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Amateur Radio

Communications & Technology

June 2002

CQ

VHF Special!

In This Issue

On the cover: Rick Roderick, K5UR, operates on the VHF/UHF station near Little Rock, over 80 plaques and certificates ails on page 111.

MATEUR'S JOURNAL

Versatility Superiority

UBZ-GR14
FRS FreeTalk™

TH-22AT
2 meters

TH-G71A
2 meters
& 440 MHz

TH-D7A(G)
2 meters
& 440 MHz

TH-F6A
2 meters & 220MHz
& 440 MHz

VC-H1
Visual
Communicator

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

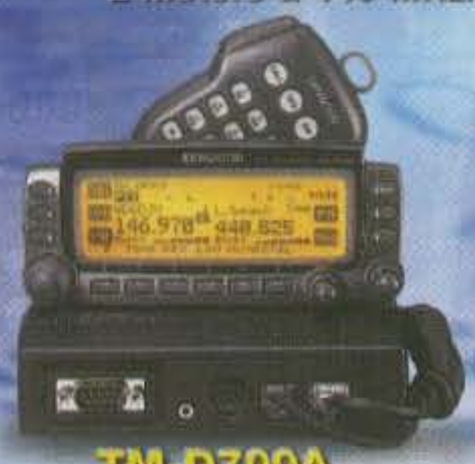
TM-541A
1200 MHz

TM-331A
220 MHz

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

TM-G707A
2 meters & 440 MHz

TM-V7A
2 meters & 440 MHz



TM-D700A
2 meters & 440 MHz

TS-50S
Compact HF All Mode

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

TS-870S w/DSP
HF All Mode

TS-2000
HF/VHF/UHF Multi-Mode

TS-B2000
HF/VHF/UHF Multi-Mode

RC-2000
Compact Mobile Controller

ARCP-2000
PC Radio
Control Program

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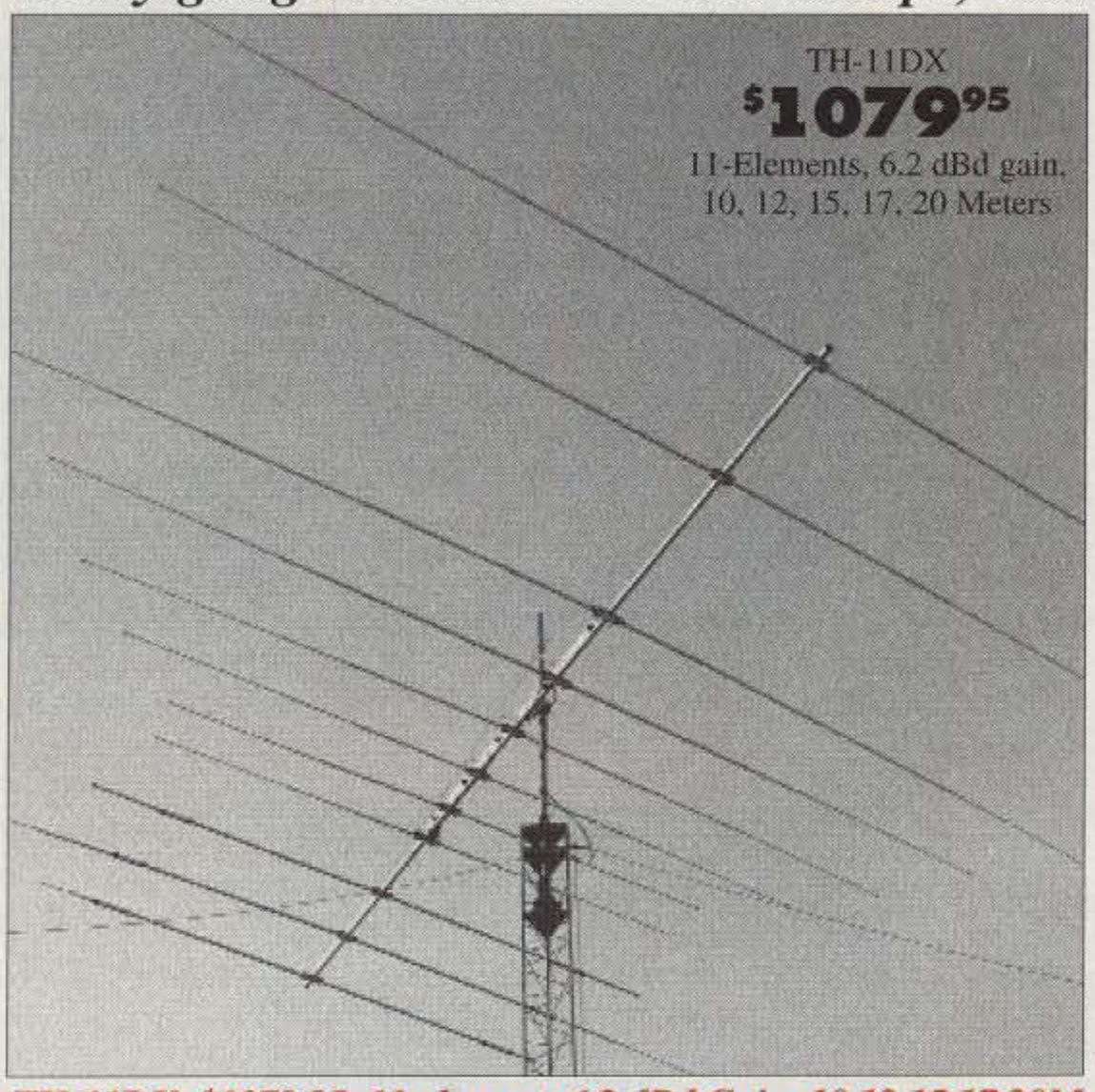
JQA-1205

hy-gain® HF BEAMS...

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



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

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

The choice of top DXers.

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

Handles 2000 Watts continuous, 4000 Watts PEP.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

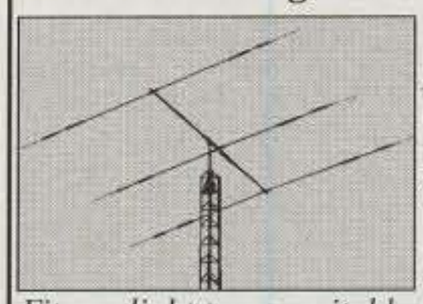
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

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

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

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

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



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

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

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

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

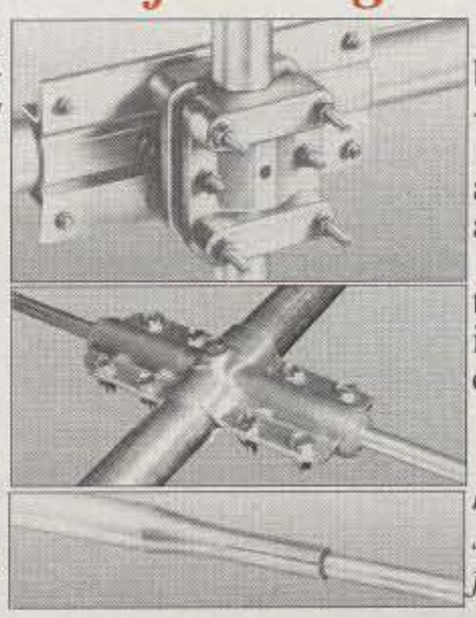
Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
TH-11DX	11	6.2	22	4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	**7**	**6.57**	**21**	**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	6.1	20	1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	**5.8**	**25**	**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	5.8	25	600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	**3.4**	**15-20**	**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4	5.9	25	1500	10,15,20 opt. 30/40	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

Tooled Manufacturing . . . Highest Quality Materials

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

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

3. Thick-wall *swaged* aluminum tubing



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

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

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

Durable precision injection molded parts.

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

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CQ Amateur Radio

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FEATURES

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DEPARTMENTS

DYNAMIC DIGITAL DUO

Messaging

Location

FREE
Operating Manuals and Brochures via the FTP site*

TH-D7A(G) / TM-D700A

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

The TH-D7A(G) and the TM-D700A are the only radios ever produced that have both built-in TNC and APRS™ operating software, allowing you to send and receive exact GPS positions. You can even send text messages over 144.390 MHz, an international APRS™ frequency. Position reports and two-way messaging can also be achieved over the Internet, across the country or around the world. Street level mapping can also be employed using a PC, palm device or GPS. And yes, the TM-D700A is great for receiving satellite packet!

Venture into the future of Ham radio today and experience Kenwood's "Dynamic Digital Duo". They may just be the excitement and enjoyment you have been waiting for!

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Ham Radio News

From The CQ Newsroom

CQ/ARRL Add Countries for Award Credit

Both the ARRL and CQ have announced that two "new countries," Ducie Is. and North Korea, will be accepted for their respective DX awards—DXCC and the CQ DX Award. The ARRL specifically recognized only P5/4L4FN, who has been active from North Korea since last November. CQ also recognizes the demonstration station operated by OH2BH and his crew, which made about 20 contacts, and will therefore accept for award credit any contacts with authorized North Korean stations made since 1995, according to CQ DX Award Manager Billy Williams, N4UF. (However, P5RS7 and P5A contacts are not acceptable for either award.)

CQ is also accepting contacts made with Ducie Island since February 2002, making the new maximum number of CQ DX Award countries 335, as of June 1, 2002. Williams urges CQ DX Honor Roll members with valid confirmations from the recent Ducie Island DXpedition (VP6DI) and from P5/4L4FN to submit an update by May 31st to maintain ranking positions. Updates should be sent to P.O. Box 9673, Jacksonville, FL 32208-0673. There is no charge for updates not requiring issuance of an endorsement sticker. An SASE should be enclosed if the applicant wishes written confirmation of his or her new total.

In addition, Williams announced that CQ DX Honor Roll standings are now online at <http://home.earthlink.net/~bfwillia/_wsn/page3.html>. Honor Roll operators are encouraged to check their listings and send any corrections to N4UF at <n4uf@cq-amateur-radio.com>. Complete rules for the CQ DX Awards are available online at <http://www.cq-amateur-radio.com/dxawdrul.html>.

ARRL Petitions FCC for Novice Band "Refarming"

The ARRL has formally asked the FCC to eliminate the Novice/Technician-Plus subbands on 80, 40, and 15 meters, and to expand the voice bands on 80 and 40. The FCC designated the petition as RM-10413 and was seeking comments, with a deadline of May 16. For details, see this month's "Washington Readout" column on page 80.

Also up for comment with a May 16 deadline is a petition by Nick Leggett, N3NL (RM-10412), seeking to require manufacturers to make all amateur equipment "field repairable." According to the ARRL, Leggett's petition asks the FCC to mandate things such as ICs in sockets, easily-replaceable modules or circuit boards, minimum component spacings on circuit boards, and other requirements to make it easier for amateurs to perform their own repairs.

FCC Issues First Rules on UWB

The FCC has issued its first Report and Order on Ultra-Wideband (UWB) transmitters, deciding to permit the new technology even though promoters could not show that their products could operate without causing harmful interference to existing radio services. UWB transmitters are extreme spread-spectrum devices whose signals' bandwidths are no *less* than 500 MHz. The FCC is permitting the use of three types of UWB devices over three broad frequency ranges: 30–960 MHz, 1990–10,600 MHz, and 22–29 GHz. These ranges include several amateur bands. Uses include ground-penetrating radar, surveillance devices, vehicular radar systems, and short-range wireless voice/data networks.

Typically, a UWB signal would sound like noise to an analog receiver and the signal would be on any given frequency for only a fraction of a second, but the FCC admitted that proponents "have not provided information demonstrating that their products could operate without causing harmful interference to (currently) authorized services (on the same frequencies). Even so," the Commission continued, "we are not persuaded that higher emission limits for UWB operation are prudent at this time." The FCC promised to revisit its regulations after six months to see if changes were needed once UWB systems were actually on the air in significant numbers. The complete 118-page text of the FCC's Report and Order may be found on the internet at <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-02-48A1.pdf> or <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-02-48A1.txt>.

13-centimeter Band Threatened Again

The ARRL reports that the FCC is looking at possible sharing or reassignment of the primary amateur allocation at 2390–2400 MHz. This is a portion of the 13-centimeter ham band which is already split into two segments, 2300–2310 and 2390–2450. The 2390–2400 portion is the only primary amateur allocation on the band. According to the *ARRL Letter,* the FCC is looking for additional spectrum to accommodate public-safety services being displaced from the 800 MHz band due to overcrowding.

In a Notice of Proposed Rule Making that was not yet open for public comment as of mid-April, the FCC says that "if incumbent amateur services cannot coexist with relocated 800 MHz services (on 13 centimeters), we seek comment on whether incumbent amateur services could be relocated, what spectrum could be used for their relocation, and what procedures would apply to such relocation."

The FCC is considering other bands as well. The downlink of the AO-40 satellite on 2401 MHz would not be affected.

AO-40 Back on Air

A three-month planned shutdown of OSCAR-40 (AO-40) due to poor sun position is over and the satellite is again available, with uplinks on 435, 1268, and 1269 MHz and downlink on 2401 MHz. However, the AMSAT News Service says there continue to be "eclipse" periods without sunlight of up to a half hour in length during which the transmitter is shut off to conserve power. This summer those eclipse periods will grow to more than two hours at a time before improving in the fall.

Other amateur satellites are also in the news. Saudisat 1A (SO-41) has been opened for amateur use, and two small French satellites were scheduled to be placed in orbit in early May. For details on these satellites, see this month's "Amateur Satellites" column on page 66.

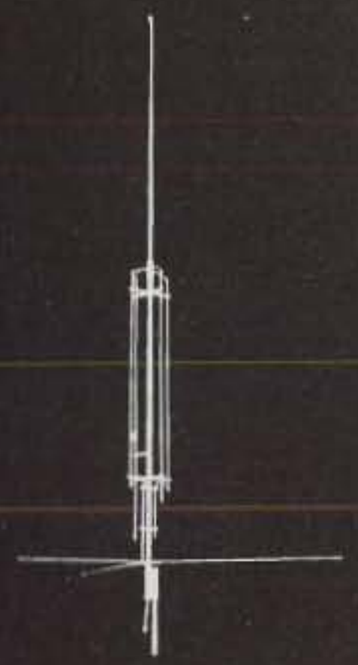
AMSAT Faces Fiscal Crisis

AMSAT-NA President Robin Haighton, VE3FRH, called a special meeting of the amateur satellite organization's board of directors in mid-April to review the group's financial situation and "decide on a proper course of action." Haighton explained in his most recent "President's Letter" that contributions to AMSAT dropped off significantly after the terrorist attacks last September and have not recovered. However, he noted that all current satellite projects are continuing. At press time there was no word on the outcome of that meeting.

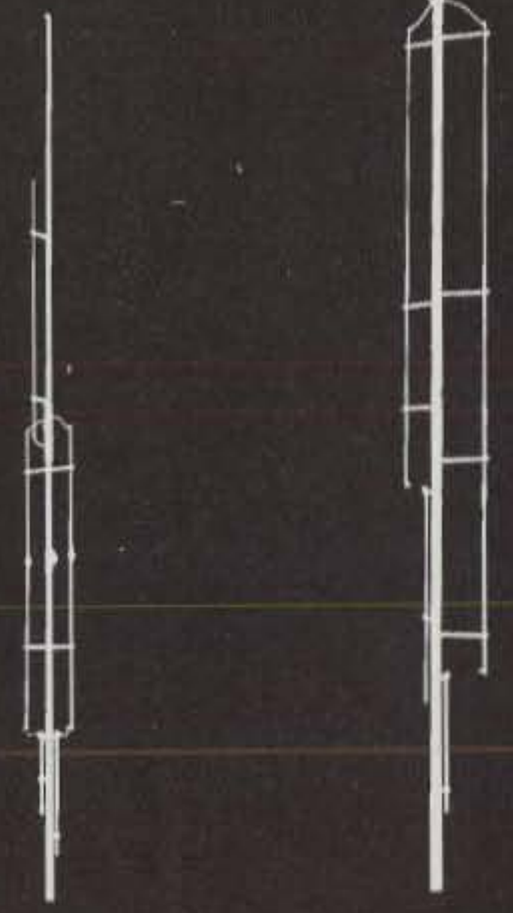
Additional and updated news is available on the Ham Radio News page of the CQ website at <http://www.cq-amateur-radio.com>. For breaking news stories, plus info on additional items of interest, sign up for CQ's free online newsletter service. Just click on "CQ Newsletter" on the home page of our website.

GAP: The Perfect Antenna

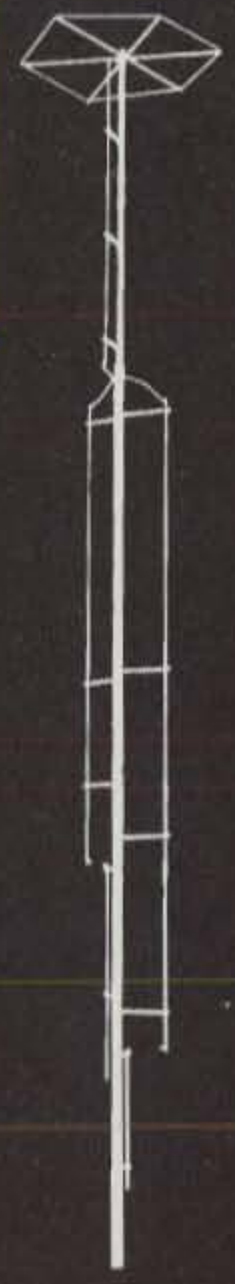
We at GAP realize there isn't a perfect antenna. No singular antenna will scream DX on 80 and be the best for local nets on 10. If anyone tells you there is, beware! The perfect antenna does not exist, but the right one for you may. If you want something to bust the pile on the low bands, then consider the Voyager. Just starting out in ham radio and need a great general coverage antenna, the Challenger is easy to assemble and for little effort will yield superior performance, especially on DX. Maybe you knowingly or unknowingly moved into one of those "restricted areas" where the Eagle's limited visibility, but unlimited ability is desired.



Eagle DX



Challenger DX



Voyager DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires **NO RADIALS**. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

A GAP antenna has no traps, coils or transformers. This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its NO tune feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

The secret is out and people in the know say:

CQ–"The GAP consistently outperformed base-fed antennas. .and was quieter."

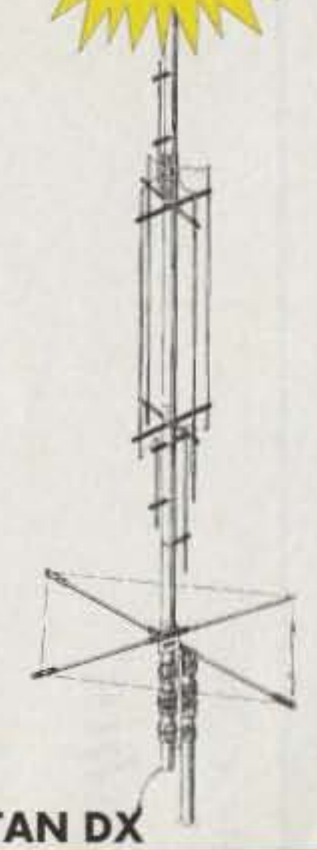
73–"This is a real DX antenna, much quieter than other verticals."

RF–"To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by S units, not just DB's."

Worldradio – "These guys have solved the problem associated with verticals. That is, an awful lot of RF is wallowing around and dropping into the dirt instead of going outward bound. A half-wave vertical does need radials if it is end fed (at the bottom). But the same half-wave vertical does not (as much, hardly at all) if is fed in the center."

IEEE–"Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole): it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."

Since 1989



TITAN DX

This all purpose antenna is designed to operate 10m-80m, WARC bands included. It sits on a 1-1/4" pipe and can be mounted close to the ground or up on a roof. Its bandwidth and no tune feature make it an ideal antenna for the limited space environment as well as a terrific addition to the antenna farm.

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	$299
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	$309
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$339
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$419

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Zero Bias

BY RICH MOSESON, W2VU

An Editorial

Gone Fishin'

"With all the more modern means of communications available today, what's the continued attraction of ham radio?"

The question came from a recent dinner guest, on learning that I'm the editor of a ham radio magazine. It's a question I hear these days with some frequency (pun intended), often from hams themselves. Generally, my answer is simple:

"What's the attraction of fishing? If I want fish for supper, I can just go to the supermarket. What's the attraction of sailing or horseback riding when there are much more modern, more efficient, ways of getting places?"

I explained to my guest that amateur radio's appeal goes far beyond mere communication. I explained about the challenge of working DX and of calling CQ and not knowing who might answer or from what part of the world they'll be calling. I explained about the challenge of pointing an antenna at a fast-moving dot in the sky, and communicating through that dot of a satellite with someone else doing the same thing. I explained about the fun, competition and camaraderie of contesting. Along the way, I also explained that ham radio can be as modern as anything else out there and, oh yes, when all that other stuff breaks down – as it does when overstressed – ham radio keeps on working. My guest went home with a new understanding of who we are, what we do and why we do it.

Then, a couple of weeks later, I had the opportunity to visit with hams attending the National Association of Broadcasters' convention in Las Vegas (CQ and Kenwood co-hosted a ham radio reception there for several hundred ham-attendees). After talking with some of these hams, many of whom are pretty high up in the world of broadcast engineering and management, I realized that my fishing analogy is only partially correct.

Few, if any, amateur fishermen develop new, better and cheaper ways of catching fish that are then adopted by the commercial fishing industry; and it's highly unlikely that improvements in horseback-riding "technology" will provide added horsepower to the transportation industry. Even racing sailors, who are constantly tinkering with their boats to gain competitive advantage, advance the state of sailing technology, but their improvements rarely "trickle up" to influence the design of large cargo and passenger ships. This is not the case in amateur radio.

While many of us are the communications equivalent of fishermen—pursuing our hobby more for the enjoyment of the "journey" than of reaching the "destination"—there are those among us who help advance the state of the art not only of amateur radio but of communication technology in general. This has been the case since the beginning of radio, and it continues to be the case today.

Example: Wireless computer networking is today's hot ticket in the telecommunications arena. Who do you think created the first viable large-scale wireless computer network? Hams. We called it packet radio. The technology that swept amateur radio in the 1980s is the foundation for today's wireless LANs and WANs (local and wide-area networks, respectively). Ah, you say, but your laptop computer can be linked to the internet from anywhere because you're on a satellite network (a FAN, perhaps, for Far-out Area Network?). Hmmm. Just like PACSAT—AO-16—and its fellow digital satellites launched in 1990, and its many successors. What's that? Your state-of-the-art cell phone can display brief text messages? So can Kenwood's TH-D7A handheld, using APRS (another amateur invention), on the market since late 1998.

In Virginia, it seems that microwave enthusiast Brian Justin, WA1ZMS/4, and his friends are continually establishing new distance records on 241 GHz. You'd better believe that what they learn about signal propagation at these frequencies will quickly make its way into the knowledge base of the commercial marketplace and will contribute to the development of meaningful communication services for this frequency range.

Plus ... even when some aspect of communications technology doesn't get its start on the amateur bands, the people responsible for developing that technology are often hams. At the NAB ham reception, we had a roomful of several hundred leaders in communications technology—all united by a common bond of being amateurs. Not only that, but many of them regularly apply the knowledge, skills and problem-solving philosophy they've learned in ham radio to their jobs in broadcast technology.

The street can be two-way as well. Elsewhere in this issue, you'll find my review of the digital-audio-capable Alinco DJ-596 handheld. One of my observations is that digital audio and analog audio are not compatible on the same frequency, or even on adjacent frequencies. Alinco Manager Katsumi "Naky" Nakata, KE6RD/JE6AVS, points out that when digital audio takes root in the amateur community, it's likely that we'll have to designate specific areas for digital communications, to minimize interference with analog audio. Yet, the hot topic in broadcast radio today is something called IBOC, short for In-Band, On-Channel. It's a developing technology that will permit broadcasters to overlay a digital audio signal right on their analog signal (in-band, on-channel), permitting each to be received by the proper receiver without interference to or from the other. Many of the people working on the IBOC standards are hams, and I have no question that the resulting technology will quickly be adapted to amateur use, permitting us to transmit simultaneous analog and digital signals on the same frequency without interference. I'm equally certain that amateur adaptation of IBOC technology will double back to benefit the second generation of broadcast IBOC.

So we're not all fishermen or horseback riders, keeping alive "outmoded" technologies that would otherwise have disappeared. Some of us continue pushing the limits of RF technology. On the other hand, for some jobs, there's still no vehicle better than a horse. Just ask a cattle rancher or a mounted police officer. Finally, there's a well-known saying that "a bad day of fishing is better than a good day at work." That's because fishing, like radio, has a sense of magic that must be experienced to be understood. It's summertime ... go fishing (but take a ham rig!).

Contests vs. Nets

It seems that every major contest brings out a flurry of complaints from non-contesters about clogging up the bands and causing interference to nets. There's no question that many nets perform a vital and valuable public service. Most of these complaints call on us, as a contest sponsor, to "do something" about the problem. One of the most common requests is that we declare certain frequency ranges to be "contest-free zones" and disqualify any contester operating within those zones. As it happens, we already have contest-free zones, by mutual agreement of the major contest sponsors: 30, 17 and 12 meters, three entire bands on which there is no credit given for contacts during a con-

(Continued on page 111)

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Announcements

• The following Special Event stations are scheduled for June:

K1D, from Atkinson, New Hampshire; K1MOM and W1DAD for Kid's Day & Ham Radio Awareness, Atkinson ARC; 0400Z June 1 to 0400Z June 16 (Kid's Day 1800–2400Z June 15); on 28.380, 21.380, 14.270, or 7.230 MHz. Certificates for Kid's Day contacts. For certificate or QSL send SASE to Peter Schipelliti, W1DAD, 7 Dearborn Ridge Rd., Atkinson, NH 03811. Free (via e-mail) K1MOM Amateur Radio Coloring Book for children, including operating aids for Kid's Day, log sheet, WAS map, and phonetic alphabet is available from <k1mom@arrl.net> (<w1dad@arrl.net>).

WW2DDM, from Bedford, Virginia; National D-Day Memorial; Roanoke Valley and Franklin County ARCs; 1400–2400Z June 8 on 80, 40, 20, 15, 10, 6, and 2 meters CW, SSB, PSK-31, and RTTY. For QSL send SASE to Charlie Beckwith, K4BSF, 563 Buzzard Rock Lane, Rocky Mount, VA 24151-4844. Info: <www.qsl.net/ww2ddm>.

W3CWC, from Hagerstown, Maryland, Antietam Radio Assn. Golden Anniversary; June 24–30 *(no times given)* near 7.240, 14.240, 28.440, 50.140, and 147.090 MHz. For certificate send QSL and #10 or larger SASE to Antietam Radio Assn., P.O. Box 52, Hagerstown, MD 21741-0052.

W3GR, from Baltimore, Maryland, Historical Electronics Museum ARC; to commemorate the vital role of electronics in D-Day; 1400–2100Z June 8 and 9 in the General and Novice portions of 10, 15, 20 meters. For certificate (9×12 SASE) or QSL (#10 SASE) send QSL to HEMARC W3GR, P.O. Box 746, M.S.4015, Baltimore, MD 21203. Info: <w3gr@arrl.net>.

W3VPJ, from Richfield, Pennsylvania, Bison Farm II Spring Bison Festival; Susquehanna Valley ARC; 1600–2400Z June 1 on 7.240 MHz. For certificate send 9×12 SASE to Chris Snyder, NG3F, 3 North Maple St., Selinsgrove, PA 17870.

4-land, from Cape Lookout, North Carolina (NA 067), National Safe Boating Campaign; members of the U.S. Power Squarons Amateur Radio Net *(no call given)*; 1400– 2200Z June 28–30 on 7.267, 14.267, 21.267, 28.367 MHz. For certificate send QSL and large SASE to Donald Stark, N3HOW, 65 Stark Spur, Eighty Four, PA 15330-2547.

AA4TA, from Clarksville, Tennessee, Customs House Museum; CORE Group celebrating International Museums on the Air Weekend; 1600–2300Z June 15 and 1800–2300Z June 16 on 14.270, 28.470, 50.170 MHz. For certificate send 8½×11 SASE and QSL to Hank Koebler, N3ORX, 1150 Hutcheson Lane, Clarksville, TN 37040.

NC4ZO, from Asheboro, North Carolina, Peddycord Foundation observance of D-Day; Randolph ARC; 1300–2000Z June 1 on 28.400, 21.320, 14.240, 7.240 ±QRM. For certificate send QSL and $1.00 (no SASE) to Randolph ARC, 6747 King Mt. Rd., Asheboro, NC 27205.

WD4FVO, from Richlands, North Carolina; celebrating opening of North Carolina Opry and relocation of WSMO studio; Onslow ARC; 1300Z June 8 to 2100Z June 22 on 10–80 meters (no WARC bands) and local 2 meter FM. For certificate send QSL and SASE to OARC, P.O. Box 841, Jacksonville, NC 28541-0841.

KSØJC, from Olathe, Kansas, Ensor Museum; to honor code teacher Marshall Ensor, W9BSP; Johnson County ARES; 1800–2200Z June 1 and 2 on 28.400, 18.150, 14.250, 10.125 MHz. Send QSL and large SASE for certificate or business-size for QSL to Dan Reed, 29545 West 152nd Ter., Gardner, KS 66030.

VE3MIS, from Streetsville, Ontario, Canada, 30th Streetsville Founders Bread & Honey Festival; Mississauga ARC; 1400– 2000Z June 1 and 2 on 7.230, 14.240, 28.340 ±QRM. Send QSL (non-Canadians send green stamp or IRC, *not* U.S. postage) to MARC, c/o Michael Brickell, 2801 Bucklepost Crescent, Mississauga, ON L5N 1X6 Canada. Info: e-mail <ve3mis@rac. ca>, web: <www.marc.on.ca>.

• These hamfests, etc., are slated for June:

June 1, **Sangamon Valley RC Hamfest,** Illinois State Fairgrounds Cooperative Extension Bldg., Springfield, Illinois. Contact Ed Gaffney, 13997 Frazee Rd., Box 14A, Divernoon, IL 62530 (217-628-3697; <egaffney@family-net.net>). (Talk-in on 146.685(–); exams 9 AM)

June 1, **Tennessee Swapfest & Tailgate Party,** Silver Point Community Center, Silver Point, Tennessee. Contact Bobby, N2BR, <brradioman@charter.net>. (Talk-in 147.135 and 146.520; exams 9 AM)

June 1, **Bergen ARA Spring Hamfest,** Westwood Regional Jr./Sr. High School, Washington Township, New Jersey. Contact Jim Joyce, K2ZO, 201-664-6725, <k2zo@arrl.net>. (Talk-in on 146.19/.79; exams 8–10 AM)

June 7–8, **Jackson County ARC Hamfest & Computer Show,** Jackson County Fairgrounds Civic Center, Pascagoula, Mississippi. Contact Ira Groff, NN5AF, 228-826-5095, <nn5af@arrl.net>. (Talk-in 144.510/145.110 input/output W5WA; exams 9:30 AM Saturday)

June 8, **Macon, Missouri Hamfest,** Macon VoTech School, Macon, Missouri. Contact Dale Bagley, <k0ky@arrl.org>, <http://www.qsl.net/n0pr/hamfest.html>. (Exams)

June 8, **Bloomsburg Hamfest & ARRL Eastern PA Section Convention,** Bloomsburg Fairgrounds, Bloomsburg, Pennsylvania. Contact Dave, WC3A, <wc3a1@intergrafix.net>, phone 570-752-6851. (Talk-in 147.225 (+600), PL203.5, 146.52; exams 10 AM)

June 8, **Franklin AR Repeater Assn. Picnic & Tailgate,** Bronco Club, Franklin, Virginia. Contact Ralph Atkinson, WB4ZNB, 30137 Country Club Rd., Courtland, VA 23837 (757-562-5710). (Talk-in 147.30/.90)

June 8, **Albany (GA) ARC Swapfest 2002,** Potter Community Center, Albany, Georgia. Contact Bob Smith, K4PHE, 229-883-9633, <k4phe@bellsouth.net>, <http://www.qsl.net/w4mm>.

June 8, **Knoxville Hamfest & Electronics Exposition, ARRL Tennessee Section Convention,** Cokesbury Center, Knoxville, Tennessee. Contact David Bower, K4PZT, RAC of Knoxville, P.O. Box 50514, Knoxville, TN 37950-0514 (865-670-1503, <d.bower@ieee.org>); <http://www.W4BBB.org>. (Talk-in 147.300, 145.210; exams)

June 9, **Six Meter Club of Chicago Hamfest,** DuPage County Fairgrounds, Wheaton, Illinois. Call InfoLine 708-442-4961. (Talk-in 146.52, 146.37/97; exams 9–11 AM preregister by calling InfoLine)

June 9, **Wabash County ARC Hamfest & Computer Show,** Wabash County 4-H Fairgrounds, Wabash, Indiana. Contact Ralph Frank, KB9PLV, 260-563-8487, <WIA1@netusa1.net>. (Talk-in 147.03, 442.325)

June 9, **Egyptianfest 2002,** Southwestern Illinois College Campus, Granite City, Illinois. Call InfoLine 618-650-2949; or Patrick Riley, 618-655-1232, <w9pat@arrl.net>. (Talk-in 146.790; exams)

June 14–15, **Hamboree 2002,** Siouxland Convention Center, South Sioux City, Nebraska. Contact Tom, WBØYNX, 712-252-4107, 10–5:30 Mon.–Sat.; <www.3900club.com>. (Exams)

June 15, **Raritan Valley RC Hamfest,** Columbia Park, Dunellen, New Jersey. Contact Doug Benner, W2NJH, 732-469-9009 (before 8 PM), <wb2njh@aol.com>. (Talk-in 146.025/625, 447.250/442.250, PL 141.3, 146.520)

June 16, **Dad's Day Hamfest & Computer Show,** Lake County Fairgrounds, Crown Point, Indiana. Contact Lake County ARC, P.O. Box 90, Crown Point, IN 46308-0090. (Talk-in 147.00, 146.520; exams)

June 16, **Monroe Hamfest,** Monroe County Fairgrounds, Monroe, Michigan. Contact Fred VanDaele, 734-242-9487; <ka8ebi@arrl.net>; <http://www.mcrca.org>.

June 22, **Barry ARA Field Day Ham Radio & Computer Swap,** Charlton Park, Hastings, Michigan. Contact K8YPW, P.O. Box 370, Hastings, MI 49058; <k8ypw@arrl.net>. (Talk-in 146.46; exams 1–3 PM, advanced reservations until June 1, contact N8ZSG <peted@msgexp.net>)

June 23, **Easton Maryland ARS Hamfest,** Talbot County Community Center, north of Easton, Maryland. Contact Tinsley Meekins, K3RUQ, 410-770-3715; <http://www.ajfox.com/ears/>. (Talk-in 147.0450)

June 28–30, **Friedrichshafen Ham Radio 2002,** Conference Center, Friedrichshafen, Germany. See <http://www.messe-fn.de/fairs/ham_radio/index.php3>.

June 30, **Hall of Science ARC Hamfest,** NY Hall of Science parking lot, Flushing Meadow Corona Park, Queens, New York. Contact Stephen Greenbaum, WB2KDG, 718-898-5599 (evenings), <wb2kdg@bigfoot.com>. (Talk-in 444.200, PL 136.5, 145.52; exams 10 AM, for info Lenny, W2LJM, 718-323-3464, <LMenna6568@aol.com>)

To place a item in the "Announcements" column, send the specifics about your special event or hamfest to CQ Announcements, 25 Newbridge Road, Hicksville, NY 11801; fax 516-681-2926; or e-mail: <hamfests@cq-amateur-radio. com>. Deadline is the first of the month that is two months prior to the event date (i.e., June 1st for an August event).

Oops...

Our April news item on increased security at the Dayton Hamvention® misidentified spokesman Garry Matthews, KB8GOL. His correct title is Hamvention Production Manager.

Also in the April issue, we transposed a callsign in a caption on page 103, in the WPX contest results. The operator of SP9W shown in the photo is actually SP9HWN, not SP9WHN.

Finally, an update to a clarification in our May issue (p.8). We are now informed by ICOM America that the IC-775DSP transceiver has been discontinued.

Our Readers Say

Search for the Missing Link

Editor, *CQ:*

We read with great interest the April 2002 *CQ* magazine article "The Impact of Solar Storms on World Economics . . ." by Professor Emil Heisseluft, who was reported as staying at the La Semana Hotel here in French Saint Martin. The article leads us to believe that this is the same person who many years ago performed solar storm studies here on the island of St. Martin. Earlier this year we learned from our friends and employees at the exclusive Semana spa that a reclusive elderly gentleman of German or Austrian descent who "resembled and spoke like Albert Einstein" had been experimenting with some weird antenna apparatus and aerials at his penthouse apartment at the hotel, as well as having some strange hardware and high-voltage poles schlepped uphill very near to our Paradise Peak FS5ZMG repeater site.

It would be interesting to locate Professor Heisseluft, because we feel he was the same scientist involved in very unique French solar-flux power research. Our friend Alain Rochemont, FS7AR, the former chief of the Electricite de France power company, remembers back in the early '50s that it was a "long-haired Austrian power professor" who was also responsible for EDF installing 60-cycle power! Of course, there is nothing wrong with 60 cycles for Americans, but the French engineers here and in Guadeloupe are still puzzled as to why an eccentric European professor imparted it here in French St. Martin. So why is our island the only French territory in the world that does not provide the expected 50 cycles? We think that solar scientist Emil Heisseluft may have the answer.

This power-cycle design has been a missing link to the frequency of the French for many years. Yet what is so baffling is that at the exact time in last January when Professor Heisseluft apparently left French St. Martin, the EDF employees shut down the entire St. Martin power system for several days. We heard that the stock value plummeted, and at the same time the French commodity traders refused to accept currency payment in French francs!

At any rate, we old timers here at the island radio club (and local engineers) are intrigued and hope that *CQ* can contact the professor, as we all want to see him back here in French St. Martin.

Mort Bardfield, FS5UQ/PJ7A
French St. Martin

Professor Heisseluft's reply: *I am indeed flattered that the esteemed Hon. Morton Bardfield would think that I had something to do with the sequence of events leading to the loss of commercial power on French St. Maarten and to the problems his island's people experienced switching to the Euro. These and other events that occurred on the island last January were, indeed, unfortunate coincidences, although their confluence certainly bears further research. As for me, I hope it soon will be possible to again visit the beautiful island and to enjoy the great shopping and seaside market in Marigot, the wonderful accommodations at La Semana, and most of all, the wonderful, welcoming people of St. Maarten.* —*Emil*

CW
It Will Not Die!

Editor, *CQ*:

With reference to the editorial in the January 2002 issue of *CQ* regarding the feared demise of CW, I offer hope to those who express this concern. If the CW requirement is lifted from license testing, the mode will not die, I assure you! Here's why:

Along with being an avid ham operator, I am also an avid hunter, and there are several important parallels between the two activities. Both are highly regulated hobbies, under strict government control, requiring licensing of one form or another. While many states require a demonstration of proficiency before they will sell you a hunting license, there are none that I know of which require a demonstration of proficiency in the use of a muzzle-loading musket or a bow and arrow before they will issue you a license to hunt with a modern firearm. Yet year after year, thousands upon thousands of hunters still utilize black powder muskets and archery to harvest game. Why? Primarily because they enjoy the process. For, trust me on this, it is far, far easier to harvest a buck or a boar with a 30.06 scoped rifle than a musket or a bow. Thus it will also be with CW, when the requirement is removed from licensing exams. People will continue to utilize the mode, as long as amateur radio exists, because they enjoy the process.

Other hobbies offer similar parallels to support this hypothesis. With good-quality fish available in the supermarket, there is no earthly reason to spend thousands of dollars on boats and tackle, only to bring home a fraction of the value in edible fish. Yet people do, because just like CW enthusiasts, they enjoy the process. (My XYL has calculated that some of the fish I have caught and brought home for dinner has cost me over $300 per pound! Ouch!)

Clothing is plentiful and cheap in stores everywhere, yet people who enjoy sewing still make their own garments because they like the process. Restaurants abound, and prepared food is easily available in every supermarket, yet many people who can afford to eat out daily or hire a housekeeper still cook for themselves merely because they find the activity pleasurable, as the huge popularity of the Food Channel will attest.

Even inside our own hobby there are examples. You don't have to build a rig to pass your test, yet look at how many amateurs do so because they enjoy doing it. Listen to the AM net on 10 meters, and hear many amateurs keeping amplitude modulation alive, while the majority of us have abandoned it for the far more modern and efficient digital and SSB modes.

Bottom line: Don't get your shorts in a knot over this. CW will live on long after the requirement to learn it has been lifted. Even if the CW sub-bands are eliminated, the mode will live on because it provides those who enjoy it with the pleasure of the process, as well as the ability to make contact in weak-signal situations such as moonbounce, meteor scatter, and VLF.

Greg Grambor, WB2GMK

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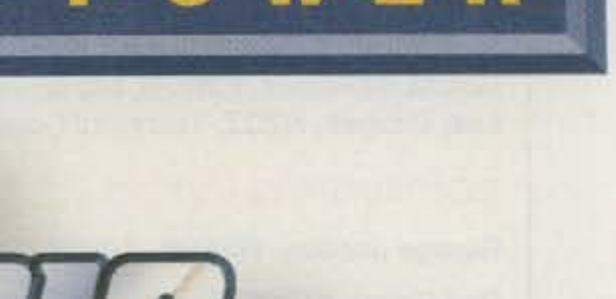

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BY CHIP MARGELLI,* K7JA

Los Angeles has just been devastated by a magnitude 8.5 earthquake centered in the Long Beach area. Both casualties and destroyed dwellings number in the thousands, and the entire communications infrastructure has been disabled. The rest of the state knows something bad has happened, but damage assessment is impossible due to the communications breakdown.

Hopping into his SUV on Signal Hill (overlooking Long Beach), Joe, WX6ABC, switches on his 440 MHz mobile rig, hits the PTT, and announces, "This is WX6ABC activating the WIRES link." Listening for a second, he hears the emergency repeater 50 miles away in the desert loud and clear. Joe hits the PTT again, and presses the [1] key on his microphone's keypad momentarily.

"WE6SAC, WE6SAC, this is WX6ABC down in Long Beach, Node Six, calling State ARES Headquarters in Sacramento. We have an emergency!"

"WX6ABC, this is WE6SAC, operator Sue on duty. We just heard about an earthquake. What can you tell us?"

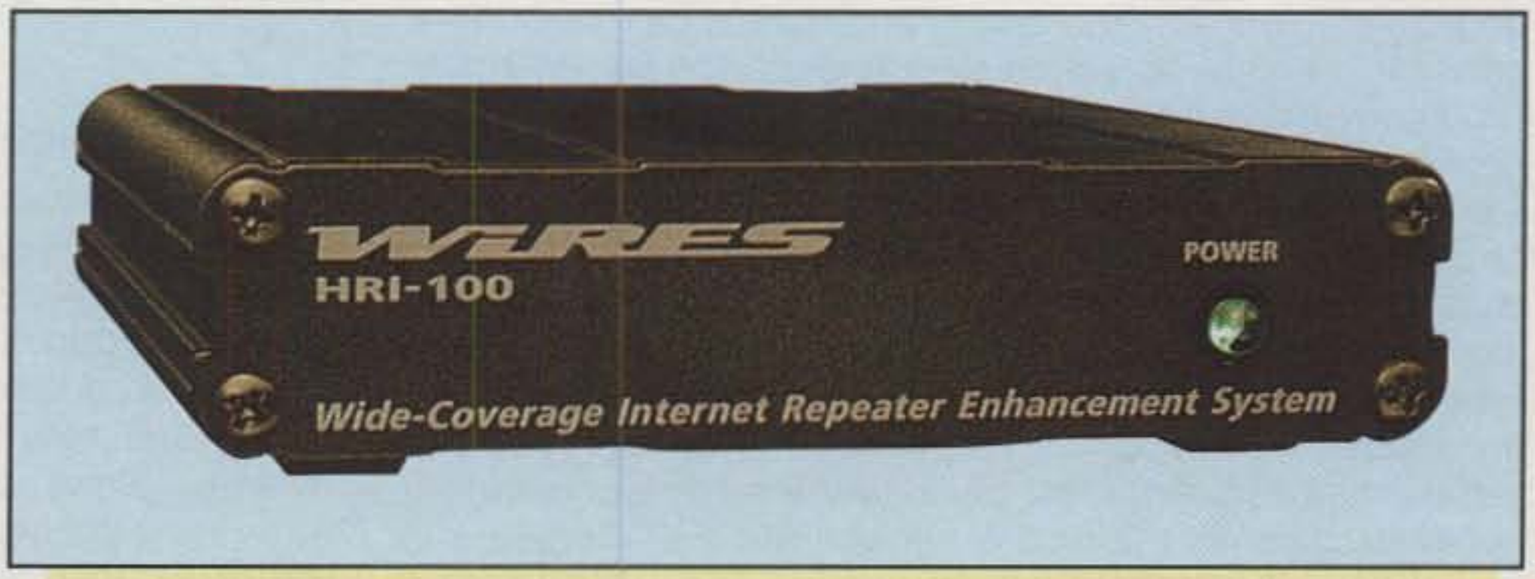
"WE6SAC, this is WX6ABC. Sue, this seems to be 'The Big One.' There is major damage, a number of structure fires visible from this location, and I'm sure a lot of people are hurt. I am en route to ARES headquarters, ETA ten minutes, but I recommend you mobilize for a Level-One operation."

"Roger, Joe. We just got the word of an eight-point-five magnitude. It's going to be busy here for a few minutes; please alert the ARES station at FEMA on my authorization. WX6ABC, this is WE6SAC, out."

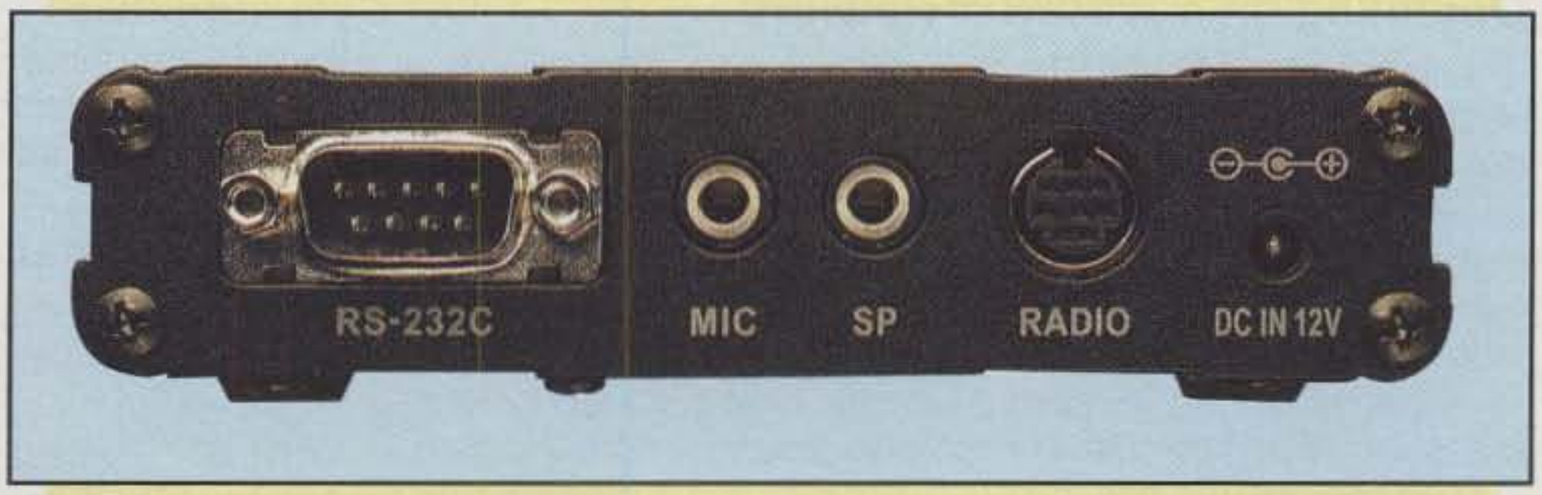
"Understood, talk to you soon. WE6SAC, this is WX6ABC, out."

Pressing the [*] key drops the internet-based link Joe had established to the state capital some 400 miles away. Now he again hits the PTT, presses the [5] key on his microphone, and makes another call. . .

"WF3EMA, WF3EMA, this is



Yaesu's HRI-100 WIRES™ interface box connects between any DMTF-equipped amateur transceiver and a PC running Windows® 98 or newer with a 56K internet dial-up connection. Software provided with the box provides for on-the-fly internet linking of repeaters.



Rear view of the HRI-100 shows simple connections for a computer, a microphone, speaker, radio, and 12 volts DC.

*c/o Vertex-Standard USA, 10900 Walker St., Cypress, CA 90630
e-mail: <cmargelli@vxstdusa.com>

Editor's Note: While the author is Yaesu's Amateur Sales Manager and this article is about a Yaesu product, we feel that a combination of the article's description of the new technology used, the fact that this will work with any DTMF-equipped radio, and growth of interest in internet linking of amateur repeaters justifies publication of this article.

WX6ABC in Long Beach, California, Node Six, with emergency traffic."

"WX6ABC, this is WF3EMA, operator Jack on duty in Washington, D.C., go ahead."

"WF3EMA, this is WX6ABC. Jack, we have just had a magnitude eight-plus earthquake in the Los Angeles area. I have been authorized by state ARES Headquarters in Sacramento to alert you as to the situation. I expect this to develop into a major FEMA response shortly. Here's what I can see from here. . . ."

Thanks to the power of internet linking, Joe in Long Beach was able to call out from the stricken area, alerting other stations in the statewide amateur radio emergency network as to the situation. Emergency management officials could then get first-hand information at once, where wire-line or cellular communications would be impossible.

WIRES™—A New Technique For Repeater Networking!

As happens so often in amateur radio, what begins as a weekend project concept over coffee and donuts can sometimes grow into a worldwide technology standard. The first WIRES™ (Wide-coverage Internet Repeater Enhancement System) network was created in California as a "proof-of-concept" exercise. It was so successful that Yaesu has developed an Interface Box (model HRI-100) with software, and radio-based support for the WIRES™ protocol is now appearing on new transceivers such as Yaesu's new VX-7R hand-held. However, the system will work with any DTMF-equipped transceiver.

Hardware requirements, besides the repeater, include a personal computer (running Windows® 98), 56K modem, and sound card. A standard dial-up internet connection is also required. For 440 MHz systems (in the U.S.) a "link radio" may also be used, at someone's home, to link your repeater (which must be set to pass the WIRES™ DTMF control tone) to the internet. It's like a long-distance "wireless microphone," if you will.

Operating on a WIRES™ Network

The idea behind WIRES™ is that it is an on-the-fly method of linking to a remote repeater, using the internet, but without the need to maintain the link if a quick, local exchange between stations on one repeater is needed. For example, in the fictional earthquake scenario presented earlier, Joe in Long Beach was also in contact with two other local hams who were telling him what streets to avoid as he drove to the Emergency Communications Center. However, these local messages didn't tie up the link to Sacramento or Washington, D.C. How was this possible?

In actual operation, a link is established by sending a 100 ms single-tone DTMF "blip" at the beginning of each transmission. This signals the HRI-100 interface to route your audio to the remote (internet-linked) repeater. The DTMF key number corresponds to the "Node Number" in the network, so it helps to announce your own system's Node Number when initiating a link (In the earthquake scenario, WX6ABC was calling from Node 6.). The answering station presses the [6] DTMF key at the start of the transmission to respond via the internet.

Now if you need to talk to someone locally, without the audio going out over the internet, just transmit normally, without the DTMF burst. To resume the linking, just press the appropriate DTMF key. This protocol keeps linking in use only when it is really needed.

There also is a "Calling All Nodes" mode that can be initiated (ideal for emergency call-ups), and this can be enabled or disabled at each Node sysop's option.

Radios such as the Yaesu VX-7R support the WIRES™ protocol by enabling automatic generation of the DTMF burst at the beginning of the transmission. However, any manufacturer's radio that is equipped with a standard DTMF keypad can be used for WIRES™ system access.

How Does It Work?

