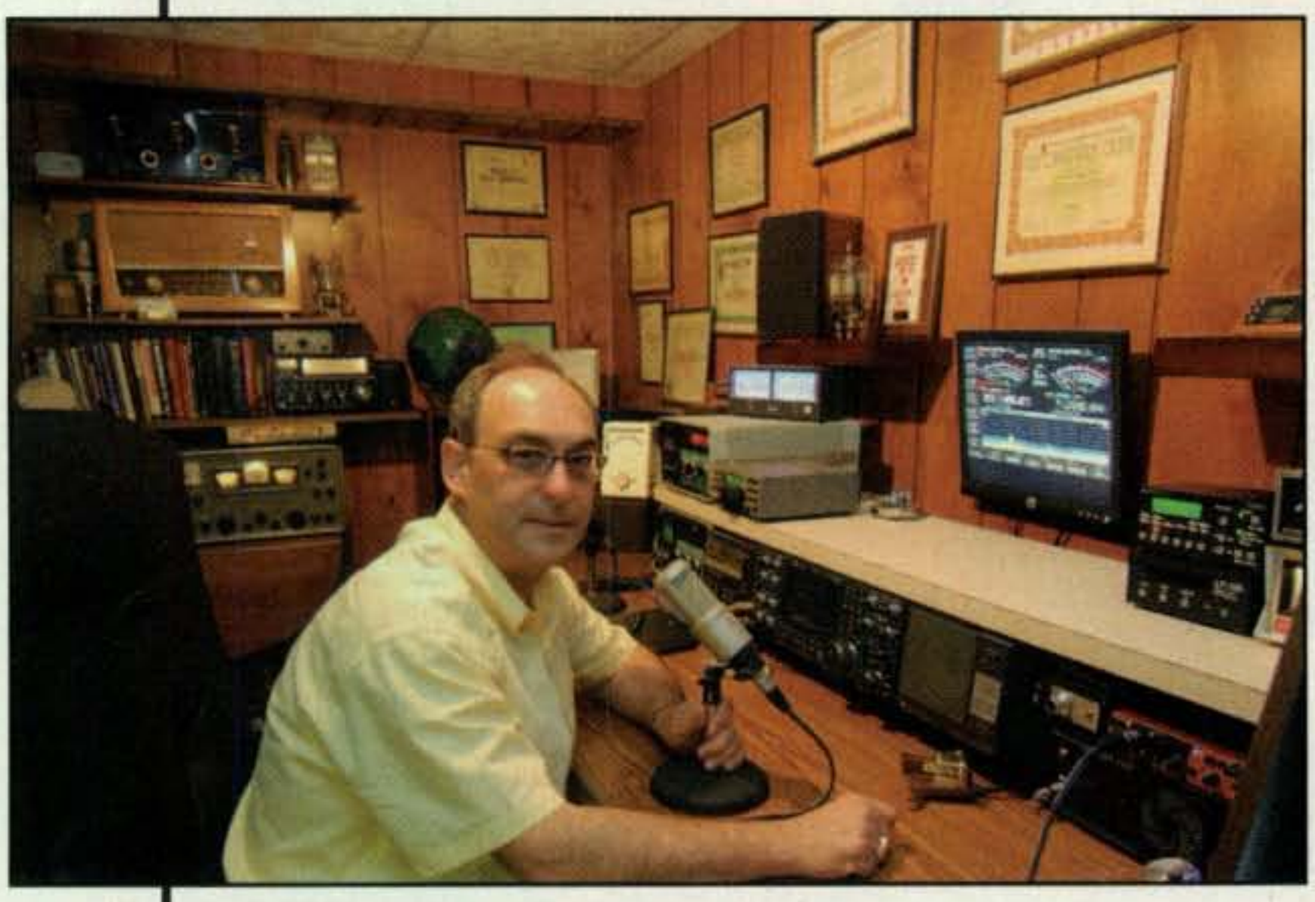
By Howard Sherer, AE3T (howardms@lehigh.edu)

Although I have been an active amateur for the past 46 years and have an interest in VHF and propagation study, I have not had the opportunity to experience operating EME "moonbounce" on 144 MHz until recently.

From the 1970s through the 1990s I was active on the OSCAR amateur satellites and had a station equipped for the various modes of operation.

e-mail: <n6cl@sbcglobal.net>

AE3T's latest EME antenna. (AE3T photo)



AE3T at his station. (AE3T photo)

VHF Plus Calendar

February 3	New Moon
February 6	Moon apogee
February 11	First quarter Moon
February 11-13	Orlando HamCation (See text for details.)
February 18	Full Moon
February 19	Moon perigee
February 24	Last quarter Moon

In the late 1990s during an EME activity weekend I decided to spend some time to see if I could hear any of the big-gun stations off the moon.

Using both my OSCAR array on an az/el mount, and my horizontal Yagi used for 2 meters SSB, I was able to copy four stations from the U.S. and Europe on CW and one station on SSB. I was amazed that this was possible, but realized that my 150 watts and single Yagi would not make the grade.

I decided to take the plunge during the October 2009 ARRL EME weekend. I was running 250 watts to a 13-element 13b2 at 35 feet with no elevation control. I don't have a clear horizon in any direction, so the possibility of using ground gain was in doubt, but that is what I had to work with. I watched for activity from well-equipped stations on the NØUK Ping Jockey internet reflector and requested some of the stations to try for a contact.

It only took a short time and I had completed my first QSO with EA6VQ in the Balearic Islands. I was thrilled, and a short time later made my second contact. I was able to copy five other stations during the weekend, but did not make any additional QSOs for another week.

By learning more about the lunar propagation path and its many variables, I was better equipped to plan my limited access time with an antenna having no elevation control. I had what I thought was very good success, making 18 EME QSOs with my current station. I was bitten by the bug and wanted to improve my station, but realized that I would have to stay with a single Yagi due to space limitations.

I made the following improvements to my station in short order: I added 3 dB to my transmit signal by going to 500 watts with an old tube amplifier, changing my Yagi to a more effective 2.5-wavelength 12-element design with limited minor lobes, adding elevation rotation to my Yagi, and finally moving my low-noise receive preamplifier up to the antenna. These changes each made small incremental improvements, but together they have made a big improvement in my success in competition for a QSO.

There are many small EME station operators like myself who have become active on EME with the development of WSJT, and we all share the same high level of excitement in completing every new contact. I have been pleased and actually quite surprised at the amount of success a small station can have on EME given sufficient time to plan around the better lunar conditions.

My greatest thanks must be directed to Joe Taylor, K1JT, the creator of WSJT, who has used some of his great knowledge to advance the state-of-the-art for amateur radio communications.

ARISSat-1 to Fly this Month

The ARISSat-1 satellite (also previously known as SuitSat 2) is scheduled to be launched from the International Space Station this month. Actual launch date was not available at the time of the writing of this column in mid-December.

The satellite is planned to have an education component for use in classrooms. The information about this component also was not available at the time of writing this column. More information will be available in Keith Pugh, W5IU's "Satellites" column in the Winter 2011 issue of *CQ VHF* magazine, which is scheduled to be published later this month. Additional information on the satellite can be found on the web at: <http://www.arissat1.org>.

SDR Dongle

Part of what will help move along the education component of the ARISSat-1 is a new SDR (software-defined radio) dongle. Named the FUNcube Dongle, it is an SDR that has a frequency range between 64 and 1700 MHz. It can be plugged into a USB port on most computers and receive most modes. It is designed to allow anyone to try his or her hand at receiving satellites, such as AMSAT-UK's FUNcube satellite, which is scheduled for launch late this year.

The educational goal behind the dongle is to furnish it to classrooms and have the radio connected to a VHF antenna that will pick up satellite signals. Coupled with satellite and telemetry tracking software, students will be able to see near-real-time satellite and telemetry tracking.

While early production problems slowed the initial release of the dongle, some units were sold in December last year. For more information, see the organization's website at: <http://www.funcubedongle.com/>.

The FUNCube Dongle Pro. (Photo from <http://www.FUNCubeDongle.com>)

Educational Help Needed

Concerning the education component mentioned above, the following is from Southgate Amateur Radio News:

Help needed with educational outreach:

AMSAT-UK is looking for people in the educational field to help develop the educational outreach part of the FUNcube satellite project.

AMSAT-UK's FUNcube is a satellite project with the goal of enthusing and educat-

ing young people about radio, space, physics, and electronics. Additionally, it features a 435- to 145- MHz linear transponder for SSB/CW operation for use outside school hours. It will support the many existing educational Science, Technology, Engineering and Math (STEM) initiatives, including GB4FUN. The target audience consists of school pupils and young people, in general. FUNcube will feature a 145-MHz telemetry beacon that will provide a strong signal for the pupils to receive.

A simple FUNcube dongle SDR receiver has also been developed. This will connect to the USB port of a laptop to display telemetry and messages in an interesting way.

The project commenced in October 2009, and it is anticipated that the satellite will be launched before the end of 2011. More information can be found at <http://www.funcube.org.uk/>.

As the technical work on the satellite itself is now well under way, AMSAT-UK is now looking to develop the educational outreach part of the project. This will include the design and contents of the "ground station" laptop display, the best method of providing the information so that it relates to current curricula, and all the supporting information that will be needed by the teachers. As they have little current educational experience, AMSAT-UK needs additional professional advice as to how to carry it forward.

The FUNcube website now has details of the planned educational aspects of the project. See the "education outreach" link.

If you are in the educational field and have experience in curriculum matters, then please consider helping AMSAT-UK with this. In the first instance, please contact Richard, G3RWL, for further information; e-mail:< g3rwl@amsat.org>.

FUNcube website: http://www.FUNcube.org.uk/; FUNcube SDR Dongle: http://www.FUNcubeDongle.com/; FUNcube Yahoo Group: <http://groups.yahoo.com/group/FUNcube/>.