Audio quality is great. Usually it is indistinguishable from audio coming through from a regular hand-held or mobile station (except the WIRES™-linked station might be in London instead of across town!).

If the internet gets busy, WIRES™ will buffer the transmission until the data packets can be sent. Messages usually pass through in real time, though, so worldwide conversations can occur at normal speed. If the repeater being paged is already busy, WIRES™ will not interrupt that conversation; it is polite, and will feed back a ".wav" file to advise that the link will have to wait until the remote repeater is not in use.

Future Applications

The possible uses of a closed-loop, internet-linked repeater network are many. Owners of repeater systems currently linked via wire-line can use WIRES™ as a backup system, in case the trunk lines go down, for everyday communications. Kindred emergency groups (such as storm reporting teams) can now link their repeaters state-to-state along "tornado alley" corridors to provide real-time alerting between neighboring areas coming under the threat of severe weather.

Also don't forget the "fun" aspects, as well. You might link your local repeater to a "sister city" repeater in Australia, or Japan, or Sweden, and exchange birthday wishes with a far-away ham who was born on the same day you were. Or you could call your buddies back home from a trout stream in Idaho, describing in vivid detail the size of that linker Rainbow you just landed. Or maybe tease your friends back home from your 50-yard-line seats at the Rose Bowl when your team scores the winning touchdown as time expires ("Don't you wish you had come out for the game?").

More Information

As WIRES™ expands, you may want to get in on the action. If you don't make it to the Yaesu booth at the 2002 Dayton Hamvention®, you can get more information from the WIRES™ Project Group at Vertex Standard USA (Yaesu Amateur Products Division), 10900 Walker Street, Cypress, CA 90630 (714-827-7600), or send an e-mail to <WIRES@vxstdusa.com>.

Internet repeater linking can greatly expand the capability of any repeater group's system. Why not expand *your* repeater's horizon? ■

Additional Resources on Internet Repeater Linking

Cassel, Paul, VE3SY, "IRLP: The Internet Radio Linking Project," *CQ VHF*, Spring 2002, p. 22.

Millner, Jim, WB2REM, "I-LINK: A Marriage Between Radio and the Internet," *CQ*, March 2002, p. 30.

Millner, Jim, WB2REM, "I-LINK, The .WAV of the Future," *QST*, March 2002, p. 38.

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HAM-IV, $529.95. *The heavy duty Ham-IV is the most popular rotator in the world!* It is designed for medium size antenna arrays up to 15 square feet wind load area when mounted in-tower, or 7.5 square feet when mast mounted with an optional lower mast bracket. New alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. New low temperature grease permits normal operation down to -30 degrees Fahrenheit. New wire-wound potentiometer gives reliable and precision directional indication, new ferrite beads reduce RF susceptibility, new Cinch plug connector plus 8-pin plug at control box (no screwdriver needed). Dual 98 ball bearing race for load bearing strength. Strong electric locking steel wedge brake prevents wind induced antenna movement. Easy-to-use Control Box has illuminated directional meter with North or South center of rotation scale, separate snap-action brake and rotation switches. Uses low voltage control for safe operation. Accepts masts up to $2^{1}/_{16}$ inches diameter. Rotator size is $13^{1}/_{2}$Hx8D inches.

T-2X, $619.95. *Extra heavy duty Tailtwister antenna rotator!* For large antennas up to 20 square feet wind load when mounted in-tower, or 10 square feet when mast mounted with optional support bracket. Triple 138 ball bearing race, strong electric locking steel wedge brake. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches. Accepts masts up to $2^{1}/_{16}$ inches diameter. Rotator size is $14^{1}/_{16}$Hx$9^{3}/_{16}$D in.

CD-45II, $369.95. *Medium duty antenna rotator.* Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches with disc brake release. Accepts mast sizes up to $2^{1}/_{8}$ diameter. Includes light duty lower mast support, Rotator size is $17^{3}/_{8}$Hx8 D inches.

AR-40, $269.95. *Lightweight antenna rotator.* Handles smaller ham antennas and large TV/FM antennas up to 3.0 square feet windload area when mounted in-tower, or 1.5 square feet when mast mounted using the supplied lower support bracket. Dual 12 ball bearing race, disc brake system. Silent, automatic control box -- just dial and touch for desired direction. Accepts mast sizes up to $2^{1}/_{8}$ diameter. Includes light duty mast support. Rotator size is $17^{3}/_{8}$Hx8D inches.

Call your dealer for your best price!

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

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Results of the 2001 CQ WW VHF Contest

BY GENE ZIMMERMAN,* W3ZZ

My old friend Al Ross, K4CAW, used to say that every dog has his day, and 2001 was the CQ WW VHF Contest's "day." After many years of being plagued by bad conditions, last year the propagation gods smiled on us. If you remember, last year 6 meter sporadic-*E* openings were few and far between and occurred mainly from the Midwest to the west coast. In 2001 the rest of the country got in on the fun, as you will see from the contest winners. Most of the U.S.—and apparently many parts of Europe, judging from the few logs we got from there—enjoyed solid single-hop E_s contacts for most of the contest. As usual, in the U.S. the south (Florida), southeast, and southwest (Texas) had the densest ionization to play with, but here in the northeast conditions were unusually good and propagation to and from the Midwest was excellent.

Not everyone got into the act, however. Double-hop E_s contacts were not much in evidence on 6 meters, and few, if any, contacts single- or double-hop reached any part of the west coast. The exception seemed to be N6MU operating from the splendid N6NB mountaintop site in southern California, who reported both single- and double-hop E_s. Maybe you had to be up really high to get into the propagation. Colorado seemed to be the place for unusual contacts. W7SAO reported field-aligned irregularities (FAI) to both the northwest and southwest, and KØGU worked several stations on the east coast (including me) at the beginning of the contest on some kind of odd, perhaps non-direct scatter path.

The good conditions on 6 meters meant that activity on 2 meters was even less than usual. It didn't help that tropo conditions were essentially flat all over, even though there were some decent grid totals in the U.S. In Europe F6IFR had 371 Qs and 68 grids, and PE1AHX reached 42 grids even with the low activity. DX activity into the U.S. was also scarce. CO2OJ, WP4LNY, and TI5KD/2 were worked from the south. Sunday afternoon EH and CT stations on the Iberian peninsula were worked by quite a few stations on the east coast and as far west Ohio.

The Top Scorers

Scores were much better in 2001 than in 2000. In the U.S. K2DRH in Illinois moved up from second place to the top all-band single op, overcoming the challenge of W1XX/2

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e-mail: <w3zz@cqww.com>

WØAH at the Edge of the Inland Sea

By Douglass Allen, WØAH

Ever wonder why you work so few stations between the western border of the EN/EM grid blocks and the front range of the Rocky Mountains (DM79 et al.)? VHF stations are few and far between in the Inland Sea. Here well-known portable and rover operator Doug Allen, WØAH, takes to the open road for a location in extreme western Nebraska on the DN71/DN81 border. Here's what it was like.—W3ZZ

This was a test run for the 1976 Chinook mini-motorhome I bought for $500 on July 3—my first trip in it. The auto mechanic who did $200 worth of service the Friday before the test gave the Chinook a "fair" bill of health, saying, "You better take a lot of credit cards with you." I had added the Chinook to my AAA policy on Thursday, but was told that there would be a five-day waiting period before it was covered. I was prepared to live in the broken-down motorhome for three days if necessary! As it turned out, I didn't need my AAA policy or credit cards, just some dollars for oil—a quart every 150 miles.

Getting a late start, I didn't arrive on Panorama Point in extreme southwest Nebraska (about 45 miles from Cheyenne, Wyoming) until 2100Z (3 PM local time). I was set up and made my first contact 40 minutes later using my ICOM IC-706 MKIIG at the 25 watt level to a 3-element beam on 6 meters and a 10-element beam on 2 meters. Panorama Point is in a sliver of DN71 that extends into Nebraska, because the surveyors who set the state boundaries over 100 years ago were off by about a mile. The elevation is 5424 ft. and HAAT *(height above average terrain—ed.)* is minimal, perhaps 0–50 feet to the west. On a clear day—not this past weekend—you can see some of the Colorado peaks west of Fort Collins.

It turned out to be an okay location with good signals from the Front Range of Colorado and surprisingly good 2 meter signals from the western slope of Colorado. W7SAO in DM59 was consistently one of the strongest stations. The best contact was probably KIØG/R running 5 watts in DN50, which happens to be the only Colorado grid I haven't contested from. My HAAT was probably better to the east than toward Colorado, but I heard no Kansas stations except NØKQY and no Nebraska stations except a nearby mobile. The NØLL 2 meter beacon was good copy whenever I listened for it.

I had a good night's rest in the Chinook, something that wasn't the case when I slept in the front seat of my Pathfinder during the ARRL VHF test. Sleeping in the back of the Pathfinder during Field Day wasn't much better. I started tearing down at 18Z (12 noon local) on Sunday, intending to see if I could find a good spot in DN81, a stone's throw to the east. No luck at all. The land slopes down toward the northeast (easy to see on a map); all the streams run northeast. After an hour of unsuccessful searching, I drove home via Cheyenne. I've operated VHF contests in Kansas and New Mexico several times, but this was my first from Nebraska.

I really enjoyed this contest. Thanks to all who worked me in Nebraska.

WØAH takes to the QRP road.

TOP SCORES

WORLD

All Band

VE3SXE	4,450
VE7DX	3,072

6 Meters

VE1YX	32,280
CO2OJ	13,064
VE4KX	5,916

2 Meters

E20LCH	15,918
HS8KVA	4,544

QRP

EH2CAR	4,320

Multi-Operator

F6IFR	99,720
VA7ISL	16,168
HS3AN	7,150
E20KTU	5,346
E20REE	4,208

USA

All Band

K2DRH/9	115,692
W1XX/2	88,800
K9HUY/4	78,674
K4QI	71,307
NJ2F/4	62,560
KB8U	39,204
W3ZZ	32,616
W3SO	32,012
NØURW	29,232
K1TEO	29,003

6 Meters

WD5K	116,960
NW5E/4	86,756
AE5B	83,100
W3EP/1	37,120
WØVX	34,398
N2ODU	34,026

2 Meters

W5CMP	2,120

QRP

N6MU	25,696
N9EXU	24,084
AF4HX	23,232
WØAH	16,362

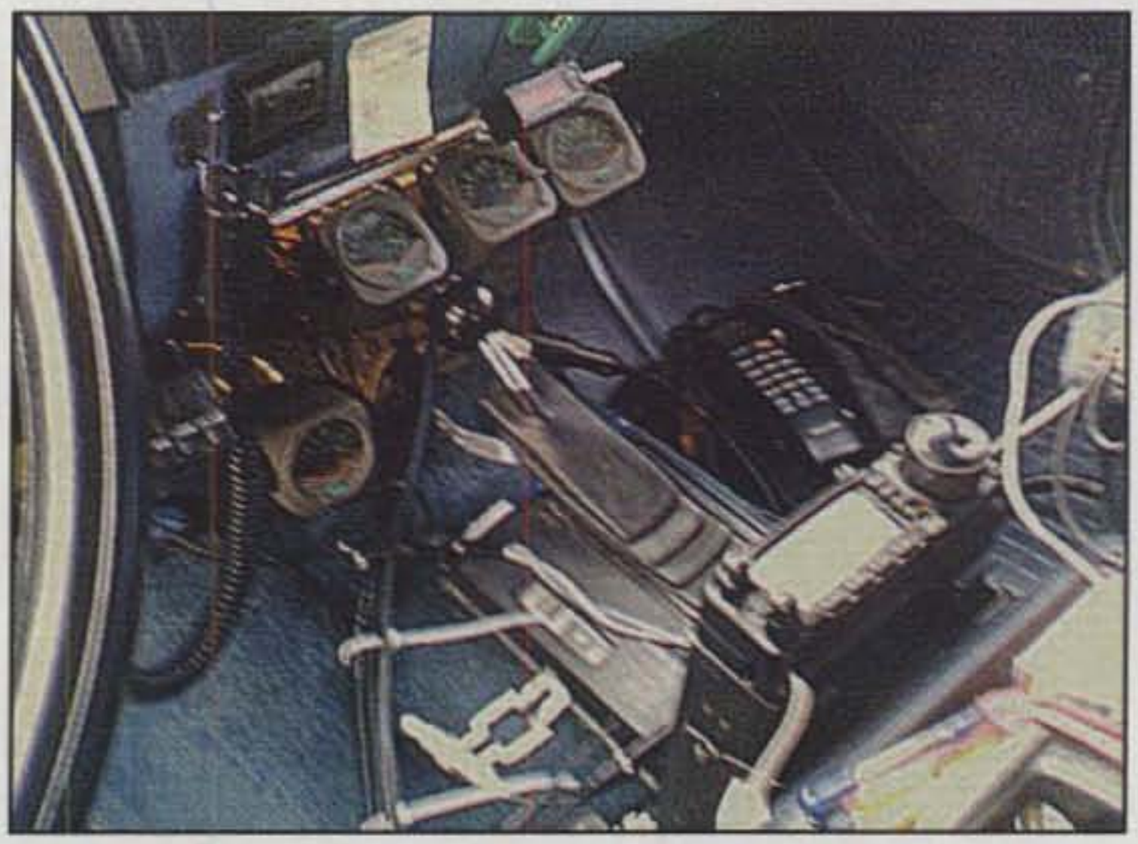
Rover

W4VHF/R	85,008
NØDQS/R	29,256
KFØQ/R	14,151

Multi-Operator

N4ION	89,960
W7SAO	60,760
KB9PJL	9,426

Boy Scout Troop 49 (WT4IX) in the North Carolina mountains.



The business end of NØDQS/R.

in eastern New York. Both Bob and John used 6 and 2 meters to good effect, but Bob's bigger totals on 6 meters made the difference. K9HUY in Florida and K4QI, who is better recognized by east coast VHFers for his enormous signals on 70 and 23 cm, followed closely behind. On 6 meters WD5K again proved that the combination of a location in Texas, an excellent operator, and a big station is hard to beat. Tom moved up to first place, while Gary, NW5E, in central Florida moved from fourth to second. The closest race was in the QRP category. Here N6MU operating at N6NB's station overcame some mediocre conditions in southern California to edge out N9EXU in Texas and AF4HX in North Carolina. On 2 meters activity was very sparse, but Cris, W5CMP, had the high score from Texas. For the second year in a row, Ted, W4VHF/R, took top rover honors. Top grid-activation honors went to second-place finisher NØDQS/R, who provided nine midwestern grids to the contestants. N4ION and N4JDB piloted N4ION to the top multi-operator score. Last year's winner, NØKE, joined W7SAO and WO9S to lead W7SAO to second place from a rare grid in western Colorado.

Again DX activity was sparse, but some interesting scores were posted. VE3SXE had the leading single op all-band score. Master DXer Bob, VE1YX, easily won the 6 meter category. Oscar, CO2OJ, was second with six times the score in 2000. EH2CAR used 6 meters to achieve the top QRP score, and F6IFR took top honors in the multi-operator class with a huge 2 meter score. Two meter FM is the name of the game in Thailand; E20LCH made 379 contacts on 2 meters on his way to the top 2 meter DX score. Several other HS stations made over 250 contacts on 2 meters both as single ops and multi-ops.

Feedback

There were 153 logs received, an activity level 40% higher than in 2000 and likely the highest ever recorded for this contest. A great deal of this increase was no doubt due to the splendid conditions here in most of the U.S. However, if possible, we would like to improve the contest even more, keeping active the number of stations who operate and even increasing that number. It is now clear that most of the participants like the format—a 6 and 2 meter contest that does not make great hardware demands of portable stations or rovers that want to go out into the field so soon after both the ARRL June VHF Contest and ARRL Field Day, and a contest that emphasizes the midsummer propagation. Two other features continue to prove very popular. Surveys done by the ARRL Contest Advisory Committee continue to show that a large majority of U.S. participants in any VHF contest strongly prefer the original rover scoring rules. These rules will continue to be used in the CQ WW VHF Contest. Likewise, we feel there is no reason to restrict what countries anyone can work. DX stations will continue to be able to work other DX stations, W's, or vice versa.

The one big change for the coming 2002 CQ WW VHF Contest is the date. In the past we have used the second full weekend in July based on the supposition that sporadic-*E* propagation is significantly better that weekend than, say, the following weekend. Last year I asked for your input on the subject of moving the contest forward one weekend. It is clear that there are now sufficient numbers of HF contesters who enjoy working the IARU contest, but have 6 and/or 2 meter weak-signal capabilities. The conflict with the IARU contest on the same weekend as the CQ WW VHF Contest was hurting the activity level in the VHF contest, perhaps quite significantly. Moreover, the activity in Europe remains quite low. Part of this, as PE1AHX notes in the "Soapbox," is the lack of timely advertising in the appropriate European ham radio magazines. Likewise, the proximity to the European Field Day on the first week of July has been a deterrent.

After checking several years of my own logs and those of others, I determined that while E_s is less likely to occur at the later date, the

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● **5 WATTS POWER OUTPUT:** Using a new-technology all-band MOS FET power amplifier, the FT-817 provides 5 Watts of power output when using a 13.8 Volt DC source. When using Alkaline batteries or the optional FNB-72 Ni-Cd Battery Pack, power is automatically set to 2.5 Watts; via Menu, this can be changed to 0.5 Watt, 1 Watt, or up to 5 Watts.

● **WIDE CHOICE OF POWER SOURCES:** The FT-817 is equipped with an alkaline "AA" cell battery case, and a 13.8 volt DC cable is also supplied. Available as an option is the FNB-72 Ni-Cd Battery Pack (9.6 V, 1000 mAh), which can be recharged using a 13.8 Volt power supply while the radio is being operated.

● **TWO ANTENNA PORTS:** A "BNC" connector is provided on the front panel, and a type "M" connector on the rear panel, with Menu selection of which connector will be assigned for operation on HF, 50 MHz, 144 MHz, and 430 MHz.

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WD5K	680	W1XX	103
AE5B	554	K2DRH/9	101
NW5E	529	K4QI	54
K9HUY/4	479	W3SO	53
N4ION/M	466	W3CMP	53
K2DRH/9	420		
NJ2F/4	412		
W1XX	349		
N2ODU	318		
K4QI	309		

GRIDS

50 MHz		144 MHz	
WD5K	172	K2DRH/9	40
NW5E/4	164	K4QI	36
N4ION/M	157	W1XX	30
AE5B	150	W3SO	25
K9HUY/4	147	W5CMP	20
K2DRH/9	146		
K4QI	135		
W1XX	130		
W3EP/1	128		
NJ2F/4	128		

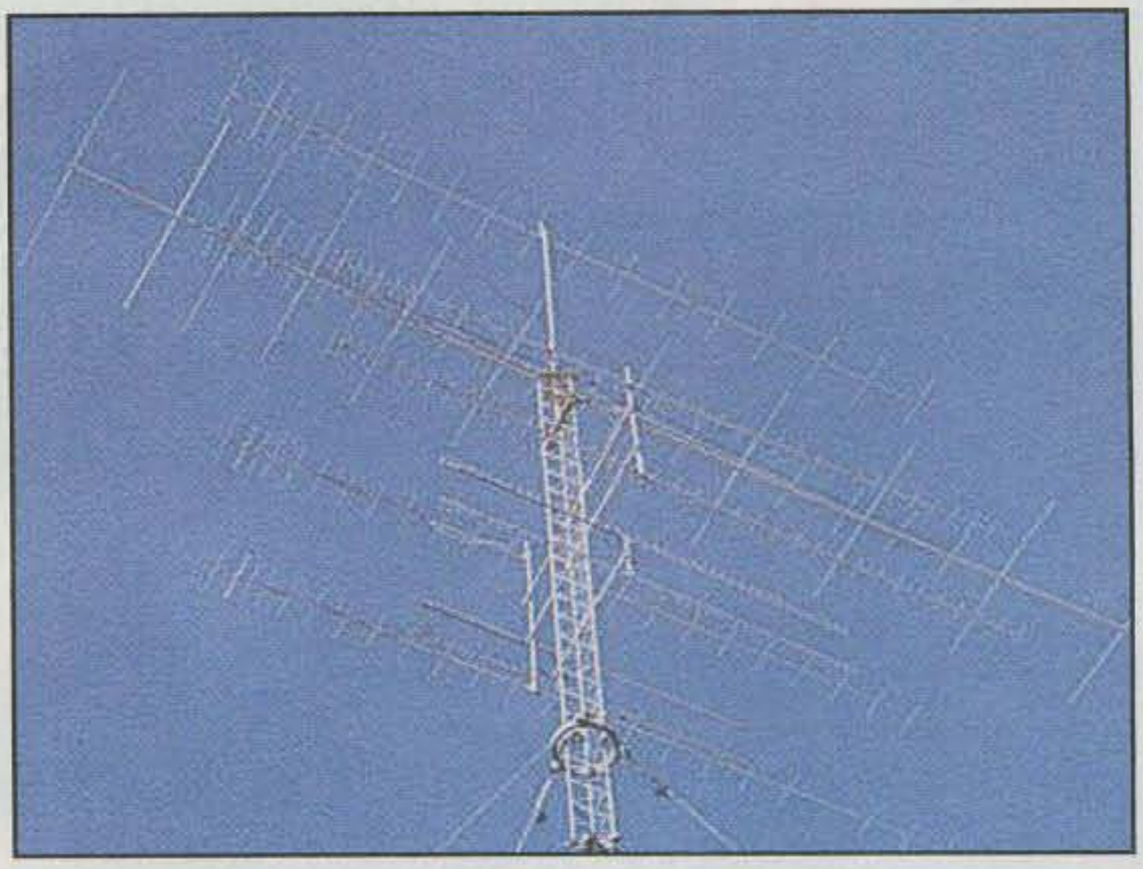
DX

QSOs

50 MHz		144 MHz	
VE1YX	269	E20LCH	379
CO2OJ	184	F6IFR/M	371
VE4KX	116	E20KTU-M	297
F6IFR/M	59	HS8KVA	284
		HS3AN/M	275
		E20REE-M	203

GRIDS

50 MHz		144 MHz	
VE1YX	120	F6IFR/M	68
VE3SXE	78	PE1AHX	42
CO2OJ	71	E20LCH	21
F6IFR/M	52		



Wonder why K2DRH is so loud? This stack of aluminum might explain it.

difference does not appear to be as great as I had feared. Therefore, we decided to move the contest to the *third* full weekend in July, this year the 20–21. Now that there is no conflict with the IARU contest and the World Radio Team Championship (WRTC), I hope my HF contesting friends will reward me by participating in this year's CQ WW VHF Contest. Think of it as a 10 meter contest with poor skip propagation (for 10 meters). Also, after an additional weekend of rest, I hope our friends in Europe will participate more.

Rules for the 2002 CQ WW VHF Contest are elsewhere in this issue of *CQ* and on the CQ website <http://www.cq-amateur-radio.com/vhfcontest.html>. We prefer electronic logs to be sent via e-mail to <cqvhf@cqww.com>, or they may be snail-mailed to CQ WW VHF Contest, 25 Newbridge Road, Hicksville, NY 11801 USA. Again, the contest this year will be the third full weekend in the month, July 20–21. I hope all the old timers will be back, and that we will be joined by a host of HFers turned VHFers and a large contingent of DX stations.

73, Gene, W3ZZ

Forward Scatter—Soapbox 2001

After listening on 6 meters 23 hours of the 27 hours of the contest, I finished the CQ VHF test with lots of QSOs: one 50 MHz, but on 2 meters only one QSO in (of course) one grid (Where were the 2 meter operators in South Florida?). Conditions were poor and activity was more or less the same. Six meters opened two or three times during the contest, mainly to the EM and FM grids with good double-hop to FN and EN grids. My final score, although not high at all, is six times better than the one I got last year in this same contest. Besides, I had a lot of fun. Thanks to everyone who gave me a point and a multiplier . . . **CO2OJ.** I ran the RAST Headquarters station HSØAC until the IARU contest finished. Then I rushed back home and enjoyed the CQ WW VHFContest. Lots of fun. . . **E21EIC.** Few openings during the contest, but very low atmospheric pressure combined with rain static gave us very bad activity. On 6 meters our greatest distance was with EH8AG at 2867 km . . . **F6IFR.**

I do like the scoring format for this contest very much. Many contacts can do as much as distant contacts, as you have the grid multipliers. I do suggest however that you try some promoting of this contest by informing the various magazines and news groups way in advance especially in a VHF contest-flooded continent (every week the NAC, every two months the major contests, every so many weeks various activity contests, etc.). It is and will be difficult to muster a large following. Maybe it will grow, but I had a lot of difficulties working these 135 stations, whereas one week ago I made over 250 QSOs leisurely in the big contest (in less time). In a big contest participating continuously I can make at least 400 QSOs. That was impossible considering the lack of participation. I do think that the late starting and stopping time does not help. I understand you have to do so for your U.S. participants; however, to start at 2000 local until 2300 local is not appealing for going mountaintopping or portable if you have to go back to work the next day. The same is true for stations farther east. . . **PE1AHX.**

Lots of EH/CT on Sunday . . . **VE1YX.** Working CT, EH, and VO1 in an otherwise dead band was a great surprise. So thanks to this contest. I worked two new countries: CT and EA . . . **VE2ZP.** 26 QSOs in 26 hours. Then the band opened! . . . **VE4KX.** Had a late start Saturday (0130Z) due to work commitments and lost almost three hours Sunday morning trying to stop the tent from flooding after a torrential downpour that started just after midnight. Ahhh . . . the joys of mountaintopping. Had lots of fun and learned a bunch for next time . . . **VA7DX.** Conditions not good to my area during the contest. Hope to improve the results for next time. Anyway I enjoyed all the contacts and had a good time . . . **WP4LNY.** I couldn't spend much time operating, but I enjoyed the 6 meter opening! . . . **AF1T.** Glad to see you could use the old rover scoring rules . . . **N1GC/4.** Conditions on 2 meters at this particular time were quite poor this year. I'll have to do a little more tweaking before the next contest . . . **N1YIS.** Another great contest operating from the top of Mt. Killington (VT) at 4235 ft. Really enjoyed the band opening on 6 meters to the south at the start of the contest. I only wish I had more time to operate. Thanks to all the terrific operators who participated! . . . **W1KMH.** Nice to hand out FN23. . . **K2CS.**

This contest is really shaping up to be a lot of fun. There seemed to be a lot more people than last year, almost exactly double my score! . . . **K2DRH/9.** Saturday on 6 meters was amazing and Sunday was a bust. Everyone must have been busy on 6, as there was no one on 2 meters and the only Qs I had on 2 were "walk-ups" from 6. I rovered through three grids but only managed

N6DN and N6TEB in front of the N6TEB rover wagon.

to make contacts from two of them . . . **N2GKM.** Things were great on Saturday, but Sunday was dead up here until about 19Z, when I got some good European E_s into Portugal and Spain. These three contacts were my first DX contacts on 6 meters ever! . . . **N2YEV.** I participated in the CQ VHF Contest for the first time, operating only on 6 meters. This is my first foray into VHF (other than 2 meter repeaters) in 42 years as a licensed amateur. You *can* teach an old dog new tricks! . . . **WA2EMF.** Lots more activity this year. Too bad I couldn't spend more time at it . . . **WA2HFI/Ø.** Biggest thrill was working W7CI in Arizona via double-hop sporadic-*E* using only 25 watts . . . **WB2AMU.**

This was one of the best, if not the best, 6 meter DX contests I have ever been in. It is a shame I was not able to spend more time operating. It was to me a very laid back and fun contest. Want to thank all those who gave me a contest point, and I apologize to all those I could not hear due to an extremely high (10/20 dB over S9) line noise problem I have been experiencing. . . **K3EOD.** Wow! Two meters may have been one damp firecracker, but 6 meters was a whole 4th of July 10 days late. Before the CQ VHF I had about 150 grids confirmed on 6 (i.e., I've worked all the easy ones), so was astonished to work 20 new grids out of 54. Never got that many new ones in any VHF contest in five years of trying. Worked nearly a third of EM (32 grids), three in Europe, and five double-hop in DN and DM. Could have worked dozens more in FL if they had only been on the air; the few whowere ran pile-ups and made lots of new friends . . . **N3UM.** Sporadic-*E* conditions on 6 meters were great. The band was open for many hours, there was workable double-hop to the west coast, and even a few Europeans made it into the log. Local activity on both bands was quite sparse . . . **W3EP/1.** We are located on Mt. Wopsonnock at 2580 feet. Did not hear Europe, but nice to have openings to south and southwest. Wish the northwest had opened also. Everything worked well and we'll be back next year. . . **W3SO.**

Thanks for putting on this contest! Keep up the good work . . . **AF4HX.** Best thing was the number of ops using CW . . . **K4SC.** Great contest, some of the best action I've seen on 6 meters in a long time. Too bad there wasn't much going on with 2 meters this year . . . **KD4EVB.** Thanks for sponsoring the 2001 VHF contest. Had a very enjoyable time! . . . **N4SC/8.** Conditions on 6 were great here in Atlanta/North Georgia, which is good and bad. The good is self-evident, but the bad is you can't get guys to move over to 2 meters, even local guys that a 2 meter contact with would be a slam dunk. I ended up with only two dozen 2 meter contacts, a lot on FM simplex! . . . **W4KXY.** I would have been a rover, but this contest was scheduled for the same weekend as the IARU and you've got to catch the DX when it is available. Six wasn't open all the time, and I figured I'd operate on HF where you can scare up a contact anytime on at least one band during contests. Two meters is pretty dead around Nashville so stayed on 6. Still nabbed a few new squares though . . . **WA4JA.** We were portable, hiked gear up mountain and used solar power. KG4JGF and KG4JFY are both 14 years old and Life Scouts. There are now 14 amateurs in our troop. Saturday night was the coldest on record for that part of NC. About froze us off the mountain until we hit the tents. . . **WT4IX.**

Could have possibly worked a few more except that my antenna is 60 feet from the shack and my Armstrong rotor gave out . . . **K5FDJ.** Had a great time when the band was open. Shut down and never opened again my way. Looking forward to next year . . . **KJ5RC.** Good band opening on Saturday. Sunday was the pits! . . . **N5PA.** This was my first CQ WW VHF Contest. I had a great time. Will be looking forward to it next year . . . **N5TIF.** Enjoyed a casual on and off operation again this year. Generally better conditions both

Saturday and Sunday. Some short-hop contacts and most of the openings were to the northeast with some to the west Sunday. Best DX was FN43 . . . **W5USJ.** Strongly suggest you change the date of this contest so it doesn't coincide with the IARU contest which is extremely popular and takes many operators away from the VHF contest . . . **N6MU.** Ran all weekend with 5 watts from an FT-817 on Mt. Crag CN87 . . . **N7EPD.** Managed to get on the air just before my flight to Japan after a three-year stay in the U.S. . . . **W7KN.** We had several instances of what appeared to be FAI propagation on 6 meters. KMØT EN13 was worked Saturday afternoon along with some W9 stations at least 30 degrees south of direct with a slightly raspy signal. We could not copy if beamed direct path. On Saturday evening AA7A DM43 was worked at 315 degrees while he was working to Oregon and Washington and no signal at the direct path. Also semi-auroral quality signal. N6RMJ DM14 was heard to the northwest for a long time but couldn't hear us. He was also working the Pacific Northwest. We did work DM06 and CM97 via this assumed FAI mode at about 30 degrees north of direct. No FAI heard on 2 meters . . . **W7SAO.**

Saturday band conditions were fair but ended around 2200Z. Sunday I read the Sunday funnies, as conditions were dismal here. Still had fun! . . . **K8AB.** Propagation was certainly an improvement over last year, although Sunday got a little slow in the afternoon. I thought participation was quite good . . . **K8KFJ.** Nice opening into Spain and Portugal near the end of the contest. Downside to the good 6 meter conditions was that the pickings on 2 meters were kind of slim; most operators stayed on 6 . . . **KB8U.** Biggest thrill was working W3ZZ on E_S backscatter on 6 meters—no direct path to him . . . **N8XA.** Biggest thrill was making any QSOs at all. Jury-rigged operation here at the summer home . . . **K9EA/VE3.** It was a great contest with openings a lot of the time. Made almost twice as many Qs as last year . . . **K9HUY/4.** It was really fun getting back on 6 meters after a 20-year layoff. A great band opening made it loads of

Number groups after call letters denote the following: Class (A = all band, 6 = 6 meters, 2 = 2 meters, Q = QRP, M = multi-operator, R = rover) Final Score, Number of QSOs, Grids, State/Province (USA/Canada only), Grid Locator or Number of Grids Activated (rover only). Rover grids are listed on the line following the rover score.

2001 VHF RESULTS

NORTH AMERICA

UNITED STATES

K1TEO	**A**	**29,003**	**256**	**97**	**CT**	**FN31**
AF1T	A	8,976	128	66	NH	FN43
K2HZN/1	A	7,232	108	64	NH	FN43
K1TR	A	6,240	113	52	NH	FN42
W3EP/1	**6**	**37,120**	**290**	**128**	**CT**	**FN31**
N1YIS	2	8	2	2	ME	FN44
W1KMH	**Q**	**1,200**	**40**	**24**	**VT**	**FN33**
W1XX/2	**A**	**88,800**	**452**	**160**	**NY**	**FN32**
NS2P	A	5,472	91	37	NY	FN24
N2YEV	A	4,002	81	46	NY	EN34
KC2GHT	A	56	11	4	NY	FN24
N2ODU	**6**	**34,026**	**318**	**107**	**NY**	**FN02**
K2CS	6	6,048	108	56	NY	FN23
K2OEQ	6	2,090	55	35	NY	FN13
WA2BKN	6	832	32	26	NJ	FN21
WB2AMU	Q	221	17	13	NY	FN30
W2JEK	Q	156	13	12	NJ	FN20
KC2BEZ	Q	128	13	8	NY	FN30
N2GKM	R	825	30	24	NY	2
					FN21,	FN31
K2IWR	M	270	18	15	NY	FN12
W3ZZ	**A**	**32,616**	**302**	**108**	**MD**	**FM19**
W3SO	**A**	**32,012**	**249**	**106**	**PA**	**FNØØ**
					(W3TEF op)	
N3UM	A	6,490	95	59	MD	FM18
K3EOD	A	5,115	86	55	PA	FN20
W6AXX/3	2	576	32	9	MD	FM19
W3CB	2	80	10	4	MD	FM18
N3EP	M	3,290	64	47	PA	FN21
N3WP	M	403	25	13	PA	FM19
K9HUY/4	**A**	**78,674**	**495**	**154**	**FL**	**EL86**
K4QI	**A**	**71,307**	**363**	**171**	**NC**	**FM06**
NJ2F/4	**A**	**62,560**	**436**	**136**	**FL**	**EL96**
W4KXY	**A**	**19,095**	**170**	**95**	**GA**	**EM84**
KD4EVB	**A**	**12,210**	**156**	**74**	**KY**	**EM78**
KB2SFA	A	6,903	109	56	FL	EL96
W4WA	A	6,785	101	59	GA	EM84
W4OZK	A	3,564	64	44	AL	EM64
K4SZ	A	3,182	69	43	GA	EM84
N4UFP	A	1,976	48	38	SC	EM94
N4MM	A	819	31	21	VA	FM09
NW5E	**6**	**86,756**	**529**	**164**	**FL**	**EL98**
KF4FAJ	**6**	**10,241**	**133**	**77**	**FL**	**EL96**
WA2EMF/4	6	3,800	76	50	SC	EM94
K4SC	6	2,200	50	44	FL	EL98
N4WD	6	1,952	61	32	GA	EM74
KF4LVF	6	1,840	46	40	NC	FM05
KE4BVP	6	1,102	38	29	VA	FM08
W4OGG	6	480	30	18	TN	EM55
N3WAV/4	6	272	17	16	VA	FM27
WA4JA	6	252	18	14	TN	EN65
AF4HX	**Q**	**23,232**	**264**	**88**	**NC**	**EM85**
WB4WXE	**Q**	**7,840**	**109**	**70**	**AL**	**EM74**
KE4VCS	Q	1,287	39	33	NC	EM96
W4VHF	**R**	**85,008**	**483**	**176**	**NC**	**4**
				EM85, EM86, EM95, EM96		
N1GC/4	R	572	26	22	NC	3
					EM97, EM98,	FM08
N4ION	**M**	**89,960**	**493**	**173**	**AL**	**EM62**
WT4IX	M	2,380	53	34	NC	EM85
KM5TY	**A**	**26,555**	**230**	**113**	**TX**	**EL29**
N5TIF	A	7,670	102	65	TX	EM12
K5CZD	A	4,050	74	54	LA	EM32
N5BA	A	3,081	58	39	TX	EL29
K5JWL	A	2,898	62	46	TX	EM10
WD5K	**6**	**116,960**	**680**	**172**	**TX**	**EM12**
AE5B	**6**	**83,100**	**554**	**150**	**TX**	**EM02**
WØVX/5	**6**	**34,398**	**294**	**117**	**TX**	**EM12**
KB5VPR	**6**	**21,631**	**223**	**97**	**TX**	**EM13**
KZ5E	**6**	**17,177**	**193**	**89**	**TX**	**EM20**
AA5CH	6	14,904	184	81	AR	EM35
KJ5RC	6	9,570	145	66	MS	EM42
N5PA	6	6,048	108	56	MS	EM51
W5USJ	6	4,028	76	53	TX	EM22
N5OHL	6	432	24	18	OK	EM15
WA5KBH	6	180	15	12	LA	EM30
W5CMP	**2**	**2,120**	**53**	**20**	**TX**	**EM12**
N9EXU/5	**Q**	**24,084**	**206**	**108**	**TX**	**EM20**
K5FDJ	Q	1,184	37	32	TX	EM12
KB5ZSK	Q	744	31	24	NM	DM84
KA5CVH	Q	720	30	24	TX	EL29
WH6LR	R	3,550	70	50	OK	2
					EM04,	EM05
KF6JBB	**A**	**3,317**	**77**	**31**	**CA**	**DM12**
KC6SEH	A	1,411	50	17	CA	CM98
KF6GYM	A	1,027	79	13	CA	CM87
N6ZE	A	104	9	8	CA	DM04
N6MU	**Q**	**25,696**	**267**	**73**	**CA**	**DM05**
						(@ N6NB)
N6TEB	**R**	**5,217**	**78**	**47**	**CA**	**5**
				CM94, DM03, DM04, DM13, DM14		
NW7O	A	943	37	23	NV	DM26
N7EPD	**Q**	**5,336**	**135**	**29**	**WA**	**CN87**
W7KN	Q	21	7	3	WA	CN87
KB8U	**A**	**39,204**	**286**	**121**	**MI**	**EN71**
N4SC/8	**A**	**14,520**	**165**	**88**	**MI**	**EN72**
K8ROX	A	6,656	90	52	OH	EN80
K8AB	A	3,696	77	48	OH	EN91
KB8JVH	A	2,490	61	40	OH	EN80
K8KFJ	**6**	**1,836**	**54**	**34**	**WV**	**EM98**
W8IDM	6	330	22	15	OH	EN81
N8XA	**Q**	**7,378**	**104**	**62**	**OH**	**EM79**
KC8KSK	Q	1,344	42	32	WV	EM97
K2DRH/9	**A**	**115,692**	**521**	**186**	**IL**	**EN41**
WA1UJU/9	**A**	**21,328**	**232**	**86**	**WI**	**EN53**
W9SR	A	5,060	82	55	IN	EN70
KB9TLV	A	4,876	82	53	WI	EN45
KB9VSG	A	1,485	42	33	WI	EN52
KB9Q	A	672	26	21	WI	EN52
K9OM	**6**	**3,654**	**87**	**42**	**WI**	**EN65**
W9JOT	6	713	31	23	WI	EN62
KB9VZL	6	399	21	19	IN	EM79
KB9VMW	6	216	18	12	IL	EN60
N9KO	6	80	10	8,	IL	EN52
NE9O	**R**	**2,279**	**53**	**43**	**IN**	**3**
					EM69, EM79,	**EN60**
KB9PJL	**M**	**9,426**	**147**	**81**	**WI**	**EN44+**
NØURW	**A**	**29,232**	**238**	**112**	**IA**	**EN41**
W6OAL/Ø	**A**	**24,892**	**227**	**98**	**CO**	**DM79**
WBØULX	A	2,856	61	42	SD	EN04
WØETT	A,	2,592	59	36	CO	DM79
KØGU	A	360	19	18	CO	DN70
KØUK	A	20	4	4	CO	DM59
WA2HFI/Ø	6	600	30	20	MN	EN34
NEØP	6	357	21	17	IA	EN41
NØFCK	6	50	10	5	CO	DM59
WØAH	**Q**	**16,362**	**177**	**81**	**NE**	**DN71**
WØGNJ	Q	1,800	50	36	IA	EN41
WBØYEA	Q,	1,178	38	31	TX	EM20
NØDQS	**R**	**29,256**	**159**	**138**	**NE**	**9**
				EN12, EN13, EN20, EN21, EN22,		
				EN23, EN30, EN31, EN32		
KFØQ	**R**	**14,151**	**125**	**89**	**MN**	**4**
				EN33, EN34, EN43, EN44		
KIØG	R	450	18	18	CO	3
					DN50, DN60,	DM69
WØETT	R	198	18	11	CO	4
				DM79, DM87, DM88, DM89		
				(WØETT, KCØGBC ops)		
W7SAO/Ø	**M**	**60,760**	**360**	**155**	**CO**	**DM59**

CANADA

VE3SXE	**A**	**4,450**	**78**	**50**	**ON**	**FN25**
VA7DX	**A**	**3,072**	**81**	**32**	**BC**	**CN89**
VE3OIL	A	1,536	42	32	ON	EN93
VE2BFW	A	72	8	8	PQ	FN25
VE2PIJ	A	6	2	2	PQ	FN35
VE1YX	**6**	**32,280**	**269**	**120**	**NS**	**FN74**
VE4KX	**6**	**5,916**	**116**	**51**	**MB**	**DN99**
CG2CUA	6	1,479	51	29	PQ	FN35
VE7HPS	6	112	16	7	BC	CN99
K9EA/VE3	2	32	4	4	ON	EN94
VE2ZP	Q	144	12	12	PQ	FN25
VA7ISL	**M**	**16,168**	**244**	**47**	**BC**	**CN88**

CUBA

CO2OJ	**6**	**13,064**	**184**	**71**	**EL83**

PUERTO RICO

WP4LNY	**A**	**860**	**35**	**20**	**FK68**

EUROPE

FRANCE

F6IFR	**M**	**99,720**	**460**	**120**	**JN09**

NETHERLANDS

PE1AHX	**2**	**11,340**	**135**	**42**	**JO21**

SPAIN

EH3ATO	**6**	**551**	**29**	**19**	**JN02**
EH2CAR	**Q**	**4,320**	**80**	**54**	**IN82**

ASIA

THAILAND

E20LCH	**2**	**15,918**	**379**	**21**	**NK93**
HS8KVA	**2**	**4,544**	**284**	**8**	**NJ98**
HS8AN	**2**	**2,160**	**180**	**9**	**NJ98**
E20VOO	2	1,750	125	7	OK03
E21EIC	2	96	24	2	OK03
HSØXNO	2	96	24	2	OK03
HS3AN	**M**	**7,150**	**275**	**13**	**OK14**
E20KTU	**M**	**5,346**	**297**	**9**	**OK03**
E20REE	**M**	**4,208**	**263**	**8**	**OK03**

Top-gun rover W4VHF relaxes out in the field.

N9EXU piloted this fine station to the #2 QRP score.

fun! . . . **K9OM.** I just wanted to see what type of contest this would be: It might have been bad or very good! In the last 55 minutes 6 meters opened up and picked up contacts like VE4VX which helped my score . . . **KB9TLV.** I will need to put up more antennas than my current pair of verticals and no tower to be competitive . . . **KB9VMW.** I was not able to operate much during the contest, but did want to check out a new 6 meter "squalo" I was playing with. Had a lot of fun. Six meter contacts were with the new antenna made from an aluminum lawn chair! . . . **W9SR.**

I was mobile running at the drag races. Came in second and had fun doing both. It was tough to make any contact due to ignition noise from all the cars and could not take much time either day . . . **KØUK.** My first ever effort for the CQ Test. I didn't know what to expect, but the band opening on 6 was great! From what I could tell, participation was really good, a bit light here on 144 however. I had a great time for the few hours I had available to operate on the weekend . . . **KFØQ/R.** Good 6 meter conditions. Getting 2 meter Qs was tough but pulled a few out. Enjoyed the contest and seems the activity was up from 2000. Looking forward to next year. . . **NØDQS/R.** I just can't believe how the band has been these last few weeks. A really good opening in the contest . . . **NØFCK.** Lots more activity this year. Too bad I couldn't spend more time at it . . . **WA2HFI/Ø.**

Station Ops, Multi

E2ØKTU: E2ØKTU, E2ØVXI, E2ØWXT. **E2ØREE**: E2ØREE, E2ØNGF. **F6IFR**: F6IFR, F6CWN, F6GWV, F6HMQ. **HS3AN**: HS3NEX, HS3NKH, HS3NNE, HS8KOE. **K2IWR**: KB2FAF, KB2GIL, KB2HKB, KB2LUV, KB2NCW. **KB9PJL**: KB9PJL, KB9YSX. **N3EP**: AE3EZ, KC3QU, N3KAI. **N3WP**: N3WP, WA3RQD. **N4ION**: N4ION, N4JDB. **VA7ISL**: VA7AA, VE7DAY, VE7DDK, VE7DXG. **WT4IX**: KG4CHX, KG4EGX, KG4JFY, KG4JGF. **W7SAO**: W7SAO, WO9S, NØKE. ■

If you've plugged a 2 meter whip into your multimode HF/VHF rig and wondered why you're not hearing much on 2 meter SSB, the reason is probably your antenna.

Mobile Antennas For 2 Meter Single Sideband

BY GORDON WEST,* WB6NOA

Imagine this: operating 2 meter SSB mobile to a home station 400 miles away; no repeaters and no satellites to help. Or this: summertime tropospheric ducting where 2 meter SSB signals lock into an inversion layer, often traveling 1000 miles away, for two or three days on end.

"I was driving along the Pacific Coast Highway and called CQ on 144.200 MHz upper sideband, and the return call came from Paul, KH6HME, in Hawaii, 2500 miles away!" comments Julian Frost, N3JF. "He was *also* mobile, halfway up a volcano in Hawaii, and we stayed in touch for over an hour," adds Frost.

On 2 meter SSB down at 144.200 MHz, the national SSB calling frequency, it's common for Chicago mobiles to make summertime contacts with stations in Virginia. Two meter SSB operators on Long Island, New York will sometimes hook up with other mobile units driving to Key West, Florida. On Florida's Gulf coast, every summer on 2 meter SSB it's a week-in, week-out phenomenon to work mobile stations in Houston, Texas, which is well over 1000 miles away.

Radio manufacturers have stimulated activity in the weak-signal (SSB and CW) portion of the 2 meter band by including multi-mode VHF and UHF bands in many of their popular high-frequency transceivers. The trend began with ICOM's IC-706, and now includes its IC-746, Kenwood's TS-2000, and Yaesu/Vertex's FT-817 and FT-100. Before these radios came on the market, getting onto 2 meter single sideband generally involved a substantial investment for a single-band 2 meter, SSB-capable transceiver or a transverter and amplifier for an HF transceiver.

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Yes, you can put a 2 meter beam on your car, but it's a bit impractical if you're operating while driving. That's why most folks who operate mobile on 2 meter SSB, where horizontal antennas are a must, use some type of loop antenna. (WB6NOA photos)

More good news: The popularity of these HF transceivers which include 6 meters, 2 meters, and even 432 MHz multi-mode has prompted many hams to put up large directional antennas specifically tuned to the weak-signal VHF and UHF bands at their home stations. These stations with big antennas can more easily hear and be heard by mobile stations, making operating mobile on 2 meter sideband an ear-opening, wide-eyed experience. *However*, you need to have the right type of antenna on your car. It doesn't need to be big, but it does need to be *horizontal*.

Polarization

On 2 meters and 432 MHz SSB virtually everyone uses horizontal antenna polarization *exclusively*. Horizontal polarization cuts local power-line noise almost in half, appears to propagate slightly better over water and hilly terrain, and recent tests between my own station and KH6HME in Hawaii reveal that horizontal polarization has less deep dropouts during periods of long-haul tropospheric ducting than vertical-to-vertical polarization with about the same amount of gain.

More important, *cross-polarization loss* between horizontally and vertically polarized antennas can be as much as 15–20 dB! This is why if you tune into 144.200 USB with a vertical whip antenna, you probably thought there wasn't any 2 meter weak-signal activity in your area. Sure, you will hear your cross-polarized buddy mobile to base 20 miles away, but *he* can probably hear other

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HTX-252

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#19-1127, $159.99

New Dual-Band Handheld
HTX-420

Feature-rich, 2M/70cm transceiver with up to 5W on 2M, SAME weather alert plus digital compass. 100-ch. memory, 50 CTCSS enc/decode, 16-key DTMF with 6, 16-digit autopatch memory, lighted display and keypad, battery volt meter, condition indicator. 7.2V 1200mAh Li-ion pack and charger, and empty "AA" battery tray.
#19-1108, $269.99. Available in June.

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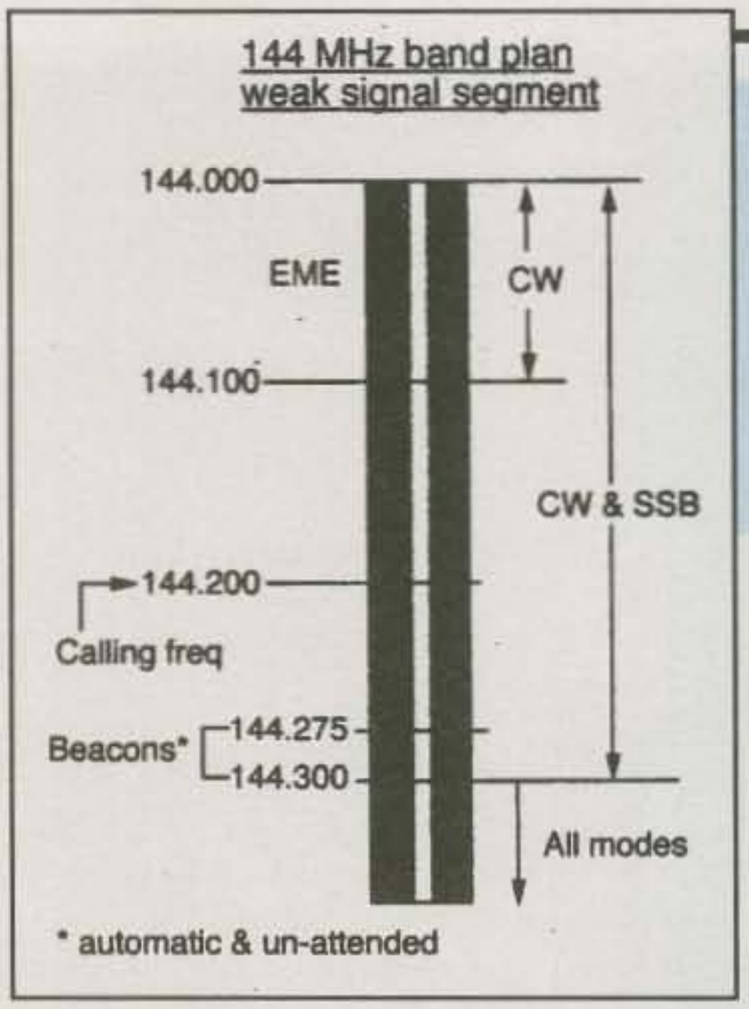


Fig. 1– This chart shows where to find different modes and activities in the weak-signal portion of the 2 meter band, between 144.000 and 144.300 MHz. While FCC rules permit all modes above 144.100 MHz (144.000–144.100 is reserved for CW and digital modes only), all commonly accepted band plans for 2 meters limit FM operation to frequencies above 144.300 MHz.

mobile operators who are horizontally polarized 200 miles away!

Going horizontal on a beam antenna at home is as simple as remounting it with the elements parallel to the earth using those two extra mast holes, the ones you wondered why they were there in the first place. Home stations should still be able to work repeaters cross-polarized, and they certainly will pick up other horizontally polarized base and mobile stations ten times farther away than before.

On the Road

For mobile setups, probably the most popular horizontal 2 meter antenna is the loop. Variations on these antennas have been around for years and are the best way to operate 2 meter SSB horizontally (See "Loop Antenna Sources" for a list of manufacturers.).

You also could homebrew your own loop using numerous designs in antenna handbooks, or you might luck out and spot a vintage Saturn or Hi-Par 2 meter loop at a swap meet.

Which Loop is Best?

I have conducted exhaustive tests with well-known weak-signal operator Chip Margelli, K7JA, attempting to see who makes the *best* loop antenna. The results were interesting: Each horizontal loop has its own unique mobile-mounting capabilities, and each commercially manufactured loop has almost identical unity gain in all directions, with physically larger loops having noticeably more nulls and peaks while doing a 360-degree drive test (driving in a circle while your partner stays in one place to see if the signal strength changes).

We also confirmed a minimum of 2 dB gain when you stack 2 meter loops. However, be sure to follow the loop manufacturer's stacking cable kit dimensions less you dramatically undo the gain you are hoping to achieve. Also, not all stacking cable kits are the same because of differences in the feed system; each manufacturer may claim its system is better than that of the competition. Separation between stacked 2 meter loops is typically 38–48 inches. Recommended minimum distance from the bottom loop (or single loop) to major horizontal metal on your vehicle (such as the roof or trunk lid) is no closer than 36 inches. However, satellite enthusiasts wanting maximum gain *upward* will space the lower loop at exactly 18 inches above the major metal on their vehicles.

Practicality

Start off with a single 2 meter loop. Pick the one which appears to have the easiest mounting system for your vehicle. Some will easily fit over the Hustler HF mobile mast. Some may be sold with a magnet mount that will keep the loop in place at most driving speeds. You don't need to get it sky high in the air, especially if you are operating while driving (as opposed to stopping someplace to operate). Just get the antenna up and in the clear, and make absolutely sure the mount is solid enough so the extra wind resistance won't blow it off the vehicle and have the car behind you squash it (or cause worse damage and/or injuries).

Once you have mounted a loop on your vehicle, use an MFJ SWR analyzer with 2 meter capabilities and sweep the loop looking for the sharp dip at the bottom of the band. Some loop manufacturers purposely offer deep and narrow resonance tuned to 144.200. This is good, as a real sharp dip will minimize out-of-band interference creeping in when you're operating weak-signal up near the repeater site.

On the Air

Okay, your loop is resonant, your feedline is hooked up to your multi-mode rig, and you are tuned to 144.200 MHz *upper sideband (USB)*. Double check that your RIT is turned OFF and that you're not set up for a repeater offset. On weak-signal VHF you always transmit and receive on the same frequency.

In the evening listen at around 7:00 PM for local nets. Tune 50 kHz high, and 50 kHz low, and spot the frequency where you find a net in your area ...

Loop antennas don't have to be round! This M² Sqloop is an omnidirectional, horizontally polarized antenna suitable for mobile or fixed use.

2 Meter Weak-Signal Frequencies

144.200 MHz is the calling and greeting frequency for weak-signal operators over 2 meters. Two meter weak-signal operators use upper sideband on this frequency, with CW contacts usually taking place below 144.100, and FM *above* 144.300 MHz. The area between 144.100 and 144.300 is recognized as the 2 meter weak-signal band plan, so no FM down there.

You can get 2 dB of extra gain on your mobile SSB signals by stacking two loops, as shown here. Be sure you have a sturdy mount.

or maybe farther away than you thought possible on 2 meters! Most nets normally transmit OFF of 144.200; it's a calling frequency, not a chatting frequency. Wow! This Sunday night you're hearing three different nets at 7:00 PM—one on 144.180, one on 144.210, and one on 144.240. Take your pick. Wait until net control asks for visitors, and jump in with your callsign (phonetically) and your mobile status along with the city or town nearest you. You'll probably jump out of the front seat when the net control says you are 5 by 8 coming into *his* city almost 300 miles away. This is *very common* on 2 meter SSB.

Stick around. Two meter and 432 MHz weak-signal operators are best known for fun, friendly contacts that go well beyond just a simple signal report or the brand of radio they are using. Rather, your local weak-signal net will talk about monthly gatherings and mobile loop shootouts; loop parties coming up where you might roll your own out of copper plumbing; weak-signal upcoming contests; and regularly scheduled "eyeballs," where all of the weak-signal operators drive in with their crazy-looking 2 meter mobile loop antennas and swap stories about mobile-to-mobile contacts in excess of 300 miles. Stick around after the net, too, for some good one-on-one contacts. Most weak-signal operators are happy to welcome newcomers.

So go horizontal down on 144.200 MHz. Forget about hearing anything more than a few miles away if you're still using your mobile whip or that omnidirectional, fiberglass base-station antenna. You won't hear much. Get a loop, or a beam for the home, or a pair of loops hidden in the attic for the condo, and stand by for 2 meter SSB DX! ■

Loop Antenna Sources

The following are the major manufacturers of VHF loop-type antennas for horizontal mobile use:

KB6KQ Loops, Carson City, Nevada (775-885-7885)

M² Antenna Systems, Fresno, California (209-432-8873; <www.m2inc.com>)

Olde Antenna Lab, Parker, Colorado (303-841-1735)

Par Electronics, Lantana, Florida (561-586-8278)

Tillo-Currie Big Wheel Antennas, Ann Arbor, Michigan (734-668-8696)

It looks like a typical dual-band HT. But press the "digi" button and you've entered a new dimension of ham radio technology … plus a new level of ham radio excitement.

CQ Reviews:

The Alinco DJ-596T Handheld With Digital Voice Option

BY RICH MOSESON,* W2VU

If you were ever the first kid on your block to get a new kind of toy, one that every other kid you knew wanted to play with, then you'll know what it's like to be the first in your club to have a pair of Alinco DJ-596T handhelds with the digital voice option. This little radio has generated a level of excitement I haven't seen in ham radio in at least 20 years, taking me back to scenes of people crowding around a computer monitor to watch lines of text appear on the screen when something called packet radio first came on the scene, or folks with their ears glued to their 2-meter FM rigs, listening for the first live ham radio signals from space to come up out of the noise as the shuttle Columbia rose above the horizon.

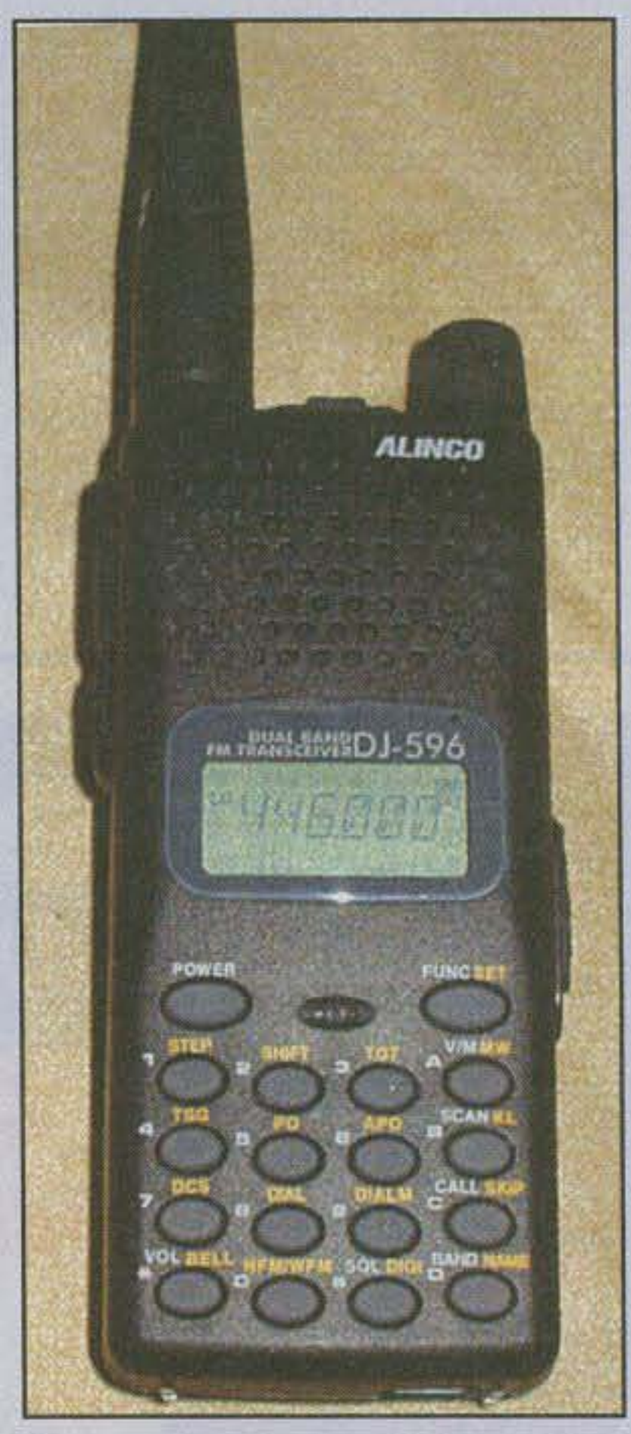
Here's what it was like at *CQ* with the 596: On the day the rigs arrived, Publisher Dick Ross, K2MGA, put his work aside for a few minutes to talk with me across the office, seeing if we could hear a difference between analog and digital voice (A few other staff members—non-hams—responded to our high-level technical experimentation by building a string telephone!). Next, *Popular Communications* Editor Harold Ort, N2RLL, took one of the rigs with him on a walk to the bank (but wisely put it away before going into the building). *CQ* "Computers and Internet" Editor Don Rotolo, N2IRZ, took a few hours off from work one day to help me do some field testing. Contributing Editor at-large Gordon West, WB6NOA, talked from his right hand to his left hand while we were driving down the highway (He was talking; I was driving.). At the Tropical Hamboree in Miami, *CQ* Advertising Manager Arnie Sposato, N2IQO, helped me with additional tests, as did HAL Communications President Bill Henry, K9GWT, and a few other hams I bumped into on the air.

This radio generates a host of questions. How is digital voice different from analog FM? What are the benefits and drawbacks? Is this the start of a new age in ham radio? I'll try to provide a few answers to these questions in this review, starting with the last one: Yes, I have no question that we're entering a new age in ham radio, and that other manufacturers will soon be introducing digital-voice rigs as well.

Inside the DJ-596

I'd like to start out by introducing you to the radio itself and then move into the results of our field tests. There are three distinct components of this radio that merit discussion: the DJ-596T as an analog dual-band handheld; the EJ-43U digital voice board, and believe it or not, the connector into which you plug that board. Putting the three of them together gives you a new radio—one that communicates in digital voice. Let's start with the analog part of the 596.

Ignoring the digital part of the radio—which its manual does and which you'll have to do if you want to operate on most repeaters (more on that later)—the DJ-596 is a good, no-nonsense dual-band handheld that will hold its own in the marketplace quite well. It offers up to 5 watts output, 100 memory channels in any combination of VHF or UHF settings, CTCSS encode, and digital coded squelch (DCS). Plus, it lets you give alphanumeric tags (names) to memory channels, offers seven different tuning steps from 5 to 30 kHz, variable transmit frequency offsets (splits), and most of the other features we've come to expect in today's HTs. It even offers a theft alarm, external terminal control (an incoming signal turns on 5 VDC up to 5 mA on the mic line), plus Alinco's exclusive—and still experimental—mosquito-repellent tone (for real; it's an ultrasonic tone that the com-



The Alinco DJ-596T is part dual-band analog FM handheld and—with an optional circuit board—a pioneering digital voice transceiver. (W2VU photo)

*Editor, CQ

MFJ *Apartment* Antenna

Covers 40 thru 2 Meters . . . Mounts outdoor to windows, balconies, railings . . . works great indoors mounted to desks, tables, bookshelves

MFJ-1622
$99.95
New!

New MFJ-1622 Apartment Antenna lets you operate 40 thru 10 Meters on HF and 6 and 2 Meters on VHF with a single antenna!

Its universal mount/clamp lets you easily attach it to window frames, balconies and railings. It also works great indoors mounted to a bookshelf, desk, or table. It's not a 5 element yagi, but you'll work your share of exciting DX!

Highly efficient air wound "bug catcher" loading coil and telescoping 5½ foot radiator lets you really get out! Radiator collapses to 2½ feet for easy storage and carrying.

It includes coax RF choke balun, coax feed line, counterpoise wire and safety rope. Handles 200 Watts PEP.

Operating frequency is adjusted by moving the "wander lead" on coil and adjusting counterpoise for best SWR.

MFJ Ground-Coupled Portable Antenna Base

Provides effective RF ground and stable mount for vertical antennas . . . Antennas radiate well with low SWR

MFJ-1904
$99.95
New!

MFJ *Ground-Coupled Portable Antenna Base*™ provides an *effective* RF ground 160 through 2 Meters and a stable mount for vertical antennas.

Capacitive coupling to ground is a *time-proven* principle. It needs no tuning and antenna radiates well and gives good SWR on all bands. Performance is similar to mobile stations when using a mobile antenna but is far better with longer antennas.

The base can support a lightweight multiband vertical antenna -- like the all band Hy-Gain 18AVS and the bandswitching MFJ-1795 -- and provide a semi or permanent installation.

You can easily set up and take down vertical antennas for stealth operation and hide the base by covering it with dirt.

The MFJ-1904 is a 2x2 foot *stainless steel* square with reinforcing bends that greatly strengthens it. Folded and tapered six-inch *stainless steel* legs firmly anchor the MFJ-1904 into the ground.

Built-in antenna mount with SO-239 coax connector and two U-bolts lets you mount most standard and homebrew vertical antennas.

Standard 3/8-inch x 24 mobile mount is built-in for MFJ Mobile Whips, bug catchers, *Hustlers* and screwdriver antennas.

Two handles make carrying and removing the base fast and easy. You can also attach radials for improved performance.

33 Feet Telescoping fiberglass Mast . . .

Collapses to 3.8 feet, weighs 3.3 lbs.

MFJ-1910
$79.95

Super strong fiberglass mast has huge 1¾ inch bottom section. Flexes to resist breaking. Resists UV. Put up *full size* inverted Vee dipole/vertical antenna in minutes and get *full size performance!*

MFJ Vertical

for Antenna Restricted Areas

40, 20, 15, 10 Meters, Automatic Band Switching

MFJ-1795
$149.95
New!

Perfect for permanent or portable operation in antenna restricted areas. Hide behind trees, fences, buildings, *in* bushes -- only 7 to 10 feet tall (adjustable).

Low angle of radiation for DXing, omni-directional, handles 1500 watts PEP, low SWR.

Highly efficient end-loading. Entire length radiates.

Ground mounts with suitable ground such as MFJ-1904 *Ground-Coupled Antenna Base*, radials or ground rods. Or roof mount with radials.

HF mini-Bugcatcher

Highly efficient 40 - 6 Meter base-loaded 5½ foot Bugcatcher mobile antenna . . . Use light duty mounts

MFJ-1624
$79.95
New!

Become an *"HF Mobileer"* almost instantly with this *new* MFJ high-efficiency *mini-bugcatcher* mobile antenna! Have tons of fun rag-chewing and DXing on the HF bands. Turn boring drives into fun-filled ham adventures.

Attach a simple mount to your vehicle (*mounts*: trunk lip, MFJ-347, $39.95; mirror or luggage, MFJ-342, $9.95; tri-magnet, MFJ-338T, $19.95) . . . **Screw** in your MFJ *mini-bugcatcher* . . . **Throw** your rig into your car, plug into cigarette lighter and turn power down to 20 Watts (to avoid overloading your cigarette lighter; MFJ-1624 handles 300 Watts PEP). **Operate!**

Bugcatcher design uses large highly-efficient *air-wound* inductor -- far out performs other compact HF antennas. *Exclusive* built-in inductive matching network keeps SWR low. 5½ foot whip collapses to 2½ feet for easy storage and low garages. Base loaded for minimum wind load and light duty mounts. Change band by moving *wander lead*. 3/8x24 in. mount.

MFJ Portable Antenna

MFJ-1621
$89.95

Operate from apartments, homes, hotels, campsites, beaches or any antenna restricted area. Work all bands 40, 30, 20, 17, 15, 12 and 10 Meters.

DXCC, *WAZ, WAC, WAS have been won with the MFJ-1621!* Compact 6x3x6 inch cabinet has 4½ foot telescoping whip, built-in antenna tuner, field strength meter and 50 feet coax. Handles 200 Watts.

MFJ Super High-Q Loop

MFJ-1786
$379.95

MFJ's *tiny* 36 inch diameter *high-efficiency* loop antenna performs like a *full-size* dipole! Operate 10 thru 30 MHz *continuously* -- including WARC bands!

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

Mounts vertically or horizontally. Low angle radiation gives you excellent DX.

Super easy-to-use! Remote control autotunes to desired band, then beeps. No control cable needed. Handles 150 watts.

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

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- *gives you highest possible efficiency*. Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

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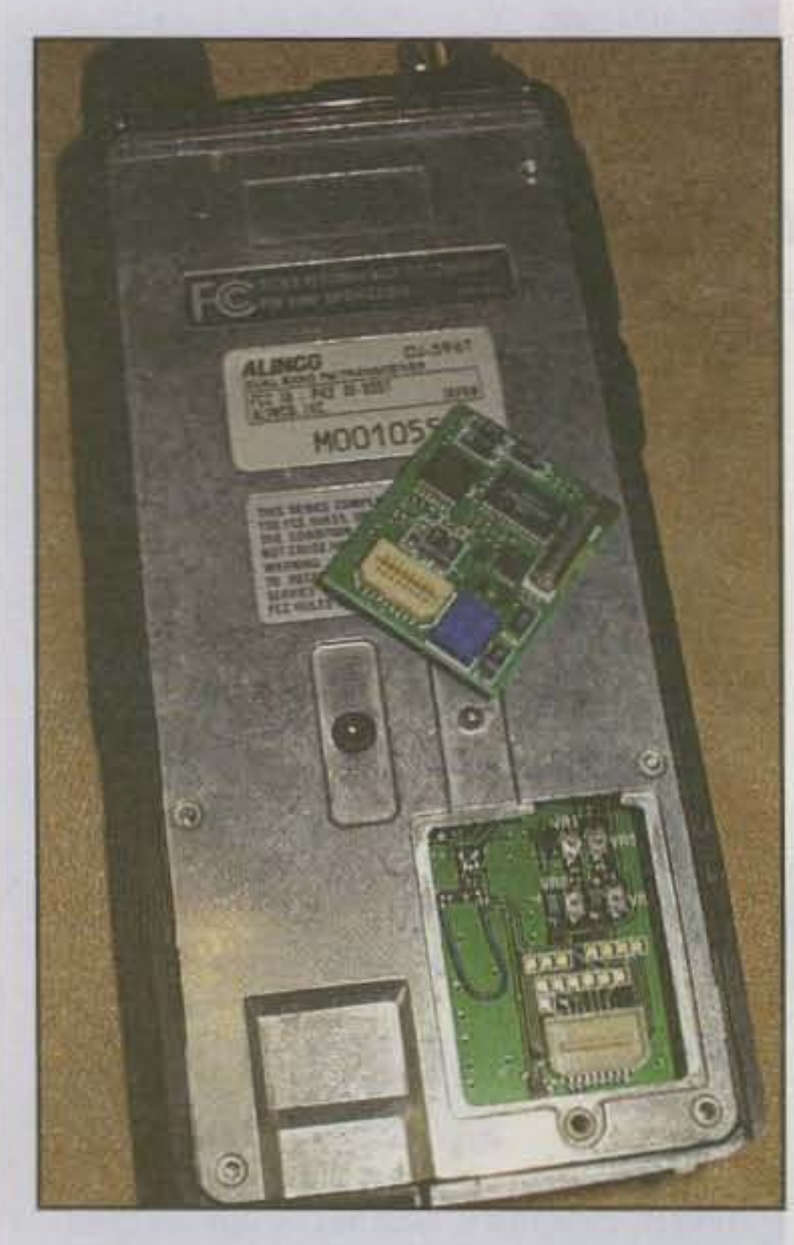

The EJ-43U digital audio board (seen here just before installation) plugs into a special socket behind a trap door in the back of the DJ-596T. (W2VU photo)

pany says is disliked by some, but not necessarily all, mosquitoes!). Memories are cloneable by wire between two matching radios (WB6NOA tested this function, along with the autodial, and found both easy to use.) and it will accommodate standard AFSK packet at up to 1200 baud (Remember, this is in analog mode.).

On the air, I received consistently excellent audio reports, the radio held repeaters very nicely, even on low power, and I encountered very few intermod problems, even while driving through New York City with the radio connected to a trunk-mounted antenna. The nickel metal hydride (NiMH) battery pack holds a charge for a good long time, but as is typical of NiMH batteries, drops down from full power to nothing very quickly when it reaches a certain discharge level. It's always good to carry a spare charged battery pack with you.

One feature that I never quite got used to is the fact that there is only one control dial on the radio, and in order to change the volume or squelch setting, you must first press the VOL or SQL button on the keypad, then turn the dial. I found this to be inconvenient, for example, while driving and monitoring the radio when my cell phone rang. Even with my hands-free headset on the cell phone (as required by New York State law), a loud radio next to me made it difficult to hear. I generally ended up shutting off the radio instead of turning it down, because it was quicker to find and press the power button. Another minor annoyance with the DJ-596 was that it's too easy to reprogram the memory channels. I lost count of how many times a VFO setting would accidentally be written over whatever memory channel I was last on, and I'm still not sure how it happened, although it happened many times.

Beyond these little quibbles, though, the analog side of this radio is excellent and is a good value in its $300 price range.

Doin' Digital

What sets apart this radio from other dual-banders, though, is the fact that you can spend another $100 ($113, actually) and get a tiny circuit board that plugs into a socket behind a trap door behind the battery case and gives you a radio capable of digital voice communications. (For some reason, the DJ-596 manual makes absolutely no mention of its digital capabilities, does not mention the EJ-43U digital board, and offers no explanation of the "DIGI" label on the button marked "SQL DIGI." As far as the manual is concerned, the DJ-596 is an analog-only radio. However, there *is* considerable information about the radio's digital features on the Alinco website.)

This is something new for the amateur market, even though it's been a topic of discussion for several years. Two years ago, the ARRL Board of Directors approved a recommendation from its Technology Task Force "that the ARRL proceed with the development of digital voice for the Amateur Service," and appointed a group of "individuals knowledgeable in the field of digital voice" to guide the effort. As of this writing, there has been nothing concrete from this panel of experts.

Meanwhile, Alinco didn't wait for the ARRL or anyone else. It went ahead and developed a board that *does* digital voice, and does it in accordance with an international open-modulation protocol, so it's perfectly legal, at least in the U.S. (see below). Here's how it works: When you speak into the microphone, the analog voice signal is converted into a 14.4 kbps digital stream by a Continuous Code Delta Codec (CVSD), then processed by the board's microcomputer chip using the open ITU-TV.32 digital voice protocol, and transmitted via a GMSK (Gaussian Minimum Shift Keying) modem. On the receive side, the digital signal goes through the GMSK modem, the microcomputer chip, and the CVSD, which translates it into an analog voice signal and sends it to the speaker. Any radio capable of receiving ITU-TV.32 encoded digital voice signals can recover the analog audio, and Alinco makes a similar board (the EJ-40U) for use in its DR-135, -235, and -435 mobile radios. Plus, Alinco has just announced that it will introduce the DJ-296, a 222-MHz handheld, at Dayton. It will also be able to use the EJ-43U digital board.

What about the legalities? FCC rules on digital codes permit the use of "any technique whose technical characteristics have been documented publicly" –as long as there is no intent to obscure the meaning of their communication. In addition, "unspecified digital codes" are permitted above 50 MHz, again provided there is no intent to obscure the meaning of the communication. These signals appear to fall under the "unspecified digital codes" provision and are thus legal in the U.S. (see Section 97.309(b) of the FCC Rules for additional details).

The Digital Board and Socket

CQ's "Computers and Internet" Editor Don Rotolo, N2IRZ, helped me conduct field tests of the DJ-596. Then he discussed the potential advantages of the digital board, as distinct from the radio, and even of the digital board *socket*, as distinct from the board! According to Don, the board provides a platform for digital repeaters, which are different from traditional packet digipeaters in that they're real-time (like voice repeaters) rather than store-and-forward; could ease repeater linking because there's theoretically no signal degradation and no loss of audio qual-

List Prices

DJ-596T 2m/70cm transceiver: $301.95
DJ-296 222 MHz transceiver (available May 2002): $249.00
EJ-43U digital board: $113.00
EJ-40U digital board (for Alinco DR-x35 mobiles): $124.00
For more information, visit your favorite Alinco dealer or contact ATOC Amateur Distributing, 23 S. High St., Covington, OH 45318; (telephone: 937-473-2840; web: <http://www.alinco.com>).

Testing the DJ-596 on a spectrum analyzer showed that the digital mode actually had less deviation than the analog voice mode, even though the digital signal seems wider. (WB6NOA photo) →

Measured Specifications
Alinco DJ-596T

Transmit power on battery: 4.8 W VHF, 4.2 W UHF
Transmit power on 12 VDC: 5.3 W VHF, 4.7 W UHF
Deviation
- Analog voice: ±4.8 kHz ("hot")
- Digital voice: ±3.0 kHz (normal)
- CTCSS: ±400 Hz (normal)
- DTMF tone pad: ±2.0 kHz (normal)

ity between links; and provides good packet potential—with a 14.4 kb/s modem virtually guaranteeing good performance at 9600 baud (and yes, 9600 baud *is* legal on 2 meters; in fact, speeds up to 19,600 baud are legal on 2 meters! Look it up.).

Don also looked into future possibilities, beyond the basic abilities of the EJ-43 board. Future generations of digital boards, he noted, could include digital signal processing (DSP), and could be used for tasks such as routing signals or switching circuits. Don also noted that an experimenter could use the socket to connect his/her own board to the radio. "This is a baby step in the direction of smart radios," he explained. "With automatic power control and the ability to adjust frequencies on the fly, it could be like a multicasting cell phone."

"You could have repeaters with features such as chat rooms," Don added. "You can also connect your own board

to the socket on the rig, creating an RF entry/exit point for whatever the external board is capable of doing."

Getting Digital-Capable

First, let's do a "walk-through" of installing the digital board and putting the radio into digital mode. Start by removing the battery pack from the back of the radio. On the rear panel, you'll see a little "trap door" held closed by a tiny screw. Using a jeweler's screwdriver, remove the screw and the cover plate. Unpack the EJ-43U board and line up its connector with the one behind the trap door (There's only one way it'll fit.). Press the board securely into place in the connector, then replace the cover and screw it shut. Installation complete.

Now, turn on the radio, press the FUNC SET key, then press the SQL DIGI key. A string of six digits (probably all zeros) will appear on the LCD screen. Ignore them. They're designed for commercial versions of the radio, which allow users to select up to 500,000 variations of the coding protocol. They do nothing in the amateur version. Press FUNC SET again or the PTT (press to talk) switch, and the numbers will disappear. A speaker-like symbol will appear on the screen to indicate that you're in digital mode.

At this point, analog signals will not be audible, although they'll still be there (of course) and will show up on the S-meter. Because of this, and the fact that digital signals monitored on an analog radio come through only as noise, it is *essential* that you monitor the frequency in analog mode before going digital in order to prevent accidental QRM. In one of my tests at the hamfest in Miami, my digital signal was full-scale noise to another ham listening in analog a couple of hundred feet away. A digital QSO at that point would have wiped out any analog QSOs on the same frequency. Bottom line: Digital and analog voice cannot share a single frequency, and users of one mode cannot tune in the users of the other mode. Alinco Manager Katsumi "Naky" Nakata, KE6RD/JE6AVS, points out that future band plans may have to designate separate frequencies for digital and analog voice. So be sure to listen on analog before switching to digital, and as a courtesy to other hams, it wouldn't be a bad idea to identify in analog and say you're switching to digital voice. If nothing else, it should prompt the "lurkers" on the frequency to ask you what in the world you're talking about, and will give you another chance to demonstrate how cool you are because you have digital voice and they don't!

On the Air in Digital

OK, so how does it work? How does this particular radio perform using digital voice in everyday amateur communications? Overall, quite well, with only one noticeable problem—audio quality—and that needs to be viewed in the proper perspective, which we will do in a moment. As I mentioned in the beginning, several of us made informal tests at the office and elsewhere, and N2IRZ and I conducted some slightly more formal field tests in my neighborhood.

On 2-meter simplex at a range of about one third of a mile (on low power, with obstructions), we started losing signal (It wasn't easy to get the signal to drop!). As Don went down into a culvert, the signal disappeared completely when the antenna went below ground level. There was no fading, but as the signal weakened, dropout became more and more noticeable. The signal either was there or was not, but many times a second. It sounded like very fast picket-fencing. Signals on 440 seemed a bit better than on 2 meters, perhaps because signals tend to bounce off the rock walls of the culvert better at 440 than on 2 meters, and because it was winter with no foliage to absorb the 440 signals.

We did notice that audio quality was less than we've come to expect with analog FM radios, with noise even at a range of a few feet. However, it did not degrade (or improve) as the distance changed, and frankly, outside of a quiet indoor environment, you probably wouldn't notice it if you weren't listening for it.

Alinco freely admits that the digital audio isn't CD-quality, explaining on its website that "(d)ue to simplified circuit design, the error-correction rate is not as high as more expensive 'cutting-edge' commercial rigs." Alinco's Naky Nakata also noted that the relatively narrow bandwidth of a standard amateur FM signal (16 kHz) further limits audio quality. But he emphasized that high-quality digital audio was *not* the company's goal in introducing this product:

By offering the DJ596 and DR135 series radios, we are trying to give amateurs the opportunity to test and experience the digital voice mode at affordable prices. The spirit of amateur radio is to experiment with something new in communication and radio technology, not to obtain a stable digital data stream.

Who wants to connect to the internet over the ham bands with slow download speed except for experimenting? Just pay $19.95 a month and you can enjoy full mobile wireless PC access and cell-calls, right?

We just wanted to offer a new playground in voice communication to the amateurs. After that it's only hams' imagination that will limit how to play with it.

Actually, one of Japanese microwave interest groups made available to club members a modification board to use our EJ40U with (the Yaesu) FT-817 and their handmade microwave rigs (10G and up). I have

seen an article in the Japanese *CQ* about how to modify our unit to use with our competitors' mobile radios. This is what we wanted—to generate a general interest about digital voice technologies for ham use, with simpler, more affordable hardware.

Naky pointed out that adding bandwidth (permissible on 440) would provide better audio, but at a higher cost, noting that "we are offering a little modification to commercial users, enlarging the filter frequency and bandwidth a bit to send more data to obtain higher audio quality, and using a TCXO (temperature-compensated crystal oscillator) to stabilize the signal more and eliminate communication error caused by frequency drift."

Repeater Operation

Our digital tests were conducted almost exclusively on simplex. We made one attempt at using a repeater while in digital mode (with permission from the control operator). Since the repeater was CTCSS (PL®) controlled, the digital signal didn't even key it up. This is because, as Naky explains, "CTCSS is an analog system. Entering into the digi mode automatically deactivates the PL mode. In digi, the radio detects only GMSK-modulated signals, and they become audible only if a coding protocol matches. If a non-matching GMSK signal is received, the radio opens squelch but only white noise can be heard from your speaker."

Theoretically, the digital mode should work through a carrier-access (non-CTCSS) repeater, but Naky says don't count on it working in reality. "For repeater use, all transmit, receive, and repeater frequencies must be very accurately aligned, stable, and capable of high-speed data transfer. You may try using open repeaters with NO CTCSS, but if the setup is not accurate, you may encounter a poor result."

In many cases, there are little differences in frequency between your rig, the repeater, and the radio of the person you're contacting that aren't apparent to the ear but are obvious to a receiver looking for either a one or a zero and nothing in between. As Naky puts it, "Anything that obstructs data transfer is an enemy of digi mode." So don't be surprised if you have problems using the 596 in digital mode through an analog repeater (according to Naky, the Japanese Amateur Radio League is experimenting with a digital repeater network for voice and data communications. Called D-Star, the network will use a 10 GHz "backbone" between repeaters, with user inputs and outputs on 1.2 GHz).

Digital Bandwidth

One other observation during the tests of the 596 was that the digital signal, monitored on an adjacent analog handheld, appeared to be wider than the analog signal in terms of breaking the squelch on adjacent frequencies, with more signal above the center frequency than below. However, additional tests produced contradictory results, so I asked WB6NOA, who has better access to test equipment than I do, to take some measurements.

Gordon checked out the radios on a spectrum analyzer, an MFJ deviation meter, and a frequency counter. He found the frequency on one unit to be about 1 kHz high, and another about 400 Hz high, but doubts that that's significant enough a difference to account for the noise we heard on the digital audio. In terms of deviation and bandwidth, both were measured at approximately ±3.5 kHz in digital mode, well within the specs of ±5 kHz (A DTMF tone, by comparison, measured ±2 kHz; see "Measured Specifications" box.).

However, Gordon also noticed that the radio in digital mode opened the squelch of an analog radio tuned 15 kHz higher in frequency. His conclusion is that this is due to the 100% modulation of the digital signal, which is constantly transmitting a datastream even if you're not talking, rather than the brief peaks and valleys of an analog FM signal (Think of the difference between a RTTY signal and a CW signal.). Again, this stresses the need to be considerate of hams operating on adjacent frequencies and the likelihood, as digital voice takes hold (which it will), that band plans will have to be revised to keep digital and analog signals separated.

Gordon also tested the radios through a carrier-access analog repeater. As predicted by Alinco, they were able to get through sometimes, but not reliably (See Naky's comments above about repeater operation.).

Conclusions

The Alinco DJ-596 is really two radios in one package—an excellent dual-band analog radio for everyday use, and a very reasonably-priced testbed for experimentation with digital audio over amateur radio. I have no reservation about recommending it for either function, and especially for both. I hope digitally-oriented hams will take advantage of this new "playground" for amateur experimentation and help advance the state of the art for narrowband digital voice communications. ■

Where can you go to learn the things you didn't need to know for your license exam but you DO need to know to be successful on the air? Things such as the truth about SWR, DXing tips, or how and why you'd use APRS (or even what it stands for)? If you live on New York's Long Island, the answer is Ham Radio University, an idea that any group of experienced hams can adapt for any other location.

It's Not A Hamfest!

BY DIANE ORTIZ,* K2DO

"Thanks for calling about our event. No, you can't buy a table. It's not a hamfest!" How many times have we said those words on the telephone and on e-mail over the past few years? The next question usually is, "Well, what is it then?"

It started with Phil Lewis, N2MUN, who had the beginnings of an idea. As president of the Great South Bay Amateur Radio Club (GSBARC) on the south shore of Long Island, New York (about 50 miles east of New York City), Phil saw that many of the club's newer members needed help getting on the air. Both experienced and new hams wanted to know more about the technical aspects of the hobby as well.

A few decades ago most people came into amateur radio by way of an Elmer (or Elmira?)—teachers in their schools (often the shop or science teacher), friends, or family members—or were exposed to it in the service or via their jobs. The latter is especially true on Long Island, where Grumman and other aerospace and electronics companies had large facilities. These days most new hams take a class or purchase a book at RadioShack or from the ARRL and take their FCC license exam at one of the many Volunteer Exam sessions. Often there's no one close by to help them purchase equipment, set up their station, or get on the air.

Phil thought that we should do something to help resolve this situation and got together with ARRL NYC/LI Section Manager George Tranos, N2GA. Many "diner meetings" later, and together with Tom Carrubba, KA2D, myself, and representatives from the leadership of other clubs in the area, Ham Radio University was born. The idea was to have some type of event where local hams could go to learn about various aspects of the hobby.

Visitors to Ham Radio University on New York's Long Island were greeted by a banner and a display of QSL cards.

Planning for HRU 2000

The first few planning meetings were the most difficult. The logistics were daunting. We didn't have any money. We weren't sure where or when to have the event, and if we did have it, would people come? Everyone had a different idea of what direction we should take. Some wanted to target retirees, while others thought that we should go to the local schools and get the kids involved. There were so many possibilities, and we knew that we had to narrow our focus or we would fail. Finally we decided to target the inactive ham—someone who didn't belong to a local club, was on the air infrequently or not at all, and maybe never did get on the air after getting his/her license. With that decision out of the way, the next few came quickly.

GSBARC offered to be the host club and secured a place to have the event from the local town at minimal cost. It was a former school now used for cultural activities and meetings. It had some classrooms we could use for forums and a large cafeteria where we could set up club tables. Ham Radio University was finally coming into focus!

There were many discussions about when to hold this event. In the summer? That was voted down, as the school doesn't have air conditioning and here on Long Island most people would rather go to the beach or out on the water in the summer. Spring and fall

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HRU Chairman Phil Lewis, N2MUN (left), and ARRL NYC/LI Section Manager George Tranos, N2GA, welcome attendees to the 2002 session of Ham Radio University.

were out as well, because there were many local hamfests and with contests, holidays, etc., it seemed as if every weekend there was some kind of conflict. We finally decided that January would be the ideal time. The school was only available for the entire day on a Sunday, so we picked the third Sunday in January and made sure it wasn't Superbowl Sunday!

With a location and date out of the way, we concentrated on setting our priorities. All of our ideas were great, but we needed a specific plan. The committee brainstormed and came up with a workable outline. Throughout the day we would have forums running on topics ranging from the digital modes to purchasing equipment for your first station. All the clubs in the area would be invited to set up tables at no charge and encouraged to bring their banners and have materials about their groups on display as well as someone there to answer questions. There would be no flea market, and everyone would be a volunteer. The committee decided to ask for a donation of $2 per person at the door to cover the cost of printing flyers and providing free coffee and donuts.

It all sounds so disciplined and organized, but in reality the first time was anything but easy! There were so many things to take care of, such as contacting the speakers and clubs; publicity; badges; getting extra tables and chairs to the site; a talk-in station; signs; organizing the volunteers; and finding out who needed a projector, screen, black-

Looking Ahead in CQ

Here are some of the articles that we're working on for upcoming issues of *CQ*:

Antenna Special in July!

- "*CQ* Reviews: High Sierra HS-1500MkII Antenna," by WB6NOA
- "An Electrically-Shortened Two-Band Dipole," by VE3ERP
- "Build 6 Meter J-Poles from CB Ground Planes," by KB6LZW

Plus...

- "*CQ* Reviews: Win-EQF Logging Software," by AAØA
- "An Automatic Power Supply/Battery Charger," by K7PF
- "Applying for Operating Awards," by K5RT

Do you have a ham radio story to tell? See our writers' guidelines on the CQ website, <http://www.cq-amateur-radio. com>.

board, etc., for their forum and then finding out who had one they could bring to the event. We made lists, assigned tasks, and begged and borrowed what we needed. One thing we did find out is that you can find just about anything if you put your mind to it, and once the ball started rolling with Ham Radio University, people who wanted to host a forum or just help out began to contact us. The clubs were encouraged to publicize the event in their newsletters and on their nets and web pages.

By the time the end of December 1999 rolled around, we were meeting practically every week, either on the air or at the Babylon Town Emergency Operations Center, where GSBARC has a small room and station. The forums were set, the donuts were ordered, and now all we needed were attendees. Everyone was nervous: Would it be a big success or a huge flop?

At that first Ham Radio University on Sunday, January 23, 2000, we had 15 different 45-minute forums. Three forums were run simultaneously and the sessions started at 10 AM. The forums included the following:

•ARRL (Amateur Radio License Restructuring and how it may affect you)

•Packet Radio Today, including the new FLEXNET

•SWR (standing-wave ratio)—myths and facts

•DXing—learn about the correct method to snag that rare DX station

APRS – Automatic Packet Reporting System, how it works and why to use it

•YL Forum—issues affecting women in amateur radio

•Contesting—getting started in amateur radio contesting

•Satellites—how to work amateur radio satellites

•QRP—low-power communications fun

•Antennas—antenna theory and practical uses

•ARES—Amateur Radio Emergency Service, emergency communications

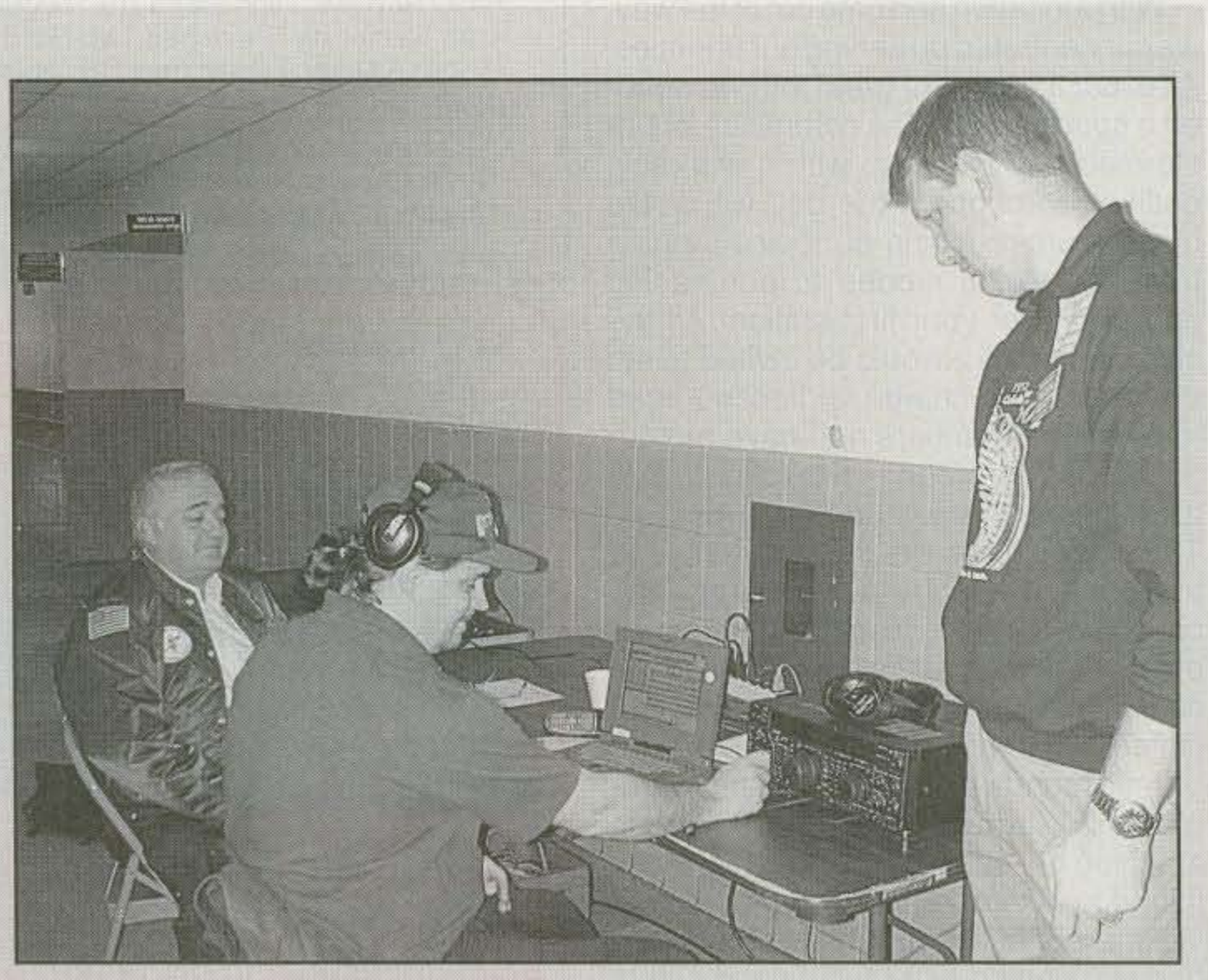
Kit Building—tips and techniques on how to build your next radio

•Tower Regs – how to go about erecting a radio tower, zoning regulations

•QCWA—Quarter Century Wireless Association for hams of 25 years or more

•Purchasing Equipment—guide to purchasing amateur radio equipment

At the end of the day there was a license exam session. The moderators were local hams who were well-known for their expertise in their topics. We had a very good turnout with about 150 people attending (not including the volunteers from the committee and clubs) and were very encouraged by the response. We immediately started planning for the next year!



A special-event station, W2V, put Ham Radio University on the air as well as on he map. It was one of several activities throughout the day-long event.

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

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

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

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

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

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

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

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

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

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Hams who had been active enough to qualify for various operating awards had the opportunity to have their QSL cards checked and applications certified.

HRU 2001

We had kept track of how many people were at the different forums for HRU 2000 and put together as much information as possible from the forum moderators and clubs. We wanted to get a "profile" of who had come to our event to make the next HRU even better.

"We were very successful in targeting the inactive hams," said chairman Phil Lewis, N2MUN, "and happy to see so many new hams as well. Many families were there as well as some people who had seen the announcements in the local paper and wanted to see what it was all about."

Everyone was surprised by the 63 people who attended the VE session. "We administered over 75 exams that day," said Volunteer Exam Coordinator Tom Carrubba, KA2D. "We had to move from a classroom out to the cafeteria to accommodate everyone!"

One outcome of HRU 2000 that no one had anticipated was the friendship and respect that resulted from all the clubs working together toward one goal. There had always been a lot of friendly rivalry and competition among the clubs, especially with hamfests and Field Day. Except for an ARRL New York City/Long Island Section picnic, there had never been so much inter-club participation and cooperation. Many club members and officers from the different groups had never met before Ham Radio University. In 2001 HRU also became the ARRL New York City/Long Island Section Convention.

"It gave me the opportunity to support HRU even further," said ARRL NLI Section Manager George Tranos, N2GA. "Many of our section staff volunteers were involved in the committee, and as forum presenters . . . Ham Radio University is a tremendous benefit to the amateur radio community and I'm proud of how everyone worked together to make it a successful event."

On January 20, 2001, the eve of the second annual Ham Radio University, Mother Nature decided to give us a little present. Snow started falling and continued throughout Sunday, finally reaching six to eight inches. Some of the speakers had trouble getting to the site, and we delayed the start an hour. We had increased the forums to one hour in length and added some new ones: Introduction to Ham Radio; Handie-Talkies; HF Digital Modes including PSK 31; 6 Meters "The Magic Band"; and an Ask the Experts session. There was also a special-event HF station W2V set up that was manned by John Nistico, NY6DX. People still came, but attendance was down a bit. Many thought we had cancelled the event because of the bad weather. As the day progressed, more people came and there was talk of moving the event to the spring or summer the next time.

HRU 2002

The committee decided to go ahead with Ham Radio University 2002 in

January. Instead of changing the date, we added, "will be held rain, snow, or shine" prominently on the flyers and web page. There were glitches here and there (a room that at the last minute wasn't available, a projector bulb that blew out, etc.), but the donuts and coffee held out, and this year over 300 people came to HRU, despite another snowfall the night before!

The forums were expanded to four per hour (21 total, not including the VE session) and included tower regulation (given by a very successful attorney who is an expert in the field and has represented many local hams), the art of QSLing, and APRN (Automatic Picture Relay Network [SSTV over APRS]) with digital photos taken at the event sent by SSTV and automatically posted to the HRU web page throughout the day.

The theme this year was "hands-on," and many forums were geared to emergency communications, especially because of the events of September 11th. The ARES (Amateur Radio Emergency Service) forum was called "The Real Thing" and featured speakers who were directly involved in the 9/11 disaster communications, including ARRL NYC District Emergency Coordinator Charles Hargrove, N2NOV, and a representative from SATERN (Salvation Army Team Emergency Radio Network). The forums on the digital modes (PSK 31), a special "How to Make and Set Up Emergency Antennas," QRP, DXing, kit building, handi-talkies and repeaters, contesting, SKYWARN, and "ask the experts" were also very popular. This year we tried to have a forum attendance "track" for the new or non-ham. For example, starting in the morning a new ham could go to the Introduction to Ham Radio, then to Purchasing Equipment, to Practical Antenna Tips, etc.

Over 20 organizations, such as the Kings County Radio Club, took part in Ham Radio University this year. Each had space to put up a display about their group and its activities.

Starting Your Own HRU

Want to have a Ham Radio University in your area? Start by getting together a core group of hard workers from a number of different clubs. Being organized and having a pool of ham radio operators who are knowledgeable in different areas of the hobby and are willing to give of their time is essential. This year we had 21 different organizations from the area involved, from the ARRL, QRP and contest clubs, ARES groups, and large and small amateur radio clubs, to the Friends of LI Wireless History. We thought that getting the speakers would be the hardest part, but it was the easiest. HRU has reminded us what a great resource ham radio operators are to the community and to each other. The success of Ham Radio University has proven it.

The complete forum schedule and other information on Ham Radio University is available on the web at <http://www.hudson.arrl.org/nli.hru2002.htm>. If you would like help starting your own HRU, please feel free to contact me (K2DO@arrl.net), Chairman Phil Lewis, N2MUN (n2mun@arrl.net), or ARRL NYC/LI Section Manager George Tranos, N2GA (N2GA@arrl.org). Ham Radio University is a great way to help the hobby by introducing it to the public, helping old and new hams learn more about it, and having fun, too!

Computers and Internet

BY DON ROTOLO, N2IRZ

Ham Radio's Online Connection

Electronic Publications—Saving Space

I confess: I am a pack rat. I save everything. The upside of this behavior is that I usually have at least one of whatever it is I need. The downsides are manifold, including a perpetual state of trying to find where I put that one of whatever I need, a loving and tolerant spouse with views different from mine, and most important, a severe lack of space in which to store it all.

The items consuming much of the space are books. Besides my magazines and paperbacks, there are the shelves of technical reference books and catalogs. Therefore, when my loving and tolerant spouse Maria told me she did not love the clutter and was losing her tolerance for same, I decided it was time to do something. I recycled all the magazines, dropped off all the paperbacks at the library, weeded through my catalogs, and (sigh) brought a whole van load of "junk" to the local hamfest. We're now living on the happier side of pack-ratting, I'm glad to report.

So (I can hear my editor asking), what does all this have to do with ham radio, or more specifically, "Computers & Internet"? Well, virtually all hams are pack rats, so I have that angle covered. What I want to discuss this month is the subject of *electronic publications*.

Books take up a lot more space than CDs. All of these books, and quite a few more which wouldn't fit in the photo, have been replaced by their respective electronic versions, shown at lower left.

Saving Space

All those catalogs used to consume two whole shelves in a bookcase. Now they are reduced to a dozen and a half CD-ROMs, and just a half-shelf of actual paper. A similar situation has occurred with my technical reference books, although not as dramatically successful. The older publications, such as my college textbooks, just have to remain as they are until I can locate an electronic equivalent. However, many of my old standbys are now on CD-ROM, much to my ever loving and tolerant spouse's delight.

Other than the obvious advantage of savings in physical space, most of these electronic publications are much more convenient to use as well. The "pages" don't tear or wear. The index is usually much more complete. Most of the text can be searched for a specific term when the index fails. I can always print out a page if I really need a hard copy. Some CDs include video clips. Best of all, most CDs actually cost less than the paper versions.

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

ARRL Publications...

My nearly complete *QEX* collection was really taking up a lot of space. I'd leaf through them occasionally, looking for a piece of a circuit to solve a particular problem. I'm pleased to say that most of my collection is now recycled, possibly into the newspaper you read yesterday, and I have a very complete collection on CD-ROM. (In case you never heard of it, *QEX* is a cool magazine published by the ARRL for builders and experimenters.)

My 1991 hardcover *Handbook* had seen better days. Although my handwritten additions to the index were useful, the pages were smudged with grease and solder flux, and a few had torn. My *Antenna Book* was in even worse shape. Both were recycled to a young ham on a tight budget, and my CD-ROM versions are serving me well. An added bonus of the electronic versions is the inclusion of software for filter design, all the PC board template packages, design programs for Yagi antennas and antenna tuners, and more. Even my *Repeater Directory*, small as it was, has (almost) been replaced by *TravelPlus for Repeaters*. I say almost, because that tiny *Directory* is now a permanent part of my car.

And All The Others...