AMSAT-UK publishes a color A4 newsletter, "OSCAR News," which is full of amateur satellite information. Join online at <http://secure.amsat.org.uk/subs_form/>.

"The 144 MHz EME NewsLetter"

The "144 MHz EME NewsLetter" is available for download each month at <http://www.df2zc.de/newsletter>. The December 2010 issue contains the fascinating story of Rolf Niefind, DK2ZF, and Martin Steyer, DK7ZB's EME DXpedition to Easter Island and Chile. Here is an excerpt that tells about how the trip almost came to an end before Rolf and Martin could get their suitcases unpacked:

When [Rolf and Martin opened their suitcases upon arrival on Easter Island] a bunch of screws and nuts fell out of the suitcases. Also other equipment parts were virtually flying around inside the suitcases. Most spare parts were damaged. The center conductor of coax relays was broken. The switch of the elevation indicator was broken. The switching box was heavily damaged. What had happened? Was the DXpedition at its end before it even started?

To cut a long story short: The Chilean custom officers were suspicious of the strangely heavy suitcases. Consequently they performed a special explosives test by placing them on a vibrating table which heavily shook the suitcases—and destroyed most of the contents. The status of the three BeKo solid-state amps was yet uncertain.

We can only imagine how one would feel after travelling half the world, looking forward to some busy days of DXpeditioning, and then realizing that the equipment was broken. After six hours working with "on-board means" Rolf and Martin managed to get the main parts operational again. However, the final test together with the amps was postponed to the following day. With shaking hands they then switched everything on. It worked OK!

To read the whole story, download the issue at: <http://www.df2zc.de/downloads/emenl201012x.pdf>.

South African NASA

The following is from Southgate Amateur Radio News:

The Minister of Science and Technology, Naledi Pandor, on Thursday 9 December offi-

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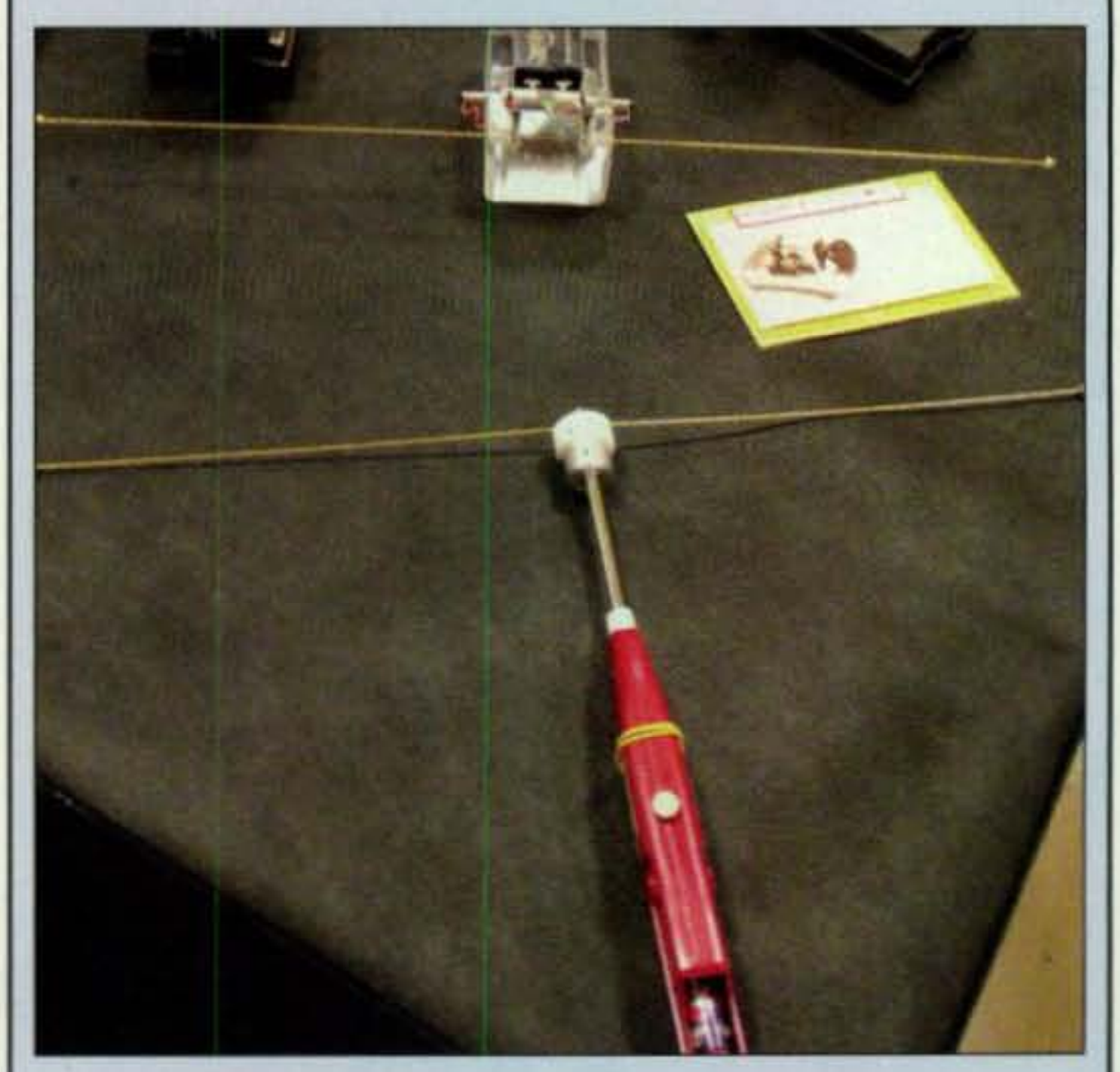


We accidentally ran an incorrect photo in December's "What's New" column. The Marconi Coherer from Begali Keys described in the text is actually the device shown here (in two parts, with 70-centimeter dipoles on each piece). Tnx to N8RXL and others for the catch.

cially launched the South African National Space Agency at a gala event in Mid Rand. She said that SANSA is mandated as the primary, but not sole, implementer of South Africa's National Space Programme to direct government's investment in space sciences and technology. The purpose is to integrate and manage the country's space activities for the greater good and implement an effective, sustainable, long-term, national space programme aligned with South Africa's socio-economic policies. On a question by the South African Radio League (SARL) at the media briefing if SANSA will support the amateur radio satellite programme, the CEO of SANSA said definitely. The radio amateurs are part of our plans.

Current Convention

The Orlando HamCation & Computer Show: The 65th Orlando HamCation & Computer Show will be held February 11–13, 2011, at the Central Florida Fairgrounds, 4603 West Colonial Drive, Orlando, Florida. For details, please see: <http://www.hamcation.com>.

Calls for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings*, or both. For more information, questions about format, media, hardcopy, e-mail, etc., please contact the person listed with the announcement. The following conference organizer has announced a call for papers for its forthcoming conference:

Southeastern VHF Society Conference: Technical papers are solicited for the 15th annual Southeastern VHF Society Conference to be held in Huntsville, Alabama on April 29–30, 2011. Papers and presentations are solicited on both the technical and operational aspects of VHF, UHF, and microwave weak-signal amateur radio. In general, papers and presentations on non-weak-signal related topics such as FM repeaters and packet will not be accepted, but exceptions may be made if the topic is related to weak signal. For example, a paper or presentation on the use of APRS to track rovers during contests would be considered.

The deadline for the submission of papers and presentations is March 11, 2011. All submissions should be in Microsoft Word (.doc) or alternatively Adobe Acrobat (.pdf) files. Pages should be 8 1/2 by 11 inches with a 1-inch margin on the bottom and 3/4-inch margin on the other three sides. All text, drawings, photos, etc., should be black and white only (no color). Please indicate when you submit your paper or presentation if you plan to attend the conference and present there or if you are submitting just for publication. Papers and presentations will be published in the conference *Proceedings*. Send all questions, comments, and submissions to the program chair, Robin Midgett, K4IDC, at <k4idc@comcast.net>. For further information about the conference please see the society's website: <http://www.svhfs.org>.

And Finally . . .

Facebook is increasingly becoming a vehicle for communicating real-time or time-sensitive information. At the same time that I am writing this column in mid-December, I have posted time sensitive stories or links to stories on *CQ VHF* magazine's wall. With nearly 700 followers, news of these events is available instantaneously around the world.

Why not consider becoming a follower of *CQ VHF* magazine on Facebook? It is free to do so, and the information, although brief, is current.

Speaking of *CQ VHF* magazine, why not also consider becoming a subscriber to the magazine? With more than a dozen regular writers, the content of the magazine is full of articles on the several sub-niches of the VHF-plus ham bands.

Thank you again for your support of this, your column. I look forward to reading about and publishing stories of your exploits on the VHF-plus ham bands. Until next month... 73 de Joe, N6CL

dx

BY CARL SMITH,* N4AA

DX Activity Wrap-Up 2010 and Coming Up in the New Year

By now the new year is well under way. We will have celebrated the holidays, worked a few contests, made a few of those New Year's resolutions (which we seem to never keep) and await more contesting and opportunities for DXing. Hopefully, those of us in the Northern Hemisphere won't be too buried in snow. As I write this, though, in early December, the snow at my QTH is about 3 inches deep with more falling rapidly and obscuring my view across the small valley below my house. But what the heck. It's that time of year here, so what should one expect? Now on to DXing . . .

DX News

ZL8X on Kermadec did an outstanding job, logging over 145.000 Q's during their stay.

CYØ from Sable was hit with yet another delay due to a plane that couldn't fly and then a storm that wrecked the beach landing areas. Randy, NØTG, gave an update: "The CYØ team has coordinated with the approving authorities and flight charter services to access Sable Island for a "third" try. March 2011 has been approved. The exact date will be determined in the near future. The link "How to Contribute" on the web home page for those able to consider this matter will be helpful and appreciated. Additional details will be provided as they develop. See: <http://www.cy0dxpedition.com/>."