Aside from the ARRL, there are many other companies producing electronic publications aimed at the electronics and amateur radio markets. I have a copy of the Tucson Amateur Packet Radio (TAPR) *Software CD* from 1998, which includes loads of software and data from their archives. My copy of the *APRS Maps* collection published in 1996 by the Sproul brothers (Mark, KB2ICI, and Keith, WU2Z) is still around. I continue to use Chicago Map Corporation's *Precision Mapping* pro-

gram to help me get from here to there. (The TravelPlus CD also comes in handy here.) In addition, *CQ* and the ARRL have jointly produced a set of CDs covering the entire run of *ham radio* magazine.

Even the service manual for my old Mercedes is available on CD-ROM. I bought it for under $100, a fraction of the cost for the paper versions. Not only am I certain that it is complete—no missing pages—but I can print whatever I want, and let *those* pages get dirty.

Catalogs

Nearly every electronic component manufacturer offers its latest catalogs on CD-ROM. For you and me, the biggest advantages are the searchability and small physical size of the catalogs. For the manufacturers and distributors, the advantage is the very low cost to reproduce and distribute these "catalogs." I'll bet that the paper Digi-Key catalog (well over one-half inch thick) costs a lot more than the approximately US$2 the CD version costs to reproduce and mail. I use it frequently, since my on-line connection is relatively slow. I also consult my Newark and Maxim catalogs quite often.

Online

If you surf the internet over to nearly any of the manufacturers, you can access their full-line catalogs online. Some will even let you download them, and those which don't would be happy to send a CD version to you. An example of the downloadable type is NTE Electronics. They are a major distributor of replacement semiconductors. They charge a nominal fee for a copy of their catalog, just a few dollars, but you can download it for free off their website. I use their software often, since their main office (which has *everything* in stock) is only a few minutes from home—much faster than mail-order.

Even if you can't (or don't want to) download NTE's catalog or get a CD version, a visit to their website will help you select the parts you need. For example, my older brother Philip coaches high school track, and he wanted a billboard-type electronic stopwatch for practice sessions. A quick search of the internet yielded plenty of clock circuits on a single chip, but none with LED drivers. It took some careful searching, but I eventually found an obsolete chip that did what I needed, and a distributor who had a few in stock.

The point is, had I been limited to the catalogs I had on hand and my local distributors, I'd have had to build a stopwatch circuit from discrete TTL chips—probably a dozen of them. With some perseverance and a little luck, I have a two-chip solution.

Acrobat

While some publications come with their own viewer, the majority of them use the Acrobat viewer by Adobe. This Portable Document Format (.PDF) viewer is available for nearly every operating system and hardware combination there is, free for the downloading. Many publication CDs include a copy of the Acrobat viewer, or you can download it from Adobe directly, assuming you don't have it already.

The PDF format is as good as it gets in the electronic publishing field today. The viewer is free and widely available. The encoded documents are compact. Documents print out exactly the way the publisher intended. Graphics and text are printed to the limits of the printer's capabilities, so output always looks as good as possible. Navigation through .PDF file pages is easy to learn and master. The encoder is not outrageously expensive, and it is very easy to use. Documents can even be password protected to prevent changes, printing, or unauthorized viewing. (Take the security features with a grain of salt; they can be broken easily enough.)

I have a licensed copy of the encoding program, Adobe Acrobat 3.0, which I bought new at a computer show for about US$30. The latest and greatest version, Acrobat 5.0, is available from Adobe for US$249 (upgrade US$99). In addition to allowing you to encode documents from virtually any application that can print, Acrobat allows you to edit .PDF documents, select text and graphics, and more.

Your Club Goes Electronic

Recently, TAPR changed its publication from a quarterly newsletter (the "Packet Status Register") printed on paper to one delivered electronically as a .PDF file. The first issue was laid out and delivered in the exact same fashion as it would have been for printing—that is, in black-and-white and with a two-column layout. The second edition was optimized for on-line reading, with a single-column layout, and all the photos are in color.

Can your club's newsletter be moved to an electronic format? If you produce it on a computer, the answer is yes. I can't imagine that anyone still types and pastes up newsletters by hand, but you never know. The second consideration is how many of your members have computers. You'll need at least a majority with a computer to make electronic publishing viable.

To get started, find someone with access to a copy of Acrobat (the whole program, not just the Reader) and convert a recent newsletter into a .PDF file. Hand it out at a meeting, and have folks say what they think at the next meeting. Almost any newsletter will fit on a floppy. As an example, the Winter 2002 TAPR Packet Status Register has about a dozen photos and is 23 pages long, with a .PDF file size of 410 kB. Alternatives to floppy distribution include posting the document on a website for downloading and burning CD-ROMs, which have a much greater capacity than a floppy.

The economics of electronic publishing should become readily apparent: Simply compare what it costs now to reproduce and distribute your newsletter with what it would cost for a floppy disk (15 cents?) plus postage (a floppy can be mailed for as little as 34 cents). Note that the weight of the floppy doesn't increase if you put more information on it. Costs for web distribution are nearly zero, while CD-ROM costs are a little bit higher than those for floppies.

The final step, after everyone agrees, is to buy a copy of Acrobat. As I mentioned above, you don't necessarily need to drain the treasury for the very latest and greatest version, but avoid versions prior to 3.0. Good luck, and don't forget to send me a copy!

That's all the space we have this month. Next time, in the September issue, I want to offer a (necessarily brief) introduction to programming. We have these incredibly powerful computers at our disposal, and we're limited to using them for what others have written software for them to do. While there's no way I can teach you how to program in a few thousand words, I can at least show you some of the possibilities and how you can bring yourself to the next level. Until then . . .

73, Don, N2IRZ

What You've Told Us...

Our April survey asked about your experiences with antenna restrictions. Our first question asked about the type of home in which you live. Nearly three quarters of you (72%) live in private homes without a homeowners' association exercising control over what you may or may not do with or to your home. Among the rest of you, 49% (14% of total) live in a private home *with* a homeowners' association; 19% (5% of total) own a condo, co-op, or townhome; 11% (3%) own a mobile home; 15% (4%) rent a house or apartment; and 6% (2%) live someplace else (on your boat?). Among those who *don't* live in a private home without a homeowners' association, 68% are aware of restrictions on installing antennas and/or towers where they live. Of that group, 50% says those restrictions are spelled out in CC&Rs (deed restrictions), 42% have them written into homeowner association rules, 11% in their rental lease, 17% answered "other," and 14% said the restrictions are not spelled out in writing. Those restrictions include: a total ban on amateur antennas (8%); ban on all outdoor amateur antennas (22%); total ban on radio transmitting (3%); some antennas permitted, subject to approval process (25%); some permitted, subject to restrictions (11%); other (8%); and none (14%).

We next asked everyone if they'd ever applied for permission to put up an amateur tower or antenna. Overall, 26% said yes; 74% said no. Among those who had requested permission, 73% of those who live in private homes without a homeowners' association had their request approved as submitted, 11% had them approved with modifications, 3% were approved on appeal, and 8% were denied altogether. It's a very different story for those who need approval from someone other than their municipal government. In that group, only 33% of requests were approved as submitted, another 33% were approved with modifications, *none* were approved on appeal, and 42% were rejected outright. Finally, among those respondents living with and familiar with antenna restrictions, 83% of those dealing only with local governments feel their rules "reasonably accommodate" amateur operation; but among those dealing with homeowner associations, condo boards, etc., 63% feel the rules *do not* "reasonably accommodate" amateur operation. Clearly, there is a significant disparity here.

Thank you for your responses. This month's winner of a free one-year subscription to *CQ* is F. R. Cartier, W6FC, of North Hampton, New Hampshire.

Reader Survey June 2002

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 Reader Service Card and returning it to us (we've already paid the postage). As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

This month we're going to repeat last June's survey to see if there have been any changes in your VHF/UHF operating patterns.

Please indicate... **Circle Survey Card #**

1. Which choice below (select only one) most accurately describes your VHF/UHF operating:

- Exclusive VHF/UHF operator 26
- Operate VHF/UHF more than HF 27
- Operate VHF/UHF and HF about equally 28
- Operate HF more than VHF/UHF 29
- Do not operate VHF/UHF at all 30
- Not currently licensed 31

2. Which of the following pieces of VHF/UHF amateur radio equipment you own:

- Single-band FM handheld 32
- Dual/Multi-band FM handheld 33
- Single-band FM mobile rig 34
- Dual/Multi-band FM mobile rig 35
- Multimode VHF/UHF mobile rig 36
- Multimode VHF/UHF base rig 37
- Multimode HF+VHF/UHF mobile rig 38
- Multimode HF+VHF/UHF base rig 39
- VHF/UHF transverter used with HF rig 40
- No VHF/UHF equipment 41

3. Your activity on VHF/UHF (select only one):

- AM operation 42
- APRS (Automatic Position Reporting System) 43
- Experimenting/building 44
- FM simplex operation 45
- Packet radio (general) 46
- PacketCluster (DX spotting) 47
- Repeater operation 48
- Satellite operation 49
- "Weak Signal" operation (CW) 50
- "Weak Signal" operation (SSB) 51
- Not active on VHF/UHF 52

4. Which VHF/UHF band(s) you use regularly (choose as many as apply):

- 6 meters (50–54 MHz) 53
- 4 meters (70 MHz—Europe only) 54
- 2 meters (144–148 MHz) 55
- 1.25 meters (222–225 MHz) 56
- 70 centimeters (420–450 MHz) 57
- 33 centimeters (902–908 MHz) 58
- 23 centimeters (1240–1300 MHz) 59
- Frequencies above 1300 MHz 60

Thank you for your responses. We'll have more questions for you in our next reader survey.

Alinco's New HTs
Fun, Fantastic and Affordable!

Check out the new DJ-596 dual bander or the DJ-196/496 monoband units. No matter which you choose, you'll get a transceiver that's rugged, easy to program and built for years of dependable operation. You expect more value from Alinco and we deliver!

DJ-596T VHF/UHF Dual-band HT NEW!

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

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

DJ-196T (2m) and DJ-496T (440 MHz)

These sturdy, full-featured monobanders are priced low and ready to go!

- 5 watts DJ-196 / 4 watts DJ-496
- Long-lasting NiMH battery
- 40 memory channels
- Keypad frequency input
- CTCSS and DCS encode+decode
- Alphanumeric display
- 13.8 VDC direct input
- Wide and narrow FM modes
- Illuminated keys and display
- Autodial memories
- S-meter
- DJ-196 TX 144 ~ 148MHz; RX 135 ~ 174 MHz
- DJ-496 TX 430 ~ 450 MHz RX 430 ~ 450 MHz

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IHC 19 car window mount
BNC connectors, window mount, sets up in just seconds!

IHC 20 glass suction-cup mount
Extension BNC suction mount keeps your antenna inside but against the glass for a true "window on the world." For mobile or base use, includes 6 feet of RG-58U cable.

IHMM270 Compact VHF/UHF Magnetic Mount Antenna
BNC connector, 9 feet of RG-174 cable and a powerful magnet. Less than 20 inches high, SWR less than 1.5:1 throughout either band. Max power: 50w/VHF; 25w UHF.

IHMM3 Magnetic Scanner Antenna
BNC connector, just 13.5 inches high. Powerful rare-earth magnet, 9 feet of RG-174 cable. Receives 100 ~ 1200 MHz, can transmit on 2m, 70cm and SMR frequencies.

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*Digital communications require at least two similarly equipped transceivers.

Digital mode is compatible with Alinco DR-135/235/435T mobile transceivers equipped with EJ-43U digital communications board.

Digital mode may not be legal in some countries. See FAQ on digital at www.alinco.com.

This state-of-the art VHF/UHF direction finder is easy to build, and it uses only three ICs!

The NØGSG Portable Radio Direction Finder

BY TOM WHEELER,* NØGSG

Foxhunting is the art of locating hidden transmitters. Many clubs have organized foxhunts several times a year. Besides being fun, foxhunting is great practice for preparing participants for situations in which real skills are needed, such as locating lost hikers, downed aircraft, and interfering carriers on repeater input frequencies.

The frequency, terrain, and size of the area to be searched all influence the choice of direction-finding technology. Many times several direction-finding methods must be used to find an RF source. Large areas (more than one square mile) are best searched from a moving vehicle using dedicated equipment mounted on the vehicle.

The general area of a transmitter often can quickly be located while driving, but many times the actual transmitter will not be visible from the vehicle. However, the search area has at least been reduced to a walkable size. A portable direction finder then will point the way.

For VHF and UHF hunting, direction-finding based on Doppler frequency shift can be very effective in locating transmitters, especially in close quarters. Using directional antennas poses a problem when approaching a transmitter; when signal strength is high, the receiver may pick up signals leaking through its cabinet and connecting cables, which makes it difficult to get an accurate bearing. Using the Doppler frequency shift eliminates the dependency on signal strength, which effectively will allow the hunter to walk right to the source!

The NØGSG portable RDF (photo A) uses two antennas that are switched alternately at a frequency of 1 kHz. This produces the effect of a rotating antenna. When both antennas are equidistant from the RF source, there is no phase difference between the signal from the antennas, and the receiver produces no audible tone; a null is produced, and the hunter is either walking directly toward or away from the RF source. When either antenna is closer to the source, it produces a signal that is slightly ahead or "leading" in phase compared to the other antenna. This results in a 1 kHz phase-modulated tone being placed onto the incoming carrier (remember, the antennas are being switched alternately at a 1 kHz frequency). An attached FM receiver will demodulate this as a 1 kHz audio tone. The phase of the audio tone will be either 0 or 180 degrees, indicating which antenna is closer to the RF source (and also indicating which way the hunter should walk).

Two microprocessors direct all the activity within the direction finder. One generates the antenna and filter timing signals, and the other analyzes the phase of the incoming audio signal from the receiver. There is only one calibration adjustment (a switch), and the circuit is insensitive to the volume level from the receiver. The unit will operate for more than 10 hours from a 9V transistor-radio battery.

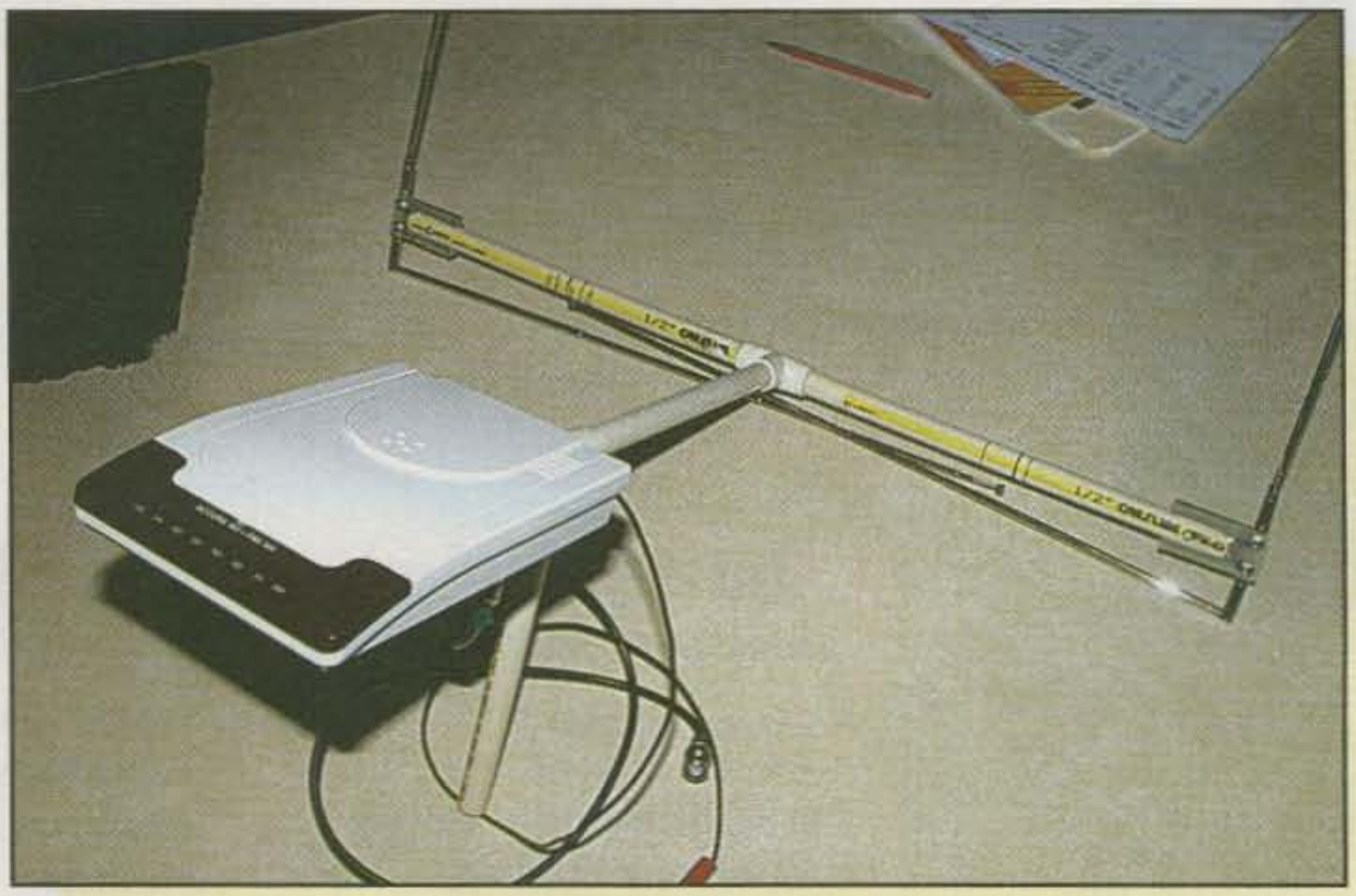

Photo A– The NØGSG portable RDF unit.

Circuit Description

Fig. 1 is the schematic diagram of the unit. There isn't much there! U2, an Atmel AT90S1200A, generates three timing signals: *ANT1*, *ANT2*, and *100 KHZ CLK*. The *ANT1* and *ANT2* signals alternately go high to switch the antennas at a 1 kHz rate as shown in fig. 2. The *ANT1* and *ANT2* signals are shaped by R19, C16, R20, C17 before driving PIN switching diodes D2 and D5. D2 and D5 are wired differentially: When D2 is forward biased (through R6 and R7), D5 is reverse biased through R9 and R11. This is important because the PIN diodes must be reverse biased

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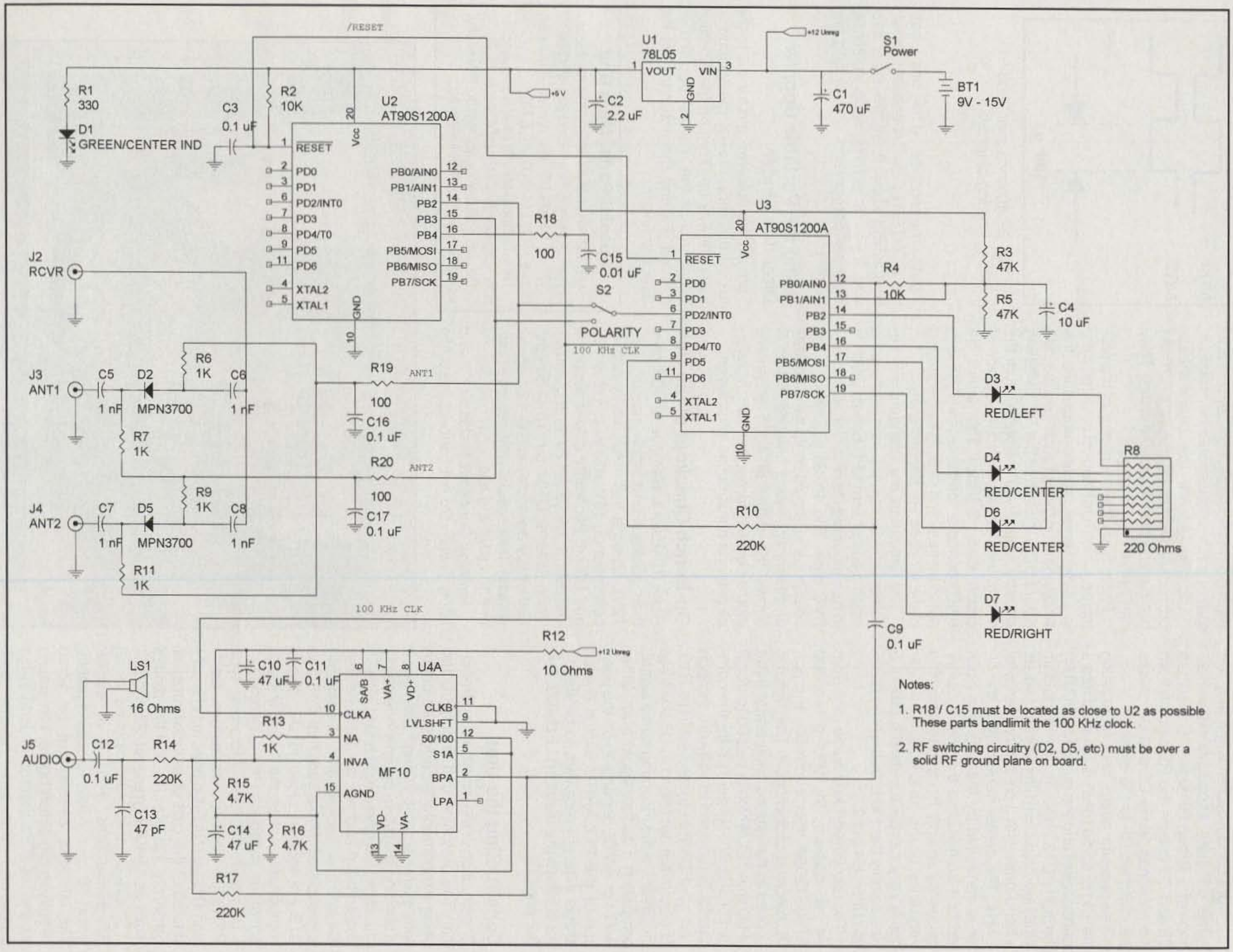

Notes:

1. R18 / C15 must be located as close to U2 as possible These parts bandlimit the 100 KHz clock.
2. RF switching circuitry (D2, D5, etc) must be over a solid RF ground plane on board.

Fig. 1– Portable Doppler direction-finder schematic diagram.

to assure good isolation when they are in the "off" state, especially in the presence of a strong RF signal. Capacitors C5 and C7 couple the RF signals from the antennas, while C6 and C8 couple the switched RF to the receiver.

The receiver audio input (containing the 1 kHz audio tone) is coupled into a loudspeaker and the audio filter IC (U4) through C12. U4 is a monolithic switched-capacitor filter configured as a band-pass with a center frequency of 1 kHz. The center frequency of the filter is controlled by the 100 kHz clock fed to it from U2, so the filter's center frequency *exactly* tracks the switching frequency of the antennas. The filter has a very narrow bandwidth (about 5 Hz), so only the 1 kHz audio tone passes out on U4 pin 2.

The recovered 1 kHz audio tone from U4 is passed to U3, a second AT90S1200A microcontroller, through DC blocking capacitor C9. The signal is applied to the analog comparator input of U3 (pin 12), which is biased to Vcc/2 by R3 and R5. Hysteresis for the comparator is provided in software through port pin PD5 (pin 9) and resistor R10. The software contained in U3 analyzes the phase of the incoming audio signal, comparing it to the signal from either *ANT1* or *ANT2*, depending on the position of the POLARITY switch (which allows different receivers to be used). U3 displays the result on LEDs D3, D4, D6, and D7.

Constructing the Unit

Construction of the main unit is non-critical. The prototype unit is constructed using experimenter's perforated board with point-to-point wiring. Use good grounding practice; use only *one* heavy ground bus on the circuit board. All ICs should be in sockets; do not insert the ICs into their sockets until all soldering is completed. Make sure that R18 and C15 are located close to U2. These components soften the 100 kHz clock waveform to reduce RF interference.

D2 and D5 are Motorola type MPN3700 PIN switching diodes. Common 1N914/1N4148 diodes may be substituted at the cost of reduced receiver sensitivity. Do not use rectifier diodes (such as 1N400x types) for D2 and D5!

Shielded cable must be used for all RF connections. RG174 or similar "mini" 50 ohm cable is quite suitable. The antenna cables can be wired directly to the circuit board, eliminating J3 and J4 (This method is used in the prototype.). For best results, both cables should be equal in length and no longer than necessary. The top half of each dipole should be "hot," and the bottom of each dipole should be "shield."

U2 and U3 are the same microprocessor (Atmel type AT90S1200A) but have different programming. They can *not* be interchanged!

Photo B shows the interior of the prototype, which has been constructed within an old Hayes modem enclosure (the small board on the right contains the indicator LEDs). Note that the RF switching circuitry (upper left) is isolated from the rest of the circuitry on a small piece of copper-clad PC board. This allows the BNC connector for the receiver RF output to be mounted directly to the ground plane for good RF performance.

The antennas are standard FM receiver broadcast units mounted onto a small piece of scrap PC board, which is in turn mounted into the slotted end of a PVC pipe. The shield ground of each coaxial cable should contact the *bottom,* or *downward,* facing antenna. Photo C shows the detail of each antenna's mounting method; fig. 3 shows the overall antenna construction information.

On-Bench Checkout of the Unit

Static Checkout. Remove all ICs from their sockets and apply power (9V–12V). Using a voltmeter, verify proper power supply (5V ±0.1V) to U2 pin 20 and U3 pin 20. Verify power supply at U4 pins 6,7,8 (9V–12V unregulated). Verify bias at U104 pin 15 (4.5V–6V, half of the unregulated 9V–12V power supply). If all checks well, remove power and install the ICs.

Running Checkout. Install all ICs and apply power. Do not connect the audio input to the receiver. At this point, both the *CENTER LEDs* (D4 and D6) should be flashing about three times per second. If you do get this, congratulations. Both microprocessors are running and healthy!

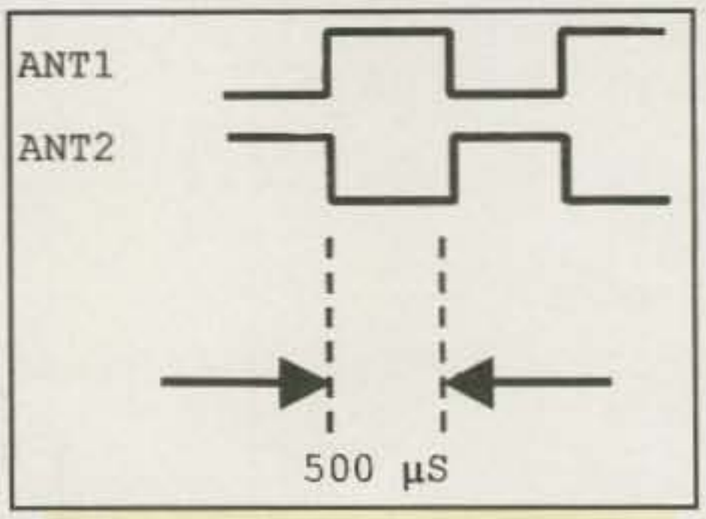

Fig. 2– Antenna-switching timing diagram.

Using the Portable Doppler Direction Finder

Turn on the receiver and tune it to the fox's frequency. Adjust the volume at least halfway up. Turn on the direction finder. Adjust the receiver squelch as desired. Extend the antennas on the direction finder.

Special Parts, Main Unit

U2, U3 – Atmel AT90S1200A microcontroller, Digikey P/N AT90S1200-4PC-ND

U1 – LM78L05 low-power regulator, Digikey P/N LM78L05ACZ-ND

U4 – National MF-10 switched capacitor filter, Digikey P/N MF10CCN-ND

D2, D5 – Motorola MPN3700 PIN diode, Allied Electronics P/N MPN3700

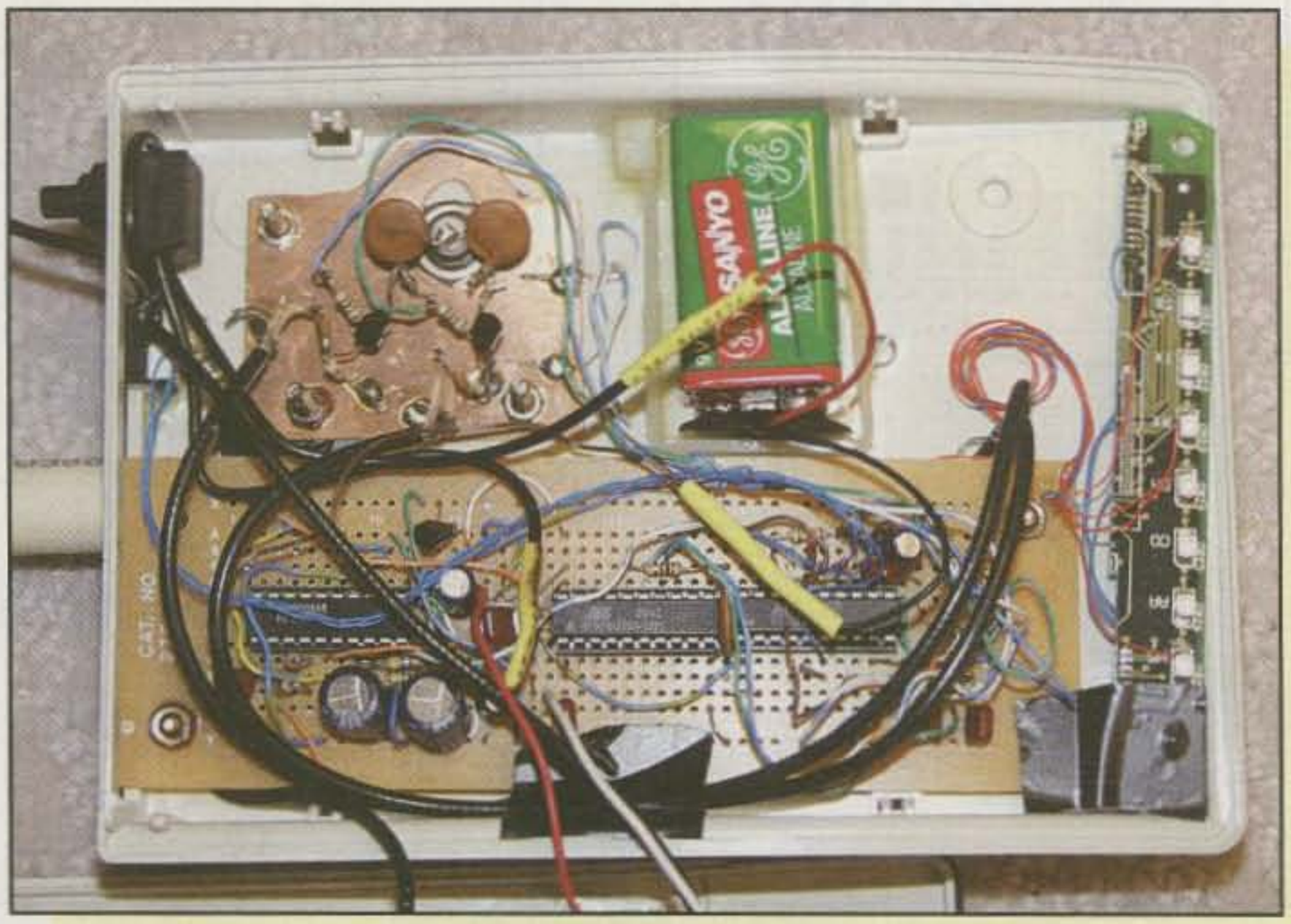

Photo B– Inside view of prototype main unit.

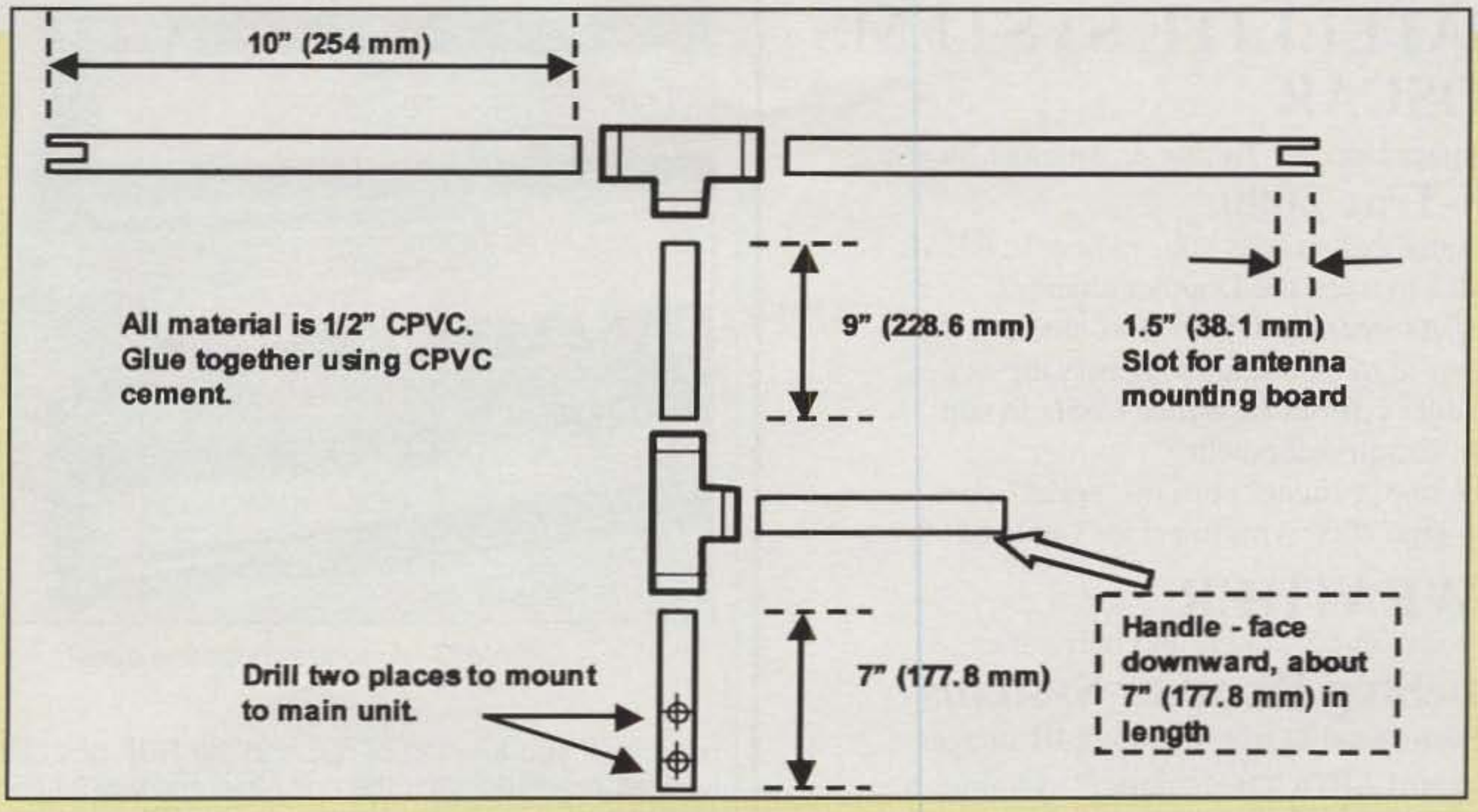

Fig. 3– Antenna construction.

The first time you use the direction finder with a particular receiver, check the setting of the POLARITY switch. Point the direction finder toward a known RF source. If you turn *right* of the bearing to the source, the *left* LED indicator should light. If you turn *left* of the bearing, the *right* LED indicator should light. If this relationship is wrong, move the POLARITY switch to the opposite position to correct the problem.

Listen to the 800 Hz tone and watch the indicator LEDs. The *RIGHT* and *LEFT* LEDs light to indicate the correct direction for walking. The *CENTER* LEDs flash when your bearing to the transmitter is true (or if there is no signal). You will also notice that the 800 Hz tone nulls when you're either facing directly toward or directly away from the fox.

You can determine if you're going the wrong way when

Photo C– Antenna-mounting detail.

hunting. If you turn left of null and the RDF unit tells you to turn left *more*, do what the unit says and you'll find yourself walking in the correct direction to the RF source. You also can use your receiver's signal-strength indicator as a rough indication of distance to the source.

If *both* the LEFT and RIGHT direction LEDs light at the same time, the battery is weak and should be replaced. (The direction finder needs at least 8V DC to work properly.)

Foxhunting Hints

One of the first things new hunters learn is that the world of RF is a very dirty place. RF signals rarely travel in a straight line between transmitters and receivers; radio waves reflect off anything and everything along the way! When walking with a portable direction finder, you will notice that the bearing to the source almost constantly seems to vary as you move. This is completely normal and can be very frustrating if you don't know how to deal with it.

The best bearing information is obtained when the hunter is in a clear location at a high elevation. If you are not getting a clear bearing to the RF source, try moving to a clearing (preferably on a hill). Even if the fox is hiding deep in the woods, you will get a good bearing this way.

Listen carefully to the quality of the signal coming from the speaker. When the tone is clean and pure, the RF signal being captured by the receiver is most likely to be coming to you by line-of-sight, indicating a true bearing to the fox. Multipath signals sound raspy and distorted, and these bearings should be treated with suspicion. Sometimes you will not be able to get a clean signal at all. In this case, move to a different (preferably higher) location and try again.

Don't forget that you can still use signal strength as a general indicator. If the fox signal keeps getting stronger, that's a good indication that you are on the right track!

Summary

The portable direction finder can easily be built in a few evenings. You'll find it to be a valuable part of your direction-finding arsenal. With a little practice, you'll be hunting like a pro!

Notes

1. Preprogrammed ICs for U101 and U103 are available. Send $20.00 (check or money order) to Tom Wheeler, 11224 Holmes Road Room 208, Kansas City, MO 64131. ■

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

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

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

AMERITRON ATR-20 Antenna Tuner

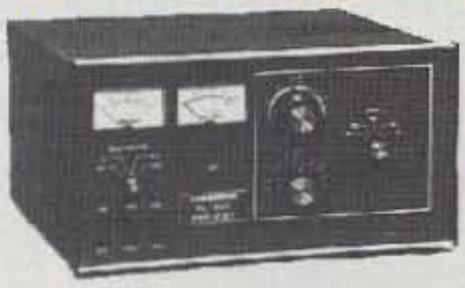
ATR-20, $459. Handles full 1.2 kW SSB/600 Watts CW. Handles full SSB power of Ameritron AL-811/811H/80B/ALS-500M/600, other 1.2 kW SSB amps. Roller inductor, turns counter, verniers on capacitors, balun, cross-needle SWR/Wattmeter.

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

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

Ameritron's *most powerful* Amp

with Eimac® 8877 ceramic tube



AL-1500

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

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

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World Of Ideas

BY DAVE INGRAM, K4TWJ

A Look At The World Around Us

Survival Radio Challenge Winners and Awards

Results of our first Survival Radio Challenge are in, winners have been awarded prizes, and the endeavor appears to have been remarkably successful. It inspired folks to think more about emergency communications needs, and it also increased interest in homebrewing simple weekend projects for impromptu and portable use. We are proud to share views and details of both leading entries and their prizes in this month's column. Look it over, and I am sure you too will agree that the more "what's involved" knowledge and technical expertise we have on our side, the better we can handle all types of unusual circumstances, from antenna limitations to emergency communications.

Some quite beneficial lessons evolved from our first Survival Radio Challenge (which, incidentally, began only a month before the September 11th terrorist attack on our great nation). We acquired a greater appreciation of simple and inexpensive gear for portable and emergency use, and we learned about the importance of proper battery selection, the versatility of wire antennas, and much more. We also re-realized that even in these changing times amateur radio still has the advantage over cell phones and internet links during widespread emergencies. May the high spirits and proud traditions of our amateur radio world continue forever, and with your dedication, friends, they will! Now let's focus on our illustrious Challenge winners and supporters!

Outstanding Homebrew

All of our esteemed judges were favorably impressed with the small, waterproof, and quite complete survival communications package put together by Lee Hutchins, KA6IRL (photos 1, 2, 3, 4, and fig. 1). Indeed, Lee did not overlook anything in his "Mark I" survival package. It is simple, compact, easy to duplicate, and contains a battery-powered trans-receiver plus a roll-up wire antenna, key, MFJ-461 stand-alone "Code Reader," earphone and clock,

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

SURVIVAL RADIO CHALLENGE—FIRST PLACE WINNER

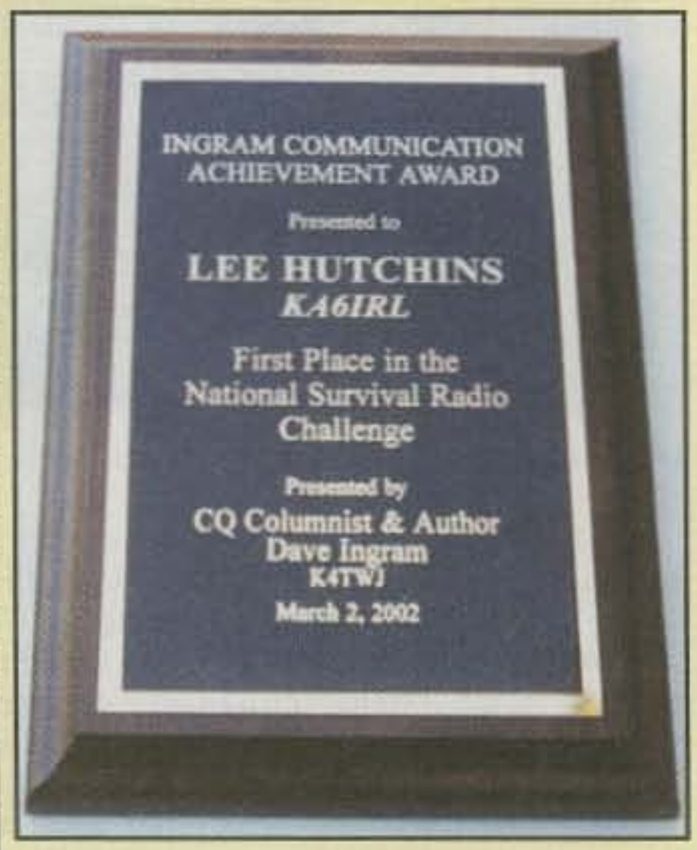
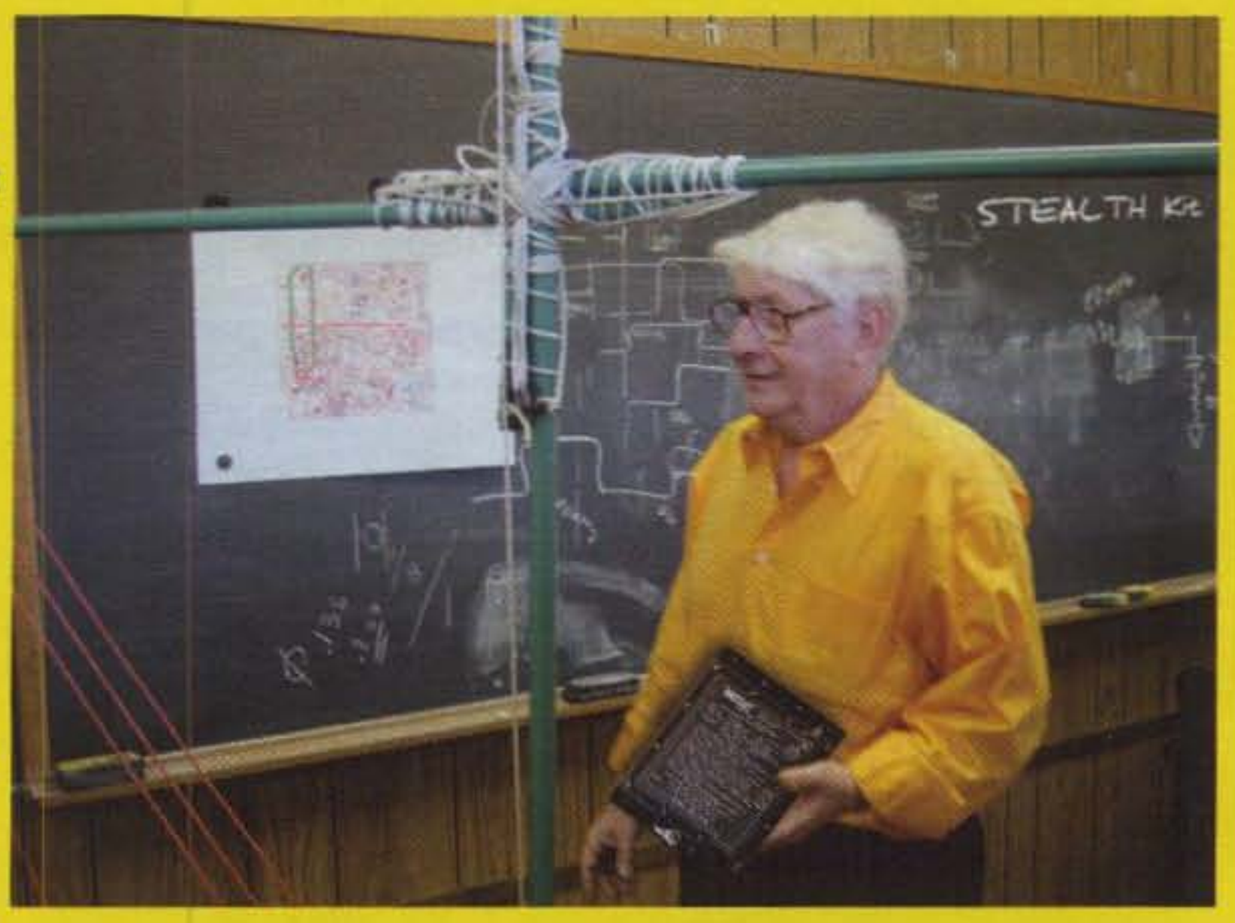


Photo 1– The complete-in-every-respect Survival Radio Challenge entry from Lee Hutchins, KA6IRL. The pint-size setup consists of a homebrewed transmitter and receiver plus wire antenna, battery, clock, key, earphones, MFJ Code Reader, AM/FM radio, and instructions on use in a waterproof "Otter Box" that even floats. In recognition, Martin Jue, K5FLU, awarded Lee a neat MFJ Cub transceiver kit. Now Lee is really set for both portable fun and emergencies. As first-place winner, Lee also received our esteemed Ingram Communication Achievement Award shown inset with the Cub in this photo.

A letter from Pierre Goral, President of SGC



We are very excited to introduce our newest product, the STEALTH Kit, into the HF market. With the STEALTH Kit, SGC is providing an all-in-one, convenient antenna solution that is perfect for emergency use, when an urgent communications command center must be setup in minutes. The STEALTH Kit contains everything a novice or professional needs to erect an antenna in any location—and provides performance equivalent to most dipole antennas!

The introduction of this new antenna kit eliminates much of the mystery of HF "magic". The STEALTH Kit (**S**mart **T**uning, **E**mergency **A**ntenna **L**oop, **T**actical **H**F Kit) provides a solution of how to achieve clear HF communications quickly and easily.

And, in keeping with its' name, the STEALTH Kit is an ideal antenna solution for restricted areas, such as condominiums and gated communities where dipoles and towers are forbidden. Or, use it in city apartments where access to roofs or large open areas is restricted. It is also a great antenna solution when you are on vacation. Whether in an RV or a hotel room, the STEALTH Kit is a "Grab and Go" box - filled with everything you need to complete your communications center.

We are proud of the STEALTH Kit as it provides an antenna system that is automatic, easy to install and easy to use. Any location, any radio and any situation - the STEALTH Kit is the perfect choice for a quick and convenient antenna solution.

Since 1971, SGC has been designing and manufacturing a wide range of HF SSB communications products. Our goal is to provide reliable equipment, which is competitively priced and which fits the need of the radio user. Please visit our booth in Dayton this year to see the STEALTH Kit in action and find out what everyone is talking about.

Pierre Goral

KI7UA

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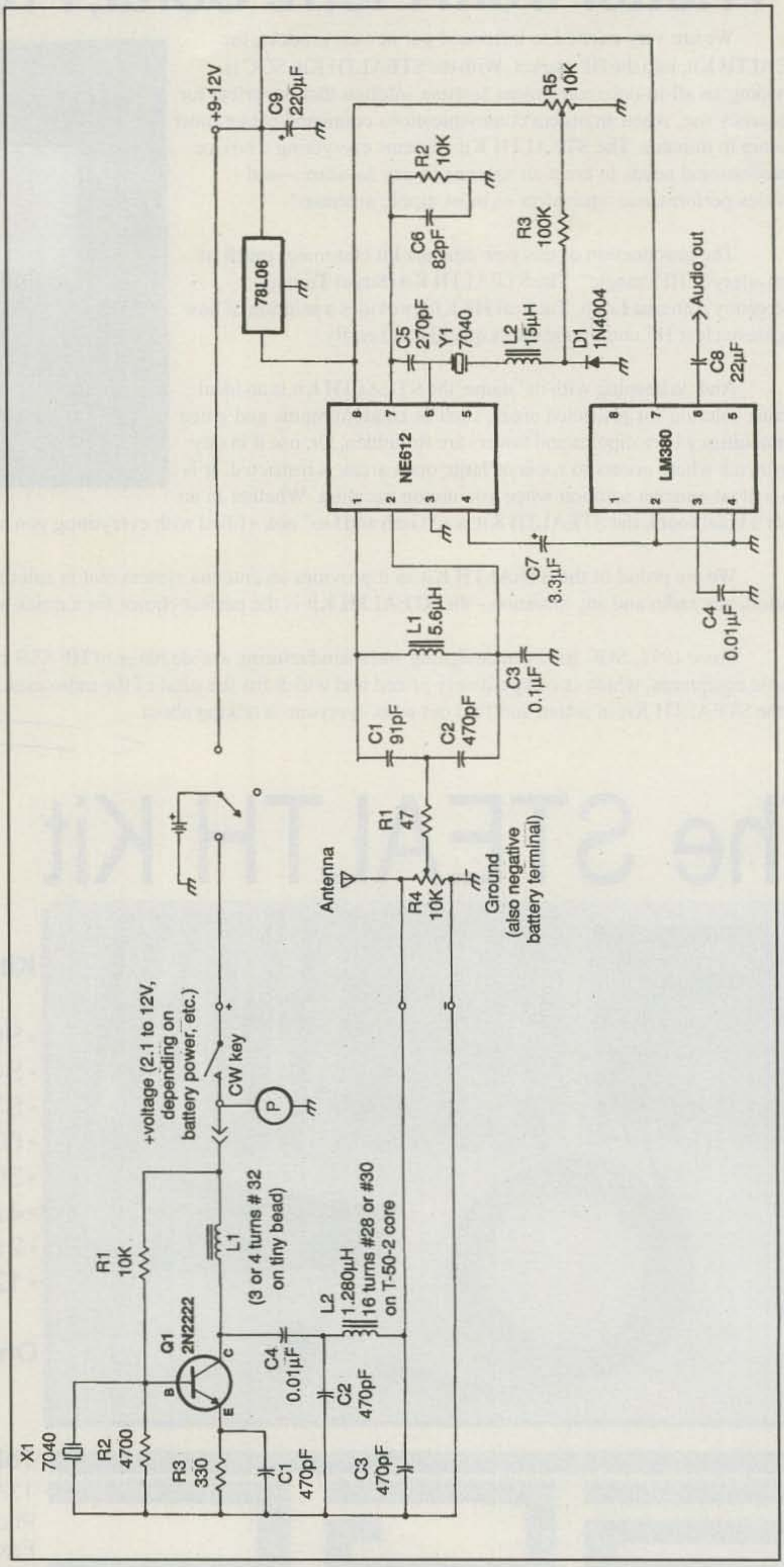
Fig. 1– Circuit diagram of the Mark I Survival Radio trans-receiver setup built by Lee, KA6IRL. (Discussion in text.)



plus AM/FM micro-receiver (Radio Shack #12-793) in a waterproof "Otter Box." Since Lee designed this package, let's let him describe it in his own words.