What's that old saying? The third time is the charm! We hope so for their sake. They certainly deserve a break after all they've been through.

DXØDX from Spratly should be wrapping up by the time you see this.

VP8ORK from South Orkney should just be starting their operation.

VK9 – Cocos Keeling is set for some activity later in February into early March.

Larry, NØQM/VQ9LA, has ended his long-term activity from **Chagos** and will next be heard from

Another "new one" group: Brian, PJ2/N2MF; Bill, PJ2/K2TQC; Tony, PJ2/K2NV; and Ken, PJ2/W1NG operated from the Curacao PJ2T superstation. They made close to 29,000 Q's with 8000 on the WARC bands and about 1200 each on RTTY and 160. (Photo courtesy of Brian, N2MF)

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

Did you work KH7CW in the CQ WW SSB Contest 2010? Here is the "crew" that operated as a M2 entry (l to r): Kan, KH6BK/JA1BK; Tets, AH7C/JH1JGX; Rich, K2WR; and Soichi, AH6TH/JH1ECG. Sitting in front is Lee, KH6BZF. (Photo courtesy of Lee, KH6BZF)

From November 2–8, 2010, Jan, SM5FUG, and Len, SM5ENX, activated St. Barthélemy, FJ. "They used the calls FJ/SM5FUG and FJ/SM5ENX and made more than 6000 QSOs on CW and some RTTY. (Photo courtesy of Len, SM5ENX)

the Philippines as **DU3/NØQM**. Larry did a fantastic job of making VQ9 available to DXers on all bands on CW/RTTY. He worked some SSB until he got so disgusted with the "stuff" he was hearing that he just decided to work only CW/RTTY. His logs were uploaded to the LoTW, so there should be no problem getting Chagos confirmed. He still responds to paper card requests, too.

There are some "far out" DXpedition plans for **Conway Reef (3D2/C)** in September 2011 and **Jarvis Island (KH5)** in November. No doubt there will be others throughout the year, too, and I'll bring you whatever news/information when it becomes available.

ZS8M continues to be active from Marion Island. Pierre, ZS1HF, had hoped to have that new SteppIR vertical up in late November. Unfortunately, after the move into the new quarters, he encountered some problems that delayed him. He reported in his "Christmas Special" newsletter that he had encountered severe electronic interference on the HF radio. He was able to identify the source as being the fire-alarm system and the air-handling units, which when switched on cause severe broadband interference, preventing successful HF operations, even on the commercial frequencies. He relocated the ham radio operation back to the old base and will operate from there until he can eliminate the source of the noise. Pierre will be leaving the island in April, so he

The WAZ Program

20 Meters SSB

1198 ..... W3ESH

20 Meters CW

602 ..... NI5F
603 ..... RN6FK

160 Meters

360 ..... RZ3AUL (30 zones)
361 ..... RN6FK (37 zones)
362 ..... N4NN (40 zones)

All Band WAZ Diamond Jubilee

068 ..... 9A4WY
069 ..... W8BBQ
070 ..... VY2DA
071 ..... DLØAF
072 ..... W3FJ
073 ..... WD6FF
074 ..... JE1GWO
075 ..... W6GR
076 ..... K3FGO
077 ..... JA1WWO
078 ..... WC5N
079 ..... W6DPD
080 ..... KJ6P
081 ..... JN3SAC

Mixed

8754 ..... K5VIP
8755 ..... W7HPW
8756 ..... OK2FB
8757 ..... K6RV
8758 ..... SM5AFU

SSB

5146 ..... UX7IM
5147 ..... N3EEI
5148 ..... NN6UOZ

CW

612 ..... JE7OEC
615 ..... G3UFO
614 ..... LU3XX

RTTY

212 ..... NI5F

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, P.O. Box 449, Wiggins, MS 39577-0449. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

The WPX Program

CW

3253 ..... TF8GX
3254 ..... RN3AKK

SSB

3081 ..... TF8GX

Mixed

2128 ..... DL5JH
2129 ..... KK7X
2130 ..... TF8GX
2131 ..... EB3CW

Digital

48 ..... TF8GX

CW: 500 AG4W. 750 TF8GX. 2450 VE6BF. 2950 I7PXV. 3550 WA5VGI.
SSB: 1000 NW3H. 1000 VE6BF. 1300 AE9DX. 1650 AG4W. 1750 TF8GX. 2700 WA5VGI.
Mixed: 450 KK7X. 550 EB3CW. 600 DL5JH. 1800 TF8GX. 1850 AG4W. 2550 VE6BF. 4700 HA5DA.
Digital: 850 AG4W.

160, 80, 40, 20, 17, 15, 20, 10 meters: TF8GX

Africa, Asia, Europe, Oceania, N. America, S. America: TF8GX

Award of Excellence: TF8GX

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, N3XX, 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, NN1N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B, KØDEQ, DKØPM, SV1EOS, UAØFAI, N4GG, UA4RZ, 7K3QPL, EW1CQ., UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UT9FJ, UT4EK, K9UQN, UR5FEO, LY2MM, N3RC, OH3MKH, RA3CQ, UT3IZ, S55SL, RU3ZX, YO9HP, RA3DNC, K8ZT, KE5K, JH8BOE.

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, N3XX, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, NN1N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, KØDEQ, DKØPM, SV1EOS, N4GG, UA4RZ, 7K3QPL, EW1CQ, UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UR5FEO, N3RC, UT3IZ RU3ZX, YO9HP, RA3DNC, K8ZT, KE5K, JH8BOE.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage for airmail) to "CQ WPX Awards," P.O. Box 355, New Carlisle, OH 45344 USA. Note: WPX will now accept prefixes/calls which have been confirmed by eQSL.cc. Other electronic QSL confirmation means are not accepted.

*Please Note: The price of the 160, 30, 17, 12, 6, and Digital bars for the Award of Excellence are $6.50 each.

is quite anxious to get on the air with a better signal before that time.

The Upper Bands

We keep waiting and hoping for the solar Cycle 24 to improve conditions on the upper HF bands, and we are waiting and waiting and waiting. . . . . No one seems to be able to tell us what is going to happen, so we just continue to struggle along with what we hear on the bands. Case in point is the ARRL 10-Meter Contest in early December. At least from the N4AA QTH in western North Carolina, it was a struggle. It didn't seem to matter where the antenna was pointed—most of the time anyway. Most signals were pretty weak on CW and SSB, except for some from South America. VP5CW seemed to have the most consistently loud signal every time he was heard. Most of my operation was on CW, since that's where the most signals were. QSB would take a signal from readable to "nothing" almost instantly, so we had to be quick in making the exchange.

FO8RZ was workable on Saturday evening, but nothing else was heard from that area at all. Sunday morning ZS6NJ was very loud but was only heard working one station and never heard again. CR6K was weak but workable, then gone and not heard again. That's the way it was the weekend of December 11–12 for the ARRL 10-Meter Contest. Perhaps, and hopefully, it was better where you were.

Most Wanted Survey

The annual Most Wanted Survey conducted by *The DX Magazine* was published in January. Since there were not many DXpeditions related to the higher ranked "needs" for 2010, the top rankings didn't change much. A few are worthy of mention, however: Glorioso (FR/G) dropped from # 8 in 2009 to # 43 for 2010. That drop was due to the September/October 2009 DXpedition (FT5GA) by the French Military personnel—Bernard, F5LPY; Yves, F5PRU; David, F8CRS; Freddy, F5IRO; and Philippe, F4EGS.

Other than Glorioso's move, the Top 20 are essentially the same again for 2010. The Top 20 are shown below, and for the entire list of 100, see the website: <http://www.dxpub.com>.

2010	Prefix	Ctry	2009
1	P5	North Korea	1
2	KP1	Navassa	2
3	3Y/B	Bouvet	4
4	7O	Yemen	5
5	VKØ/H	Heard Island	6
6	FT5Z	Amsterdam	9
7	ZS8	Marion Island	3
8	VP8/S	South Sandwich	10
9	FT5W	Crozet	7
10	BS7	Scarborough	11
11	VP8/O	South Orkney	12
12	HKØ/M	Malpelo	14
13	VKØ/M	Macquarie	15
14	SV/A	Mt. Athos	13
15	FR/T	Tromelin	16
16	ZL9	Auckland & Campbell	17
17	KH5K	Kingman Reef	18
18	PYØS	St. Peter & St. Paul	19
19	KH5	Palmyra	20
20	FR/J/E	Juan de Nova	21

DX Foundations, DX Clubs, etc.

In looking over some of the QSL cards from DXpeditions, I see all the various logos for groups who financial supported them. These groups exist with one purpose … to help fund DXpeditions to the places *you* want to log and confirm. You are encouraged to support them as they support the DXpeditions.

An example I happened to have seen is from the Northern California DX Foundation (NCDXF). In 2010 it provided financial support to these DXpeditions: YI9PSE, Iraq; 3CØC, Annobon Island; ZL8X, Kermadec Island; CYØ, Sable Island; E4X, Palestine; T31A, Kanton Island (Phoenix Group), Central Kiribati; VP8ORK, South Orkney Islands; PJ7E, Sint Maarten; 5V7TT, Togo; 9UØA, Burundi; 9XØSP, Rwanda; ZK2A, Niue; and VK9N, Norfolk Island.

This is just a sample of one foundation. Others are the European DX Foundation (EUDXF); German DX Foundation (GDXF); International DX Association (INDEXA); Island Radio Expedition Foundation (IREF); UK DX Foundation (Chiltern DX-Club), etc.

There are dozens of DX clubs that

5 Band WAZ

As of December 1, 2010, 831 stations have attained the 200 zone level and 1704 stations have attained the 150 zone level.

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

G3SJX

The top contenders for 5 Band WAZ (zones needed, 80 or 40 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40)
IK1AOD, 199 (1)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
RU3FM, 199 (1)
N3UN, 199 (18)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
N4NX, 199 (26)
N4MM, 199 (26)
EA7GF, 199 (1)
N6HR/7, 199 (37)
JA5IU, 199 (2)
RU3DX, 199 (6)
N4XR, 199 (27)
HA5AGS, 199 (1)
VE3XN, 199 (26)
N5AW, 199 (17)
JH7CFX, 199 (2)
K7LJ, 199 (37)
RA6AX, 199 (6 on 10m)
RX4HZ, 199 (13)
KØGM, 199 (17)
S58Q, 199 (31)
KQØB, 199 (2 on 10)
K9OW, 199 (34 on 10)
G3NKC, 199 (31 on 10)
K8PT, 199 (26)
IN3ZNR, 199 (1)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
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)
F5NBU, 198 (19, 31)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
W7VJ, 198 (34, 37)
W9RN, 198 (26, 19 on 40)
W5CWQ,198 (17, 18)
I5KKW, 198 (31&23 on 20)
IV3MUC, 198 (1&31 on 40)
UA4LY, 198 (6&2 on 10)
IK4CIE, 198 (1, 31)
JA7XBG, 198 (2 on 80&10)
HB9ALO, 198 (1, 31)
JA3GN, 198 (2 on 80&40)

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

KE5TX (156 zones)
US5CB (150 zones
S55ZZ (183 zones)

5 Band WAZ updates:

None

***Please note: Cost of the 5 Band WAZ Plaque is $100 shipped within the U.S.; $120 all foreign (sent airmail).**

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, P.O. Box 449, Wiggins, MS 39577-0449. 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>.

CQ DX Awards Program

CW

1117 .....YO6HSU

SSB Endorsements

340.....XE1AE/341
340.....NØFW/341
340.....K6YRA/341
340.....IK1GPG/341
340.....K2TQC/341
340.....K4MZU/341
340.....K5OVC/341
340.....K5TVC/340
340.....W6BCQ/340
330.....DJ9ZB/339
330.....OZ5EV/339
330.....VE2GHZ/338
320.....N1ALR/3299
310.....N2LM/312

CW Endorsements

340.....NØFW340
340.....K2TQC/340
300.....N2LM/300
200.....HA2ESM/200

The basic award fee for subscribers to *CQ* is $6. For nonsubscribers, 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. As of October 12, we recognize 341 active countries, pending a final decision on the former Netherlands Antilles. Please make all checks payable to the award manager. Photocopies of documentation issued by recognized national Amateur Radio associations that sponsor international awards may be acceptable for CQ DX award credit in lieu of having QSL cards checked. Documentation must list (itemize) countries that have been credited to an applicant. Screen printouts from eQSL.cc that list countries confirmed through their system are also acceptable. Screen printouts listing countries credited to an applicant through an electronic logging system offered by a national Amateur Radio organization also may be acceptable. Contact the CQ DX Award Manager for specific details.

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries. With few exceptions, the ARRL DXCC Countries List is used as the country standard. The CQ DX Award currently recognizes 341 countries. Honor Roll listing is automatic when an application is received and approved for 275 or more active countries. Deleted countries do not count and all totals are adjusted as deletions occur. To remain on the CQ DX Honor Roll, annual updates are required. All updates must be accompanied by an SASE if confirmation of total is required. The fee for endorsement stickers is $1.00 each plus SASE. Please make checks payable to the awards manager, Billy F. Williams. All updates should be mailed to P.O. Box 9673, Jacksonville, FL 32208.

CW

NØFW 340	N4JF 336	N5FG 336	VE3XN 335	K8LJG 334	K6LEB 331	KE3A 327	OZ5UR 318	KØKG 308
K2TQC 340	K4IQJ 3368	YU1AB 336	K4JLD 335	W4MPY 334	K5RT 330	K6CU 327	CT1YH 318	KT2C 302
WB4UBD 336	K2FL 336	K4CN 336	N5ZM 335	K5UO 334	JA7XBG 330	W1DF 327	EA3ALV 317	HA5LQ 302
K3UA 336	K4MQG 336	UAØMF 336	N4AH 335	K7LAY 334	W4UW 330	KA3S 326	RA1AOB 315	N2LM 300
K9MM 336	W8XD 336	K9BWQ 335	N4CH 335	N6AW 334	K8SIX 329	IKØADY 326	W6YQ 314	K4IE 296
W4OEL 336	N7RO 336	N4MM 335	PY2YP 335	KA7T 334	W7IIT 329	F6HMJ 326	WA4DOU 314	N2VW 281
EA2IA 336	F3TH 336	W7OM 335	K9OW 335	K3JGJ 334	K1FK 329	EA5BY 326	YO9HP 314	4Z5SG 277
OK1MP 336	DL3DXX 336	W7CNL 335	K9IW 335	HB9DDZ 334	N7WO 328	WG5G/QRPp 320	ON4CAS 312	K4EQ 275
N7FU 336	WK3N 336	WØJLC 335	K2OWE 334	G3KMQ 332	W6OUL 327	W9IL 319	WD9DZV 310	