"In an effort to keep things simple, I chose K4TWJ's Micronaut transmitter kit and K8IDN's complementing MRX-40 receiver. The MRX-40 is no longer available in kit form, but FAR Circuits (www.cl.ais.net/farcir/) has both PC boards and assembly instructions. A 7.040 MHz crystal for the transmitter was obtained from WA6GER of NorCal, and other receiver parts came from Digi-Key (1-800-344-4539), DC Electronics (1-800-467-7736), and Mouser Electronics (1-800-346-6873).

"I assumed this radio should be useful to anyone, including non-hams, so I included laminated sheets for setup and operation, plus a copy of the Morse Code and a new stand-alone MFJ-461 Code Reader. My finished design/unit includes two ultra-long-life 1200 maH lithium-hydride 9 volt batteries, extra lithium batteries for the Code Reader and AM/FM receiver, two 33 foot lengths of antenna wire, a 50 foot hank of fishing line, plus the AM/FM radio, clock, earbuds, and miniature key. The entire setup is housed in a waterproof "Otter Box" (www.otterbox.com). These cases are secure to 100 meters, they float, and they are available in black or survival yellow colors."

Lee's brain child worked like a champ from the start, and he is now convinced that, as we always say, QRP romps! Congratulations, old boy. You have seen the light!

In recognition of Lee's outstanding work, Martin Jue, K5FLU, awarded him an MFJ Cub Transceiver kit for the band of his choice (thanks, Martin!), and Lee chose 20 meters. As you may know, the Cub is a palm-size CW transceiver with 2 to 4 watts output, a wide tuning range, and a high-performance receiver with good single-signal selectivity. It is available in monoband versions for 80, 40, 30, 20, 17, or 15 meters, kit or pre-assembled form, and makes a terrific fun/emergency rig. There is even room in the little rig's case to include a 9 volt lithium battery and a couple of titanium alkaline cells for stand-alone operation. Every amateur should have a Cub in his or her den!

Another impressive entry in the homebrew category is the Double-

SideBand mini-transceiver designed and built "perfboard" style by John Rymell, N3PFF (fig. 2 and photo 5). John nicknamed his quickly assembled mini-rig "Jiffy," and explains its design as follows.

"Since size and portability were prime considerations, I pondered housing 'Jiffy' in a small box or Altoids tin. Then I found a Plano 3213 double-sided fishing-lure box at Wal-Mart. It is rugged, water resistant, partitioned, and pocket-size. The rig, roll-up antenna with counterpoise, and batteries fit fine in the box. Technically, the transmitter section uses an NE741 op amp as a mic/speech amplifier and an NE602 as a balance modulator. The receiver section is direct-conversion with another NE602 serving as a frequency converter and an LM-386 handling audio amplification. A 3-pin 28.322 MHz computer clocking chip serves as a common oscillator for both transmitter and receiver sections.

"Looking closer, the microphone is mounted directly to the perfboard to ensure short leads. Audio is input on Pins 2 and 4 of the '741, output on Pin 6, and applied to Pin 1 of IC-2, the 'transmit NE602.' Simultaneously, a 28.322 MHz oscillator signal is applied to Pin 6 of IC-2. Output from Pins 4 and 5 of IC-2 then goes through a broad tuned filter circuit consisting of L1 and C5, to the T/R switch, and on to an end-fed halfwave 10 meter longwire antenna or an external 4 or 5 watt amplifier stage."

For emergency preparedness, John packs a 16 foot wire/antenna and an 8 foot counterpoise/wire to use with this rig. A crystal filter is not included at the output of IC-2, so a double-sideband signal (which can be tuned in just like a regular SSB signal) results. Output of the NE602 is high impedance and very low power. That is why a longwire or amplifier is used.

Photo 2– A closer look at the various items in the Survival Radio package built by KA6IRL. The mainframe houses the trans-receiver. Supporting items such as antenna wire, Code Reader, etc., are stored in the center cut-out. Operating instructions are in the box lid.

On receive, incoming 10 meter signals are peaked by L2 and C6, then applied to Pin 1 and 2 of IC-3, the "second NE602." Simultaneously, the 28.322 MHz oscillator's signal is applied to Pin 6 of IC-3. Resultant audio from Pin 4 is then coupled through C8, into Pin 3 of the LM-386, amplified, and output at Pin 5 to an earphone or small speaker. A DPDT switch handles T/R functions, one section switching the antenna and the other section switching the battery (which consists of three 1.5 volt AA cells).

In my opinion, John's survival radio project is a clever idea, and it can also be expanded into a super-simple sideband transceiver. By adding a crystal filter, small amplifier stage, and batteries and assembling the unit surface-mount-style,

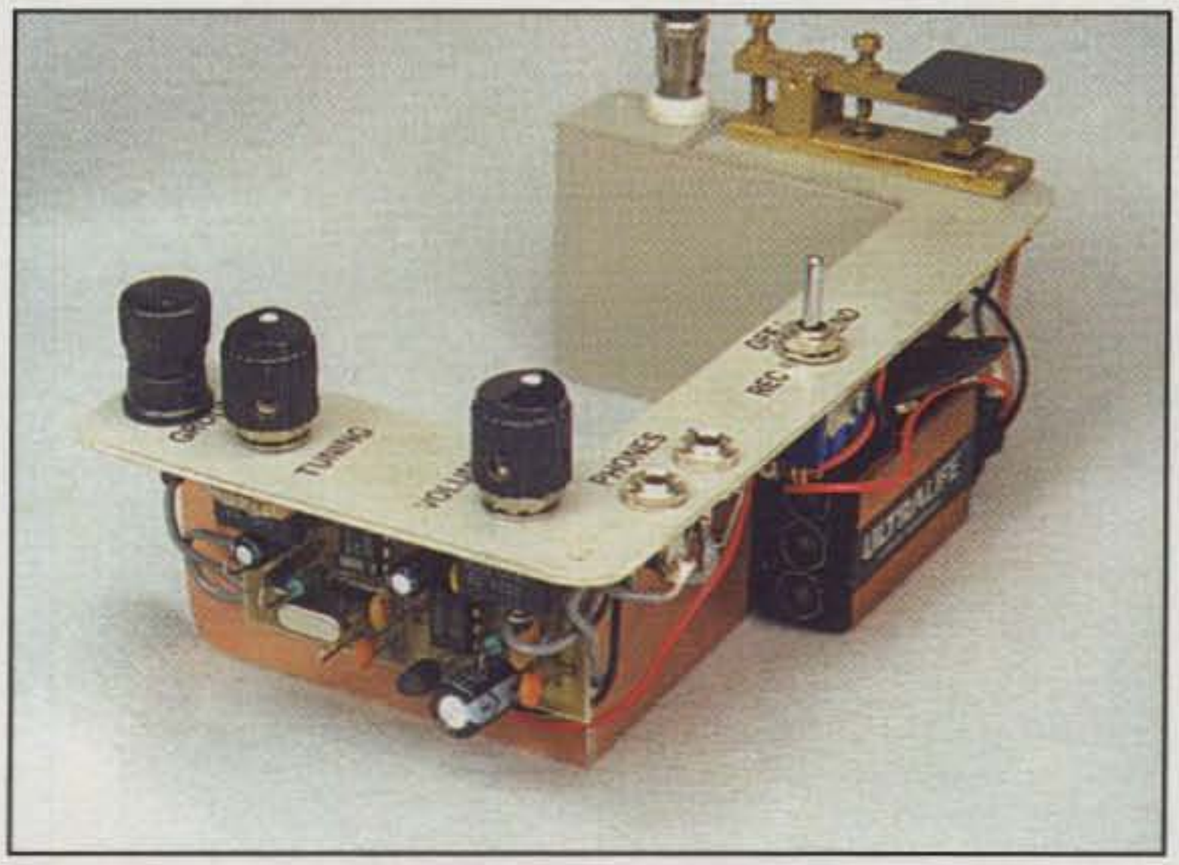


Photo 3– Side view of the KA6IRL mainframe shows the MRX-40 receiver and one of two 9 volt high-current lithium batteries. Estimated battery life is six months, assuming a half-hour use per day, or almost ten years if shelved for emergency use.

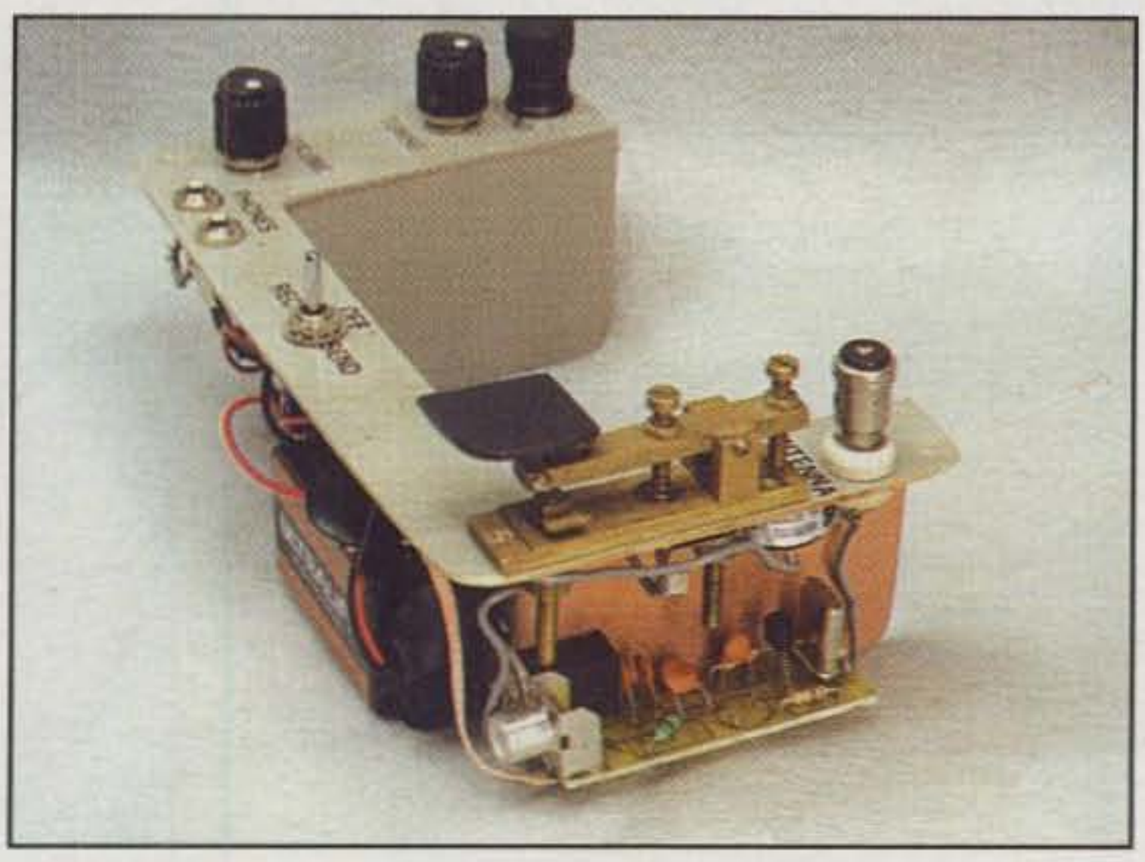
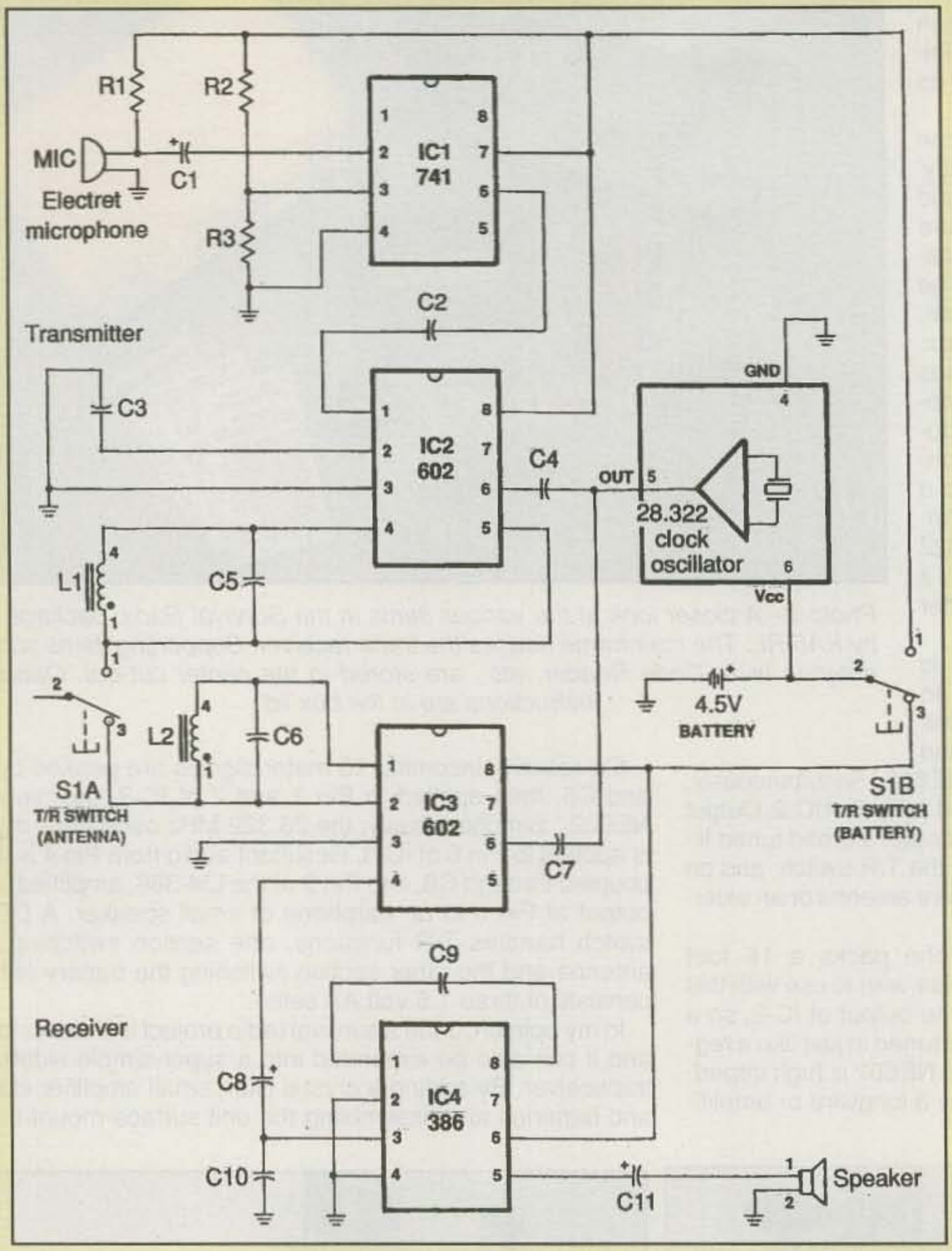


Photo 4– Opposite side view of the KA6IRL mainframe showing miniature key and Micronaut transmitter. The mainframe is built from soldered together sections of copper-clad circuit-board material. Look carefully and you will see the antenna connector originally came from a BC-455 receiver (gasp!).

SURVIVAL RADIO CHALLENGE—WINNER



The N3PFF "Jiffy" 10 meter Transceiver Parts List

R1: 1K ohm, 1/8 watt 20%
R2: 47K ohm, 1/8 watt 20%
R3: 47K ohm, 1/8 watt 20%

C1: 4.7 µF electrolytic, 16 volt
C2: .1 µF disc ceramic
C3: .1 µF disc ceramic
C4: .01 µF disc ceramic
C5: 31.5 pF
C6: 31.5 pF
C7: .01 µF disc ceramic
C8: 3.3 µF electrolytic, 16 volt
C9: 10 µF electrolytic, 16 volt
C10: .01 µF disc ceramic
C11: 100 µF electrolytic, 16 volt

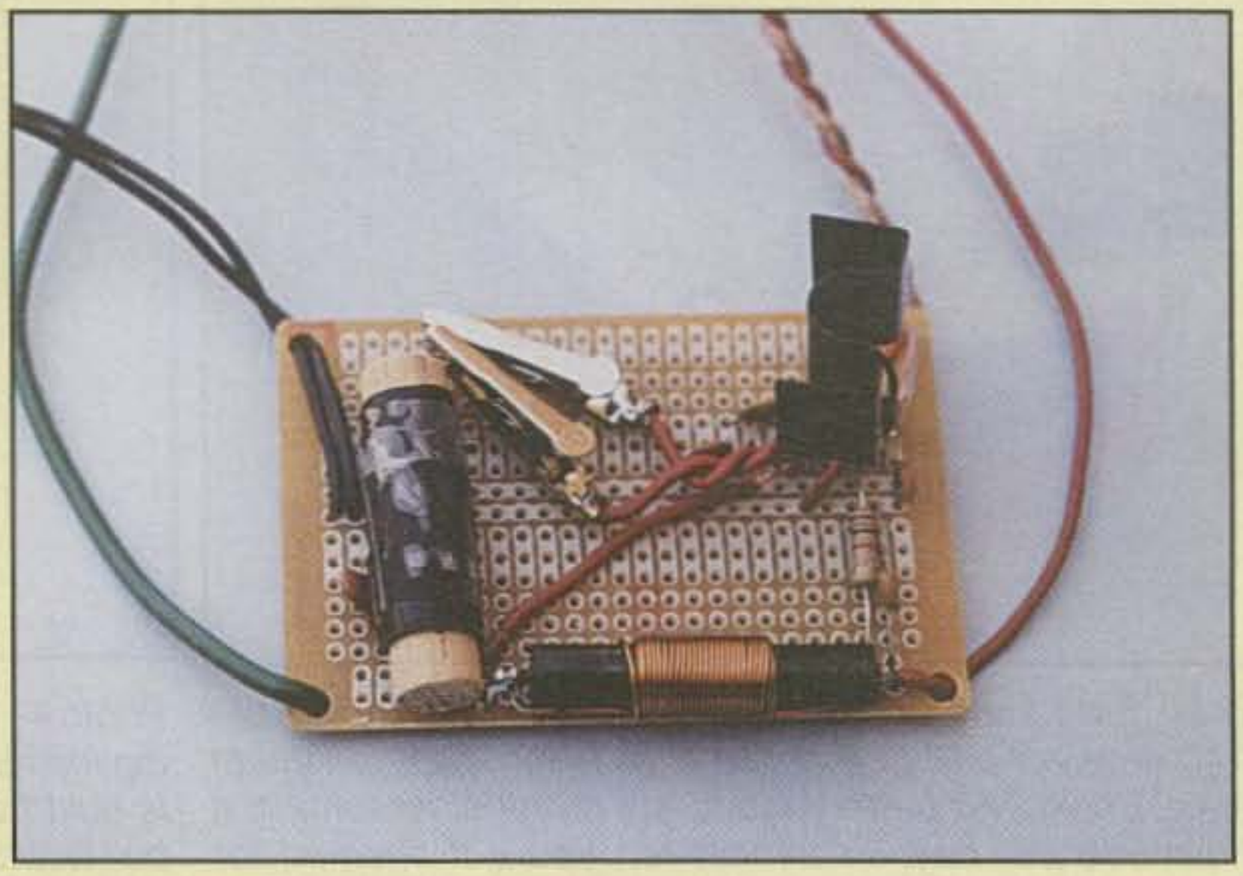
L1: 1µH choke
L2: 1 µH choke

IC1: 741 op amp
IC2: SA602 (NE602)
IC3: SA602 (NE602)
IC4: LM386

S1: DPDT toggle switch

Battery: (3) 1.5 volt AA batteries
(3) series-wired AA battery holders

Fig. 2– Circuit diagram of the clever DSB rig devised and built by John Rymell, N3PFF. IC-1 and IC-2 make up the transmitter, IC-3 and IC-4 the receiver, and clock IC/module is a common local oscillator. Add a simple crystal filter and RF amplifier and this gem can become a miniature SSB transceiver. In recognition of his work, John received a Peanut Whistle II transmitter from DWM Communications, a one-year subscription to CQ, a coffee mug from MFJ Enterprises, and a T-shirt from Heil Sound, Ltd.



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SS-12	10	12	1⅜ x 6 x 9	3.4
SS-18	15	18	1⅜ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅝	4.2
SS-30	25	30	3¼ x 7 x 9⅝	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

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

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

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

WITH SEPARATE VOLT & AMP METERS

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

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

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

WITH SEPARATE VOLT & AMP METERS

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

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GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
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SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

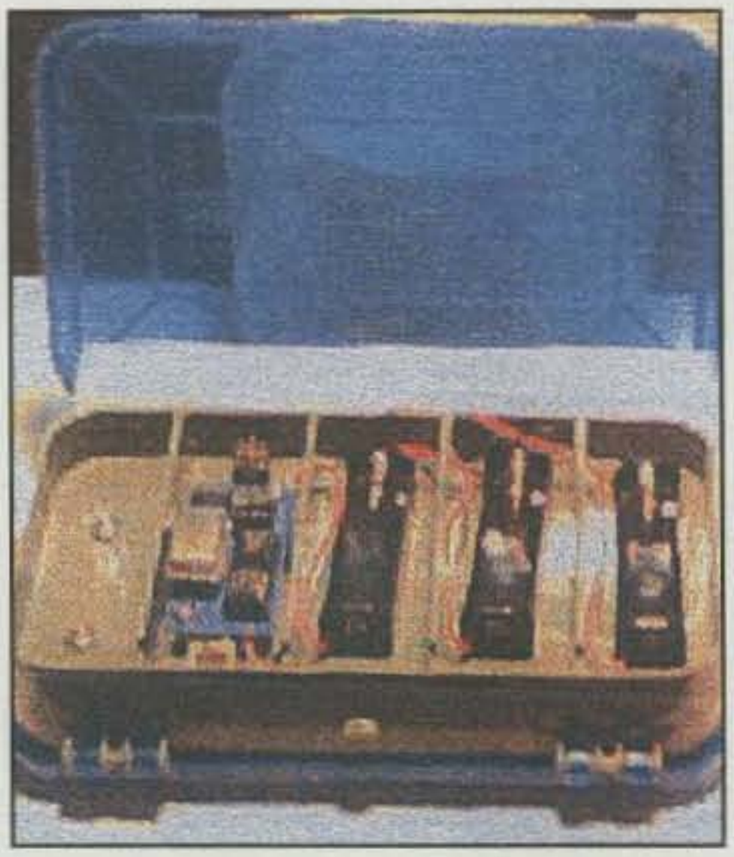

Photo 5– The complete N3PFF DSB transceiver mounted in a pocket-size fishing-lure box from Wal-Mart. Circuit board is on the left and batteries are on the right.

it can even be made as small as a key-fob. Wow!

In recognition of his achievement, John received a one-year subscription/renewal to *CQ* magazine (thanks, gang!), a Celebrity coffee mug from MFJ Enterprises, a special T-shirt from Heil Sound, and a "Peanut Whistle II 40 meter QRP transmitter" from Bill Lauterbach, WA8MEA, of DWM Communications. The Peanut Whistle II is a fully assembled little delight that operates on 12–14 volts DC and produces a 2.5 watt signal. The transmitter can also be modified for 30 meters and again produces a 2.5 watt signal. Combined with a portable shortwave receiver, it makes a handy rig for impromptu and/or emergency operations.

DWM Communications also has several shortwave listening antennas, a deluxe "YoYo"/pull-out antenna for 80–10 meters, and other goodies. Check it out on the web at <http://qth.com/dwm>, or contact DWM Communications at 1-517-563-2613 or via P.O. Box 87, Hanover, MI 49241.

A third homebrew entry came from Walt Bullerwell, KF4YJQ, with his Spider Jr. transceiver and "disposable dipole" antenna featured in our February column. For his efforts, Walt received a one-year's subscription/renewal to *CQ* magazine (thanks again, gang!), an MFJ Celebrity coffee mug, and a special Heil Sound T-shirt. Hearty congratulations to all three homebrewers.

Commercial Adaptations

Now looking at the top three entrants in the commercial-gear category, we begin with Jim Cihon, K3TLP, and his two-box "grab'n go" setup shown in photos 6 and 7. As Jim explains, "My emergency station is packed in two Sterilite-brand cases from Wal-Mart. The larger case contains my SGC-2020 transceiver, an MFJ-945 antenna tuner, key, paddle and microphone, plus a roll-up wire antenna and counterpoise. The

SURVIVAL RADIO CHALLENGE—WINNER

Photo 6– The two-box station Jim Cihon, K3TLP, put together for "grab'n go" emergency communications is shown here packed and ready for travel. Setup is built around an SGC-2020 transceiver, MFJ Tuner, 11 amp battery. Jim was rewarded with an SGC-237 all-band automatic antenna coupler for the design, thanks to Pierre Goral of SGC.

smaller case holds an 11 amp/hour gel-cell with plug-in charger and a meter I mounted on the case front. In a test run I operated from Saturday afternoon until Sunday morning and made over 250 contacts before the battery needed recharging." Good show, Jim!

Pierre Goral, KI7UA, owner and manager of SGC, was favorably impressed by Jim's ingenuity and awarded him a new SG-237 Automatic Antenna Coupler to use with the two-box setup (big time radio!). The SG-237 is quite small (9" × 7" × 2"), handles up to 100 watts, and is ideal for tuning random-length wires or mobile whips for operation on all bands from 160 through 6 meters. After quick and easy hook-up, you just start transmitting and the SG-237 automatically tunes for a perfect match plus stores selected L-C values in some of its 170 memories for instant recall as needed. It's a clever remote tuner. It's only one of several SGC auto couplers, and it works great. Thanks, Pierre. You are a real trooper!

Equally impressive in concept and execution is the combination low- and high-band setup used by Patrick Tipton, KLØYO, traveling remote in Alaska by snowmobile. Pat's setup was featured in our February column, and a view of him communicating via AO-14 is included in photo 8 as a reminder. As you will recall, Patrick showed us how an ICOM dual-band talkie and Yaesu/Vertex FT-817 beat out all other commercial systems for communicating from isolated areas near and far. He also opened our eyes to battery type selection and received one of the first new-style Heil Sound BM-10 Boom Mike Headsets with PTT and up-down tuning box for plug-in used with his FT-817. Using this upgraded BM-10, Pat can operate hands-free while mobiling or hiking in the cold Arctic.

As you probably know, Bob Heil, K9EID, and his custom microphones are world-famous for their ability to enhance any rig's transmitted audio. Bob also continues to expand his line of sound equipment and microphones. The most recent additions are the dual element HMM hand mic and this remote tuning BM-10 headset. If you want to stand tall with a terrific-sounding signal, Bob and his assistant at Heil Sound are good folks to know. You can reach them at <www.heilsound.com>, telephone 618-257-3000, or via mail at 5800 N. Illinois, Fairview Heights, IL 62208.

Our third commercial-gear entry came from Bill Campanelli, W2LRU, and was also featured in our February column. Bill packed an MFJ-9040 transceiver plus

Photo 7– The two-box station of K3TLP unpacked, set up, and ready for action. The station proved its communications capabilities during several days of portable operation.

tuner and keyer in a small wooden crate. He added an external "power station" battery and charger plus a roll-up antenna, and developed a rugged "use anywhere" station for emergency or portable operations. For his efforts Bill received a one-year subscription/renewal to *CQ*, an MFJ Celebrity coffee mug, and a Heil Sound T-shirt.

Hearty congratulations to all of our entrants and sponsors/supporters. You are all good guys of amateur radio and top-of-the-line winners!

The Second Survival Radio Challenge

In light of the events of September 11th and encouraged by your notes of appreciation, we are proud to introduce a second Survival Radio Challenge. It starts right now, June 1, 2002, and ends October 15, 2002. As before, all entrants should pre-register with me, Dave Ingram, K4TWJ, 4941 Scenic View Drive, Birmingham, AL 35210, by August 1, 2002 and supply a brief overview of your planned project. Early pre-registration is encouraged, and by postal mail (with an SASE!), not by e-mail. (My e-mail is excessive and overflows into Cyberspace, with some e-mails never received. Please use postal mail. We cannot be responsible for lost entries.)

The objective of this second challenge is similar to our first challenge: to build a super-small, simple, low-cost rig capable of stand-alone portable or emergency communications when and if needed. It differs from the first challenge in rig size (the smaller the better!), completeness, and operating abilities (100 mW minimum power), and will be compared against other entries. You can use your own or an existing circuit design or kit, one or more transistors or ICs, and follow PC board, perfboard, surface-mount, or Manhattan-style construction, as desired. You can even submit one of your pet projects built from a previous magazine article. Every idea qualifies for consideration. Just remember your setup should be complete with a battery and roll-up wire antenna and be small enough to fit comfortably in a shirt or jeans pocket (tiny!). Again our definition is broad, but in the true spirit of amateur radio we want your creative ingenuity to flourish.

Prizes for the second Challenge are still being cataloged. They will include another MFJ Cub, SGC Tuner, DWM YoYo plus antenna, another K4TWJ plaque, and more. For additional thought-provoking ideas on projects, read our "QRP" column elsewhere in this issue of *CQ*. Again, judges decisions are final, winning entries will be featured in future "World of Ideas" columns, and we wish everyone good luck. Join the Challenge! Have fun! Build something!

73, Dave, K4TWJ

SURVIVAL RADIO CHALLENGE— WINNER

Photo 8– Patrick Tipton, KLØYO, put together a 2 meter/70 cm plus HF station which he uses as his sole means of communication from remote areas of Alaska. His ideas on working AO-14 for FM communications using an FT-817 for HF operations and lithium batteries to survive the cold bagged a new Heil Sound HS-10 Headset with PTT and up/down tuning box (thanks, Bob Heil!).

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Math's Notes

What's New And How To Use It

BY IRWIN MATH, WA2NDM

Unique Components

Every so often we take a look at some of the unique components and accessories that have become available for the experimenter (and designer as well) and try to make you aware of them. It is once again time to perform this task, and I hope what follows is of interest to you.

Anyone using modern audio equipment is familiar with the common detent-stop potentiometer. This is the device that seems like a multi-position switch but is in reality only a potentiometer with some sort of wheel that gives it the feel of a switch. Many such pots are available from the larger distributors, but for the average experimenter, the desired value (or availability of such a pot altogether) is often a problem. Well, Electronic Hardware Corporation (EHC) has come up with a very neat solution to this problem.

The firm's solution is its novel detent knob. This clever device consists of a complete knob assembly that provides the entire detent action within the knob mechanism itself. The knob is designed to be mounted using the nut that holds the original pot and will work with all standard 1/4 inch shafts. To install the device you simply loosen the component's mounting nut, slide the molded base piece in place, and replace the nut (which neatly fits into a molded recess in the base assembly). Then you assemble the rest of the device and finally secure the glossy black knob. The result is a detent pot (or similar device) that looks just like it was original equipment.

The DTM70C28-# unit comes in five models from 18 detents per rotation all the way up to 72 detents per rotation (the number after the dash signifies the number of detents/turn). The cost is $14.39 each for small quantities of any model. The DTM70C28 series is available from Newark Electronics, and a description and diagram of the unit can be found on the website <www.newark.com> with a little bit of searching.

As a test, I used one of these units (the DTM70C28-72 72-detent model) with an old air-gap trimmer capacitor (remember those?) of the type used to dip the final of a vacuum-tube transmitter. The resultant action was very smooth and gave the impression that the whole tuning assembly was much more accurate and rugged than it actually is. If you use rotating components such as pots and capacitors, this is the device for you.

Recently we had the need to design a very low-cost, high-current (6 amps) power supply that had to be overload protected. The first thought was to use a current-sensing circuit, but that would have meant the use of a pass element that would have to carry 6 amps (and be heat sunk as well). The next thought was to actually use a fuse, but if and when the fuse blew, it would have to be replaced. Then came the idea of using a thermal circuit breaker, but have you checked the price of these devices today? Finally we came up with the ideal solution—the resettable thermal fuse.

The resettable fuse is a low-cost thermal device that is made of a semiconductor material that exhibits very low

c/o CQ magazine

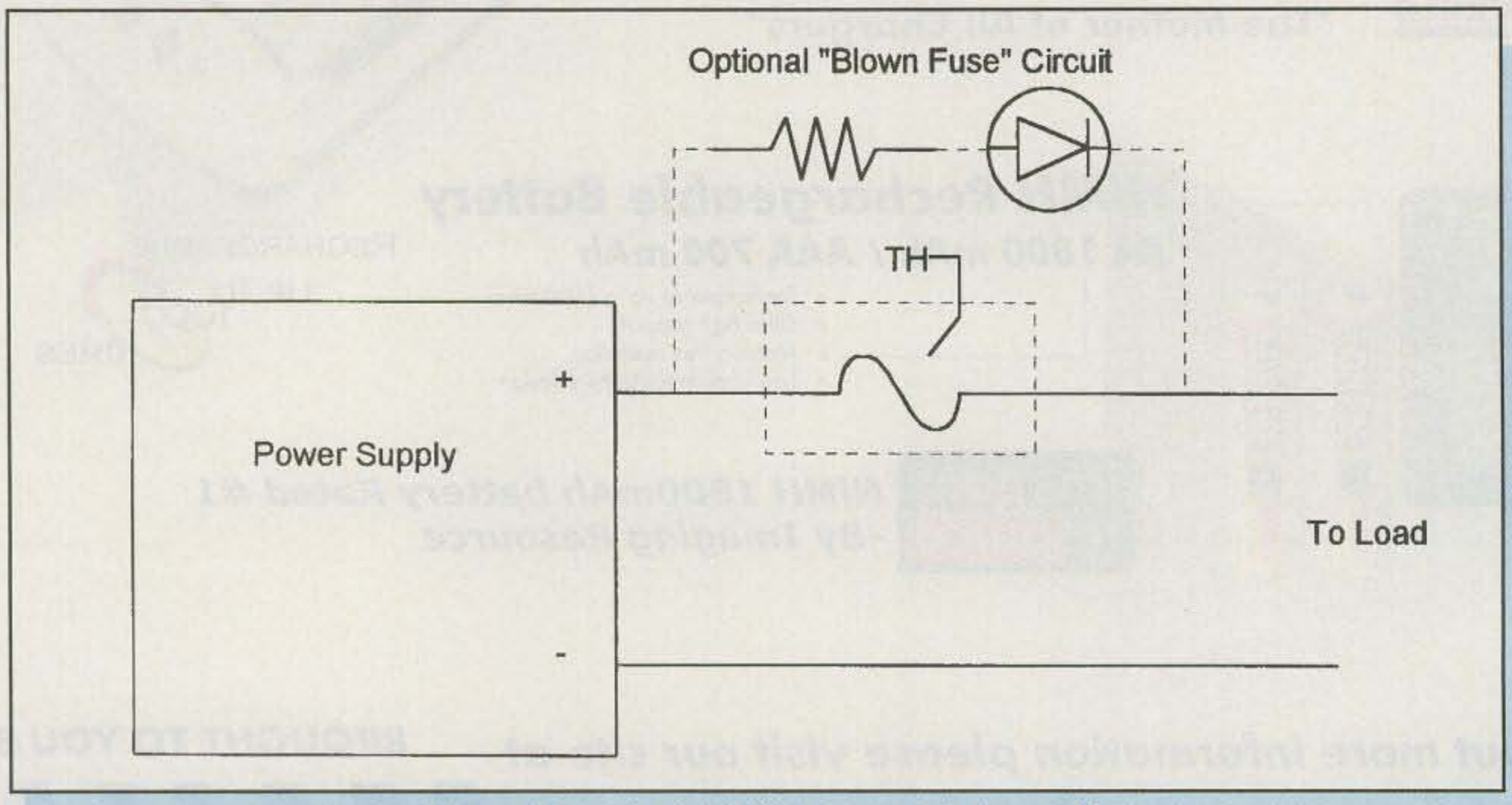


Fig. 1– A simple circuit for a resettable thermal fuse.

resistance (usually less than an ohm) until a pre-determined current flows through it. Then the device self-heats and its resistance sharply increases. This reduces the current flow just as quickly. When the overload is removed, the device cools down and normal operation resumes. Fig. 1 is a schematic of the elegantly simple hookup with an optional "blown fuse" circuit. Pretty simple, huh?

Resettable fuses come in sizes from about 0.1 amp holding (0.2 amp trip) to about 15 amps holding (23 amps trip). They are manufactured by several companies, including Bourns and Tyco/ Raychem. For more information, visit either <www.bourns.com> or <www.raychem.com>. Resettable fuses usually cost less than a dollar, even in small quantities, and are available from most major distributors.

While on the subject of fuses, another interesting (and similar) device is the so-called NTC Inrush Current Limiter available from Thermometrics. This device is a negative temperature coefficient (thus the NTC designation) thermistor that has a high resistance until current flowing through it heats it. As the thermistor heats, its internal resistance drops, allowing more current to flow. The basic circuit is the same as that shown in fig. 1, except in this case the power is applied slowly to the load. Inrush current limiters are available with ratings of from 4 to 16 amps and are ideal for applications where it is necessary to slowly apply current to a load. A device such as this would have been great for controlling the filament supply in vacuum tubes had they been around 50 years ago, but I am sure you will find a more modern use for them. For more information on NTC Inrush Current Limiters go to Thermometrics' website at <www.thermometrics.com>.

Correction

Before we sign off for this month, I would like to thank Ted, K4IJS, for pointing out an error in the January "Math's Notes." The acorn tube used in the 2 meter transceiver discussed was indeed a 955 (not the 933 I mentioned). I guess time has a way of blurring this sort of recollection, but I still have a copy of the schematic, and transmission distances could easily exceed a mile. This was without repeaters, on AM to boot, and I must say it was as exciting as (or maybe more so) working via today's repeaters.

See you next month . . .

73, Irwin, WA2NDM

Beginner's Corner

BY PETER O'DELL, WB2D

For the Newcomer to Ham Radio

A Virtual Small Town

A couple of months ago, in the April column, we looked at the physical makeup of a repeater. This time we are going to talk about the social aspects of using repeaters. As we go through these discussions, please keep in mind that repeaters are *fun* to use. Some of them have clever tools (bells and whistles) to play with. It's okay to play with them—just do it responsibly.

Someone Owns That Repeater

One thing that was implicit in the last discussion should be stated here unequivocally: Because of the special requirements of repeaters, it takes a fair amount of money (and/or ingenuity and scrounging) to put a repeater on the air and to keep it on. Somebody has to pay for it. Therefore, most repeaters across North America are club operations. There are some privately owned repeaters, particularly on 222 MHz and higher, but most are group operations.

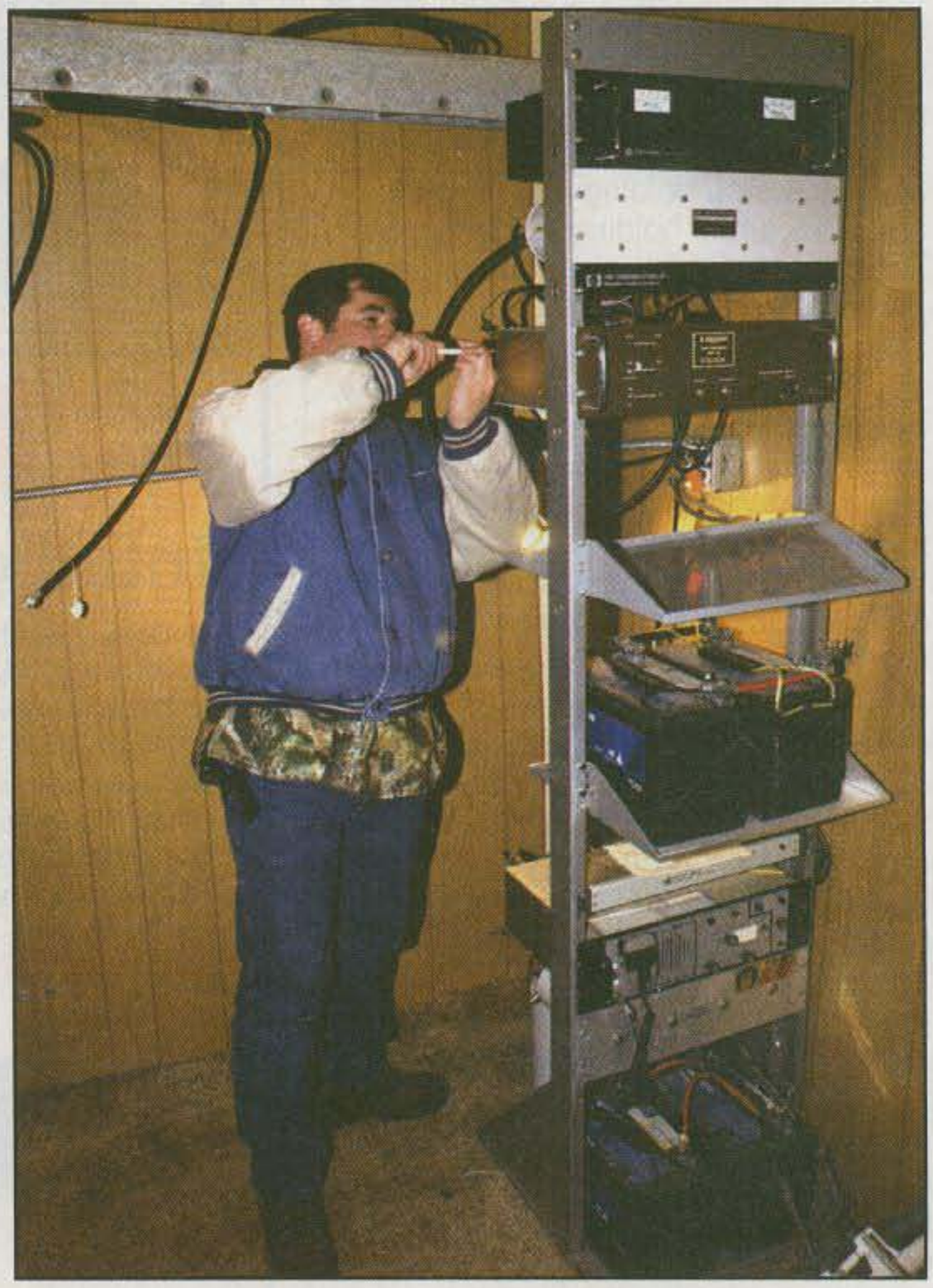
Whoever owns the repeater, individual or group, has put a lot of time, money, and effort into getting the repeater on the air. It is their station. Within legal limits, they can do whatever they want with it. They set the tone or atmosphere for communicating, and they have the right to restrict who can use the system and how it can be used. Besides, Elvis really is dead. Just learn to live with it.

In the past this has been a controversial issue in some areas. Certain hams took the attitude that the airwaves are free and that anyone can and should use any repeater he (or she) wants in any manner he wants. The airwaves are free, but the station isn't. The repeater is a station just the same as the one you have in your home. Suppose someone came over to your house and demanded to use your home station; or maybe he just walked in and started using it without saying anything; or perhaps someone walked up, pulled your handheld off your belt, and started using it without asking. The air waves are still free, but . . . Well, a repeater is a station, too, and it belongs to someone or some group. They have a right to run it pretty much however they want, as long as its operation stays within the parameters of the FCC rules and regulations.

What it boils down to is this: If you are going to use a repeater that belongs to a club, you should join the club as soon as you start to use the repeater on a regular basis. (It would be considerate of you to volunteer to help, too. There are a lot of nontechnical things that need to be done from time to time.) If it is a private repeater, then find out who owns it and ask permission. You could offer to help out there, too. There are no rules that require this, just common decency. Think of what you would want from strangers who are guests in your home and apply those standards to your behavior on the repeater.

Open and Closed Repeaters

When you look through the *ARRL Repeater Directory,* you will notice that some repeaters are listed as "open" and others as "closed." An open repeater is one which has been made available to the public for use—not misuse, not abuse, just *use*! It is an open invitation to join as you pass through the area or from time to time if you live or work in the area. However, if you are going to be a regular, frequent user, you should follow the guidelines above—that is, *pay your dues.*



Somebody owns, and maintains, every amateur radio repeater, so when you use a repeater, act like an invited guest at someone else's station. You are! Here Andy Gagliardo, N7SGV, works on the KI7D repeater overlooking Las Vegas, Nevada. (Photo by Larry Mulvehill, WB2ZPI)

A closed repeater, on the other hand, is one where use is limited to those invited to join in. Closed repeaters are more prevalent among those which are privately owned, but there are plenty of clubs around that restrict use to club members in good standing. There is nothing wrong with this. Just accept it as the way things are. Such repeaters are often dedicated to a special use, such as DX spotting, or the members tend to have similar narrowly defined interests (all involved in broadcasting, for instance).

CTCSS

When FM first exploded on the ham scene back in the early 1970s, some groups used CTCSS (Continuous Tone Coded

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Squelch System) on the repeater receiver as a means of limiting access to group members. Everybody called it "PL" back then, which is Motorola's trademark. As such things go, PL even became a verb in ham jargon, as in "they PL'd the machine." In those days a CTCSS encoder was big, ugly, and expensive, and you were limited to one tone, too. I don't recall a single FM box offered directly to the amateur market back then that featured a CTCSS encoder as an option. To add one to your radio, you had to be technically proficient. In certain groups there was even an effort to keep the specific tone secret.

Don't be surprised if you run into a few old timers who complain about the evils of "PL" and the curse that it has brought to ham radio. They came up through the ranks when it was a tool of exclusion—perfectly legal, perfectly justifiable—but a tool of exclusion nonetheless. There are those who just don't deal well with any form of rejection.

Now almost all new ham FM transceivers come with a CTCSS encoder built in—one which can dial up any of the 32 standard tones at the touch of a couple of buttons. CTCSS is of little value these days to help enforce a closed repeater's status as such.

CTCSS does have some really wonderful uses, however. With the proliferation of repeaters, it is not uncommon to find some unintentional overlap in coverage areas. For instance, a particular hilltop might be outside the prime coverage area of two or more repeaters, but because of its height, any mobile driving over it or parked on it might key up two or more repeaters simultaneously. Also, there are certain areas of the country prone to weather patterns that produce skip. This is particularly true along coast lines.

Reader Feedback

Hector E. Perez, NP4FW: I read your article about lightning in the March issue of *CQ*, and let me tell you, something was missing. In preparation for lightning, every ham must also buy a good, loyal dog. Yes, a good, nice dog. These creatures can feel the approach of thunderstorms hours before they hit. My dog will stand there at my door barking, advising me of an unusual weather situation. When I see her scary face, I know what's coming and it's time to quickly disconnect all.

About a year ago I forgot to disconnect my gear and went to bed. The dog, of course, gave me her usual advice, but I just forgot. It seemed as if we were going to have a nice summer rainfall for a good sleep. By 1:30 AM there was this enormous lightning blast, and the whole room went bright. No joke, for a few seconds I thought it was the end of the world and said a couple of prayers. After the big blast I rushed to my shack and disconnected everything. It had taken me by surprise. Then I went back to bed.

The next morning when I was leaving my home for work, I noticed that the gamma match of my R7 was gone and that my vertical was leaning to one side. I walked to my patio just to find out that part of the concrete ceiling where my vertical mast was attached was missing, the gamma match gone. The antenna, believe it or not, was still standing intact, but hanging from the nylon guy wires attached to it.

To make the story short, I lost my TV set, the TNC, my 2 meter base radio, a 40 channel Cobra CB set, and countless other electronic items—adding to a sum near the $1000 figure.

Lightning is no joke. We have to do our best to protect our gear. The sad part is that I had grounds all over the place.

It can be maddening to try to monitor a repeater when the band is just barely open. Signals are there with enough strength to key the repeater's transmitter, but not strong enough to fully quiet the receiver. In other words, your ears are treated to a constant bombardment of static. This is a perfect time and place to use CTCSS on the receiver input. All that is needed is some cooperation with the distant repeater so that each site is set up to receive a different CTCSS tone. With CTCSS in place and turned on, the repeater transmitter does not activate unless the proper CTCSS tone is present, regardless of how strong the received signal may be from moment to moment. The system is not flawless, but it beats stuffing your ears with cotton.

That brings up a point of courtesy: If you happen to live where you can key up more than one repeater on the same frequency, it would be a good idea to switch over to a directional (beam) antenna. That way you can "point" your signal at the repeater that you intend to use and leave the other(s) in peace. Also, the FCC rules require you to use the minimum power level to maintain good communications—a largely unenforceable rule, but one which just makes good sense. If 5 watts will do, then turn off the 100 watt amplifier. You don't need it. Running an amp when you don't need it just makes you look like a jerk.

Getting on the Air

The best way to get started on a repeater is to spend a lot more time listening than talking (as in all aspects of ham radio). You learn a lot that way. Each group has its own set of rituals and ways of doing things. The closer you follow the set pattern, the more effortless it is to blend in. When you do this, it is much easier to gain acceptance and make new friends.

Once you have the patterns down (and it won't take long), it's time to get on the air. (If you are really concerned, make some notes of what to say and how to say it; no one will know!) Make yourself known by keying the microphone and saying something like, "This is WB2D monitoring." (Of course, you use your own callsign, not mine.) Speak clearly and distinctly, and at a tempo in the middle range of the group. If this is your first time using a mic, you may have a few butterflies in your stomach. This is normal the first few times you talk over the radio. Butterflies tend to cause you to speed up, so make a conscious effort to speak slowly.

When someone calls you back, jot down the callsign and name as you go back to them. In my early days, I once blanked out on my own callsign because I was so nervous. After that, I kept notes in front of me at my operating desk with my name, callsign, phonetics, and any other trivia likely to come up.

Just talk normally with as little jargon and "cutesy" language as possible. One of the fastest ways known to mankind to annoy oldtime hams is to use the pseudo-cop language prevalent on CB. The 10 signals and such do not belong here, and using them is an invitation to be ignored, laughed at, or even asked to go away. That's not to say that hams haven't come up with some really stupid-sounding words and phrases over the years. In the early days of FM it was common to hear someone sign off the repeater by saying that he was "destinated." That non-word always brought up all sorts of bizarre images in my mind when I heard it. Fortunately, it seems finally to have died a natural (perhaps, unnatural) death.

One of the best features of FM communication is that there is little static, and communication is clear and easy. As such, there is no need for Q signals, phonetics, and other aids. Just speak clearly and distinctly. It is a good idea to know the phonetics for your callsign, though, should someone ask you. Other than that, the use of phonetics should be kept to a minimum. Also save the cute phonetics—"Willy Billy Two Doggie," for instance—for the club meetings, or the bar after the club meetings. It just comes across as childish.

On-the-Air "Don'ts"

Once you've become active, here are some sure ways to destroy your credibility on the air. One is to talk incessantly, launching into long discourses on any subject that comes up. Most repeaters have time-out timers that limit the length of any single transmission—usually three minutes or less, so one of the fastest ways to get ridiculed is to "time out" the machine. Do it consistently and people will start avoiding you.

Closely associated with this pattern is the person who forces himself into every conversation that starts on the repeater. It is wonderful to be an active ham everyone knows is there when needed or called, but it is okay to let other people carry on conversations, too, particularly when you do not have anything of substance to add to the conversation. One Native American tribe believed that each person comes to this life with a set number of words to be spo-

ken. When you've exhausted your supply of words, your time is up and you "give the big sign-off." Who knows? It could be true.

Most repeaters reset the time-out timer when the received signal disappears. Many repeaters are equipped with a hang-time timer that keeps the transmitter on the air for a few seconds. This provides "smoother" listening and saves on equipment wear and tear. Some repeaters have a courtesy tone to alert you that the time-out timer is reset. If the repeater you are using is so equipped, you should wait to hear the courtesy tone before transmitting. Pausing a second or so before beginning your transmission also gives another station the opportunity to break into the conversation. It is just common courtesy.

Be careful with the jokes, jabs, insults, and teasing. Some studies suggest that the meaning of the words spoken account for as little as seven percent of the communications received. As much as 60% may come from visual cues. This is a double-edged sword. First, the person you are teasing or joking with may not catch on that you are joking, at least not as quickly as he would in person. Second, you have no visual feedback to tell you that the other person is becoming uncomfortable.

Unfortunately, it took me a long time to learn my lesson. I like to joke and tease, but I went too far with several people on the air. I thought I was being cute and funny. Based on subsequent behavior, I believe they had a different slant on my "humor." These were people with whom I could have been good friends had I been a little more sensitive.

Repeaters are fun. I've made some great friends on repeaters. I've made all sorts of mistakes, too, many of which are mentioned here. Just go have some fun now. Remember, though, it's a small town out there. People know who you are, and they remember.