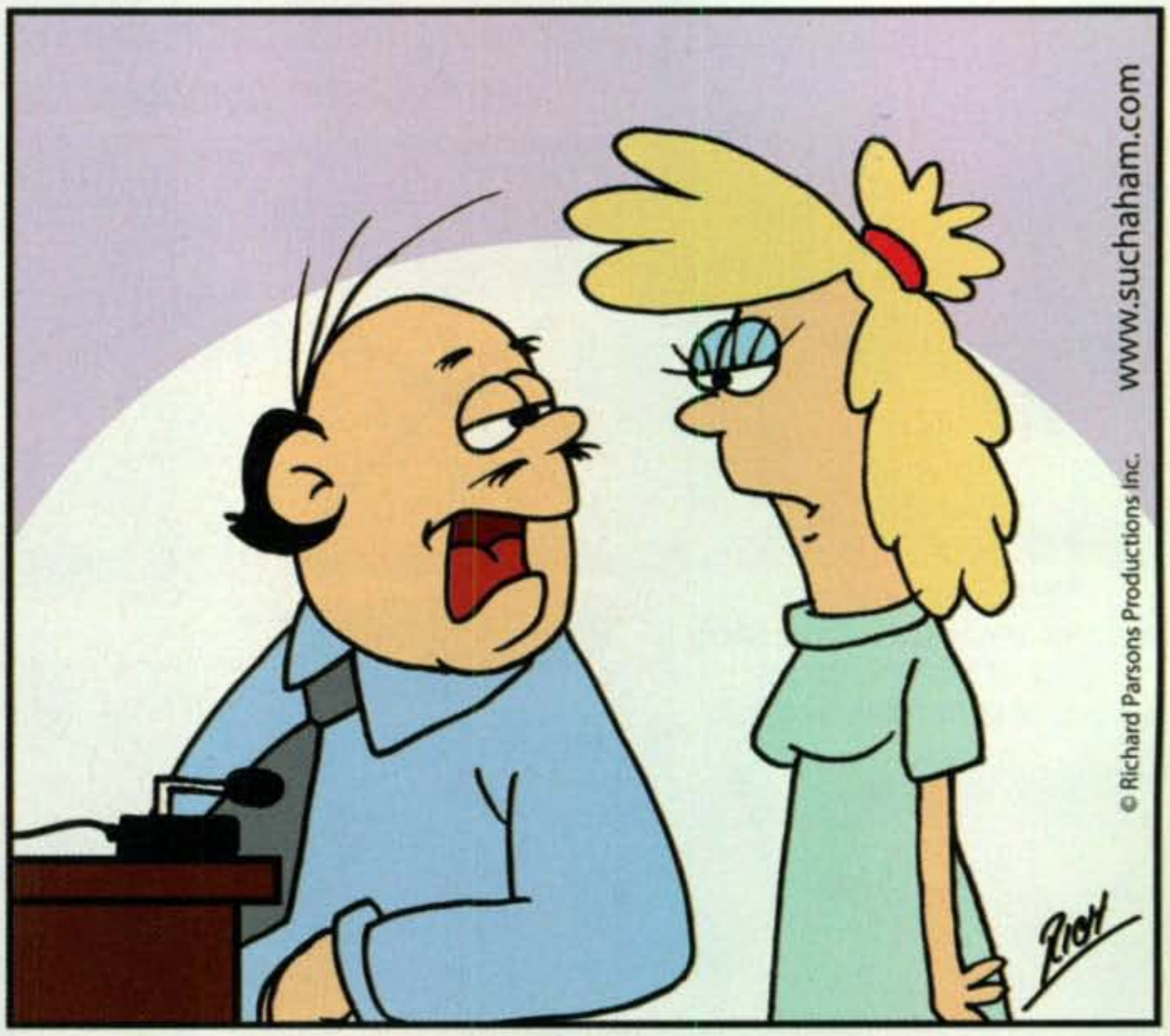
SSB

XE1AE 341	K3UA 337	IØZV 337	W7OM 336	EA5BY 336	K1UO 335	F6HMJ 331	XE1RBV 319	W5GT 306
NØFW 341	N7BK 337	OE2EGL 337	K9BWQ 336	OE3WWB 335	HB9DDZ 335	CT1AHU 330	WØROB 319	K4IE 306
K6YRA 341	4Z4DX 337	W4ABW 337	W8AXI 336	N6AW 335	K9IW 335	K7HG 329	VE7SMP 318	HB9DQD 305
IK1GPG 341	WB4UBD 337	DL3DXX 337	W9SS 336	IK8CNT 335	N7WR 335	N5YY 329	ON4CAS 317	4Z5FL/M 304
K2TQC 341	OZ3SK 337	I8KCI 337	VK4LC 336	EA4DO 335	K8SIX 334	N1ALR 329	N8SHZ 314	K7SAM 303
K4MZU 341	OK1MP 337	VE1YX 337	K7LAY 336	CT3BM 335	KE3A 334	KE4SCY 328	IV3GOW 314	I3ZSX 302
K5OVC 341	N4JF 337	N4CH 337	WS9V 336	K8LJG 335	N2VW 334	W9GD 327	W6NW 312	4X6DK 301
K5TVC 340	W4WX 337	EA3BMT 337	W6DPD 336	W3AZD 335	W2CC 334	SV3AQR 326	KU4BP 312	4X6DK 299
W6BCQ 340	K4MQG 337	IKØAZG 337	VE3XN 336	KØKG 335	JA7XBG 334	VE7EDZ 326	N2LM 312	WD9DZV 299
DJ9ZB 339	N4MM 337	K4IQJ 337	K9HQM 336	W2FKF 335	K3LC 334	KD5ZD 324	KA1LMR 310	K7ZM 298
OZ5EV 339	K9MM 337	WK3N 337	K2FL 336	W7FP 335	K5UO 333	W1DF 324	RA1AOB 310	AD7J 298
VE2GHZ 338	VE2PJ 337	N5FG 337	VE3MR 336	YU3AA 335	K5RT 332	W4MPY 323	G3KMQ 310	W9ACE 292
K4JLD 337	K3JGJ 337	YU1AB 337	VE3MRS 336	W7BJN 335	WØYDB 332	TI8II 322	XE1MEX 310	AE9DX 292
EA2IA 337	N5ZM 337	K4CN 337	AA4S 336	AB4IQ 335	WA4WTG 332	YO9HP 322	IØYKN 309	W6MAC 290
IN3DEI 337	N7RO 337	UAØMF 337	PY2YP 336	W4UNP 335	ZL1BOQ 332	KW3W 322	XE1MW 307	N3RC 278
DU9RG 337	KE5K 337	KZ2P 336	K9OW 336	W4UW 335	W9IL 332	W6OUL 320	AA1VX 306	WA5UA 276

RTTY

WB4UBD 335	NI4H 334	N5FG 333	N5ZM 331	K3UA 330	OK1MP 329	UAØMF 318	K4CN 314	K8SIX 298

SUCH A HAM



I'm up to 20 words per minute, Mavis.
I can only imagine what you do without a key.

make substantial financial donations to DXpeditions as well. No matter your location, or financial situation, please consider making a donation. For those in the U.S., donations made to many of these clubs/foundations are tax-deductible.

Remember, without the financial support of these groups/foundations, most of the major DXpeditions could not be financed by the team itself. Your help is needed and will be greatly appreciated.

Until next time, remember. Enjoy the chase and Have Fun!

73, Carl, N4AA

In spite of its size, the LP at ZP6CW is almost hidden by the coconut tree Doug says, "is in full bloom" outside his home. He added, "All is super down here. Pushing 20,000 QSOs with the RLP since August 2009 and everyone has been sent a bureau card." Doug is retired and spends a lot of time on the radio. His wife handles the QSLing. (Photo courtesy of Doug, ZP6CW)

QSL Information

CU1F via CT1GFK
CU1T via CT1GFK
CU2/DL1DA via DL1DA
CU2/DL3OCH via DL3OCH
CU2/DL8AAV via DL8AAV
CU2KH via OH8NC
CU2M via DL5AXX
CU3X via IZ8CCW
CU4M via CT1GFK
CU4NH via W3HNK
CU4T via CT1GFK
CU5ANB via EA5FL
CU5AQ via EA5KB
CU5T via CT1GFK
CU7/DL5AXX via DL5AXX
CU7T via CT1GFK
CU8/DL8AAV via DL8AAV
CU8A via CT1GFK
CU8AT via CT1GFK
CU8T via CT1GFK
CU8W via CT1GFK
CV5A via CX2ABC
CW4T via EA5KB
CW6V via W3HNK
CX/K9VV via K9VV
CX/PY2TJ via PY2TJ
CX/SP9MRO via SP9MRO
CX1AA via W3HNK
CX2AL via HB9IBG
CX5DNT via ON5NT
CX5NT via ON5NT
CX5X via W3HNK
CX6DAP via JA4ATV
CX6VM via W3HNK
CX7CO via WB3CDX
CYØZZ via VK4AAR
D2BB via W3HNK
D2CQ via CT1IUA
D2PJB via CT1IUA
D2QMN via RZ3EC
D3KNN via DL1DA
D44BC via SMØJHF
D44CF via SMØJHF
D44TOI via HB9BOI
D44TXF via DG3KAF
D44TXI via DH2KI
D44TXO via DJ2VO
D44TXP via DL1COP
D44TXQ via DL3KBQ
D44TXR via DL2RSI

(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>; <http://golist.net/>.)

BY TED MELINOSKY,* K1BV

Awards from Spain

This month we feature some of the awards offered by the Spanish national organization of ham radio, which is the Unión de Radioaficionados Españoles, or U.R.E. Its website has recently been completely rebuilt and now includes an English version of the text for many of the pages. Each of the awards has a separate page the rules, as well as a list of all those who have earned the awards over the years. There aren't many US or VE calls listed. Let's change that.

Since Spanish stations are very active on HF, and are easy to work in CQ WW, WAE, and ARRL DX contests, many of you probably have a good selection of EA/EB/etc. QSLs which can be put to work to earn these certificates.

The most difficult of the five awards described below is probably the TPEA. This requires one contact with each of the 52 Spanish provinces, or what we in the US might consider "states" or "counties." The majority of Spanish QSLs identify the province by having the 5-digit postal code, name of town, and name of province, with the name of the province in parentheses. Some examples are: 12580 Benicarlo (Castellon); 46880 Bocairent (Valencia); and 18008 Granada (in this case, Granada is the town *and* province name).

By using the list of provinces located in each call-sign area, and examining the card, you will be able to identify the province fairly easily for most of your EA cards.

U.R.E. Awards

General Requirements: GCR list signed by the award manager of an IARU-affiliated society is acceptable. SWL OK. Note the official starting date for each award, as these vary somewhat.

Fee for each award is 6 Euros, 7 IRCs, or $US6. (See the exception for EADX100 award.) Endorsements are 6 Euros, 7 IRCs, or $US6.

Apply to: U.R.E., PO Box 220, 28080 Madrid, Spain. Internet: <http://www.ure.es/awards.html> (The English version of the website is accessible from the home page.)

CIA Award. Contact Iberoamerican countries on two levels:

Gold—work 20 Iberoamerican countries, plus Portugal and Spain (total of 22 QSOs).

Silver—work 15 Iberoamerican countries, plus Portugal and Spain (total of 17 QSOs).

Iberoamerican countries are: CE, CO, CP, CT, CX, EA, HC, HI, HK, HP, HR, KP4, LU, OA, PY, TG, TI, XE, YN/HT, YS, YV, and ZP. CW and phone contacts are valid.

EA 100 DX Award. Awarded for contacting 100 different countries (entities), which must include EA, EA6, EA8, and EA9. Phone and CW awards; all HF bands may be used. For the mixed mode, contacts on phone and CW only are valid. It is nec-

Offered by the Unión de Radioaficionados Españoles, the CIA Award is for contacting Iberoamerican countries on two levels, gold and silver.

USA-CA Special Honor Roll

H. Stephen Miller, NØSM
USA-CA All Counties #1207
November 15, 2010

David Pyle, KW1DX
USA-CA All Counties #1208
November 19, 2010

USA-CA Honor Roll

500

NØSM 3521
K4UK 3522
KB7ZTI 3523
JA2FEA 3524

1000

NØSM 1805
K4UK 1806

1500

NØSM 1516
K4UK 1517

2000

NØSM 1405

2500

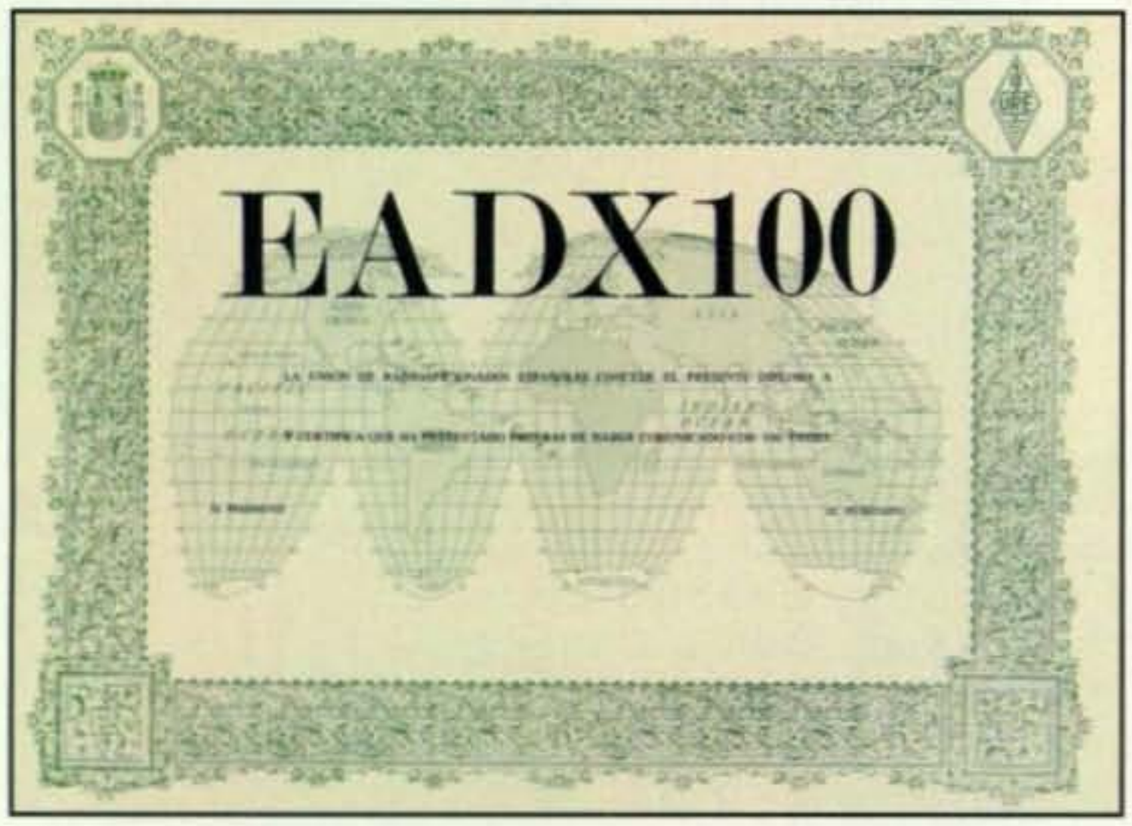
NØSM 1322

3000

NØSM 1233

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>



The EA 100 DX Award is given for contacting 100 different countries (entities), which must include EA, EA6, EA8, and EA9.

essary to contact all six continents plus Antarctica, both SSB and CW. If you have earned the award on SSB or CW, you must only submit the QSLs of contacts with these contacts on each mode. Contacts since April 1, 1949 count for the award. Endorsements for 25 or 50 additional countries. All current countries from the ARRL DXCC and WAE awards are valid. (This means GM3-Shetlands, JW-Bear Island, IT9-Sicily, and 4U1VIC-ONU Vienna International Center count.) Submit list in alphabetical order. Cards must be sent to sponsor for this award and a special application form must be used. Fee for basic certificate: 12 Euros, 14 IRCs, or $US12.

Espana Award. Contact Spanish stations after January 1, 1952 as follows:

EA stations and SWLs need 90 contacts, 10 on 4 bands each from all 9 call areas with a minimum of 35 provinces represented. EC stations, same as EA, but on 3 bands from each call area.

All others need 80 contacts, 10 from each call areas 1, 2, 3, 4, 5, 7 and 8. Also 5 each from call areas 6 and 9. Contacts must be on 3 different bands and represent at least 30 different provinces. See the TPEA rules below for the province list.

Paul Milward, NU4C
USA-CA #1206, October 22, 2010

My earliest interest in radio began in 1956. My grampa unknowingly introduced me to ham radio when he unlocked the door to the small room off the garage.

It was a wondrous place. There was a big rack near the back wall and in it was a really old radio. The small desk near one wall had a straight key smack in the middle and headphones hanging on a hook nearby. An old file cabinet on another wall contained hundreds of postcards.

"Oh," I thought, "what is this place? What are these radios and things for? Why all these postcards?" Grampa explained to me that all this stuff belonged to my Uncle Jack (W1KCF SK). This was his radio shack where he talked with hams all over the world.

Jack had joined the US Navy about a year before Pearl Harbor. He was assigned as the radio operator on a mine sweeper. After the war Jack stayed in government service as a radio operator; however, he never returned to the Amateur Radio Service.

Grampa explained that this gear had not been used in many years and the antenna that had been suspended between the house and garage was long gone. I was welcome to look and even touch, but please don't even try to turn anything on. I think Grampa was afraid of a fire. I did go through the postcard collection and soon learned they were called QSL cards and that they documented conversations my uncle had had with other hams. I think I read each one at least three times over the summer of '56.

When school started that fall, I discovered girls and my interest in radio waned. There it stayed, submerged deeply below the surface, until, during the summer of 2000, I stumbled across HamTestOnline. I was soon passing the online tests. I searched the web and found a test scheduled nearby in Mesa, Arizona, took it, and passed. I then did what most new Techs do and bought an HT. I made a few contacts, had a little fun, but then work duties and life in general took over. Back into the well.

Fast forward to summer 2004, now living/working in Florida. I had joined the local club and decided to upgrade. I passed the written test for General, but code was another story. After practicing all summer and between *Hurricanes Francis* and *Jeanne* I passed the Element 1 test and also took and passed Element 4 on a dare.

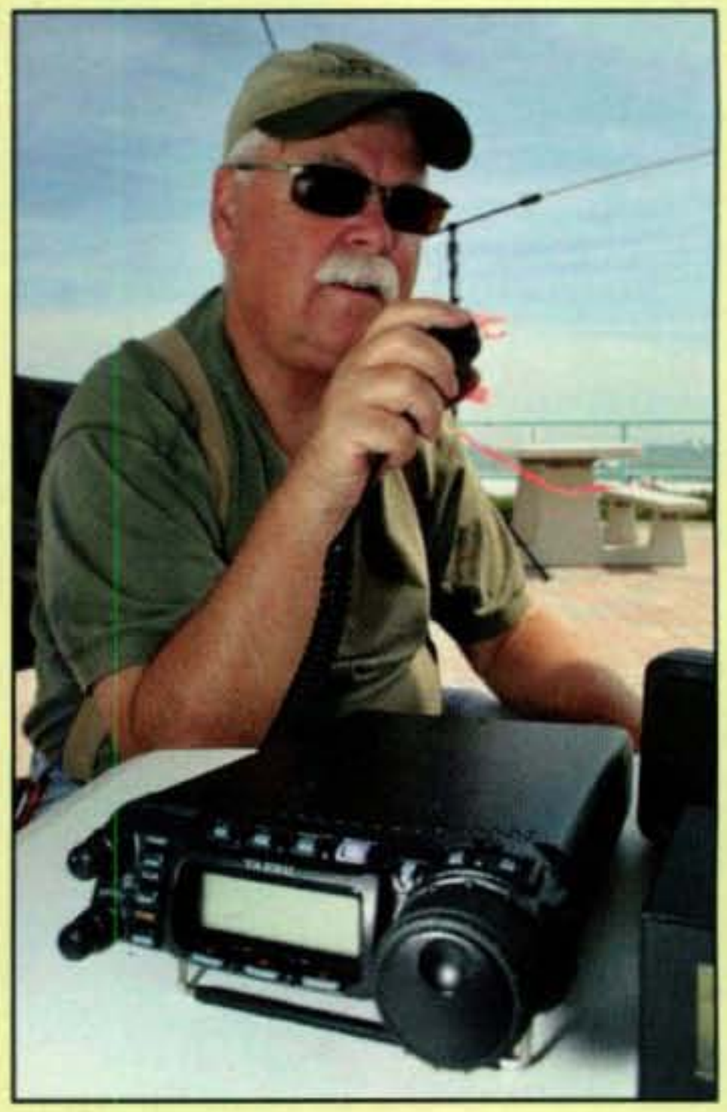
I bought a new HF rig, a Kenwood TS-2000, a vertical antenna, and some coax. I was on the air, although somewhat sporadically as I was still working. I did manage to work about 200 stations over the next two years and even got QSL cards from most of them. I now was starting to understand Uncle Jack's collection.

I retired in the spring of '06 and had more time on the radio. I was able to achieve VUCC on 6 meters and WAS on 20 and 40 meters. I was a regular on the OMISS nets. My collection was growing. I was really understanding Jack's collection now.

In early June of '07 I heard some strange activity on 14.336 and was able to work AC8W/M in Ford County, Illinois. Over the next few weeks I found myself drawn back to 14.336. I heard someone mention MARAC.org and surfed it on the web. Hey, this looks interesting. Serendipity had happened: I discovered county hunting.

By August of '07 I was hooked. I sent off to N4UJK for a package of MRCs (Mobile Reply Coupons). I became known to all the local USPS clerks on first-name basis. I found and erected a tower, purchased a used triband Yagi, and then it was "Game On." Collecting cards was now an obsession.

My TS-2000 was supplemented with a Yaesu FT-857 for /P and /M operating in 2007. In 2010 I purchased an Elecraft K3 and developed an interest in CW. I even improved enough that I felt comfortable collecting counties.



Paul, NU4C, USA-CA All Counties #1206.

My first confirmed county was Cook, Illinois from W9CBT on 17 meters; my first confirmed Ch'er was Ford, Illinois on 20 meters from AC8W/M; and my "whole ball of wax" county was Pierce, Georgia from my good friend N4GOA on 20 meters, Darrell, "TU for the extra mile." Each of those three contacts, while memorable, carries the same weight as the other 3074.

I could not have done it without the help of the all the NCS and relay stations on the nets, and most importantly, I could not have done it without *you*. I want to thank *all* the amateur radio operators everywhere. Without so many of you this hobby would be nothing.

—73, Paul, NU4C

For the Espana Award, contact Spanish stations after January 1, 1952 (see text for specifics).

TPEA Award. Contact a station in each of the 52 Spanish provinces after March 1, 1979. All HF bands valid; no mobile contacts allowed. No repeater or satellite contacts allowed.

Provinces are:

EA1—Asturias (O), Avila (AV), Burgos (BU), Santander (S), LaCoruna (C), Leon (LE), Lugo (LU), Orense (OR), Palencia (P), Pontevedra (PO), Logrono (LO), Salamanca (SA), Segovia (SG), Soria (SO), Valladolid (VA), Zamora (ZA).

EA2—Alava (VI), Guipuzcoa (SS), Huesca (HU), Navarra (NA), Teruel (TE), Vizcaya (BI), Zaragoza (Z).

EA3—Barcelona (B), Gerona (GE), Lerida (L), Tarragona (T).

EA4—Badajoz (BA), Caceres (CC), Ciudad Real (CR), Cuenca (CU), Guadalajara (GU) Madrid (M), Toledo (TO).

EA5—Albocete (AB), Alicante (A), Castellon (CS), Murcia (MU), Valencia (V).

EA6—Baleares (PM).

EA7—Almeria (AL), Cadiz (CA), Cordoba (CO), Granada (GR), Huelva (H), Jaen (J), Malaga (MA), Sevilla (SE).

EA8—Las Palmas (GC), Tenerife (TF).

EA9—Ceuta (CE), Melilla (ML).

100 EA CW Award. Earn a total of 100 points by contacting EA stations after January 1, 1966 as follows:

Stations in CQ Zones 14, 15, 16, 20, and 33 need to work 100 EA stations using CW (1 point per QSO).