73, Pete, WB2D

Call for Photos and Stories

We'd like to hear from you about your experiences as a newcomer. If you have questions, we'll try to incorporate them into future columns. If you have photos (color prints or slides okay) of your station or antennas, please send them along and we'll publish the best ones. If you have a solution to a common problem that new hams experience, we'd like to hear about it so we can pass it along. You can contact me at <wb2d@cq-amateur-radio.com> or Peter O'Dell, WB2D, Beginner's Corner, 123 NW 13th St., Suite 304-2, Boca Raton, FL 33432.

Amateur Satellites

BY PHILIP CHIEN, KC4YER

Ham Radio in Space

Could Security Concerns Threaten ARISS?

Major Educational Projects May Be Forced to Shut Down in the Name of Anti-Terrorism

No, this isn't an April Fool's joke. It's a serious threat to the space station's Kidsat and ARISS (Amateur Radio on International Space Station) projects.

After the September 11th terrorist attacks, security awareness in the United States increased dramatically. What could be done to prevent future attacks or at least make things more difficult for terrorists? Especially affected were U.S. government agencies, including NASA. Immediately, NASA's shuttle status reports stopped mentioning the locations of the shuttle. Previously cooperative public affairs officers would only verify that events took place after they took place, or it was so obvious to the outside world that there was no use in trying to deny that it had happened. Initially, NASA removed the launch times for the upcoming STS-108 and STS-109 shuttle missions from its websites and refused to confirm the schedules or times. However, it was quickly realized that that decision was absurd, as NASA had already published the launch windows for both missions.

The desire to protect launch times was still there, though, and in mid-March a policy was released. The launch times would not be classified, as that would cost too much money to implement. However, they would be considered "sensitive," to be released only on an "official use" basis. A four-hour "period" would be announced in advance. The actual launch time, somewhere within that period, would only be announced 24 hours before launch.

This wasn't as drastic as the blackout on information for the ten classified shuttle missions in the 1982 to 1991 era, but it was a radical change in NASA's way of doing business. NASA even held a meeting with reporters, "encouraging" them to cooperate by not revealing the

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New Satellites

By the time you read this article, a couple of additional amateur radio satellites should be in operation. However, one has limited operating times and two others have a very limited lifetime.

SO-41 On the Air

Saudisat 1A and 1B were launched on September 26, 2000 on a Russian launch vehicle. At the time, there were concerns expressed that while the satellites use amateur radio frequencies, there were no indications whether they would ever become publicly available as open resources for ham radio operators. The Saudi Arabian control operators did ask for OSCAR designations—a positive sign—and Saudisat 1A was assigned SO-41, while Saudisat 1B was assigned SO-42.

In early April, Saudi control operator Turki Al-Saud announced that Saudisat 1-A (SO-41) would be activated as a Mode J-FM (VHF uplink, UHF downlink) repeater for about 20 minutes on each orbit while it passed over the United States and Saudi Arabia. No specific reasons were given as to why it would be limited to only those areas, but it's probably due to the satellite's power budget as opposed to any desire to offer it only to hams in certain areas. The announcement also warned that the ham operations would be intermittent, operating only when it didn't interfere with the satellite's primary functions. Saudisat 1B (SO-42) continues to be used for other purposes and has not been opened up to ham radio operators.

SO-41 has an uplink frequency of 145.850 MHz and downlink of 436.775 MHz. It is extremely important to tune for Doppler shift on the downlink. The downlink RF power is 1 watt with left-hand circular polarization. The uplink antenna is linear.

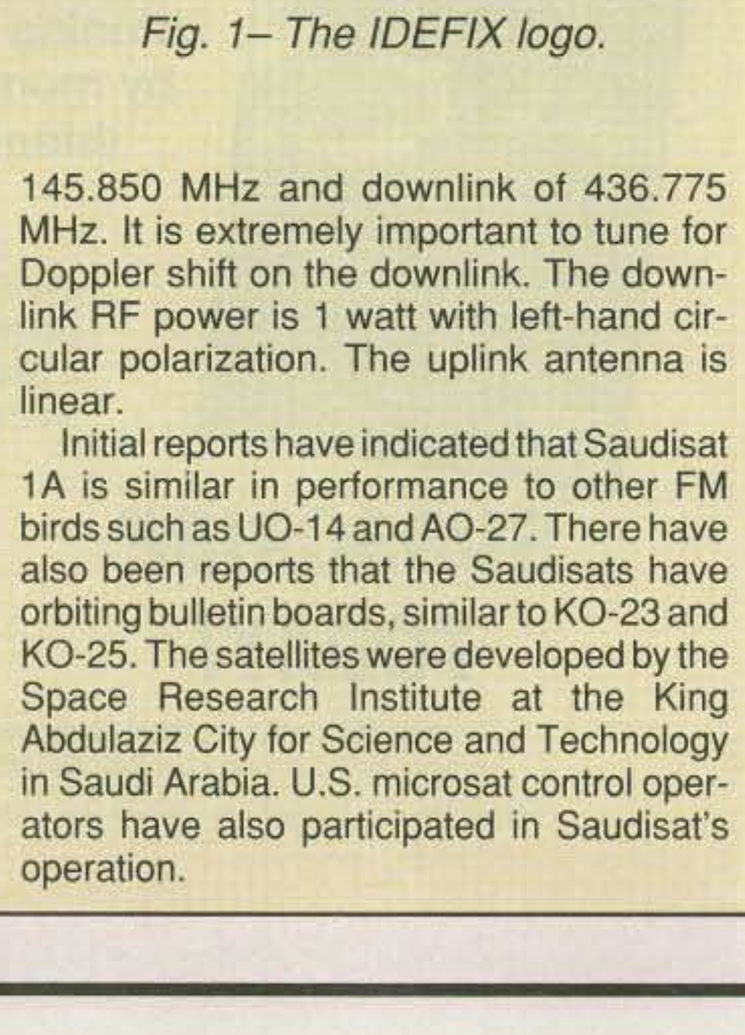

Fig. 1– The IDEFIX logo.

Initial reports have indicated that Saudisat 1A is similar in performance to other FM birds such as UO-14 and AO-27. There have also been reports that the Saudisats have orbiting bulletin boards, similar to KO-23 and KO-25. The satellites were developed by the Space Research Institute at the King Abdulaziz City for Science and Technology in Saudi Arabia. U.S. microsat control operators have also participated in Saudisat's operation.

Overall, this announcement is certainly a positive step—another resource for hams interested in satellites. However, it would have been nice if additional information was made available earlier on the satellite's status along with indications that it would be made available to hams after it was checked out and the primary experiments were finished.

French Picosats

As we go to press, AMSAT-France was in the final preparations for a pair of picosats known as IDEFIX. Unlike most small satellites, though, the IDEFIX payloads remain attached to the upper stage of the launch vehicle. The primary payload for the Ariane V151 launch was the Spot 5 Earth observation satellite. Launch into a 790 km sun-synchronous orbit was scheduled for May 3rd. The IDEFIX payloads were mounted on the Ariane 4's third stage. They only have primary batteries, limiting their lifetime to about 40 days. The payloads are supposed to transmit digitized voice messages and numeric format telemetry on 145.840 MHz and 435.270 MHz in NBFM. Telemetry data will be transmitted at 400 baud BPSK. The ground team anticipated turning on IDEFIX about ten days after launch. Assuming a nominal timeline, the satellites should operate through late June.

What does IDEFIX stand for? It's just the French equivalent of the word *Fido*. According to inside sources, the term means "an obsessive idea," and it reflects the team's passion for the project. Fig. 1 is the IDEFIX logo, showing its canine origin.

Fig. 2– Graph of Lacrosse 1's altitude over time.

launch time before NASA announced it, but NASA did not provide any reasons why protecting the launch time would enhance security in any way.

The absurdity is how easy it is for anyone who has done any satellite tracking or has a small knowledge of physics to calculate the launch time for any mission headed towards the International Space Station. Launches to the space station, including the shuttle, Progress, Soyuz, and any future European or Japanese launch vehicles, can only take place in a short period of time each day when the space station's orbit passes over the launch site. For safety reasons, the shuttle launches only toward the northeast, so all you have to do is determine when the space station's orbit will pass over the Kennedy Space Center while it's headed northeast. You can easily "eyeball" the launch time to within an hour with NASA's own J-track website or any freeware satellite tracking program.

This author wrote a quick program to calculate the launch time to within two minutes. Amateur satellite tracker Ted Molczan wrote a program which in most cases can determine the launch time to within three seconds. Only in rare circumstances will his technique return two values, about three minutes apart, with one being the actual launch time. Molczan's program even takes into account which launch pad is used. Launch pads 39A and 39B are approximately 1.6 miles apart, enough to result in a 9-second difference in launch times!

As more than one person noted, it may be rocket science, but it isn't difficult rocket science. The formulas and how to do the calculations have been known for the past four centuries! Similar techniques were used for years by western satellite observers to estimate unannounced launch times for Soviet launches to the Salyut and Mir space stations. Certainly it's well within the capabilities of an organization which can successfully hijack four separate airliners, and the skills are extremely easy to learn for anyone with a desire or need to find out the launch time.

These techniques use the space station's Keplerian elements, the parameters which define a satellite's orbit. These are normally generated by USSPACECOM's worldwide network of radar stations and distributed by NASA's Goddard Spaceflight Center. The Keplerian elements for the space station and shuttle are available at NASA's <spaceflight.nasa.gov> website and other satellite-tracking websites. Contrary to some claims, the Keplerian elements, or Keps, are very easy to obtain. Just type "Keplerian elements" or "Keps" or "TLEs" (two-line elements, the standard format used by most satellite tracking programs) in any internet search engine and see how many hits come up.

Why ARISS Could Be Affected

Naturally, then, as a response to the widespread distribution of the indepen-

Fig. 3– An unclassified photo of a Lacrosse satellite under construction in Denver, Colorado. (Photo courtesy the National Reconnaissance Office)

dent predicted launch time for the STS-110 mission, there have been talks about stopping the distribution of Keplerian elements for the space station. This would make it more difficult for educational programs such as ARISS and Kidsat, which require "civilians" to determine the space station's location with a fair amount of accuracy, or for visual satellite observers who want to look at the space station.

However, even if the Keplerian elements were no longer distributed, it would not prevent outside satellite trackers from determining the launch time. There are about two dozen low- to medium-altitude classified reconnaissance satellites for which the Keplerian elements are not distributed. The lack of official Keps makes them favorites for many visual satellite observers. It's far more challenging to use your own skills, binoculars, and stopwatch to make observations of a classified U.S. radar reconnaissance satellite than just to look based on some program's predictions. Ironically, as a result, classifying the elements for the U.S. photo reconnaissance satellites has actually made them more interesting to view than French or Russian photo reconnaissance satellites whose elements are readily available! If the "official" Keplerian elements for the space station disappear, amateur-derived elements will quickly appear.

Fig. 2 shows the altitude graph over time for the classified payload deployed by the STS-27 mission in December 1988. The satellite, nicknamed Lacrosse, used its own propellant to raise its altitude and was tracked by amateur satellite observers over its operational life until its re-entry nine years later. Fig. 3 shows a photo of a later satellite in that series under construction. It's an unclassified photo of a classified satellite!

Other independent methods for determining the orbit of the space station include monitoring its RF transmissions (ham and non-ham) and determining the Doppler shift (similar techniques have been used for many years to refine the orbits of AO-10 and AO-40), and using U.S. government radars in a passive mode. Even without any additional data, the key parameters of the space station's orbit, in particular the Right Angle of Ascending Node, don't change very much over time. One incredibly simple method for predicting future launch windows is to just subtract 23.818 minutes per day from a date for which you know the launch time. Perhaps the next over-reaction by NASA will be to try to classify the laws of physics.

There are many legitimate reasons for people outside NASA to know shuttle launch times in advance: reporters need to know what timetable they're going to work during upcoming missions and when they're going to have tight deadlines; photographers need to know at what time to set their remote-control cameras; tourists need to know how to time their vacations; local restaurants need to know when to expect post-launch crowds;, etc.

Of course all of the above only applies to shuttle flights that are headed towards another satellite in orbit, most important, the space station and Hubble Space Telescope. An independent shuttle flight would have different parameters which control its launch window and would require far more inside information. The only near-term shuttle mission that is not going to the space station is STS-107 this summer.

Update on KE4IQB

In the April column we mentioned that former astronaut Charlie Bolden, KE4IQB, had been nominated to be NASA's Deputy Administrator, the second highest position in the civilian space agency. He was the first African-American named to such a high post in NASA. However, shortly after we went to press, NASA announced that Bolden's name had been withdrawn by the White House (*as reported in our May news column—ed.*). The press release claimed Bolden, a Major General in the Marine Corps, was needed on active military duty in the campaign against terrorism. It seems strange that of all the active military personnel in the U.S., *his* skills were specifically needed *after* his name had already been announced for the NASA position. A month later no new candidate for Deputy Administrator had been announced. 73, Phil, KC4YER

Digital Wireless

BY STEVE STROH, N8GNJ

Packet Radio and Beyond

Blue Sky Amateur Radio Networking Starting from Scratch

The group of amateur radio operators in the Seattle, Washington area that I call the "Puget Sound Amateur Radio TCP/IP Group" (many prefer to call it the "WetNET Group") operates four 9600 baud bit-regenerative repeaters in the Seattle area (several more are in the works or undergoing conversion). The repeaters are on various bands: Three are on UHF, and one is on 222 MHz (which eventually may be converted to 9600 baud) and 2 meters. The predominant "mode" used on this network of repeaters is TCP/IP, and we've had an internet gateway online almost since the beginning of this network. I feel it's notable that we've been doing "Wireless Internet Access" for more than a decade now.

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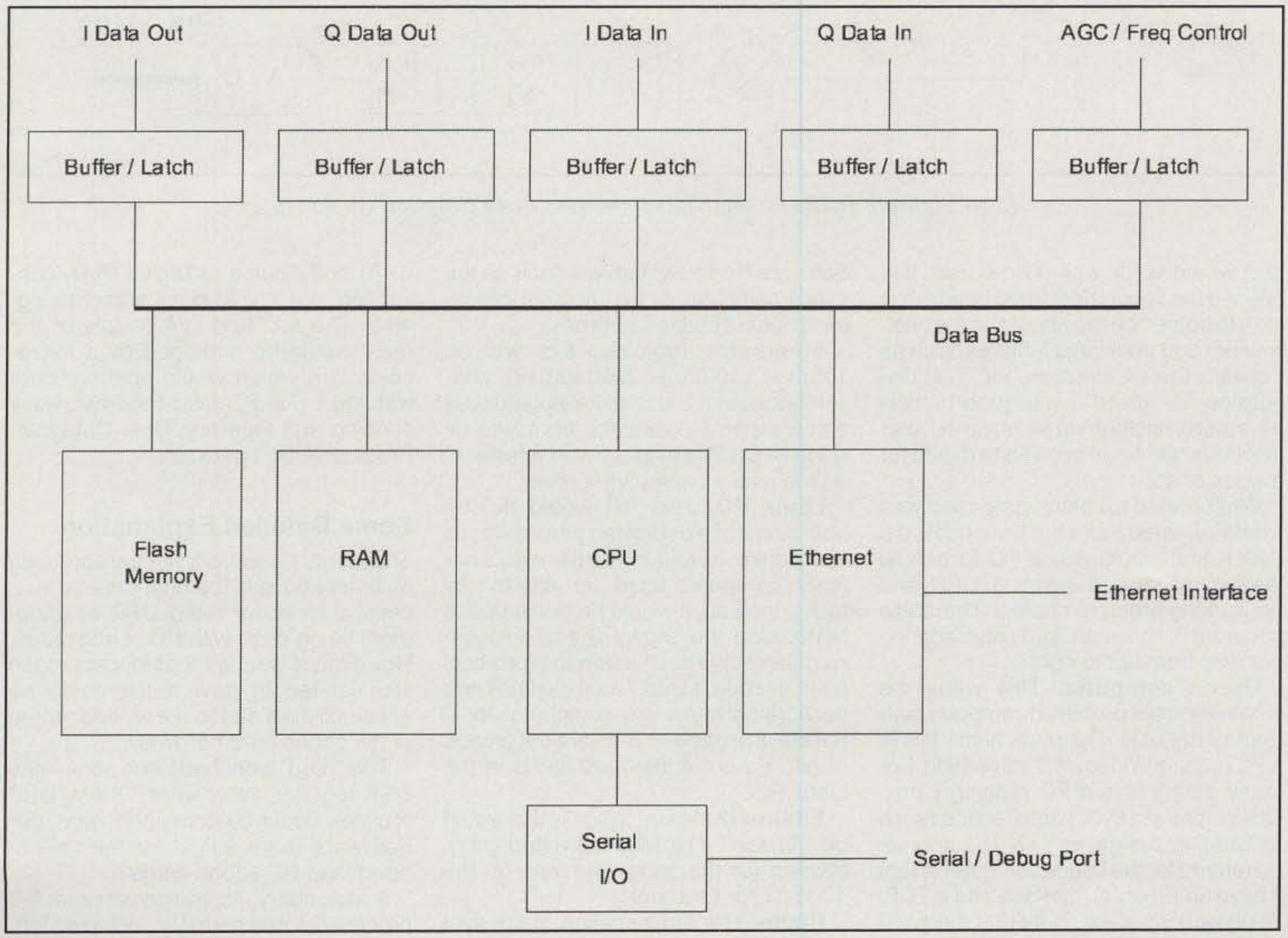
User's computer <— (Ethernet1) —>Linux PC <— (Ethernet2) —> Radio

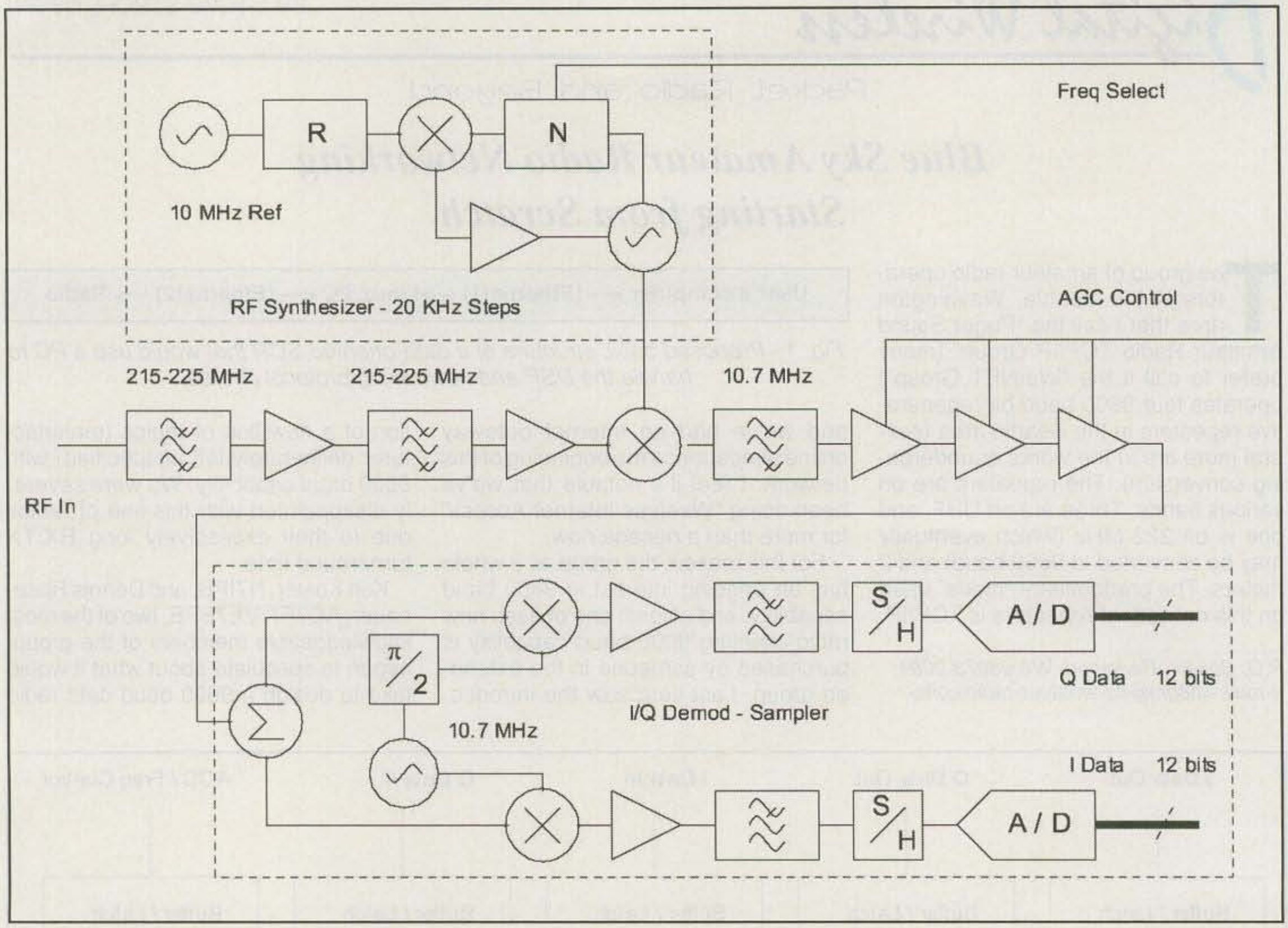
Fig. 1– Proposed basic structure of a data-oriented SDR that would use a PC to handle the DSP and networking/protocol chores.

For this reason, the group as a whole has an ongoing interest in 9600 baud capability, and at least one of each new radio claiming 9600 baud capability is purchased by someone in the extended group. Last year saw the introduction of a new line of radios (manufacturer deliberately left unspecified) with 9600 baud capability. We were severely disappointed with this line of radios due to their excessively long RX/TX turnaround time.

Ken Koster, N7IPB, and Dennis Rosenauer, AC7FT/VE7BPE, two of the most knowledgeable members of the group, began to speculate about what it would take to design a 9600 baud data radio



Seattle Software Radio Project, radio–digital block diagram, version 0.1. (Diagrams courtesy Dennis Rosenauer, AC7FT)



Seattle Software Radio Project, radio–receiver block diagram, version 0.1.

that would work well. Of course, this opened the floodgates: 9600 baud is too slow to bother, cheap should be the goal, why not add additional features such as Forward Error Correction, etc. The discussion "devolved" (with good humor) from there, but then we reconvened after the ideas had been allowed to digest for a week or so.

What ended up being proposed was a data-oriented Software Defined Radio (SDR) that would use a PC to handle the Digital Signal Processing (DSP) and networking/protocol chores. The basic structure is shown in fig. 1, and working our way from left to right...

User's computer. This would be *whatever* is the preferred computer platform of the user. For most hams this is a PC running Windows®-something. For many others it is a PC running Linux. Others prefer UNIX workstations (such as Sun), or Amiga, or ???. The only requirement for the user's computer is that it have an Ethernet interface and a TCP/IP networking stack. Note that there will be no "special" applications running on the user's computer, and the Seattle Software Radio System will "look" to the user's computer as just another device on its local 10baseT network.

Ethernet1. Typically, this will be 10baseT (10 Mbps, twisted pair), chosen because it is completely ubiquitous and inexpensive, and the troublesome issue of establishing a "radio interface" on the user's computer is done.

Linux PC. This PC would be the equivalent of a dedicated processor; as envisioned, it wouldn't be the user's primary computer used for day-to-day tasks. Instead, it would be dedicated to performing the Digital Signal Processing tasks *and* the networking (protocol code/decode) tasks. Once the DSP and networking tasks are completed for a packet, the packets are sent out on one of two Ethernet interface cards in the Linux PC.

Ethernet2. Again, typically this would be 10baseT (10 Mbps, twisted pair), chosen for the same reasons as the 10bastT for Ethernet1.

Radio. The radio section of the system portion would be minimal—a basic radio front end, and Digital to Analog (D/A) and Analog to Digital (A/D) conversion resulting in clock and data signals. The A/D and D/A stages of the radio would be managed by a microcontroller, which would communicate with the Linux PC over Ethernet, likely sending and receiving User Datagram Protocol (UDP) packets.

Some Detailed Explanation

The primary inspiration for the approach outlined above is the phenomenal success of amateur radio DSP development being done with PC sound cards. However, it was felt that this approach was limited in how much could be accomplished due to the limited nature of the sound card hardware.

The "hard" work had been done—the DSP routines. Now what if those DSP routines could be combined with DSP hardware more suited for the task at hand than PC sound cards?

A secondary inspiration was that PC processors and memory, including laptops, were advancing at a phenomenal rate, and it seemed perfectly possible in

a 2002-era PC, even a modest one, to have sufficient bandwidth to perform considerable DSP work in the background as well as run other tasks.

Linux was chosen as the development Operating System (OS) of choice, because it has all the required (open source) networking, it very efficiently multi-tasks, development tools are all available free, and there is a well-established library of DSP sound-card routines available.

This approach satisfies many of the requirements/wishlist items:

• Because the RF hardware will be relatively modest, it should be inexpensive and relatively easy to develop.

• 222 MHz was chosen because it is the most "experimentation friendly" of amateur radio's available VHF/UHF bands; parts are readily available and layout is easier than at higher frequencies.

• Using a 20 kHz (standard VHF/UHF bandplan) channel, it may well be possible to achieve speeds considerably faster than 9600 baud. To date, faster amateur radio data communications using simple two-state Frequency Shift Keying (FSK) have required channels wider than 20 kHz. It may well be possible to achieve 80 Kbps using 16QAM (Quadrature Amplitude Modulation), and after adding minimal Forward Error Correction (FEC), end up with 56 Kbps… again, in a 20 kHz channel. For comparison, the long-established WA4DSY 56K modem requires a 100 kHz channel.

• No need to reinvent or port networking code.

• Linux's advanced networking capabilities (including support for Internet Protocol version 6 [IPv6]) offers the possibility of advanced networking development.

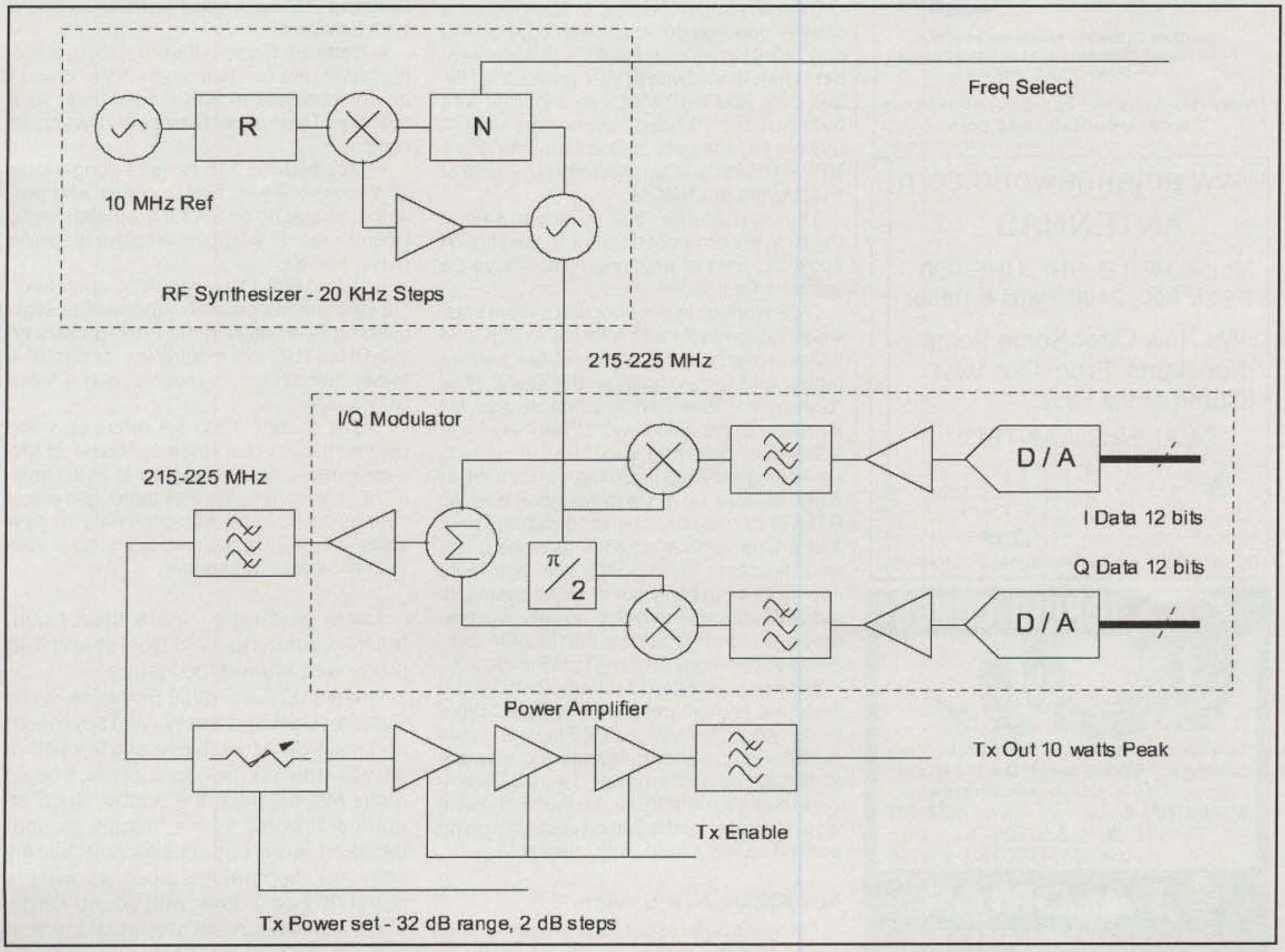
• Use of a well-supported and common interface—Ethernet—ensures that the computing platform is not restricted to PCs.

• Multiple radios can be supported (physically) with the addition of an Ethernet hub and can even be separated physically from the computer and each other.

The Ongoing Project

From the beginning, the entire project was envisioned as operating as Open Source, with software distributed under the GNU Public License and the hardware intellectual property (schematics, board layouts, etc.) also being made available as Open Source, possibly using the OpenIPCore Hardware General Public License. Documentation of the project is the automatic archiving on the project's mailing list (see below). Because of the mix of "platform preferences," diagrams, etc., will be built with UNIX open-source tools, such as xfig.

There is need for some specific skills, especially as the project evolves past the design stage, but for the moment, the ongoing project is envisioned as largely local to the Seattle area. If you wish to monitor the progress of the pro-



Seattle Software Radio Project, radio–transmitter block diagram, version 0.1.

ject, it is being documented on the group's (actively being revised) web page at <http://www.seatcp.net/>; follow the Projects link. You can also monitor the progress of the project via the Soft Radio mailing list. To subscribe to the list via on the web, go to <http://wetnet.seatcp.net/mail_lists/>, or send an e-mail to <mailto:majordomo@seatcp.net> and put "subscribe softrad" in the body of the message.

Other Potential Networking Approaches

As is also the habit of the "WETNet Group," nothing is ever cast in stone, and projects/approaches to new networking systems continue. Here are a few highlights from some recent discussions (slightly edited for publication):

From Dennis Rosenauer, AC7FT:

A while back I did a design using a Motorola 68en302, which is the same processor that is used in the TNC3 but with an Ethernet. The PCB layout is 80% done. I have yet to route the power busses.

Basically what I have is a 68en302 on a double-sided board. It is fairly large due to only being two sides (about 7" × 9" if I remember right). It has two RS-422 ports, one RS-232 port, and a 10 Mbit/sec. Ethernet with both AUI and 10-baseT connectors on it. It has old PC memory sockets on it for 2 × 1 MByte DRAM and two sockets for a total of 512K bytes of EPROM.

The cost of the '302 is about $45 at DigiKey, the Ethernet chip is $18, and I don't know the cost of anything else. I have no software for it.

I was working in this direction a while back when I expected more interest in 56K and higher speeds, but the project got pushed farther and farther back on the stove. *(The "distraction" that Dennis hints at was his marriage to his lovely wife Chris.—ed.)*

It would have the capability of running something like NOS if you were to do a major cross compile for it. I was targeting running RTEMS (a real-time operating system) on it and writing application code to make it into an Ethernet-to-radio bridge with two radio interfaces on it. I only got as far as setting up the GCC cross compiler for the 68K core processor and getting some of the run-time libraries together ready to port RTEMS to the 68K.

Now here is where I put my foot in it!!! If there are enough people interested, I could be convinced to finish the PCB layout. I could even be convinced to change the memory to something a little newer. I would be willing to make a run of PCBs, but someone else would have to handle getting parts and doing some documentation. Any interest?

Ken Koster, N7IPB, wrote:

OK, gang, time to put up or whatever. The offer has been made, and it's up to you to make it happen. We've done this in the past and nothing happens... How about this time?

While completing projects like this can be done by one or two individuals, we have to be highly motivated and have a big personal interest in the project. The motivation can quickly go away if it seems no one else cares enough to help out.

Dennis already has other projects to work on, a life, a job, a 56K repeater, welding gear to play with, a software radio. ... He doesn't really need another project, so unless help shows up, it won't happen.

The group as a whole needs to figure out what they want to do. What radios, modems, TNCs, etc. Start up a discussion right here on the mailing list, get involved, put forth proposals. I'll even start the ball rolling, but I expect others to chime in and continue the discussion. So here goes:

- Do nothing—Slide along with 1200 and 9600 with minor incremental changes.
- 56K—Dennis's repeater on 440 to start with, simplex LANs for others. Needs a radio; could be the Dutch ones. Also needs a modem; could be the PacComm or might get an old GRAPES modem.
- Dennis's 56K design uses parts that are now obsolete and would require a redesign (and help from the audience). Also needs a high-speed interface; could be the TNC3, Dennis's 302 board, or the PCISCC board from BayCom.
- Software Radio—It will do 9600, possibly faster, not for quite some time. It won't be compatible with 56K unless done as a redesign. Don't expect anything for a year or more.
- Modified 802.11b systems [long a topic of discussion] with higher power and preamps, operating on 2.4 GHz amateur radio frequencies. The biggest problem is adding power control.
- Adapt 802.11b systems to operate on 1.2 GHz amateur radio frequencies to avoid colliding head-on with the Part 15 users on 2.4 GHz. This will require the design of a transverter system in reverse, and a feasibility study.

That's a start. Time for discussion and comment. Cast your votes and come up with a consensus. You will be graded on the quality of your comments, the thoroughness of your analysis, and the originality of new ideas. I'll be disappointed if we have less then two dozen responses.

There was much more discussion, but the comments from Dennis and Ken pretty well framed the issues.

I think that the Seattle Software Radio System (SSRS) is a very valid approach, and if it is able to achieve any traction at all with amateur radio as a whole, it could really revolutionize the hobby. Such an approach would take a "middle ground" between what is possible with "purely software" approaches such as what is currently being done with sound cards, and the development of standalone systems that do all the processing on embedded processors and memory. The

former approach is highly cost effective but limited in what can be accomplished overall. The latter approach isn't cost effective (the resultant product is expensive) but is unlimited in what can be accomplished overall.

Although the initial SSRS is targeted at "9600 and faster" speeds, and 222 MHz frequencies, it seems to me that the modular approach would quickly allow those skilled in RF, but not necessarily in DSP or networking, to perhaps build a 1.2 GHz RF front end based on the "reference design" 222 MHz radio. This design approach—building on what others have done using previous work as reference—is referred to as "Open Source" in the Linux community.

The project that I would most like to see happen is to adapt existing Part 15 Frequency Hopping Spread Spectrum (FHSS) radios that operate in the 902–928 MHz band to operate in the U.S. amateur radio band of 420–450 MHz. I've written before that I feel that FHSS would be an ideal "overlay" to existing operations in the U.S. amateur radio 440 MHz band mostly because the repeaters that occupy the vast majority of the band consume only a fraction of the available channel time. Because the amount of spectrum available is similar, only minor adaptations should be necessary, such as perhaps restricting an FHSS "not to hop" into segments reserved for space operations *(Please be sure to include EME and terrestrial weak-signal frequencies as well.—ed.)*.

Correction and Update

Regarding my April 2002 column in which I discussed the Linksys WAP11 802.11b Wireless Access Point, Steve Lampereur, KB9MWR, responded with postings to several TAPR mailing lists (lightly edited for publication):

In the April 2002 issue of *CQ*, Steve Stroh, N8GNJ, wrote in his "Digital Wireless" column: "Modifying a Part 15 Device, even attaching external antennas, is a violation of FCC Part 15 rules. A Part 15 certification is for the system, not just the "radio." Modifications void the "implied license for this device to transmit."

N8GNJ implies the *only* way around this is to re-classify under Part 97, as we are allowed to make such modifications...

"Equipment that has been certified for use in another service may be used on amateur frequencies by a licensed amateur as long as it meets all appropriate standards. (97.315)"

I wish this was the case, Steve. In your thorough reading of FCC rules, you failed to read all the pertaining sections. When deal-

Seattle Software Radio Specs version 0.1 per AC7FT

Receiver
Freq. Range: 215–225 MHz
Continuous Tuning Range: 3 MHz
Step Size: 20 kHz
IF Bandwidth: 20 kHz nominal
Noise Figure: 10 dB
Sensitivity: 120 dBm for 1.0 V pp out on A/D
Sample Rate: 20 kHz I and Q (probably closer to 24)
Resolution: 12 bits I and Q
AGC Range: 80 dB

Transmitter
Freq. Range: 215–225 MHz
Continuous Tuning Range: 3 MHz
Step Size: 20 kHz
Modulation Bandwidth: 20 kHz min.
Output Power: 10 watts peak
IMD: 25 dBc two tone at 5 watts
TX Gain Control Range: 32 dB in 2 dB steps
Sample Rate: 20 kHz I and Q
Resolution: 12 bits I and Q

Processor
Flash: 8 Kbytes min.
RAM: 32 Kbytes min.
Clock Speed: TBD
Ethernet I/F: 10baseT 10 Mbits/sec.

ing with any Part 15 device, not only do you need to read 15.247, but also parts 15.205, 15.209, and 15.247. So I hope this was just an oversight on your part.

Here is the Part 15 loophole: "Section 15.23. Equipment authorization is not required for devices that are not marketed, are not constructed from a kit, and are built in quantities of five or less for personal use."

More information on this is available at <http://www.qsl.net/kb9mwr/projects/wireless/plan.html>.

And in a later message:

N8GNJ wrote, "... if you are able to modify the device in such a way that transmissions are restricted to the amateur radio segment of the 2.4 GHz band...." "Since Linksys has not, and likely will not, release detailed enough information to be able to make such a change, 'pure' amateur radio use of this device doesn't seem likely..."

...The Linksys WAP11 is a DSSS 802.11b device. All 802.11b devices have 11 user-settable channels; the first 6 channels have complete amateur overlap.

More information on this is available at <http://www.qsl.net/kb9mwr/projects/wireless/dssfreq.html>.

Maybe your Windows® driver doesn't let you "lock" onto one particular channel. Try a different 802.11b driver (they should be interchangeable). Under Linux you can set the channel using "iwconfig" or equivalent.

Bill Vodall, WA7NWP, wrote (lightly edited for publication):

You can, of course, choose the channel which your 802.11b Access Point will use.

There are three unique non-overlapping 802.11b channels; 1, 6, and 11. One and 6 are completely inside the ham segment and 11 is outside. I will be using my Part 15 home wireless network at 11 as a token gesture to not add to the noise floor for AO-40 and other amateur activities.

Steve, KB9MWR, brings up an interesting possibility. I've heard of the "under five systems for personal use" provision he references, but I'm not familiar with it, and refer interested readers to Steve and the references he provides.

Ed Hare, W1RFI, of the ARRL added: "This does assume, of course, that said homebrew design [the 'under 5 provision'] is designed such that the designer reasonably believes that the device complies with the rules."

As to "setting" 802.11b channels, I completely blew it in this part of my explanation. Steve and Bill are correct in that the channel of an 802.11b device *is* settable, but doing so is somewhat problematic with the Windows® driver included with the WAP11. As Steve and Bill point out quite correctly, it is (relatively) easy to operate an 802.11b device entirely with the amateur radio portion of the 2.4 GHz band.

Digital Conference and "Coming Soon"

Mark your calendars and make plans to attend the 21st Annual ARRL and TAPR Digital Communications Conference, to be held September 13–15, 2002 in Denver, Colorado. The most up-to-the-minute information on the DCC and the various activities will be posted at <http://www.tapr.org/dcc>.

In upcoming columns, I again hope to discuss, as promised:

- My idea for a Wireless ISP Smart Radio and how it relates to amateur radio
- A "repeater grade" 802.11b Access Point that could form the basis of an 802.11b network with long range.
- A line of high-speed radios and TNC-like devices from Germany (<http://www.symek.com/g/index-g.html> if you want to peek), and my impressions of their product line in the face of what has happened to 56K packet radio in the U.S.
- A visit to the headquarters of Shine Micro (http://www.shinemicro.com) and a discussion with Mark Johnson, AC7PU, about its new SM2496-TNC, a "TNC" implemented in software and a DSP chip in a Springboard Slot form factor for the Handspring Visor line of Personal Digital Assistants. I think there's a lot more to this development than is readily apparent.

73, and please write!

de Steve, N8GNJ

Public Service

BY BOB JOSUWEIT, WA3PZO

Public Service and Emergency Communications

Do You Have "Hazard Amnesia"?

Federal Emergency Management Director Joe Allbaugh recently asked that question at this year's National Hurricane Conference. He said, "The danger to any nation lucky enough to be prosperous, safe, or at peace is always complacency, which we in emergency management could call *hazard amnesia*."

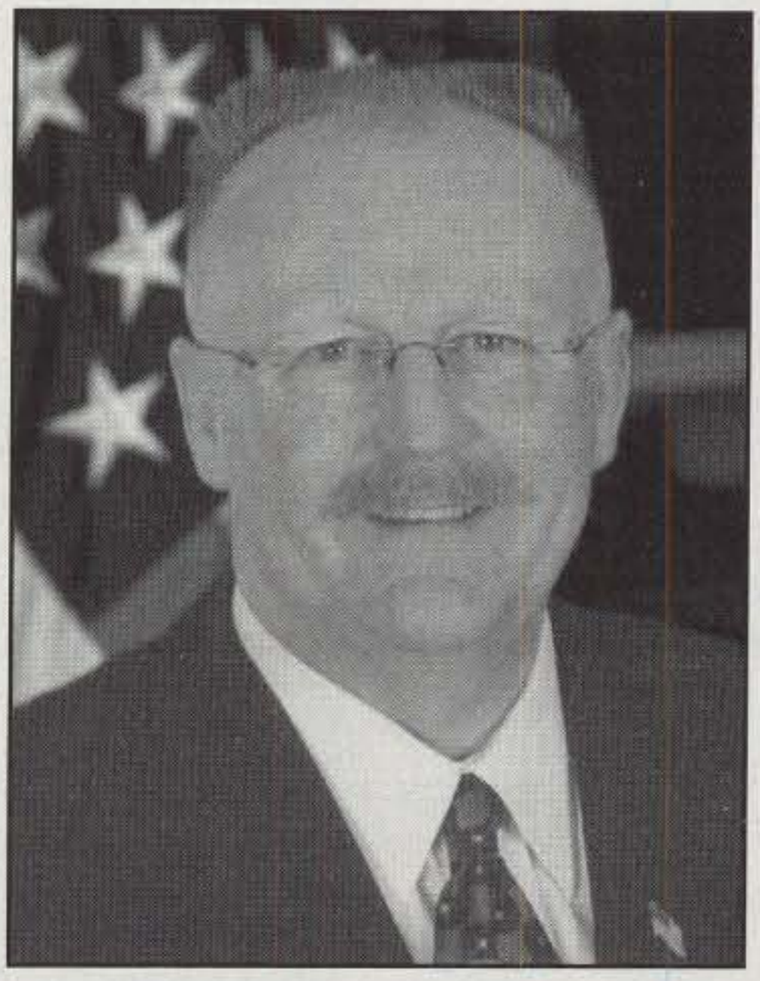
While last September was certainly a wake-up call for many of us, this past winter had some of us worrying about the lack of water as opposed to making our way through ice and snow. As Allbaugh said, "A slight shift in wind patterns here or there, a few miles in one direction or another, can make the difference between a quiet hurricane season and a disastrous one. We can't allow the last two years to lull us into any false sense of security. To stay vigilant, we need only remember that this August will mark the tenth anniversary of Hurricane Andrew, the most expensive storm to ever hit the United States." During that storm more than 2 million people were evacuated, hundreds of thousands of homes were damaged or destroyed, and families were in shelters for months.

New Role

Since September 11th, FEMA has been asked to take on new responsibilities for homeland security and terrorism preparedness. Allbaugh described it as a new challenge. He indicated that it will not be met at the "expense of our core function of natural disaster preparedness and response. Rest assured," he said, "our responsibilities aren't changing, just growing."

President Bush's first responder initiative includes $3.5 billion in federal grants for state and local firefighters, police, emergency managers, and medical personnel. It will be part of what the President hopes will be a multi-year program of increasing state and local capacity, and will initially be targeted at four areas: planning, equipment, training, and exercises. Some of these grants may be available to help local RACES/ARES organizations.

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



FEMA Director Joe Allbaugh. (Photo by Greg Schaler/FEMA News photo)

These programs will help with communications and equipment interoperability, training and personnel compatibility, more robust mutual aid, and greater coordination with all levels of government, businesses, and community groups. "The equipment, training, and people who will secure our homeland against terrorist attack," said Allbaugh, "will be the same resources we tap when faced by major natural disasters. This unprecedented federal investment will enhance our nation's ability to respond to an emergency, be it natural or man-made."

Call for Volunteers!

"But, as you know, it's not just professionals who need to prepare for the unforeseen. In recent years, recruitment in our volunteer fire service has fallen off nationwide. We in the emergency management and response communities cannot do our job by ourselves. Increasing the involvement of citizens in what we do—from businesses to neighborhood organizations to individuals—is essential to emergency planning. Everyone can help in some way. You don't have to charge into burning buildings to be part of the team. Especially in threatened, coastal communities, emergency preparedness cannot be a spectator sport. So, FEMA will also be administering the President's Citizen Corps, a network of volunteer preparedness and response organizations.

Allbaugh ended his speech by quoting an unnamed poet, who wrote "the test of men lies in action." According to the FEMA Director, "We as emergency managers and first responders cannot afford to wait for action before we test ourselves."

New Mexico Hams Train for Wildfires

Wildfires are always a concern in New Mexico and other areas of the country. In mid-March members of the Sandoval, Bernalillo, Santa Fe, and Los Alamos County Amateur Radio Emergency Service participated in a training exercise with the New Mexico State Department of Public Safety, the East Mountain Interagency Fire Protection Association, and the Rio Grande Chapter of the American Red Cross.

According to Michael Scales, KD5PCZ, Sandoval County ARES District Emergency Coordinator, they had several goals for their simulated emergency test. These included:

1. Provide supplementary digital communications for Red Cross information transfer.
2. Provide supplementary voice communications for OEMs and field operations
3. Provide a training opportunity for amateur members to run a formal net.
4. Provide an opportunity for ARES members to become familiar or reacquainted with equipment located at fixed sites and EOCs.
5. Provide an opportunity for local public-safety and Red Cross officials to become familiar with the abilities of amateur radio operators.
6. Provide media exposure for the Amateur Radio Emergency Service.
7. Establish standardized message forms and formats to be used in future events.
8. Establish standardized working procedures between area RACES and ARES teams.

Setting the Stage

Here's the scenario: A large wildland fire is burning on the Bernalillo water-

shed. Winds have aimed the fire at a residential subdivision with approximately 150 homes and 450–500 residents. The Incident Commander determines that evacuation of the area may be necessary. The County Emergency Manager has been contacted, and the Emergency Operations Center is opened. By request of the Emergency Manager, the American Red Cross has established a shelter at the Placitas Elementary School. There is no phone service at the school, since incoming calls are transferred to another location over the weekends. The local office of the Red Cross does not have radio communications with the Disaster Team vehicles or shelter. Red Cross officials have contacted the County Emergency Manager for assistance in communications.

Where would you establish communications?

The ARES groups established voice communications at the following locations: Placitas Elementary School (Red Cross Shelter); Rio Grande Chapter, American Red Cross; the Emergency Operations Centers in Sandoval County, Rio Rancho City, and Bernalillo County; and the New Mexico Department of Public Safety Emergency Operations Center. Additional links were established with the Veteran's Administration Hospital, Los Alamos Amateur Radio Club HQ, and the Incident/Field Command Post. In addition, *data* communication links were established at the Red Cross Shelter, Rio Rancho City EOC, the Veteran's Administration Hospital, and the Rio Grande Chapter, American Red Cross.

Ready for the Unexpected

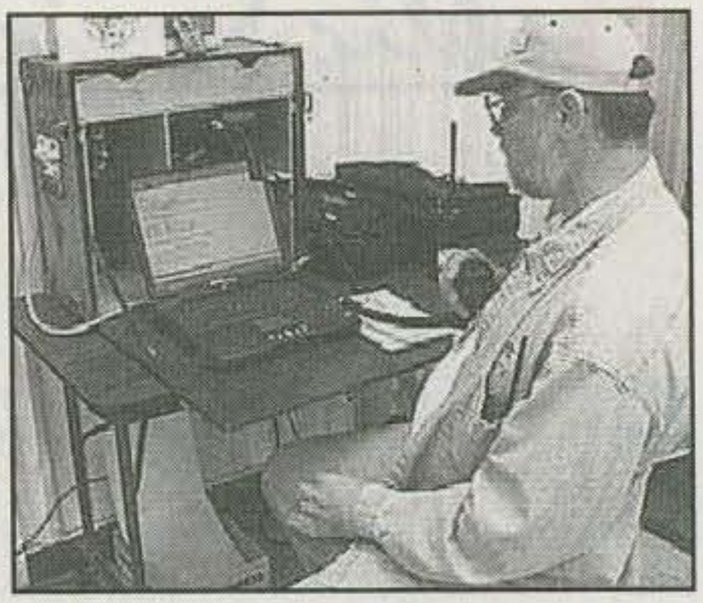
The details of the drill were kept to a minimum. The Red Cross would have to feed and provide shelter for the workers. This allowed for real training without a real emergency.

The Sandoval County Emergency Manager relocated the amateur radio Station at the EOC at the last minute, thereby requiring a change in the antenna location and power systems. Bernalillo County had just established a station at their EOC, and most members were unfamiliar with that equipment. The ARES units required all messages from the Emergency Managers, Red Cross, and Incident Command to be on "Message" forms. This allowed for better tracking and verification. Each challenge could be worked into any emergency drill.

Dusting off the TNC

In many areas of the country packet is not as popular as it was five to ten years ago. In that time have you bought a new radio? If you have, the connector between the TNC and radio may have changed. Do you even know where that old cable is?

Besides the radio, have you bought a new computer? Ten years ago DOS-based systems were still popular. Windows® was beginning to make an appearance. Today many people don't know what DOS is. One recommendation is to check the packet program you are using and check if it can run on a newer PC. Several operators had to "dust off the equipment and find that connection cable." ARES groups may want to consider establishing a monthly packet net for ARES, similar to the weekly voice nets. This may be considered a training issue as well as an equipment test issue.



Gary Bonebrake, W5BI's portable 50 lb. shack is crammed into an old WW II portable field office. It includes: Alinco DR-135TP 2 meter transceiver used for voice and packet; Yaesu FT-50RD HT and spare batteries; Motorola HT1000 HT and spare batteries; 350 watt AC power supply (inverter); 25 AH lead-acid deep-cycle battery; DC power supply (13V/10A); DC power distribution box and cigar-lighter outlets; AC power strip; Gooseneck reading lamp (12V); HP ThinkJet Printer; laptop PC; cables; connectors; paper; pens; small toolkit, and other miscellaneous supplies. (Photo by Marlin Allison, KD5QZK)

Scales told *CQ* that packet radio communications is a must for Red Cross traffic. He said: "The need for correct details and amount of information that needs to be sent at one time requires this format. Additionally, emergency managers are looking at the functionality of this communication as an additional method of information support."