Stations in CQ Zones 4, 5, 8, 9, 11, 17, 18, 21, 22, 34, 35, 36, and 37 need 50 EA contacts (2 points per QSO).

Rest of the world needs 25 EA on CW (4 points per QSO).

All applicants need at least 7 call districts and contacts on 3 different bands. The same station may be worked on different bands. A Spanish station working portable in another district counts as a different station, one contact per band. A silver medal is awarded for 500 points, a gold medal for 1000. The fee for the medal is 18 Euros, 20 IRCs, $US18, or 21 IRCs. SWLs may apply, but must make sure that at least one third of the stations heard are different.

Find any interesting awards online, or does your club sponsor an award that can use some publicity? Let's hear from you at the address of the first page of this column. 73, Ted, K1BV

Contact a station in each of the 52 Spanish provinces after March 1, 1979 to earn the TPEA Award.

For the 100 EA CW Award, earn a total of 100 points by contacting EA stations (see text for details).

The Most Important Contester?

Tnx & 73 to K1AR

From the Editor: For the first time in more than two decades, John Dorr, K1AR's byline does not appear on this column. After nearly 22 years as *CQ*'s Contesting Editor, John has decided to hang up his spurs and turn in his badge (but he'll still be a "big gun" in the contests!).

In addition to writing his monthly column, John has worked closely with all of the contest directors and committees (and still does), has served as *CQ*'s main "face" to the contesting community, and was a contesting advisor to his editors.

John also spent a few years in the mid-1990s as a full-time CQ staff member, over and above his responsibilities as contest editor. During this period, John and I developed a close personal friendship, and I have been able to call on him many times over the years for advice, commentary, or a different perspective on a host of questions and situations that have arisen. I have deeply appreciated his help and his friendship.

I want to take this opportunity to thank John for his many years of service to *CQ* magazine, the CQ contests, and to amateur radio contesting overall. John, your shoes in writing this column will be difficult to fill.

It is the nature of the magazine business, though, that those shoes must be filled. We hope to introduce a new contest editor to you very soon. In the meantime, I'll be filling in, sharing the perspective of a casual contester.

—W2VU

Calendar of Events

All year	**CQ DX Marathon**
Jan. 28–30	**CQ WW 160M 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	Delaware QSO Party
Feb. 5–6	Mexico RTTY Int'l Contest
Feb. 5–6	10-10 Int'l Winter Contest
Feb. 6	North American CW Sprint
Feb. 12	Asia-Pacific Spring Sprint (CW)
Feb. 12	FISTS Winter Sprint
Feb. 12–13	**CQ WW RTTY WPX Contest**
Feb. 12–13	Dutch PACC Contest
Feb. 13	North American SSB Sprint
Feb. 14-18	ARRL School Club Roundup
Feb. 19–20	ARRL CW DX Contest
Feb. 25–27	**CQ WW 160M SSB Contest**
Feb. 26–27	REF SSB Contest
Feb. 26–27	UBA CW DX Contest
Feb. 26–27	North American RTTY QSO Party
Mar. 5–6	ARRL SSB DX Contest
Mar. 26–27	**CQ WW WPX SSB Contest**

Who is the most important operator on the air during a contest? Is it the operator of the 20-meter "run" station at a big multi-multi? The single-op on a remote island, sorting through a pile-up that never seems to end? The ham who might not even be on the air but who provides facilities for a superstation setup? All of these people are important, of course, but I submit that the most important operator in any contest is … me! Not me individually, but the people like me—casual contest operators with average stations (mine is 100 watts and a multiband vertical) who get on for 4–8 hours (rather than 48 hours) and make a couple of hundred contacts. They are not competitive (except with their own past performances), they're not likely to show up on the Top Scores listing, and it's highly unlikely that they'll wind up with a certificate, let alone a plaque. So what makes them so important?

Simple. Without these non-competitive casual contesters, the so-called "little pistols," there would be no contest, or at least not one that's any fun or that would draw many "big guns." If it weren't for these little guys, the big multi-multis, the contest superstations, and the contest DXpedition stations would all work each other, and then everybody would pack up and go home. All the scores would be within a range of few thousand points and top scores would be in the thousands, not the millions. The contest results articles would be a lot shorter, and there would be a lot less fun to spread around.

I don't know if you paid much attention to last month's survey results article, which reported on the response to August's reader survey on CQ contests and contest reporting, so let me review some of the highlights here. The most striking number was that in the demographics section, 46% of the readers responding to the survey identified themselves as being active in contests. Yet, when asked whether they operate in CQ-sponsored contests, 69% of those same respondents said yes, either regularly (30%) or occasionally (39%). Bottom line: 50% more readers say they participate in CQ contests than identify themselves as contesters! These are the people who become the "wild cards" for the dedicated contesters, and who often make the difference between winning and losing for the "big guns."

Their main motivation for getting into the fray on a contesting weekend: Fun and camaraderie, followed closely by building up their personal DX totals. Competition with other hams accounted for only 14% of responses. So the vast majority are not in for competitive reasons, yet they are the ones who make the contest competitive for those who are.

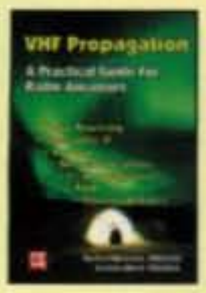
In thinking about all this, I realize that my own mental approach to contest operating is out of sync with reality. Going into a contest, I generally think, "How many big stations in exotic places will I be able to contact? How long will I have to sit and call in order to put them in my log?" But that thinking is backwards, since those big stations in exotic places need *me* at least as much as I need *them*. For me, it's another QSL; but for them, a contact with me might be the difference between first and second place, especially if I'm only on the air for a few hours.

I realize I should be thinking, "How many of *them* will be able to work *me*? How long will it take for *them* to hear *me* through the pile-up? Who will make it easier for me to work them by identifying frequently and clearly (including prefix, please), so I don't give up in frustration and move on after listening for five minutes and never hearing a callsign to know whether it's a station that I need? Who will make it clear that they've copied my exchange correctly, so I'm not left scratching my head and wondering whether to log the contact? It's a 180-degree attitude reversal.

Remember, folks, I (along with all my fellow casual contesters) am the most important operator in the contest.

73, Rich, W2VU

CQ Books & DVDs



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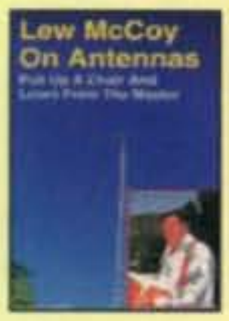

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propagation

BY TOMAS HOOD,* NW7US

February Propagation

A Quick Look at Current Cycle 24 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, November 2010: 22
Twelve-month smoothed, May 2010: 16

10.7 cm Flux
Observed Monthly, November 2010: 83
Twelve-month smoothed, May 2010: 79

***Ap* Index**
Observed Monthly, November 2010: 5
Twelve-month smoothed, May 2010: 6

One Year Ago: A Quick Look at Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, November 2009: 4
Twelve-month smoothed, May 2009: 2

10.7 cm Flux
Observed Monthly, November 2009: 74
Twelve-month smoothed, May 2009: 70

***Ap* Index**
Observed Monthly, November 2009: 3
Twelve-month smoothed, May 2009: 4

From the middle of February through early April, typical equinoctial propagation conditions can be expected on the HF frequencies. 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.

We continue seeing sunspot activity, so little-by-little we'll see improvements in the propagation at higher frequencies over long-distance paths. It is always a surprise to the casual amateur radio operator who gets on a band such as 10 meters during the solar minimum and discovers that there is still some life on the band, beyond short-skip distances, especially during periods when sunspots occur and the daily 10.7-cm flux levels increase enough to wake up the higher frequencies. However, the currently weak solar activity still does not support worldwide DXing on the highest HF bands for any significant length of time.

During the daylight hours, optimum DX propagation conditions are expected on 20 meters. The band is forecast to open to all areas of the world sometime during this period, although often with moderate to strong fading. Conditions on 17 and 15 may be good, too, but usually for much shorter distances than during peak solar cycle years. Conditions are expected to become optimal for an hour or two after sunrise and again during the late afternoon. For short-range paths (regional), 40 meters should be usable during most of the daylight hours. 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.

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 no openings expected into Europe and the Far East.

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. Better openings into 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 towards the east and the south. Openings in the same direction, but with higher noise levels and weaker signals, should also be possible on 160 meters.

Between midnight and sunrise it should be a toss-up between 20, 30, and 40 meters for DX paths. These bands should open to many areas of

*e-mail: <nw7us@sunspotwatch.org>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for February 2011

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1-4, 9-11, 28,	A	A	B	C
High Normal: 5-6, 8, 12-15 18, 27	A	B	C	C-D
Low Normal: 7, 17	B	C-B	C-D	D-E
Below Normal: N/A	C	C-D	D-E	E
Disturbed: N/A	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 in *The New Shortwave Propagation Handbook* by George Jacobs, W3ASK; Theodore J. Cohen, N4XX; and Robert B. Rose, K6GKU.

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 2 will be good (B) on Feb. 1st through the 4th, fair (C) on the 5th and 6th, poor to fair (D–C) on the 7th, etc.

3. As an alternative, the Last-Minute Forecast may be used as a general guide to space weather and geomagnetic conditions through the month. When conditions are Above Normal, for example, the geomagnetic field should be quiet and space weather should be mild. On the other hand, days marked as Disturbed will be riddled with geomagnetic storms. Propagation of radio signals in the HF spectrum will be affected by these conditions. In general, when conditions are High Normal to Above Normal, signals will be more reliable on a given path, when the path is ionospherically supported.

CQ WW CW Contest Conditions

As you may remember, I first predicted challenging conditions for both contest days for the 2010 CQ WW CW Contest starting at 0000 UTC, Saturday, Nov. 27 and continuing until 2400 UTC, Sunday, Nov. 28. I then revised that prognostication for good conditions.