The interest of ARES members was sparked when they found out they would be able to participate as active net control stations and operate from the field. "Members indicated that without the practice, in an emergency they would not feel comfortable," said Scales. "The fact that they could learn with pressure but without penalty was a valuable and rare opportunity."

Developing a "Comfort Zone"

Team members need to feel that they are a part of the solution, not a part of the problem. While classroom, take-home, and web-based training are good for knowledge, only actual practice allows participants to develop a "comfort zone." Scales said that the coordinators need to practice "center management." At each operational location there is a need for the amateur coordinator to work with the EOC or Site Manager to obtain food for the operators, sleeping areas (if needed), work space, and antenna locations. At the Santa Fe site the DEC reported that he learned about "overstaffing"

Frank Warren, Sr., AB5WJ, helps provide field communications. (Photo by KD5QZK)

Jay Miller, WA5WHN, provided communications from the Incident Command post. (Photo by KD5QZK)

and claustrophobia. In addition, all centers learned that special rule "One Radio—One Operator."

"It is extremely hard to try to communicate on three radios and pass written messages at the same time," said Scales. "Well-defined operator stations for each mode of communication are required. This will also limit noise interference between operators." He also recommended the use of headsets for all operators.

Scales suggested that groups keep an up-to-date call-out list, rotate net controls, and get people involved. "This allows for all members to feel they are a part of the team and gain valuable experience at the same time."

"September 11, 2001 clearly showed that wireless phones and 'normal modes' of public-safety communications can easily be overwhelmed or eliminated in a matter of minutes," said Scales. "Through the cooperation of the ARES groups in New Mexico, and the dedication of the members of these groups, we have learned that while we may need to 'improvise' at any time, we are ready for the challenge."

Getting News Media Attention

One of the biggest complaints of many hams during an emergency is the lack of publicity hams get for providing public-service communications. How many times do you show up at an event in street clothes with no form of amateur radio identification?

"By working with the public-safety agencies, media publicity becomes an easy avenue to show that amateurs provide a necessary function during emergencies," said Scales. "Additional exposure is club shirts, hats, and markings on vehicles during these events. This provides a forum to ask questions about the clubs (i.e., what does ARES stand for?) and other issues. This again places amateur radio in a positive light."

Training Pays Off

Just two weeks after the drill, other New Mexico amateurs supported various agencies when four wildfires broke at within a few miles of each other. Lincoln County ARES provided local communications support for the Red Cross as well as an HF link between the fire incident command post and the state EOC in Santa Fe. There were over 1000 people evacuated. This was a major effort coordinating support personnel, equipment disbursement, and food distribution. According to the *ARRL Report*, the chapter provides this support each year during fire season, so they know how to do the job correctly and have found that a radio network can improve efficiency at a time when it can make a major difference.

You Can Make a Difference

Every once in a while a story crosses our desk that talks about what one operator did to make a difference in his community. While we may report on the big disasters, sometimes it's training and the willingness to get involved that are discussed in this column.

In mid-March an unexpected late winter storm came through the Philadelphia area. First reports on one repeater indicated several serious car accidents near the Pennsylvania Turnpike. It was not supposed to snow that day, yet the ground was becoming white. Andy Shecktoe, N3OMA, was on his way home from a search-and-rescue team meeting. The forecast called for light rain with temperatures going up. The forecast and what Andy was seeing did not match up.

Shecktoe called the local television station to tell the staff that their forecast was wrong. They said they would look into it. He then called the National Weather Service. They were interested in more reports about the snow. He started the Skywarn net. Reports came in of several inches of snow and severe icing in some areas. The reports were called in to the National Weather Service. The net closed down and Shecktoe went back to eating his dinner and watching the evening news.

Within 5 minutes of Andy's call to the National Weather Service, winter weather advisories were being displayed on the local television stations. Snowfall amounts were reported. The only reports given were those relayed by the hams who checked into the Skywarn net.

Shecktoe told Montgomery County RACES that he "kind of got chills all over, and felt really proud of being a ham and of taking the initiative to fire up the net that chilly March evening." He didn't have a chance to help out in the September 11th disaster, but he "felt even better being able to help out here at home."

The Skywarn participants made a difference that night. "It was your reports that made it to the television news," said Shecktoe. "We made a real difference together; we 'stopped the presses' and changed the news, and really helped the weather service do its job. This is truly where it all pays off."

With Thanks...

This month I want to thank Michael Scales, KD5PCZ, Sandoval County ARES DEC, for providing us with information on their drill, the ARRL for information on the New Mexico fires, and the Montgomery County (PA) RACES/ARES newsletter for the weather story.

Do you have a story to tell of your group serving in the public interest? How about a Field Day story? If you are looking for someone to send a message to during Field Day, feel free to send it to me. Until next time . . .

73, Bob, WA3PZO

Washington Readout

Regulatory News In The World Of Amateur Radio

BY FREDERICK O. MAIA, W5YI

ARRL Petitions FCC to Eliminate Novice CW Bands, Expand Phone Segments

"The opportunity to eliminate the Novice and Technician-Plus telegraphy subbands and the reapportionment of those inefficiently deployed segments will allow alleviation of significant, sometimes critical, overcrowding in the popular Amateur HF allocations." —from ARRL Petition

On March 22, 2002 the American Radio Relay League filed a massive Petition for Rulemaking with the FCC requesting that the Commission eliminate the 80, 40, and 15 meter Novice/Technician-Plus CW subbands and redistribute ("refarm") those bands to the phone segments of the 80 and 40 meter bands. The petition addresses the portion of the FCC's Amateur Service restructuring order (WT Docket No. 98-143) which eliminated the granting of new Novice Class licenses after April 15, 2000.

The League, as part of its comments on Amateur Service restructuring, had proposed "refarming" the 80, 40, 15, and 10 meter Novice CW bands to make more efficient use of those segments and the HF bands in general. The Commission chose not to go this route, instead electing to deal with license restructuring first, and postpone consideration of any revised operating privileges until a later date when some experience with the new license classes was obtained.

"It has now been approximately two years since the [restructuring] Report and Order was implemented," the ARRL said, and "...the 'Novice subbands' of the HF bands remain underutilized." The League recognized, however, that "significant numbers" of Novice and Technician-Plus licensees still operate in those segments and "They must not be 'disaccommodated' in any refarming plan.

"However, substantial advancements in the use of digital techniques in the HF bands (such as the extremely popular PSK-31), and overcrowding generally (especially in the segments used for SSB telephony), firmly dictate that a refarming plan for the underutilized Novice HF subbands cannot wait longer and must proceed now."

The proposed "refarming" was in line with the recommendations of the League's Novice Spectrum Study Committee and its report to the ARRL Board at the January 2002 board meeting. Details of this survey and responses to it were covered in our March column.

Following are details of the ARRL's "refarming" proposal as presented to the FCC.

80 Meter Band

The ARRL said in the petition that the Novice Spectrum Study Committee survey showed that more than 70 percent of those responding preferred an expansion of the 80 meter phone band (which currently begins at 3750 kHz) down to either 3700 or 3725 kHz, and that a 25 kHz exclusive segment for Amateur Extra class licensees be retained.

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

The ARRL opted for "the more cautious approach," requesting only an additional 25 kHz of phone spectrum:

80 Meters, Phone/Image/CW (max. 1500 W PEP)

License Class	Current Band	Proposed	Additional
General Class	3850–4000	3800–4000	+50 kHz
Advanced Class	3775–4000	3750–4000	+25 kHz
Extra Class	3750–4000	3725–4000	+25 kHz

40 Meter Band

Nearly half of the survey respondents (48.5 percent) supported an expansion of the 40 meter phone segment (currently beginning at 7150 kHz) down to 7125 kHz for both Extra and Advanced Class licensees, and 7175 for General Class licensees. The League said, "Given (1) the severity of the interference from HF broadcasting stations to amateur telephony in the upper portions of this band, and (2) the substantial preference (approximately two to one) in favor of greater telephony band expansion...." it was proposing following change in the 40 meter phone band:

40 Meters, Phone/Image/CW (max. 1500 W PEP)

License Class	Current Band	Proposed	Additional
General Class	7225–7300	7175–7300	+50 kHz
Advanced Class	7150–7300	7125–7300	+25 kHz
Extra Class	7150–7300	7125–7300	+25 kHz

15 Meter Band

The ARRL Board rejected a committee proposal to add 50 kHz to the 15 meter phone spectrum, opting instead to request an additional 25 kHz for the General phone band, with no change for Advanced and Extra Class licensees. The League's proposal:

15 Meters, Phone/Image/CW (max. 1500 W PEP)

License Class	Current Band	Proposed	Additional
General Class	21300–21450	21275–21450	+25 kHz
Advanced Class	21225–21450	21225–21450	No Change
Extra Class	21200–21450	21200–21450	No Change

10 Meter Band

More than half of the survey respondents (54.5 percent) proposed no change to the 10 meter telephony (wideband) segment. "The subbands in this band already substantially accommodate Novice and Technician-Plus licensees," the ARRL noted. Therefore, no changes were recommended for General, Advanced, and Extra Class licensees in the 10 meter band.

10 Meters, Phone/Image/CW/RTTY/Data (max. 1500 W PEP)

License Class	Current Band	Proposed	Additional
General Class	28300–29700	No Change	No Change
Advanced Class	28300–29700	No Change	No Change
Extra Class	28300–29700	No Change	No Change

Novice, Technician Plus Licensees

Under the ARRL plan, current Novice, Technician Plus, and Technician Class (with Element 1 credit) licensees would be permitted to operate on the entire 80, 40, 15, and 10 meter

The FCC and Your Social Security Number

One of the most common questions asked of us is why does a VE, VEC, or the FCC require that you provide them with your Social Security Number (SSN), otherwise known as a Taxpayer Identification Number (TIN). Why is it needed and what does the FCC do with it?

Supplying SSNs to the FCC dates back to a 1996 appropriations bill that eventually became Public Law 104-134. Within that legislation is the Debt Collection Improvement Act of 1996. The General Accounting Office (GAO), an arm of Congress, had noted at the time that there was more than $30 billion in outstanding delinquent federal receivables. Most of this debt involved federally guaranteed housing, farm, small business, and education loans.

According to the law, the objective of the DCIA is to "...maximize collections of delinquent debts owed to the Government by ensuring quick action to enforce recovery of debts and the use of all appropriate collection tools." The DCIA was signed into law on April 26, 1996 by President Clinton.

The Debt Collection Improvement Act of 1996

...centralized the government-wide collection of delinquent debt and gave Treasury significant new responsibilities in this area.

The DCIA provides for any non-tax debt or claim owed to the United States that has been delinquent for a period of 180 days to be turned over to the Secretary of the Treasury (via the Treasury Department's Financial Management Service, or FMS) for appropriate action to collect.

The types of debts referred to FMS include unpaid loans, overpayments, or duplicate payments made to federal salary or benefit payment recipients, misused grant funds, and fines, penalties, or fees assessed by federal agencies.

The DCIA also authorizes the Secretary of the Treasury to collect past-due child support by deduction from Federal payments (such as tax refunds) or through wage garnishment, a process whereby an employer withholds amounts from an employee's wages and pays those amounts to the employee's creditor.

I am not aware of any unpaid FCC administrative fines being transferred to FMS for collection, but they certainly could be once the appeals process is completed and the amount set. FMS can recommend, and upon agency concurrence, refer debts to the Department of Justice (DOJ) if the situation warrants.

A key provision of the Act is access by the Dept. of the Treasury to TINs. One of the procedures established under the DCIA used by FMS to collect debts is its Treasury Offset Program (TOP). The TOP compares the names and TINs of debtors with the names and TINs of recipients of federal payments, including vendor, federal retirement, federal salary, and Social Security benefits.

Amateur Radio

As a result of the DCIA, all federal agencies are required to collect TINs from anyone who does business with them or who are recipients of federal licenses or permits. The collection of the nine-digit TINs (SSNs) from radio amateurs began in August 1999 with the implementation of the FCC's Universal Licensing System (ULS).

A provision was also made for applicants using an FCC-generated TIN in place of their SSN. The "Licensee ID" is a systematic number generated by the ULS when your TIN was registered with the FCC. Applicants could supply the FCC with either their SSN or use the *Licensee ID* in place of the SSN on an application.

As of December 3, 2001, however, all parties and entities doing business with the Commission were required to obtain another new unique identifying number called the *FCC Registration Number* (or FRN) and supply it to the Commission. The FRN basically replaces the Licensee ID and is obtained in one of three ways:

(1) The FCC automatically assigned an FRN to most existing radio amateurs in 2001;

(2) FRNs are automatically generated when a VEC electronically submits your application, if you do not already have one; or

(3) you can apply for an FRN electronically by going to the FCC website <www.fcc.gov> and clicking on the "COmmission REgistration System" (CORES) link on the left side. You can also submit a paper FCC Form 160, available from the FCC's Forms Distribution Center, telephone 1-800-418-FORM (3676), or from fax-on-demand by dialing 202-418-0177.

However, just about every licensed radio amateur already has an FCC Registration Number (FRN). ***Do not*** apply for an additional FRN if you already have one. To determine if you do already have an FRN, go to <http://wireless.fcc.gov/uls>, click on "License Search Enhanced" (left side of the page), and enter your callsign.

It is not possible to renew or modify an existing license or to receive a new or upgraded amateur radio license grant or vanity callsign without first providing your SSN to the FCC and receiving an FRN. You will also need your FRN, along with a user-selected password, to access your licensing records in the event you want to renew or modify your license.

General Class CW segments with a maximum 200 watt output. This includes:

Novice, Tech Plus, and Technician w/Code Credit

License Class	Current Band	Proposed	Additional
80 m CW	3675–3725	3525–3700	+125 kHz
40 m CW	7100–7150	7025–7125	+ 50 kHz
15 m CW	21100–21200	21025–21175	+ 50 kHz
10 m CW/Data	28100–28300	28000–28300	+100 kHz
10 m Phone/CW	28300–28500	No change	No change

Other Operating Rule Changes Requested

The HF Novice band "refarming" plan was not the only component of the petition. The ARRL also included an assortment of other requests for rule changes. The ARRL's "omnibus" petition asked the FCC to:

(1) permit amateurs to use spread spectrum on the 222–225 MHz band. At present, Section 97.305(c) of the Rules prohibits SS emissions below 420 MHz (the lower limit of the 70 cm band). SS in the 222–225 MHz band would be on a secondary basis and would not be allowed to cause harmful interference to stations employing other authorized emissions;

(2) expand the pool of special-event callsigns beyond the current 1-by-1 format to include identifiers for U.S. territories and possessions that do not provide for mailing addresses. These would include certain 2-by-1 callsign blocks, such as KH5K;

(3) clarify its rules to indicate that modulated CW (MCW) is permitted for repeater station identification; and

(4) incorporate into its rules a 1990 FCC waiver authorizing amateurs in certain areas of Colorado and Wyoming to operate on certain segments of the 33 cm band.

The League also invited the FCC to consolidate its omnibus petition in a "biennial review" type proceeding with other pending amateur radio related petitions now before the FCC.

"Such a means of addressing Part 97 rule changes seems to ARRL to be efficient from the perspective of the Commission's resources, and provides a reasonably convenient timetable for evaluating the necessity of future Part 97 modifications," the ARRL said.

At this column's deadline, the FCC had not given the petition an RM-number nor issued a Notice of Proposed Rule Making (NPRM) based on it. Check "Ham Radio News" in the front of this issue and/or our website news page for updates. Opportunities for comment will begin after the FCC issues an NPRM. 73, Fred, W5YI

VHF Plus

BY JOE LYNCH, N6CL

All About The World Above HF

A New Level for Weak-Signal Communications

It was just six months ago in this column when I first discussed the WSJT software program. In that column I spoke of how over the summer last year Joe Taylor, K1JT, developed a new software package for weak-signal use. Skewing its development for the meteor-scatter enthusiast, the software was beta tested in the weeks preceding the *Perseids* meteor shower.

Convinced of the program's viability to be used in meteor-scatter work, Joe introduced it to the weak-signal community as a whole via his website <http://pulsar.princeton.edu/~joe/K1JT>. Hundreds of hams downloaded the public-domain software and used it during the *Perseids*, and as attested to in my October 2001 column, many had very successful results. Commenting on its use during the shower, Joe stated, "Just for fun, I kept track of the North American callsigns noted on the August 11–12 weekend using WSJT for meteor-scatter work. I counted a total of 83 calls in 66 different grid squares."

Also in that October column Joe indicated that as part of his ongoing updating and beta testing of his software package, at some point he would develop future enhancements that would include packet and EME communications. This past March Joe introduced the EME enhancement for the software, again with much success. The premier issue of *CQ VHF* magazine contains an introductory article written by Joe describing the software and giving some indication as to its practicality by way of a description of his first EME QSO. Please look elsewhere in this issue of *CQ* for information on ordering a subscription to *CQ VHF*.

In the ensuing weeks a number of EME enthusiasts and others tested the program by way of completing QSOs on EME and terrestrial paths that previously were difficult to work. After more beta testing and feedback from these initial users, on April 14, by way of the Moon-Net reflector <http://www.nlsa.com/nets/moon-net-help.html>, Joe announced the release of WSJT Version 2.0, which is now downloadable from his website, mentioned above.

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VHF Plus Calendar

June 2	Moderate EME conditions
June 3	Last quarter moon
June 4	Moon apogee
June 7-8	Ham-Com Hamfest (See text for details)
June 8-10	ARRL VHF QSO Party (See text for details)
June 9	Poor EME conditions
June 10	New Moon
June 12	Highest Moon declination
June 15-16	SMIRK 2002 QSO Party (See text for details)
June 16	Very good EME conditions
June 18	First quarter moon
June 19	Moon perigee
June 22-23	ARRL Field Day (See text for details.)
June 23	Very poor EME conditions
June 24	Full moon
June 25	Lowest Moon declination
June 30	Moderate EME conditions

• EME conditions courtesy W5LUU

For the vast majority of the weak-signal community this new software package has been a boon to weak-signal work because of its ability to dig out intelligent information that is difficult for the unaided human ear to hear because of the noise. It has not been without its critics, however. More on that is covered later in this column.

Critics notwithstanding, the software package does have practical limitations. To try to put a cap on these limitations, I asked Shelby Ennis, W8WN, one of the ongoing beta testers, to write a sidebar piece to accompany Joe's article in the above-mentioned issue of *CQ VHF*. In that sidebar Shelby comments:

> It appears, at least for the near future, that two small stations probably will not be able to use it for EME. However, a small station (150 watts, 16-element Yagi) probably will be able to work a slightly bigger station under good conditions, if they can both elevate their antennas.
>
> Even so, my observations may turn out to be overly pessimistic, judging by some of the notes recently posted on the JT44 real-time web page <http://www.dxworld.com/hsms.html>. Two very good operators with small but efficient stations just may be able to do this! It still amazes me to be able to get copy on a station that I can't even hear.

In preparation for this column I asked Shelby to comment on the latest information related to the software program. Below are his thoughts concerning its successes:

There have been some interesting QSOs taking place on 50 MHz TEP, 1296 EME, and by smaller stations. The smallest antenna to complete thus far is 9 elements. The lowest power is less than 100 watts but with a big antenna.

A number of medium-size stations (400–800 watts, fairly long single Yagi or quad array of small Yagis, more or less, and no elevation) have made a number of EME contacts at moonrise/set. Obviously, they're big enough to work the "big guns" on CW. However, they're working other "smaller EME stations" (KW, 4 ×16 or so, with elevation) that would be difficult on CW except in the best of conditions.

Interestingly, a large number of these have been made near apogee, and also with high sky noise! Therefore, it's giving them probably a 10 dB advantage over CW. No single-Yagi, 150 watt stations have completed yet; although Andy Flowers, KØSM, has been heard via EME.

Here's a summary, from the Hot News page:

"W7SZ reports: 'Completed today [April 10] with W7LHL on 1296 MHz using JT44. Had 100 percent copy of calls and reports. Ernie was running 40 W into a 10 foot TVRO dish and just visible on my waterfall. A signal of this level is normally 8 to 10 dB below my "ears." Not too bad when considering the present moon position and perfect copy. Dish here is 12 foot TVRO.'

"From a previous report from W7SZ: 'Just completed a 10 GHz tropo contact with W7PUA using JT44. What makes this interesting is that Bob and I do not have a direct path, as our dishes are at ground level and higher terrain lurks between us. On this 85 mile path, we have to rely on refraction off particles (water vapor/ice) at 15,000 ft. in altitude or above. When refraction is at its best, we can observe the signal on the DSP-10 waterfall—always wide and rarely in the audible range. The good news is that today I was able to copy using JT44 when there was no indication on the waterfall or sign of signal over the noise trace. My ears usually require 8 to 10 dB over noise for *spotty* CW copy, so this was significant and falls well in line with your 10 dB estimate. Also, JT44 was 100 percent copy—not *spotty*—M level at 10 dB higher!'

"Johan Van de Velde, ON4ANT, reports a 6 meter QSO he had with ZD8DB via TEP. He indicated that the signals were too weak to have done it using CW.

"GM4JJJ, RU1AA, and others on both sides of the Atlantic have now made a number of contacts. IKØBZY, using only a single 6-element antenna and 800 watts, worked

K9KNW (4 × 10, 1.5 KW). KØSM (150 watts, 13B2 antenna) has been heard, but no 'small stations' have reported a completed contact yet. (As indicated above, the lowest power for a completion is less than 100 watts, but with a big antenna). There have been no 222 MHz or higher attempts been reported, although one or two 432 MHz stations (with no elevation) have been putting out requests. Several others are looking for 50 MHz schedules. Most of the first stations to attempt JT44 EME do not have elevation capabilities, thus severely limiting their windows. Several who are capable of CW EME are now calling CQs regularly. (Yes, on most of the contacts reported, the signals were too weak for CW, and in many cases were never heard aurally at all).

"On March 18, K9KNW and W8WN completed the first JT44 EME contact following a CQ by W8WN. Moon conditions were poor; signals were too weak to be heard. GM4JJJ then became the first European to make an EME contact with JT44, working W8WN on March 19. On April 3, with the moon far south in declination and very close to Sagittarius (thus giving a very high sky temperature), K2TXB (no elevation) worked W7MEM (with extra local noise). WSJT's JT44 mode has already has surpassed what most people had expected from it. But can it be made any more sensitive? It seems that this may be possible.

"One of the best sources for basic information on EME operation is W5UN, owner of the MBA (Mighty Big Array). While his EME primer is for CW EME, the requirements for a successful EME contact are about the same, regardless of the mode. The only major differences are the transmit periods and the fact that JT44 can be done with a few dB less ERP. Everyone new to EME operation should read this EME primer. It can be found at <http://web.wt.net/~w5un/primer.htm>. (By the way, W5UN has had several JT44 EME contacts.)

"The best frequencies for JT44 operation are still being debated (as with all of the new modes). Most North American activity has been in the 144.155–144.175 MHz region, with some schedules sharing the HSCW frequencies of 144.100–144.150. The European band plan is more complicated; some feel that JT44 EME should move into the packet frequencies, and others feel that the 144.150–.175 is generally unused and proper, since this is definitely for weak signals, unlike packet. A PDF copy of the Region 1 band plan (in German) is available (via <http://www.qsl.net/w8wn/hscw/hscw.html>) for your information."

JT44 Critics and Comments

With the introduction of the JT44 enhancement of the WSJT software program came several critical comments via the Moon-Net reflector. Most of the comments centered on how the enhancement diminished the challenge of working EME. Representative of such comments was this one authored by Conrad Farlow, GØRUZ:

1. Joe Taylor, K1JT, is a very clever chap and his software is very effective.

2. JT44 will encourage others on to EME so we'll all benefit. This can only be a good thing.

3. I don't personally like it and I feel the same about the meteor-scatter version, despite the fact that I was one of the first to try it in EU and almost certainly the first to have a random QSO with the mode. It is *personal* and *emotional* and I am not taking any moral stance whatsoever.

4. I have no problem using computers at all provided that in the end I have to copy the CW. This is purely because that is the minimum input that I personally can feel happy with when having a QSO. That is the part of the QSO that I like.

5. When I get back on EME and then anyone requests a JT44 QSO with me, then I will oblige, the same as I do with WSJT MS.

I do have one concern, however, and that is with DXCC claims. Those who already have their hard-won 2 meter or even 70 cm DXCC have indeed achieved something very impressive. There is no easy route to this; it will take years and big arrays and lots of legwork. It is one of my dreams to achieve this award using conventional means on 2 meters. I do feel that there should be some segregation of the award at this level, if only for purely selfish reasons. This for me is a contentious issue, not because there is anything morally wrong with WSJT JT44 mode, but it diminishes the level of difficulty considerably and therefore diminishes the achievement.

Opposing the critics' concerns were many reasonable comments pointing out that increasing enhancements have come along with the times. Representative of such comments was this one penned by Steve Powlishen, K1FO:

Having made my first EME QSO 30 years ago, I'm scratching my head as to why some of you are apparently so freaked out by JT44.

I have yet to meet anyone who can copy an EME signal (or any radio signal, for that matter) directly with his or her ears. I suggest the "if you can't hear it with your ears" camp get rid of all of their preamplifiers, mixers, detectors, oscillators, and audio amps, because all of them constitute unnatural assistance to "hearing it with your ears."

Some of you would not go to that extreme, but you may want to consider getting rid of your TS-2000's, TS-870's, IC-756's, FT-1000MP's, etc., because they all have those horrible computers in them. Some of those radios have the audacity to convert the IF signals into 1's and 0's.

You had better not use any modern GaAsFET's, HEMTS, PHEMTS, and so forth, because those all are designed on and made with computers, too.

While you're at it, you had better not use a computer to track the moon or even to display the moon's position, as that must be cheating. Visual tracking has to be the only acceptable method of operating EME.

Also make sure that none of your equipment—including gear boxes, antennas, rotors, connectors, bolts, brackets—was designed on a computer or manufactured with computer assistance.

You had better back your car over your memory keyer, as automatically sending CW can't possibly be acceptable.

Seems to me that we are now inseparably intertwined with computers, and attempts by some to draw a line as to what use of computers is okay and not okay is a bit unreasonable.

So let me ask the naysayers this: If Joe were to add to his software a CW key input to enter what is to be sent and add a Morse Code generator to output what is received in a speaker, does that make JT44 acceptable?

NM9H VHF Grid DXpedition To DN95tt

Matt, NM9H, and Sean, KX9X, would like to announce their third annual VHF Grid DXpedition. This year they will spend their summer vacation in Campbell County, South Dakota, in the north central part of the state, activating the rare grid DN95 for eight days, from June 6–14, 2002, including during the ARRL VHF QSO Party. According to NM9H and KX9X:

We will be active from Thursday, June 6 to Friday, June 14, 2002 on 50, 144, 222, and 432 MHz with high power and beam antennas on SSB, CW, WSJT (FSK441 and JT44), pursuing contacts via sporadic-*E*, tropo, aurora, meteor scatter, and any other form of propagation we stumble across. We will also be in the ARRL VHF QSO Party with a Limited Multi-Op effort.

We will also have HF gear, but HF operation is not our primary focus. If you need us on HF for a new grid, state, or county, check the website for more information.

Our mission is quite simple: We want to hand out DN95 to as many people as possible. We have not been able to find any record of VHF activity from DN95 in quite some time, certainly not in the last two to three years. There has definitely been no activity from DN95 on 222 and 432 MHz in a very, very long time. We hope to fill the need a bit.

Much of our time will be spent trying to work stations via meteor scatter. If you are new to meteor-scatter propagation, or if you are interested in the new digital modes, such as FSK441 or JT44, please visit our VHF reference website, <http://www.cahcare.com/dn95/>. We have links to several tutorials and beginner's info on meteor scatter, and we would be thrilled to be your first meteor-scatter QSO.

Current Contests

ARRL June VHF QSO Party: The dates for this contest are June 8–10. Complete rules are in the May issue of *QST*. Rules may also be found on the

ARRL website <http://www.arrl.org>. Many are making plans to activate rare grids. For the latest information on grid expeditions, check the VHF reflector <vhf@w6yx.stanford.edu> on the internet. For weeks in the run up to the contest postings are made on the VHF reflector announcing Rover operations and grid expeditions. It is a contest that will create for you plenty of opportunities to introduce the hobby to those who are not presently working the VHF-plus bands or who are not hams.

SMIRK Contest: The SMIRK 2002 QSO Party, sponsored by the Six Meter International Radio Klub, will be held from 0000 UTC June 15 until 2400 UTC June 16. This is a 6-meter-only contest. All phone contacts within the lower 48 states and Canada must be made above 50.150 MHz; only DX QSOs may be made between 50.100 and 50.150. Exchange SMIRK number and grid square. Score 2 points per QSO with SMIRK members and 1 point per QSO with nonmembers. Multiply points times grid squares for final score. Awards are given for the top scorer in each ARRL section and country. Send a legal-size SASE for a copy of the log forms. Log requests and logs (by August 1) should be sent to Pat Rose, W5OZI, P.O. Box 393, Junction, TX 76849-0393. For more information see the SMIRK website at <http://www.smirk.org>.

Field Day: The ARRL's classic, Field Day, will be held on June 22–23. Complete rules for this contest may be found in *QST* and on the League's website listed above. Gone this year from the rules is the Novice-Technician separate station. In place of it is a new Get On The Air (GOTA) station that is to be operated by Novices, Technicians, generally inactive hams, and non-licensees under the direct supervision of a control operator. In years past tremendous European openings have occurred on 6 meters. Also, as happened in 1998, tremendous sporadic-*E* openings can occur. Certainly, this is one of the best club-related events to involve new people in the hobby.

Current Conference

Ham-Com, in Arlington, Texas, is scheduled for June 7–8. As usual, the gang from the North Texas Microwave Society will present their programs on Saturday. Other programs related to weak-signal communications also will be presented.

For more information about registration for Ham-Com, contact them at P.O. Box 12774, Dallas, Texas 75225-0774 (voice/message/fax 214-361-7574; web: <http://www.hamcom.org>). A number of hotels within easy driving distance are priced between $30 (Motel 6) and $149 (Wyndham) per night. Also available within easy driving distance are RV accommodations.

Meteor Showers

Between June 3 and 11 the *Arietids* meteor shower will once again be evident. This is a daytime shower, with the peak predicted to occur at around 0900 UTC on June 9. Activity from this shower will be evident for around eight days, centered on the peak. At the peak you can expect around 60 meteors per hour traveling at a velocity of around 37 km/sec (23 miles per second).

On June 9 the *Zeta Perseids* is expected to peak at around 0900 UTC. At its maximum, it produces around 40 meteors per hour. On June 28 the *Delta Aquarids S* shower is expected to peak.

On June 29 the *Beta Taurids* is expected to peak at around 0800 UTC. Because the *Beta Taurids* is a daytime shower, not much is known about the stream of activity. However, according to the book *Meteors* by Neil Bone, this and the *Arietids* are two of the more active *radio* showers of the year. Peak activity for this shower seems to favor a north-south path.

Multiple 24 GHz QSOs

Mid-April proved to be very productive for 24 GHz EME work. On April 18 and 20 Sergei, RW3BP, made his first QSOs on 24 GHz with Al Ward, W5LUA, and Barry Malowanchuk, VE4MA, respectively. On April 21 Sergei worked Lars Karlsson, AA6IW, for initial #3, and a first 24 GHz EME QSO for Lars. This QSO between Sergei and Lars now sets the distance record for 24 GHz. On April 22 Barry, VE4MA, worked Gunter Neugebauer, VE7CLD, for a new initial (#3), a new country (#3), and a first 24 GHz EME QSO for Gunter, and then Lars, AA6IW, for initial #4. Next month we will go into the growing interest in 24 GHz EME. Suffice it to say, however, that all of the stations on the air thus far are running high-power (>75 watts) TWTs (traveling wave tubes), most courtesy of Paul Drexler, W2PED.

And Finally . . .

The Winning Recipe: Mix the introduction of the JT44 enhancement of the WSJT software package with several contest opportunities for weak-signal activity this month, adding a soup of (hopefully) excellent propagation opportunities, and you have the makings of a very successful month. In short, Joe Taylor, K1JT's release of his Version 2 couldn't have come at a better time.

While as you can see from the VHF Plus Calendar at the beginning of this column that the better EME conditions for the month do not coincide with the contests, there are still ample opportunities for checking out and using the software to enhance your ability to complete QSOs previously thought not to be possible.

Next month I will preview some of the articles that will appear in the summer issue of *CQ VHF*. If you are not already a subscriber, you need to be, for there is no better or more complete coverage of the VHF+ frequencies available today. Without it, you simply are missing out on many different types of innovative forms of communications available only on the VHF+ ham bands.

While we now have the comprehensive coverage of the VHF+ ham bands available via *CQ VHF* magazine, as always, I am looking for your input for this column, so keep your reports coming to me and I will keep publishing them on your behalf.

73, Joe, N6CL

Announcing:

The 2002 CQ World-Wide VHF Contest

Starts: 1800 UTC Saturday, July 20, 2002
Ends: 2100 UTC Sunday, July 21, 2002

I. Contest Period: 27 hours for all stations, all categories. Operate any portion of the contest period you wish.

II. Objectives: The objectives of this contest are for amateurs around the world to contact as many amateurs as possible in the allotted 27-hour period, to promote VHF, to allow VHF operators the opportunity to experience the enhanced propagation available at this time of year, and for interested amateurs to collect VHF Maidenhead grid locators for awards credits.

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

IV. Class of Competition:

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

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

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

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

4. Rover station. A Rover station is one that is manned by no more than two operators, must travel to more than one grid locator, and must sign "Rover" or /R. The spirit of this class is to encourage operation from rare grid locators by persons who are inclined to do so. It is not the intent of this class to encourage one operator to move from one super station to another super station in another grid locator in order to compete in this category.

5. QRP station. Anyone operating a station running 25 watts output, or less, is eligible to enter this category. There are no location restrictions. You may operate from your home QTH or from the highest mountain you can find.

Stations in any category except rover may operate from any single location, your home location, or any protable location. Rover stations by definition must operate from portable locations in at least two grids.

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

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

A. The rover who changes location during the course of the contest is free to contact as many other stations as he or she wishes. The rover becomes a new QSO to the stations working him or her when that rover changes grid locator.

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

VII. Scoring: One (1) point per QSO on 50 MHz and two (2) points per QSO on 144 MHz. Work stations once per band, regardless of mode. Multiply total QSO points times total number of grid locators (GL) worked. *Rovers:* For each new grid locator visited, contacts and grid locators count as new. Final Rover score is the sum of contact points made from each grid locator times the sum of all grid locators worked from all grids visited. The intent is to mirror the original Rover scoring rules.

Contest entrants may not transmit on 146.52 MHz, or your country's national 2 meter FM simplex calling frequencies, or commonly recognized repeater frequencies for the purpose of making or requesting contacts. Contacts made within your own country, in the DX window of 50.100–50.125 MHz, are discouraged. Contacts made on the SSB calling frequencies of 50.110 MHz, 50.125 MHz, and 144.200 MHz are discouraged. Contest participants are required to use UTC as the logging time.

Example 1. W1XX works stations as follows:

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

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

W1XX has 120 QSO points (50 + 70 = 120) × 33 multipliers (25 + 8 = 33) = 3,960 total points.

Example 2. W9FS/R works stations as follows:

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

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

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

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

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

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

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

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

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

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

X. Log Submissions: You may request log sheets from: CQ VHF Contest, 25 Newbridge Road, Hicksville, NY 11801. Include an SASE with your request.

Completed logs must be postmarked no later than September 1, 2002 to be eligible for awards. All logs should be mailed to: CQ VHF Contest, 25 Newbridge Road, Hicksville, NY 11801 USA.

We strongly encourage logs to be submitted on disk or sent via e-mail. We prefer an electronic log. If you submit your log in electronic form, we prefer one of the commonly available logging programs. Since this contest is not yet supported by the Cabrillo format, you must also submit an electronic summary sheet.

Disks: If you use a computer, please send your IBM, MS-DOS compatible computer disk. A disk containing your files may be submitted in lieu of a paper log. All disks must be accompanied by a paper summary sheet satisfying all logging instructions. Label your disk clearly with your call and category.

You may submit your electronic log via e-mail to **<cqvhf@cqww.com>**. Questions may be sent to **<questions@cqww.com>**.

What's New

BY KARL T. THURBER, JR., W8FX

A New Column for A New Century

Swell Summer Stuff

This month your "What's New" columnist focuses mostly on new radio shack accessories. However, we'll also shine the product spotlight on new antennas and accessories, software, and books. Without further delay, let's examine our current June crop of "swell summer stuff."

Accessories for the Shack

Daiwa Switch-Mode Power Supply. NCG Company specializes in both export and import of communications products and various specialty items. NCG is the distributor for several Japanese-based product lines and companies, including Daiwa.

Recently, the Daiwa team of professional engineers developed a new switching power supply that's said to be just one-third the weight and one-half the size of conventional power supplies having the same features and capabilities. This is the Model SS-330W Switch-Mode Power Supply (see photo A).

The new Daiwa unit sports an impressive array of features, which includes 30 amps continuous voltage, high-speed FET technology to ensure high conversion efficiency, lighted current and voltage meters, a built-in-fan, voltage adjustable over the range 5 to 15 volts, ripple voltage less than 10 mV, weight under 5 lbs., and much more. The lightweight, slim unit easily fits in limited space, yet it's rugged and reliable. It can be used for DC motors that require peak stating currents, and it accepts input voltages ranging from 90 to 130 volts. The manufacturer's suggested retail price (MSRP) is $184.95.

For more details, contact NCG Company, 1275 N. Grove St., Anaheim, CA 92806-2114 (1-800-962-2611; e-mail: <micks@natcommgroup.com>; web: <http://www.natcommgroup.com>).

Two Compact Units from MFJ. The "accessory kings" at MFJ Enterprises are this time "thinking small," having once again come up with some interesting, compact products for the amateur radio community. The two new products are the MFJ-461 Pocket Size Morse Code Reader and the MFJ-4103 Miniature Switching Power Supply for the Yaesu FT-817 Multi-Mode Portable Transceiver.

The MFJ-461 Pocket Size Morse Code Reader (photo B) lets you watch CW turn into solid text messages as the messages scroll across an easy-to-read LCD display. With the unit there are no cables to hook up, and no computer or interface is required. You simply place the unit close to your receiver speaker until the lock LED flashes in time with the CW!

Four different display modes are available on the two-line LCD display that has 32 large, 1/4 inch, high-contrast characters. The unit's serial port lets you display CW text full screen on a bright computer monitor—just use your computer serial port and terminal program. The MFJ-461 is $79.95.

The MFJ-4103 Miniature Switching Power Supply (photo C) is designed for use with the popular Yaesu FT-817 and other QRP radios. The very small and lightweight but capable unit can deliver up to 40 watts of reliable power with no RF hash. The MFJ-4103 is over-voltage, over-current, and over-temperature protected, with excellent regulation. The $39.95 unit, which is suitable for QRP rigs requiring up to 2.89 amps, has an output DC cable with a standard MFJ coaxial DC power connector that

Photo A– The Daiwa team of professional engineers has developed a new switching power supply that's one-third the weight and one-half the size of conventional power supplies with the same features and capabilities. It's the Model SS-330W, and it sports an outstanding list of specifications. Details are in the text of this month's column. (Photo courtesy NCG Company)

Photo B– The MFJ-461 Pocket Size Morse Code Reader lets you watch CW turn into solid text messages as the messages scroll across an easy-to-read LCD display. There are no cables to hook up, and no computer or interface is required. Simply place the unit close to your receiver speaker until the lock LED flashes in time with the CW! (Photo courtesy MFJ Enterprises)

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

Photo C– The MFJ-4103 Miniature Switching Power Supply is designed for use with the Yaesu FT-817 Multi-Mode Portable Transceiver and other QRP rigs. The very small and lightweight unit can deliver up to 40 watts with no RF hash. It has an output DC cable with a standard MFJ coaxial DC power connector that fits most MFJ and other ham accessories and QRP rigs. (Photo courtesy MFJ Enterprises)

Photo D– The SKB Rotationally Molded Shipping Containers, offered through Jensen Tools, are designed to provide maximum protection in shipping environments, such as for a DXpedition, where solid protection of your radio gear is a must. (Photo courtesy Jensen Tools)

fits most MFJ and other ham accessories and QRP rigs. Also included is a sturdy adapter cable for use with the Yaesu FT-817 radio.

For your nearest dealer, or to order, contact MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759 (1-800-647-1800; e-mail: <mfj@mfjenterprises.com>; web: <http://www.mfjenterprises.com>).

Scientifics® Sound Level Meter. Are you being "drowned out" by surrounding activities at your QTH? Well, perhaps you can get a handle on the noise. To this end, Scientifics® has announced the Model YF-20 (#30387-32) Sound Level Meter. It's a two-scale, direct-reading decibel meter suitable for use in the home, in schools, and in industry. The unit's low scale indicates 40 to 80 dB, while the high scale indicates 80 to 120 dB; there is also a battery-check feature and calibration settings. A large 1" × 2" window displays readings on an analog meter.

For more information on the unit, or for a new 100-page Scientifics® catalog featuring over 1500 scientific and educational products for science and engineering enthusiasts, contact Scientifics®, Dept. A021-C999, 60 Pearce Avenue, Tonawanda, NY 14150-6711 (1-800-728-6999; e-mail: <cons_order@edsci.com>; web: <http://www.scientificsonline.com>).

New SKB Roto-X (RX) Series Cases from Jensen Tools. Are you shipping any of your ham gear and accessories around the country, or possibly even embarking on a DXpedition, where solid protection of your precious radio gear is a must? If so, take a look at the SKB Rotationally Molded Shipping Containers, distributed by Jensen Tools. SKB's Roto-X (RX) series cases are designed to provide maximum protection in shipping environments.

The rugged cases (photo D) are rotationally molded for enhanced durability. Their unique exterior design allows for stacking and efficient transport and storage. The recessed, heavy-duty twist latches accommodate a padlock, and spring-loaded handles are recessed for added protection. Optional heavy-duty wheels offer maximum mobility. You can obtain the cases with or without foam lining.

For more details and pricing, contact Jensen Tools, Inc., 7815 S. 46th St., Phoenix, AZ 85044-5399 (1-800-426-1194; e-mail: <Jensen@stanleyworks.com>; web: <http://www.jensentools.com>).

Antennas and Accessories

New Maldol Triband HT Antenna from NCG Company. Recently, NCG Company announced a new imported triband antenna as the easiest and least expensive way to improve your HT's signal. It's the Maldol MH-610 2m/220/ 440 MHz HT Antenna (photo E), and it's designed especially for those new, hot-selling radios that include 220 MHz capabilities. The 14 inch long "tribander" antenna from Maldol is said to dramatically increase the performance and extend the range of these new radios.

According to NCG's Mick Stwertnik, the latest materials have been used to create an antenna that's extremely lightweight, yet is very durable. The antenna is made of the same materials as "unbreakable" eyeglass frames; the super-flexible memory whip will return to its original shape even under the worst abuse.

For details, contact NCG Company, 1275 N. Grove St., Anaheim, CA 92806-2114 (1-800-962-2611; e-mail: <micks@natcommgroup.com>; web: <http://www.natcommgroup.com>).

Stackable Aluminum Mast Tubing from The Mast Company. Henry Pollock, K4TMC, of Raleigh, North Carolina, has established The Mast Company, which specializes in the "revitalization of U.S. military surplus items," including selling military surplus stackable aluminum mast tubing (photo F). After two years of successful sales on the auction website eBay®, Henry

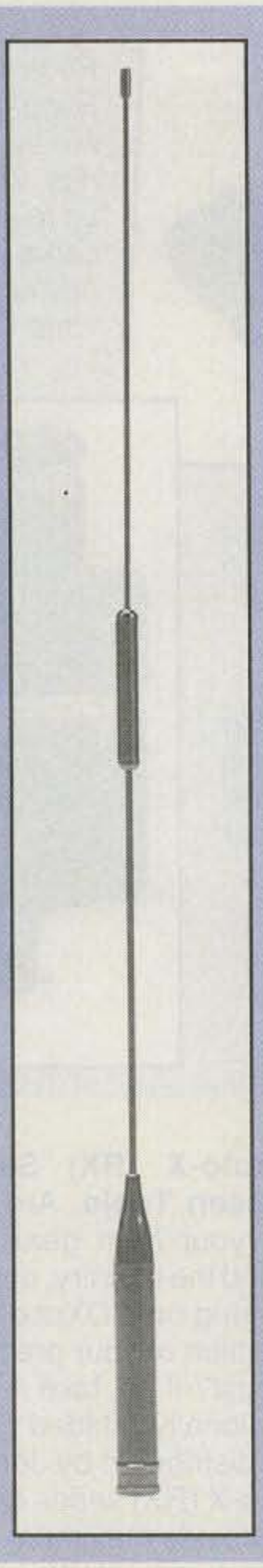


Photo E– The Maldol MH-610 2m/220/440 MHz HT Antenna, designed especially for the new, hot-selling radios that include 220 MHz capabilities, is said to dramatically increase radio performance and range. (Photo courtesy NCG Company)

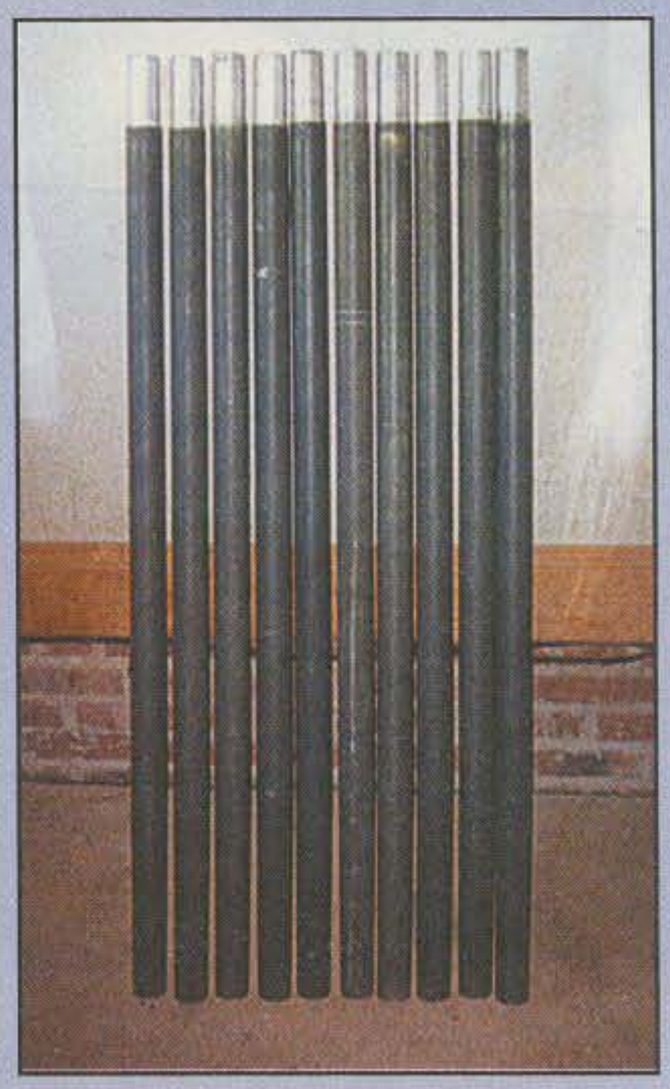


Photo F– The Mast Company offers military surplus stackable aluminum tubing, great for vertical antennas, dipole supports, short rotor masts, Field Day use, and more. The tubes are sold in boxed sets of ten pieces; included is an instruction manual on installation and maintenance. Shown in this photo are typical examples of current stock. (Photo courtesy The Mast Company)

has set up his own website for selling the masts directly to the radio amateur community.

Each mast tube is 48 inches long and 1.785 inches in diameter, with a wall thickness of 0.11 inch. This wall thickness means that the tubes are fairly heavy-duty aluminum tubes, not of the thin-wall type used in some other military mast systems. The last 3.25 inches of each tube are of a smaller diameter tube used as an inner sleeve for stacking the tubes. Ten of the tubes stack to a height (length) of 37 feet. As a result, they can be used for vertical arrays, Field Day dipole supports, short rotor masts and shafts, and even booms for some Yagi arrays. A number of non-amateur uses are possible, according to Henry, including their use as flagpoles, tent and canopy poles, fence posts, and more.

Although the tubes have been used by the military, they are still very serviceable for amateur use. Plus, they come already painted dark green (with some scratches, nicks, and rub marks), making them suitable for use in neighborhoods with restrictions. The Mast Company also offers a two-piece, hard-plastic assembly accessory you can use as a base insulator, or as a top rotating piece when the mast is used as a flagpole. Also available are fiberglass versions of the aluminum tubes and telescopic fiberglass poles.

The Mast Company sells the tubes in boxed sets of ten pieces, including an instruction manual covering installation and maintenance. For more details and pricing, contact The Mast Company, P.O. Box 1932, Raleigh, NC 27602 (e-mail: <k4tmc@aol.com>; web: <http://www.geocities.com/tmastco>).

Photo G– Jovan Peric, KB9YUL, has introduced handy, laminated credit-card-size "manuals" for various Yaesu, Kenwood, and ICOM radios. The reference cards fit in a wallet and help you quickly locate all the features of your VX-5R, TH-F6, or IC-T81A radio. (Photo courtesy Jovan Peric, KB9YUL)

Software and Computers

More on Copernic Summarizer. In February we noted the most recent release of Copernic Summarizer™ 1.5, only to discover that they had just come out with an even newer release, V2.0.

To recall, Copernic.com offers a number of excellent PC programs, notably the Copernic series of searchers and the Copernic Shopper online shopping programs. In the June 2001 column we originally noted the newly introduced Copernic Summarizer. It's text-summarizing software that helps make the most of your reading time and also helps you free yourself from "information overload." The program intelligently cuts to the chase, producing a short, condensed version of any web page, wordprocessing documents, e-mail messages, and other documents produced by popular application programs. With the program you can spend considerably less time reading PC-based documents, without missing any important information.

The new major update, Copernic Summarizer 2.0, enhances and expands previous features. These include the ability to create summaries in any text or document, including Personal Document Format (PDF) files; generate real-time summaries as you browse the web; and export and share results with others using a variety of file formats. A handy "Floating Bar" gives you quick access to the program's most-used features. The price is $59.95.

For more information on Copernic Summarizer, contact Copernic.com, 360 Franquet St., Suite 60, Sainte-Foy, Quebec, Canada G1P 4N3 (418-527-0528; e-mail: <sales@copernic.com>; web: <http://www.copernic.com>).

From the Bookshelf

Credit-Card-Size Manuals for Yaesu, Kenwood, and ICOM Radios. Jovan Peric, KB9YUL, has introduced handy, laminated credit-card-size "manuals" for various Yaesu, Kenwood, and ICOM radios, such as the Yaesu VX-5R, Kenwood TH-F6, and ICOM IC-T81A. According to Jovan, the handy reference cards (photo G) not only fit in your wallet, they also help you quickly locate all the neat features of radio. Separate cards are available for each one.

Jovan tells us that he originally designed the cards for himself, but then found them to be so useful that he decided to make them available to the public. In fact, he now suggests that you "Don't leave home without this handy credit-card-size manual." The laminated card sets are priced at $3 each (U.S. s/h is included; they are $1.50 extra outside of the U.S.).

Payment may be made via check or money order. Contact Jovan Peric, KB9YUL, 3425 W. Ardmore, Avenue, Chicago IL 60659 (e-mail: <tokivoki@earthlink.net>). You also may make payment through the popular PayPal online service, but the cards are priced at $4.00 when using this payment option, which you can check out at <http://www.radioamater.com/english/vx5r.shtml>.

Windows XP Unleashed. Have you upgraded to Windows® XP yet? Or are you trying to coax the best performance out of your new, Windows® XP-equipped PC? If so, you'll probably like this comprehensive, 912-page opus from Terry W. Ogletree. The authoritative Sams book goes "beyond the basics to unleash the full power of Microsoft Windows® XP," according to the publisher.

In this book the author guides the intermediate to advanced reader through nearly every Windows® XP topic imaginable, presenting ideas and solutions to typical problems encountered by professionals. These include issues of installation, use, and maintenance; performance tuning; optimizing memory; pushing hardware profiles to their limits; XP system tools; automatic driver update; maximizing XP for the internet, intranets, and security; and much more.