The 2010 CQ Worldwide DX CW Contest weekend was, at least by the reports I've received, much better than expected, and close to my second prediction. The planetary Ap on the first day was a mere five, rising slightly to a very quiet seven by the second day of the contest.

With such quiet geomagnetic conditions, weaker signals are more likely to be heard on those bands where openings are weak yet present. Stable ionosphere conditions allow weak signals to propagate reliably.

The 10.7-cm Radio Flux was 77 and 80 (compared to a year ago, when they were 73 and 72 on both days), and the observed sunspot count increased from the first day's 22 to 34 on the second day (a year ago, there were zero sunspots during the contest). There were no X-ray flares, so conditions were very stable. These conditions resulted in reasonable propagation on many of the contest bands. These conditions fit pretty well with the forecast.

How did you fare this year, compared to last year? I am interested in hearing from you regarding the differences between last year and this year, and how you did overall this time.

the world with conditions favoring openings towards the south and the west. Expect similar conditions on 80 meters, but with weaker signals and higher noise levels. Be sure to check 160 for some unusual DX openings towards 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

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.

Do expect moderate coronal hole activity on occasion. With the influence of coronal mass ejections or elevated solar wind streams, the geomagnetic field may reach minor storm levels.

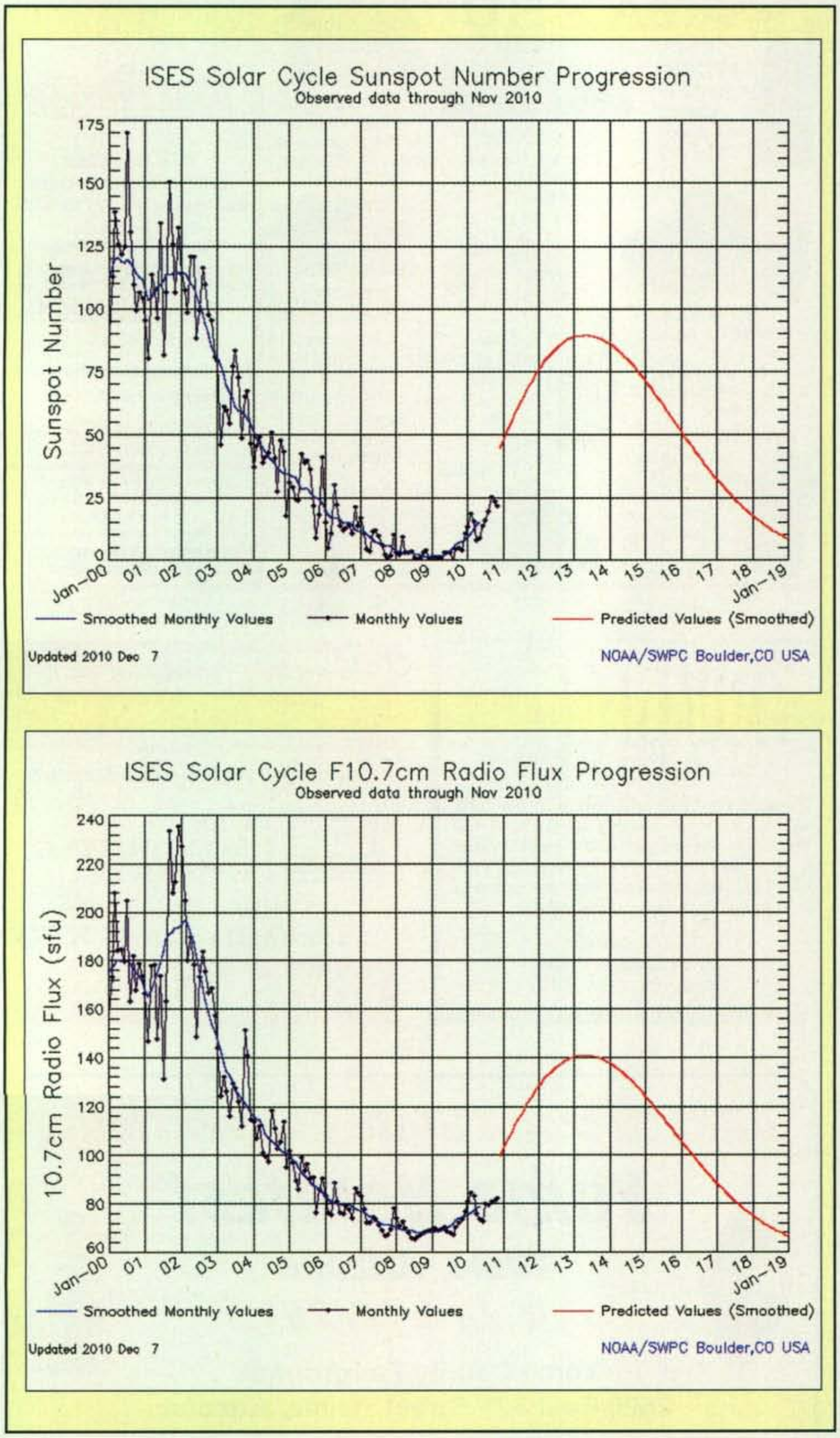

Fig. 1– Sunspot Cycle 24 progression charts showing the variable nature of monthly sunspot counts. While there is a definite and continuing upward trend, it is typical to see a month when the count is lower than previous months. Notice that even with the small decrease in the monthly sunspot count between October and November 2010, the 10.7-cm flux shows that the overall solar energy is increasing. This is what we are hoping for, as radio communicators. The higher the 10.7-cm flux, the more energized the ionosphere becomes. A stronger ionosphere propagates shortwave radio signals at higher frequencies. (Source: Space Weather Prediction Center [SWPC]/The National Oceanic and Atmospheric Administration [NOAA])

While most days will see quiet conditions, there is a fair chance that geomagnetic storms will trigger modest auroral activity. Auroral activity tends to occur more frequently during the equinoctial period.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for November 2010 is 21.6, just slightly lower than October's 23.5. It is typical to see such swings between months during a sunspot cycle; the smoothed monthly numbers never move along a smooth, straight trend line. The lowest daily sunspot value of 8 was recorded for November 24 and 27. The highest daily sunspot count was 43 on November 13. The 12-month running smoothed sunspot number centered on May 2010 is 15.5, up from April's 14.0. A smoothed sunspot count of 45, give or take about 9 points, is expected for February 2011.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 82.5 for November 2010 (about one point higher than October). The 12-month smoothed 10.7-cm flux centered on May 2010 is 79.0. The predicted smoothed 10.7-cm solar flux for February 2011 is 100, give or take about 9 points. If we do see this high of a flux in February, expect some openings on 10 and 12 meters, and a good amount of activity on 15 meters.

The observed monthly mean planetary *A*-index (*Ap*) for November 2010 is 5, which is still very quiet. The 12e-month smoothed *Ap* index centered on May 2010 is 5.7. Expect the overall geomagnetic activity to vary greatly between quiet to active during most days in February. Refer to the "Last Minute Forecast" for the outlook on conditions during this month.

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may e-mail me, write me a letter, or catch me on the HF amateur bands. Please come and participate in my online propagation discussion forum at <http://hfradio.org/forums/>. If you are on Facebook, check out <http://tinyurl.com/fbswx> and <http://tinyurl.com/fb-nw7us>. Speaking of Facebook, check out the CQ Amateur Radio Magazine fan page at <http://tinyurl.com/fb-cqm>.

Now that the new solar cycle is active, I'll be keeping my ears to the radio, hoping to hear you on the air. Happy DX!

73, Tomas, NW7US

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●10 kHz Roofing filter ●20 dB ATT/IPO ●Built-in TCXO for incredible ±1 ppm/hour (@+77°F, after warm-up) stability ●CAT System (D-sub9 pin): Computer programming and Cloning capability ●Large, Easy-to-See digital S-meter with peak hold function ●Speech Processor ●QUICK SPLIT to automatically Offset transmit frequency (+5 kHz default) ●TXW to monitor the transmit frequency when split frequency operation is engaged ●Clarifier ●Built-In Electronic Keyer ●CW Beacon (Up to 118 characters using the CW message keyer's 3 memory banks) ●CW Pitch Adjustment (from 400 to 800 Hz, in 100 Hz steps) ●CW Spotting (Zero-Beating) ●CW Training Feature ●CW Keying using the Up/Down keys on the microphone ●Two Voice Memories (SSB/AM/FM), store up to 10 seconds each ●20 second Digital Voice Recorder ●Dedicated Data Jack for FSK- RTTY operation ●Versatile Memory System, up to 500 memory channels that may be separated into as many as 13 Memory Groups ●CTCSS Operation (FM) ●My Band / My Mode functions, to recall your favorite operating set-ups ● Lock Function ●C.S. Switch to recall a favorite Menu Selection directly ●Dynamic Microphone included ●IMPORTANT FEATURES FOR THE VISUALLY IMPAIRED OPERATOR – Digital Voice Announcement of the Frequency, Mode or S-meter reading

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

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

YAESU
Choice of the World's top DX'ers

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Cypress, CA 90630 (714) 827-7600

ARRL June VHF Contest

New 6M Records Set in 2010!

Joel Harrison at his 6M station, represents team W5ZN's achievement of the 6M Grid Square Record in the Limited Multi-Operator Category.

Ted Saba, KN5O, with his IC-756PROIII achieved the top Total 6M Score in the Limited Multi-Operator Category in the June 2010 VHF Contest!

"Most HF equipment manufacturers build their radios and add 6 meters simply as a novelty add-on, relying on preamplifiers and filtering designed for HF. Icom chose to take the initiative to engineer and implement components specifically for 50MHz in the IC-7700 making it a clear choice for HF and VHF operators alike."

— Joel Harrison, W5ZN