The new Sams book is $49.99 and is available in bookstores, or contact Pearson Technology Group, 201 West 103rd Street, Indianapolis, IN 46290-1097 (phone 1-800-858-7674; e-mail: <info@mcp.com>; web: <http://www.samspublishing.com> or <http://www.mcp.com>).

Update on K6ARD's HamCards. In the December 2000 column we profiled the unique HamCards™ from Brent Walton, KF6GB (now K6ARD). To recall, Brent has come up with a "manual in a wallet," as he refers to the cards. Taking up only as much room as a few credit cards, his cards let you place important instructions for your radio equipment in your wallet or shirt pocket. No more bulky user manuals to tote around!

As we noted, besides being of a handy size, the cards are made of sturdy PVC plastic. The printing will not rub or scratch off, the cards will not tear or delaminate, and neither water nor mud will damage them.

Brent says the cards are selling well, and so he has greatly expanded the radio gear supported by them. Cards now are available for the ADI AT-600; Alinco DJ-S11T, DJ-S41T, and DJ180; ICOM IC-T8A and IC-2100H; and Yaesu FT-2500M, FT-50RD, VX-1R, and VX-5R radios. There also is a handy Q Codes card.

The card sets cost from $6 to $12, depending on the number of cards in the set; the new Q Codes card is $2. Also, Brent can create two-sided "amateur radio licensee ID cards" with your license information and photo on the front side, and the rear side containing a disclaimer that the card is not an official government-issued ID. Also available are custom card sets for other radios. Finally, Brent also makes repeater autopatch command cards for radio clubs and repeater groups, which can resell them to their members for a profit if they choose. Distributor inquiries are welcomed.

For more information, contact Brent Walton, K6ARD, 4411 Glen Canyon Circle, Pittsburg, CA 94565 (925-759-3002; e-mail: <k6ard@hamcard.com>; web: <http://www.hamcard.com>). You now can order online and purchase the cards using a credit card.

Wrap-Up

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

Overheard: Wouldn't you know it? It seems the quickest way to find something you've misplaced around the ham shack is to go out and buy a usually more-expensive replacement for it.

73, Karl, W8FX

DX

BY CARL SMITH, N4AA

News Of Communication Around The World

QSLing and Donations

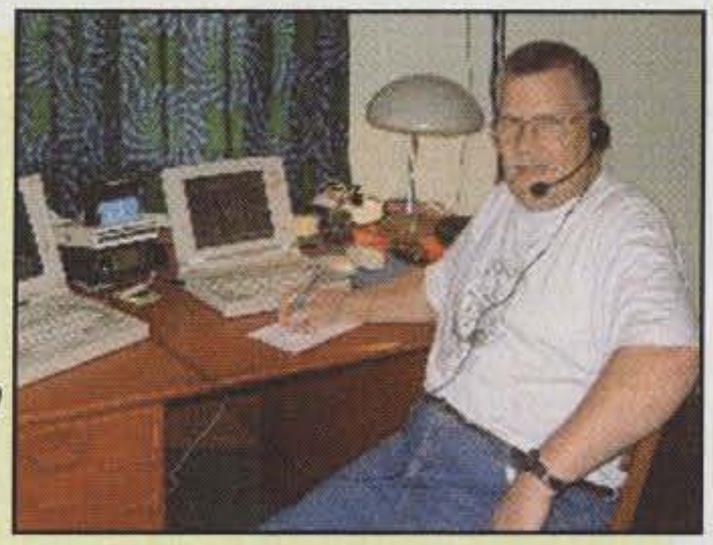
Spring is here at last. As I write this in early April, the temperatures are in the mid-70s and it feels great. I'm not one for cold weather, especially as I get older. Perhaps that's why we find so many old timers living in Florida, south Texas, New Mexico, and Arizona. Besides being warmer, I hear the DXing is better from those locations, too. Hmmmmm. Maybe I should consider a move?

By now all of you know that the DXCC Desk has approved the operation by Ed, 4L4FN, from North Korea. Since the approval Ed has been more active and the QSL cards will be in the hands of the Deserving by the time you read this. The approval was granted for only SSB, so we'll have to wait for those CW contacts from P5.

The VP6DI operation from Ducie was apparently successful in handing out over 60,000 QSOs for this all-time new one. I managed to make a few "band" contacts with VP6DI, but missed them on 40 meters—my all-time favorite band. Oh well; that just gives me something to look forward to down the ole log book.

There are a few more operations coming up during April that will give DXers ample opportunity to add to their respective "worked" lists. Mellish Reef, VK9ML will begin a ten-day run around April 15, and the Baker Island, KH1 DXpedition will come along at the end of April for a ten-day operation.

With all of the DXpeditions already this year, and those still to come, we have to be thinking about QSLing all of them. Along with QSLing comes the thought of putting a little something in with your QSL to help defray the expenses of these operations. Steve Wheatley, KU9C, and Ralph Fariello, K2PF, co-authored an article for *The DX Magazine* that addresses this very subject. I think it is appropriate at this time to share their thoughts with you through this column as well. If you have already seen it, good, and if you haven't, I hope it will provide you with some "food for thought."



Gus, 9U5D, has been very active from Burundi from this operating position. After a number of operations were disqualified, the appearance of 9U5D has satisfied many DXers' demand for this rare one.

Let's look at this from two aspects—the major DXpedition to a rare location, and that local ham in a semi-rare locale.

Every issue of *The DX Magazine* includes informative articles outlining the tremendous efforts that have been expended to plan and implement one of these operations. The list is long—determining transportation, licensing, shelter, power, food, water, waste disposal, etc., etc. The more you have to bring with you and the more difficult the transport, the more costly the operation.

Steve, KU9C, recalls his trip to Pratas Island in 1998, a rare one by any standard. Pratas is *not* a Caribbean island easily accessed by scheduled flights. It is a military base in the South China Sea with personnel stationed there and facilities to support us. Therefore, you might think that once you had the military approval it would be a "piece of cake." Well, it wasn't! As I recall, the cost to simply transport needed equipment and personnel ran several thousand dollars. Food had to be purchased for the team, and generators had to be lugged along to ensure the Q's would keep on rolling during

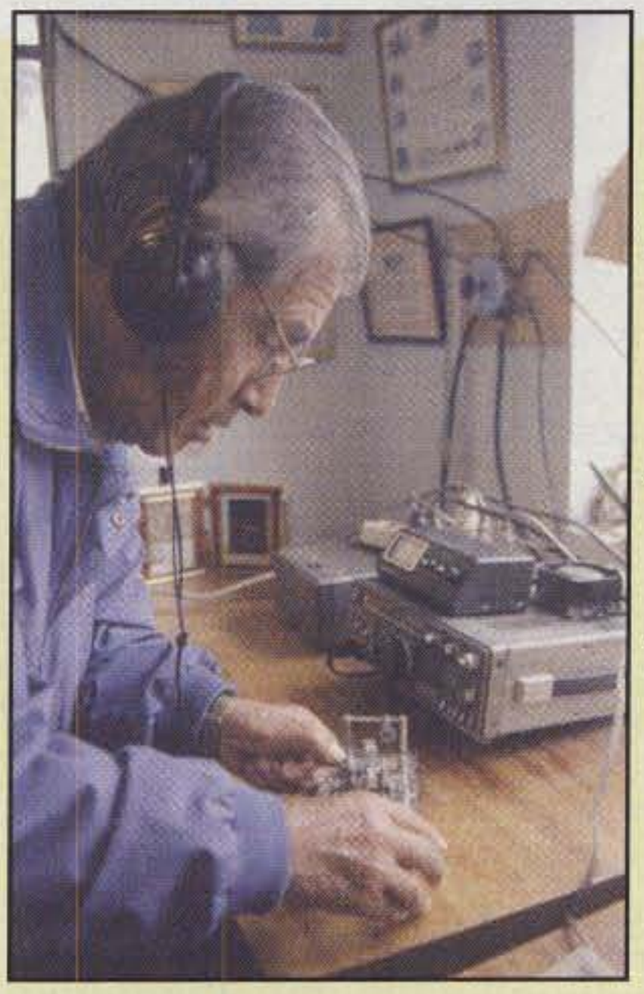
QSL Basics: Should I include a Donation?

By Steve Wheatley, KU9C, and Ralph Fariello, K2PF

One question we often hear during our chores as QSL managers is the following: Should I include a donation with my QSL request? You may have read in an announcement for a rare DXpedition that donations were accepted via a person or organization, and you wonder if you should contribute.

Whether you do or do not is a very personal choice and one we cannot answer for you directly. Should you have to pay for that QSL you need? No, but let us give you some "food for thought" for the next time you ponder this question.

At a very basic level, consider the following. Over time you have spent a reasonable sum of money assembling a station, even a modest one. If you chase DX, you probably have spent a little more than the average ham. However, the money you spent only provides part of the necessary conditions to bag a new country and get that desired card. Someone has to be on the other end of the QSO to make it count!



Alfo, HC5AI, is probably the most active ham in Ecuador right now. He just turned 75 and learned CW some 63 years ago. Alfo is a retired railroad telegraph operator, and now that he is in failing health following a recent stroke, ham radio is his entire life. The stroke caused Alfo the loss of use of his right arm (his CW hand), and he now must use a keyboard for all CW operation. (Photo courtesy Rick, NE8Z/HC1MD)

P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

The WPX Program

SSB

2824 .....NØYYO
2825.....IZØBNR
2826.....EA7FST
2827.....JH2BLM
2828.....VE2LHP

Mixed

1893 .....NS2P

CW: 550 JH8WGT. 900 KX1A. 1100 K6UXO. 1350 KT2C, AA1KS.

SSB: 450 JK7QJK. 600 NØYYO. 750 JH2BLM. 1800 IT9SVJ. 5400 ZL3NS.

MIXED: 700 WBØWAO. 1150 K6UXO. 1350 KX1A. 1900 AA1KS.

15 meters: N9DI
80 meters: K6UXO
160 meters: JH8WGT

Asia: JH2BLM
Europe: JK7QJK, JH2BLM
Oceania: JH2BLM

Award of Excellence 160 Meter Bar: KX1A
Award of Excellence Holders: K6JG, N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, I0JX, WA1JMP KØJN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, ABØP, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1PO, K9LNJ, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, I0RIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, KZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, I7PXV, S57J, EA8BM, DL1EY, KØDEQ, KUØA, DJ1YH, OE6CLD, VR2UW, 9A9R, UAØFZ, DJ3JSW, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, W4GP.

160 Meter Endorsement: K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF N4NX, SMØDJZ, DK3AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR1QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N8JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, WBØDD, I0RIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA5CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, UAØFZ, CT4NH, W1CU, EA7TV, LY3BA, RW9SG, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, W4GP.

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

The WAZ Program

10 Meter SSB

532.....JN3SAC

15 Meter SSB

571 .....JA1GLE
572 .....JAØBOV

17 Meter SSB

28 .....W8AXI

40 Meter SSB

98 .....N4PQX

10 Meter CW

175 .....JA1GRM

12 Meter CW

29 .....JA1GRM

15 Meter CW

299 .....JA1GRM

17 Meter CW

39 .....JA1GRM

20 Meter CW

526 .....JA1GRM

30 Meter CW

49 .....JA1GRM

15 Meter RTTY

7.....G4BWP

6 Meters

30.....IW9CER (31 zones)
31 .....IT9IPQ (30 zones)
32.....G4BWP (27 zones)
33 .....LZ2CC (38 zones)
34K6MIO/KH6 (30 zones)
35.....K3KYR (27 zones)

160 Meters

69 .....N4JJ (40 zones)
79.....DJ7RD (40 zones)

All Band WAZ

SSB

4765 .....K6JRY
4766.....6K5SSR
4767.....N6VHF

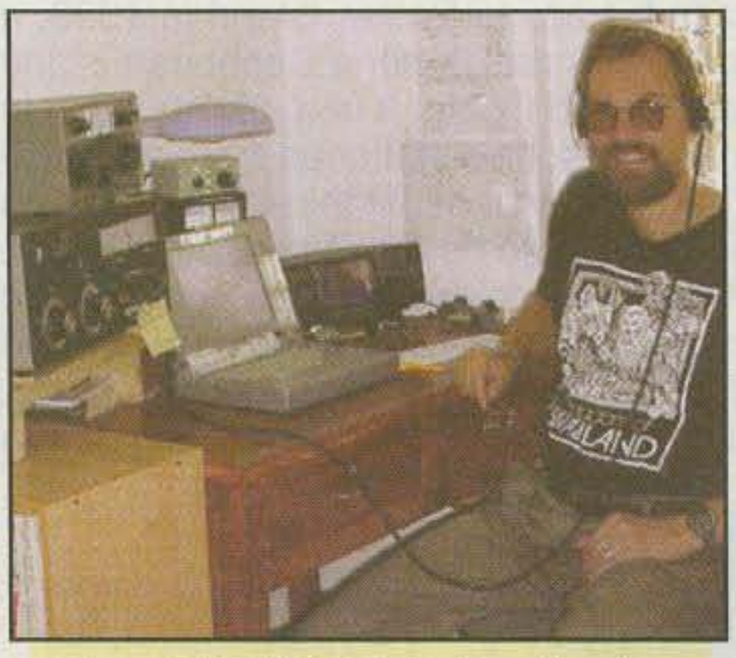
Mixed

8134 .....JHØSGG
8135.....AEØQ
8136 .....N2LM
8137.....N5GH
8138.....LU1BCH
8139.....KG4KAY
8140 .....S58U
8141 .....W3EE

All CW

306 .....IK2CMN
307.....OK1DXD
308 .....JA1PTR
309.....NEØP
310.....K8HJ

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.



Jon, DU9/NØNM, in his shack at Mindanao in the Philippines. With help from some of his Top Band friends in the U.S., Jon is now able to provide contacts on 160 to the "Deserving." (Photo courtesy Jon, DU9/NØNM)

the normal maintenance periods of the island's generators. Oh, and a substantial sum had to be spent on insurance for team members, a requirement by the military before arriving on the island. Even what then felt like a relatively "easy" DXpedition to what was a rare country was a very expensive undertaking.

Read between the lines on some of the major operations: a boat must be chartered; power must be provided; sleeping and operating facilities must be carried and constructed; etc. You can quickly become impressed, and swamped with the level of detail, planning, and logistics that must be carefully managed to make a DXpedition happen. Needless to say, the expenses can be staggering! Thankfully, there are many hams who are willing to go through that planning and expense so that you can get a new one. A donation helps tremendously to offset these expenses.

Let's not limit this discussion to the high-profile DXpeditions. There are many hams out there in semi-rare countries where QSL costs quickly become a major part of their amateur radio budget. These amateurs enjoy operating, but QSL costs can put a crimp in their budget. Choices must be made to either support their hobby or their family. Whether these hams answer QSLs themselves or use a manager, a donation helps pay for the QSL load they receive or helps improve their operation.

As QSL managers, and we speak for many others, donations are not used to supplement our personal income. Any excess over the costs of QSLs and postage goes directly to help the DX station. The difference between a "green stamp" and a "postage stamp" can provide much needed help for the DX station.

Let us give some recent examples.

Steve: I first met an operator during a 160 meter contest and found that he was running an old rig with a 10 kHz filter. I arranged to get a used, relatively inexpensive (to me!) rig to him. During the following year, he provided over 1500 Q's on 160 meters alone, many being a new band for the deserving. More recently, I arranged to get a very inexpensive 6 meter transceiver and amplifier to him. In the last year he's

5 Band WAZ

As of April 15, 2002, 596 stations have attained the 200 zone level and 1260 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:
None

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
WØPGI, 199 (26)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
KL7Y, 199 (34)
NN7X, 199 (34)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (1)
KC7V, 199 (34)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
K4UTE, 199 (18)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
K2UU, 199 (26)
W1FZ, 199 (26)
UT4UZ, 199 (6)
SM7BIP, 199 (31)
PY5EG, 199 (23)
SP5DVP, 199 (31 on 40)
K7FL, 199 (23)
W1DIG, 199 (24)
KY7M, 199 (34)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
KØSR, 198 (22, 23)
UA4PO, 198 (1, 2)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
LA7FD, 198 (3, 4)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
KF2O, 198 (24, 26)
W6BCQ, 198 (37,34on40)
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)

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

K9RR (160 zones)
W3DRY (191 zones)

Endorsements:
KØXN (200 zones)
VE3XO (200 zones)
K3JGJ (198 zones)
W4DC (198 zones)
DL4MCF (200 zones)
K3UA (200 zones)
WA5IPS (182 zones)
I2YWR (191 zones)
G3LQP (200 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $80 ($100 if airmail shipping is requested).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.

The operating team at the recent Trindade 2002 PWØT DXpedition. Many months of negotiation with the Navy finally brought about an extended operation from this most needed island. Over 65,000 contacts were made by the group. Especially noteworthy is the amazing 6 meter operation which netted nearly 2000 contacts in 88 countries over the 13-day operation. (Photo courtesy Bill, W9VA)

turned over 3000 6 meter Q's, providing a very rare grid and country to many.

Ralph: I recently purchased and sent to one of the stations I manage a basic PC, which has been used to computerize the logs (and get your QSLs to you quicker), as well as allow for various digital operating modes. It's safe to say that the bottom line is, if you provide a donation, either direct to the DX station or to many of the great QSL managers who exist, it will find its way to further this great hobby.

To us, the bottom line is: If we spend our amateur radio budget solely on *our* equipment, *our* postage to send JUST an SASE to a DXpedition to get that QSL card, *our* trip to Dayton or a local hamfest, then who is going to support the DXpeditions? We're talking about the DXpeditions to the rare ones—the ones that are not "active" by local amateurs or visitors during contest weekends or vacations. If you're a DX chaser, that expensive equipment isn't worth much if there isn't a hardy individual or team and equipment at that rare DX location you need for a new one.

If you've gotten this far, maybe the question you now pose is: Okay, you've got my attention, but *how*? How do I support these DXpeditions? How do I

CQ DX Awards Program

SSB

2371 .....UA1ZKF
2372 .....N6FUN
2373 .....KG7JO
2374 .....HK6PSG

CW

1027 .....KG7JO
1028 .....UR5BCJ

SSB Endorsements

320 .....K8LJG/333
250 .....HK6PSG/255
200 .....WB5SYT/203

CW Endorsements

320 .....K8LJG/332
320 .....N4CH/330
150 .....UR5BCJ/184

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. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 333 active countries. Please make all checks payable to the award manager.

THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

4965 .....9A2AA	3742 .....N6JV	3465.....N5JR	3005 .....HAØIT	2415.....9A4W	2063 ..WB3DNA	1751 .....VE6BF	1448 .....NG9L	1114 .....K6UXO
4364 .....W2FXA	3707.....VE3XN	3127...PAØSNG	2952 .....KØDEQ	2414 .....W9IL	2018.....HA9PP	1724 .....W7CB	1429 .....N1KC	742.....K5IC
4146 .....W1CU	3668 .....N4MM	3118 .....I2MQP	2944.....IT9QDS	2334.....W6OUL	1983 .....W9OP	1697 .....Z35M	1369 ..KW5USA	680 ....VE3NQK
4034 .....F2YT	3602 .....I2PJA	3094 .....KF2O	2841.....IK2ILH	2331 ....W8UMR	1976 .....DJ1YH	1564.....KØKG	1325 .....KX1A	
3971 .....EA2IA	3548 .....N9AF	3086 .....K9BG	2694 ..YU7GMN	2288 .....K5UR	1958....CT1EEB	1501.....W2EZ	1291 .....VE9FX	
3827 .....9A2NA	3517.....YU1AB	3062 .....S53EO	2655...WA1JMP	2121 ...PY2DBU	1914 .....I2EAY	1472..OK1DWC	1226 ...EA2BNU	
3806.....N4NO	3489...SM3EVR	3042 ..WB2YQH	2454.....K2XF	2117...OZ1ACB	1788.....AA1KS	1461.....WT3W	1130 ..PY1NEW	

SSB

4386.....IØZV	3079 .....EA2IA	2741...PAØSNG	2337 .....W2WC	1950.....K5UR	1704.....IT9SVJ	1384 ...LU3HBO	1125 .....I2EAY	812.....KU6J
4018.....VE1YX	3049 .....F2VX	2607 .....KF2O	2325.....CX6BZ	1916 .....N6FX	1687 .....K3IXD	1368 .....NG9L	1089.....N1KC	786 .....KX1A
3995 .....ZL3NS	3030 .....9A2NA	2596 .....4X6DK	2301 .....HAØIT	1864 .....K2XF	1658.....W6OUL	1287.....KI7AO	1059....JN3SAC	783 ....VE6BMX
3581 .....I2PJA	2974 .....N4NO	2594 .....I8KCI	2186 .....IN3QCI	1862 .....EA7TV	1582.....K8MDU	1238.....LU4DA	1048 ...EA3EQT	
3525.....F6DZU	2925 .....I2MQP	2570 ...LU8ESU	2180...OE2EGL	1730 .....I3ZSX	1562.....W2ME	1193 .....WT3W	990.....HA9PP	
3260 .....CT4NH	2885 .....I4CSP	2509 .....EA5AT	2002.....LU5DV	1721 ....DK5WQ	1540...SV3AQR	1190.....K4CN	981 .....AG4W	
3234.....N4MM	2885 .....N5JR	2444.....KF7RU	1969 ...CT1EEB	1715 .....W9IL	1520.....DF7HX	1162 ...EA5DCL	822.....K1BYE	
3126.....OZ5EV	2750 ...CT1AHU	2386.....EA1JG	1954 ...CT1EEN	1706.....NQ3A	1485 .....W2FKF	1136.....VE9FX	821 ....VE7SMP	

CW

4145...WA2HZR	3035.....EA2IA	2399 .....HAØIT	2032.....I7PXV	1854 .....K5UR	1603.....I2EAY	1359 .....4X6DK	1096.....YU1TR	871 .....WT3W
3743.....N6JV	2822 .....LZ1XL	2219 .....KF2O	2009.....OZ5UR	1789 .....W6OUL	1585...EA7AAW	1332.....EA2CIN	1032 .....WO3Z	809 .....KU6J
3469 ...VE7CNE	2681 .....9A2NA	2209.....KA7T	1955.....G4SSH	1737.....IK3GER	1568 .....W9IL	1284 .....AC5K	942 ...WA2VQV	729 .....N1KC
3369.....N4NO	2592 .....N4MM	2189 ....EA7AZA	1938 .....LU2YA	1671 .....DJ1YH	1460.....I2MQP	1118 ...EA2BNU	935 ....VE6BMX	
3217.....K9QVB	2578.....N5JR	2058.....N6FX	1919.....K2XF	1654 .....VE6BF	1442 .....EA6AA	1097.....K6UXO	877.....KX1A	

make sure the money I provide is effectively spent?

We certainly do not have all the answers, but here are some suggestions. First, consider supporting those organizations whose focus is on providing support for DX operations. How do you find these? There are many well-known organizations. Several provide a global focus; others, perhaps including your local DX club, are more local in nature. The next time you're going through the QSL cards of some of the rare DXpeditions you've worked, look beyond the QSOs confirmed to the printing on the cards. You'll typically find these organizations' logos on the cards! The next time you get a rare DX QSL, take a look at those stuffers that come with the card. You will find organizations or vendors that have supported DXpeditions. The organizations do much of the research to make sure that your contribution, combined with many others, is effectively used to support quality DXpeditions. Having personally approached many of these organizations for funding, we know that they rigorously review the goals, budget, and planning of a DXpedition to ensure that any funding they provide is well spent.

A second method, which many use, is to provide a little "extra" with their QSL request. This is clearly the method preferred by many, since you know you have the QSO before you provide any funding, and as QSL managers we can tell you that this is a significant source of funding for any DXpedition. If you simply send an SASE with your QSL request, please realize that you're actually creating a bit of additional expense for a DXpedition. It costs a few cents to have a very basic QSL card printed and another few cents to print the label that goes on the card. Most DXpeditions are required, especially if they receive support from the organizations mentioned above, to reply to bureau QSL requests. So if you request a bureau QSL (considering the cost of the bureau mailings), it can cost the DXpedition perhaps a dime to reply to your bureau request. Yes, we know it's only a few cents, and the DXpedition received funding from all these organizations, but many of the DXpeditions we've managed print approximately 10,000 QSL cards. The cost for QSL cards, labels, and bureau mailings can easily exceed one thousand dollars.

A third thing to consider is to support those who support DX operations. As you read the account of a DXpedition here and in other magazines, watch a presentation at a hamfest or visit their website, take a look at the various vendors that have supported them. Next time you purchase new equipment, an antenna or tower, a new piece of RTTY gear, or subscribe to a DX magazine, remember those who supported the DX that you worked. In turn, support them and tell them that you appreciate their support!

Nobody we know is getting rich by going on DXpeditions. In every case, a DXpedition comes with some degree of personal expense, and quite often some degree of risk, to bring you that new one. DXpeditions happen due to the persistence, bravery, and countless time donated by those who are members of the team. It's a very big personal accomplishment for those who are fortunate to bring the new one to you. The "thank you for the QSO" they hear in the midst of a horrendous pile-up is a very big rush to these operators. Very

few have the personal resources to "do it all themselves." Please support those who bring that new one to you, and maybe that one you don't have will come on the air very soon!

73 es DX is! Steve & Ralph

How much do you have invested in your station? Can you imagine what these people go through just to bring you a new QSL card for your wall? Considerable physical and financial effort is expended by these people for *your* benefit. Surely it's worth at least a small contribution to help defray some of the financial burden.

IOTA DXpedition, Deer Island

KL7AK will active Deer Island, part of the Southern Alaska Peninsula West Group, an un-numbered IOTA island group. Projected landing on the island is late evening July 31, staying until mid-afternoon August 5, 2002.

The callsign will be KL7AK, operated by Rick, KL7AK; Blaine, KL7TG; Linda, NL7RE; Larry, KF6XC; and Jim, K9PPY. From past experience, Rick says 20 meters is the optimum band from Alaska. However, the operation is planned for 80 through 10 meters both SSB and CW.

The QSL Manager for this operation will be Fred Stenger, N6AWD, good in all the usual callsign databases.

I'm looking forward to meeting a number of DXpeditioners at Dayton. I understand that team members from PWØT, TI9M, VP6DI, probably KH1B, and no doubt others as well, will be there to share their respective stories with us.

Have fun this summer. Get all the antennas repaired, built, installed, etc., and clean up the shack, too!

73, Carl, N4AA

QSL INFORMATION

3A/IZ1EEX via F5VHM
3B8MM via DL6UAA
3E1AA via NØJT
3V8CB via DL1BDF
3V8SF via DL1BDF
3V8SJ via DL1BDF
3V8SM via DL1BDF
3V8SQ via DL1DBF
3V8ST via DL1BDF
3W2KA/3 via 3W2KA
3W2LI/3 via 3W2LI
3W3C via EA5RM
3W3M via F6BUM
3W9KCS via DL1DA
3X1Z via K4JDJ
3ZØWPX via SP5ZCC
4H2B via VE7DP
4L5O via K1WY
5NØDOG via K4JDJ
5NØRMJ via K4JDJ
5N2DOG via K4JDJ
5N4ROF via K4JDJ
6D2YFM via K1OJ
7XØDX via DL4DBR
8Q7OA via RN3OA
9H3RA via DL3BRC
9H3ZZ via PA9ZZ
9M2TO via JAØDMV
9U5D via SM5BFJ
A35TL via DL2RUM
AH2R via JH7QXJ
AH3C via NT1N
AL1G via AC7DX
AM1AUM via EA1AUM
AN1COZ via EA1COZ
BI4F via BA4RD
BI4U via BA4RD
C51F via EA5KB
C6AKK via AA7X
CE4P via CE4PBB
CE4Y via CE4FXY
CN2DX via HB9HLM
CN2JS via F6BEE
CN2R via W7EJ
CQ1CV via CT1ETE
CV1F via EA5KB
D44AC via IK3HHX
D44CF via SMØJHF
D44TA via OE5XVL
D44TC via IV3TAN
DU1/GØSHN via F6AJA
DU7/UT2VU via UR7VA
DU8ARK via I2YDX
EMØU via UT3UZ
FM5GU via KU9C
FY5KE via F6FVY
GB50 via G4DFI
GM4YXI via N3SL
GW7X via GW3XEJ
H7DX via DL7CM
HG8OST via HA6KNB
HKØGU via DL7VOG
HR2/KC4CD via N4AA
HSØZDR via W4FOA
HVØA — pirate
HZ1AB via K8PYD
IR1R via IK1HXN
IR3B via IV3IPS
IU2C via IK2ULH
IU2P via I2PJA
J37LR via VE3EBN
J68AR via K9JE
J68ID via W8QID
JT1Y via IØSNY
JW8G via LA9GY
K3J via AH6HN
KB4ATV/4S7 via K4JDJ
KG4IZ via WA5PAE
KG4MO via K4ZLE
KG4VL via N5VL
LR7E via LU2EE
LU1FAM via AC7DX
LU1ZA via LU4DXU
LX7I via LX2AJ
LZ8T via LZ2CJ
OX/OZ1EQC via OZ5KU
P40A via WD9DZV
PA/ON4NOK via ON7YX
PA6TEX via ON7YX
PJ2/DL4WK via DL7DF
PJ2/DL7UFN via DL7DF
PJ2/DL7UFR via DL7DF
PJ4G via WA2NHA
PJ7LT via KI6CG
SØ7V via DK2WV
SØ7X via DJ6SI
S21/OK1FWC via OKDXF
S21FHQ via N4VA
S57EK via S50K
S79AN via DF8AN
S79MX via HB9MX
T48RAC via VE3ESE
T88BA via G4OHX
T93M/HI9 via DJ2MX
TJ1CR via F6AXD
TN3B via EA3BT
TN3W via EA3BT
TO4T via F6HMQ
TO9RM via F9RM
TR8CX via F5PBQ
TT8DX via F5OGL
TU5JD via IK2ILK
UN2E via DF6PB
UN7GM via PA4PA
UN9FD via DF6PB
UT2VU/DU7 via UR7VA
V26S via N2WKS
V31MF via KC5ZT
VE3ZZ via PA9ZZ
VKØMQI via JA1ELY
VKØMQI via JE1LET
VK4NIC/3X via K4JDJ
VK9LT via HB9QR
VK9ML via VK4APG
VP2EKS via HB9KS
VP2VI via W6RKC
VP5WW via KX4WW
VP6DI (HF) via VE3HO
VP6DI (6m) via JA1BK
VQ9GB via K7GB
VQ9MR via W3MR
W3IVP/5N1 via K4JDJ
XP1AB via OZ1ACB
XR2D via CE4USW
XV3A via EA5KB
XV3C via EA5KB
XW1HS via E21EIC
XW3QBR via IN3QBR
XX9TRR via N6XJ
YO2APJ via W9OL
YU8/9XØA via UA3DX
ZC4BS via G4KIV
ZD8Z via VE3HO
ZD9YL via K4JDJ
ZF2MM via K9PG
ZK1SBQ via DL8SBQ
ZK1XXX via N2LW
ZK2CW via DL2RUM
ZK3HC via DL9HCU
ZW5B via W2GD

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," P.O. Box 3071, Paris, TN 38242; phone 901-641-0109; e-mail: <golist@wk.net>.)

QRP

BY DAVE INGRAM, K4TWJ

The Art of Low-Power Hamming

Foxes, Micro Rigs, and More

If there is one particular area of amateur radio where homebrewing, kit building, and experimenting with new circuit ideas is alive and well, it has to be QRP. Indeed, we could lock three randomly picked QRPers in a room and they would have a ball designing, refining, and expanding on each other's projects, ideas, and circuits. Quite possibly, that is one of the prime reasons why QRP conferences such as Pacificon, Atlanticon, and Arkiecon have become so popular. They give everyone an opportunity to meet face to face, compare notes, and share knowledge. QRP is a special niche in amateur radio we can all enjoy and study to our heart's content, even if we are not all-out circuit specialists or junk-box homebrewers. In light of these facts, the classic FOXX mini-transceivers and some unique homebrew micro-rig ideas are the focus of this month's column. I am sure you will find our views on both topics fascinating, so let's get rolling!

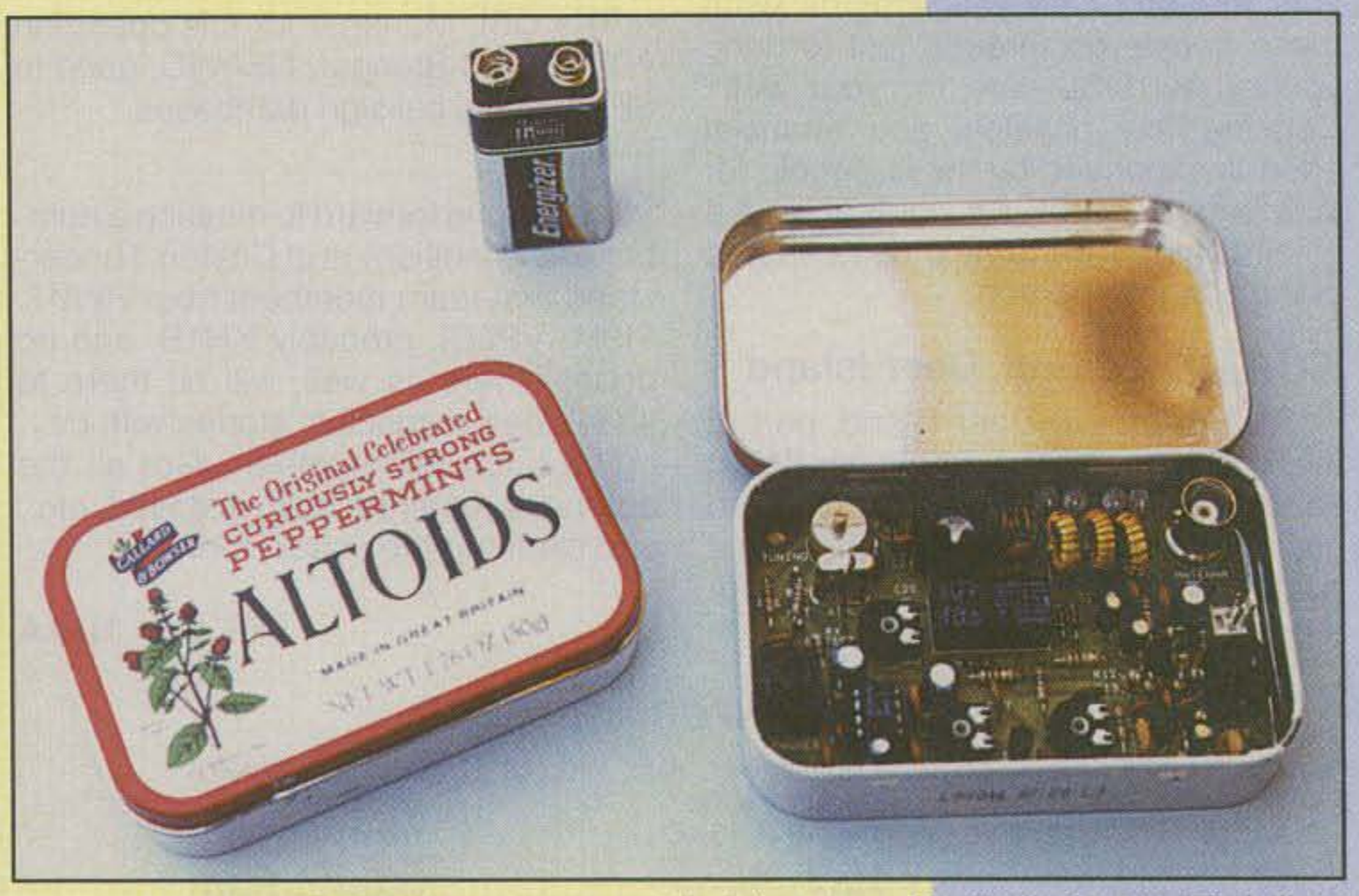


Photo 1– The FOXX III in its natural habitat—an Altoids mint tin. This little monoband transceiver is low cost, easy to build, and makes a neat traveling companion. The rig is available in kit form from Bill Kelsey, N8ET, of Kanga U.S. (Details in text.)

Foxy Rigs

While recently talking with Bill Kelsey, N8ET, of Kanga U.S., I learned the unique FOXX mini-transceiver designed by GM3OXX in 1983 and refined into the FOXXII a few years later was recently expanded into the FOXXIII. I checked out the little gem (which is now available in kit form) and found it to be a low-cost, cleverly designed fun rig everyone should find attractive for occasional use. It is easy to understand and build (assembly takes only a few hours), and it makes an ideal first project for new homebrewers.

This third-generation FOXX is a monoband transceiver with a direct-conversion receiver, 1 watt transmitter, VXO frequency control, semi-break-in operation, and CW sidetone, and it is sized to fit perfectly in an Altoids mint tin (photos 1 and 2). Now that's hard to beat from any point of view! You could build a FOXX "from scratch," but it is more convenient and less expensive to just buy the kit and get everything in one package delivered right to your door and ready to assemble. The FOXXIII is available in 80, 40, 30, and 20 meter versions, and typically tunes a 10 kHz range around its crystal's frequency (which is usually a QRP "hot spot" such as 7.040 or 14.060 MHz). It is easily powered by a small 12 volt battery, and typically draws 250 ma of current to produce a 1 watt signal. For on-the-spot and emergency use, I found that the FOXXIII can even operate from a readily available 9 volt battery (although I prefer two parallel-wired or lithium batteries for long life).

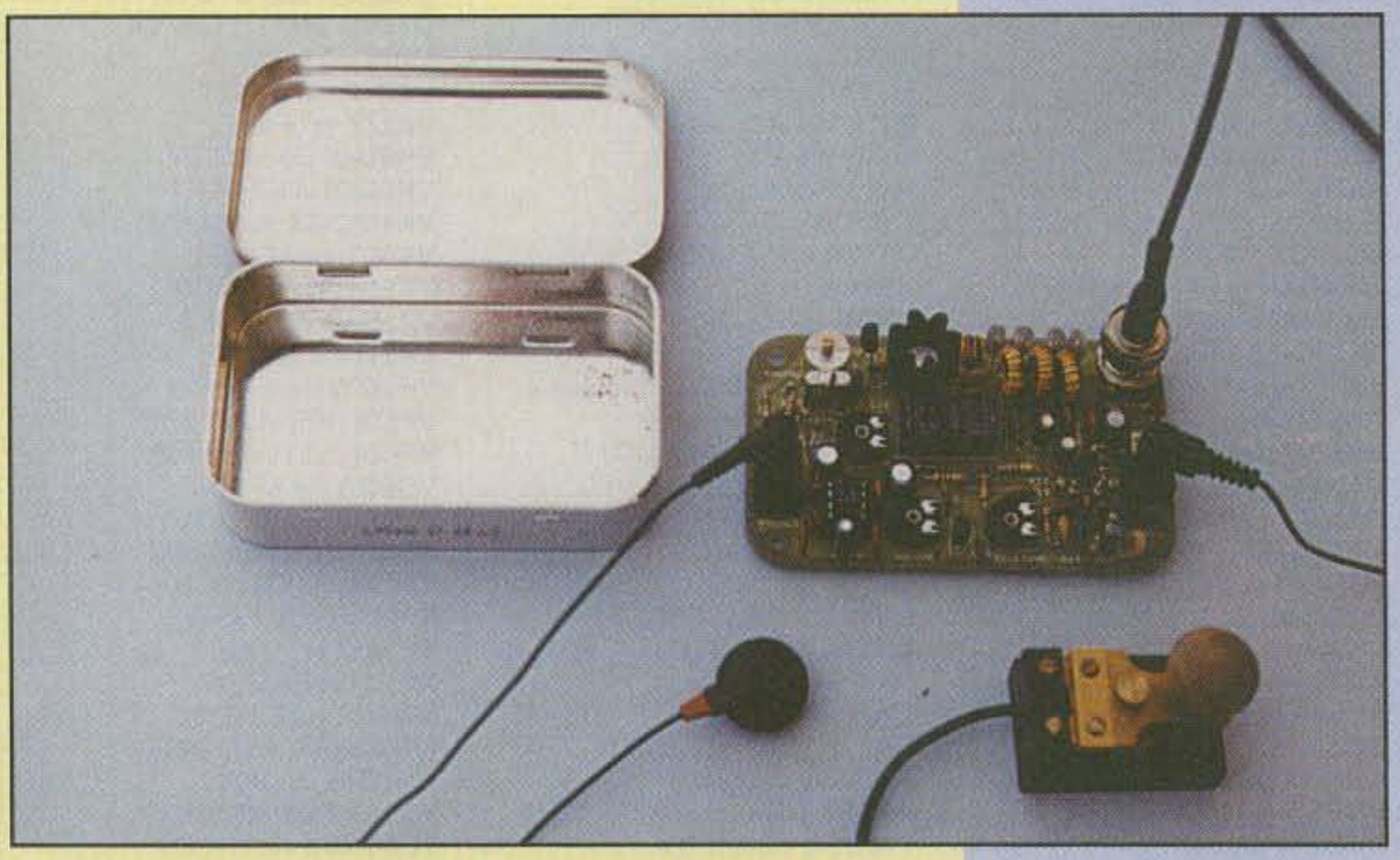


Photo 2– A close-up view of the FOXX III ready for action. Everything is contained on its 3.3 × 2.0 inch PC board. Now this, dear friends, is genuine QRP!

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

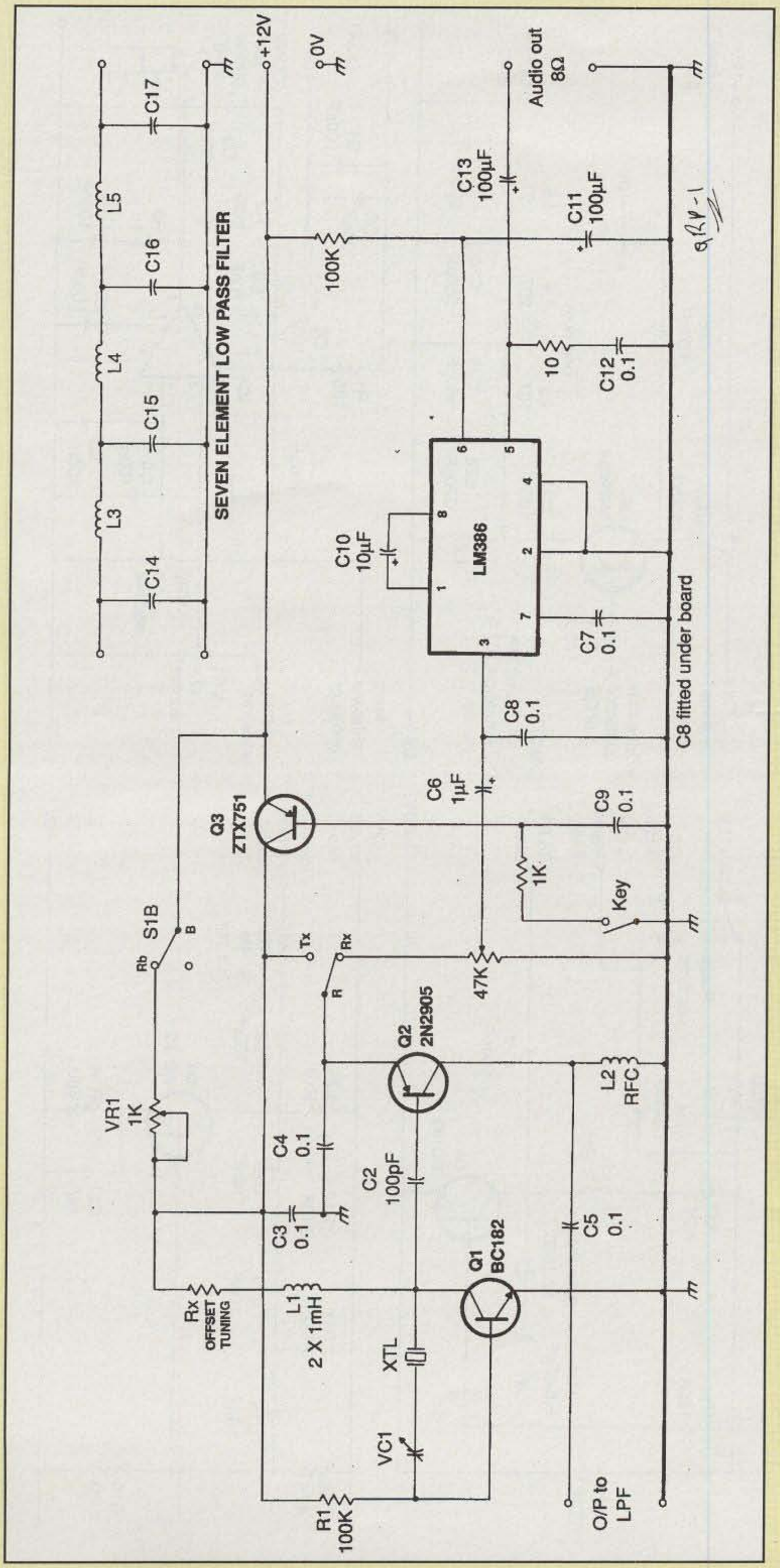


Fig. 1– Circuit diagram of the FOX II. Notice Q2 serves double duty as the transmitter's power amplifier section and receiver's mixer plus detector as ← discussed in the text.

Although the FOXXIII is slightly more sophisticated than the FOXXII, both versions share some common, fascinating circuit designs worth studying. Let's quickly compare them, starting with the FOXXII and fig. 1.

First, the transmitter section consists of a common local oscillator (Q1) driving a 2N2905 power amplifier (Q2) to approximately 1 watt output. A double-pole double-throw switch handles T/R switching and Q3 serves as the CW keying transistor. On receive, the transmitter's power amplifier (Q2) acts as a mixer and detector to convert RF signals coming in through the low-pass filter (LPF) into audio tones for subsequent amplification by the LM386.

Say what? That's right, friends; the transmitter's output transistor (Q2) serves double duty as the receiver's "front end" converter, and that is what makes the FOXXes so clever (It is also the design aspect that inspired the popular "Pixie" concept.). How is this trick accomplished? Notice on transmit both Q1 and Q2 are keyed at full power by 12 volts passed through the keying transistor Q3 and the DPDT T/R switch. On receive, however, TR1's output is reduced to a low (and constant) level by VR1 while the emitter of Q2 is switched so its base-detected signals are output to the (47K) volume control and the LM386. Q2 thus acts like a diode detector for CW, with frequency tuning performed by VXO trimmer VC1 (which is also interesting because it warps the crystal's frequency very well but does not require a traditional series-wired inductor).

Two more points warrant mention here. First, the combination of VR1 and the "ROT" (Receiver Offset Tuning) resistor establish the receiver's offset so an operator can hear other stations "zero beat" with the FOXX's signal. Second, operating voltage for the LM386 is dropped by a 100 ohm resistor rather than a 3-pin regulator so the FOXX can even operate (at reduced power) from a 9 volt battery. A regular 9 volt battery is only rated at 90 ma, however, so an extra-high-current battery should be used. Finally, the FOXXII lacks automatic T/R switching, a CW sidetone, and an on-board output filter, but it works very well for such a simple

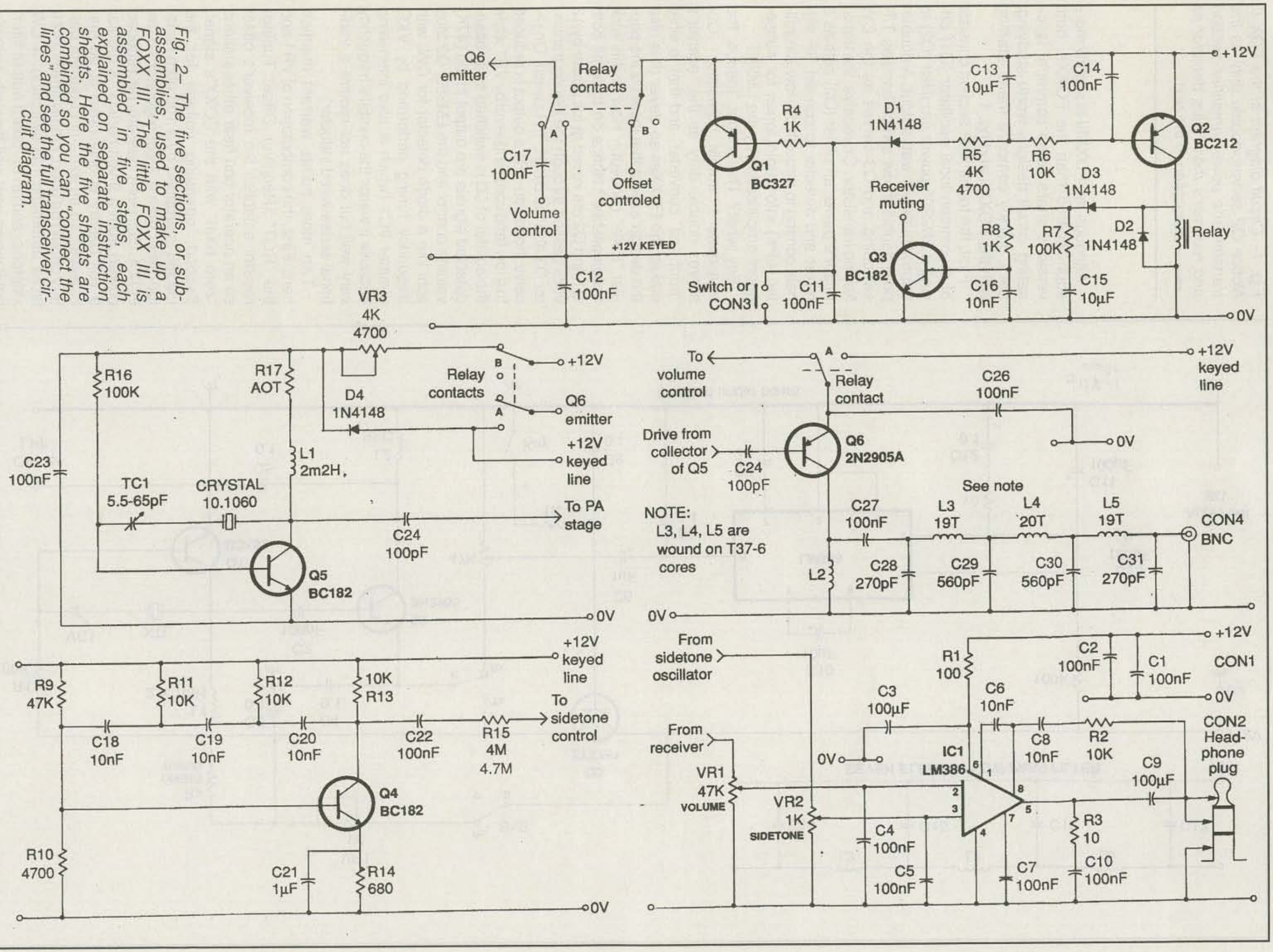


Fig. 2– The five sections, or sub-assemblies, used to make up a FOXX III. The little FOXX III is assembled in five steps, each explained on separate instruction sheets. Here the five sheets are combined so you can "connect the lines" and see the full transceiver circuit diagram.

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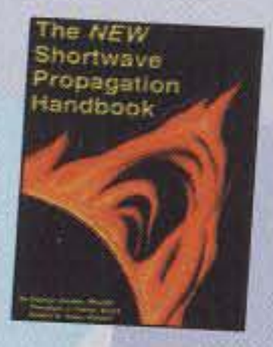

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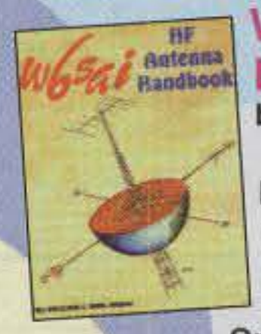

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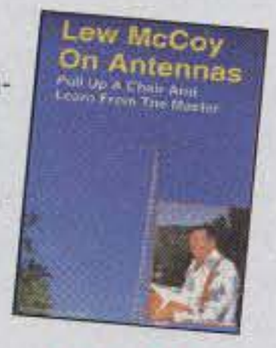

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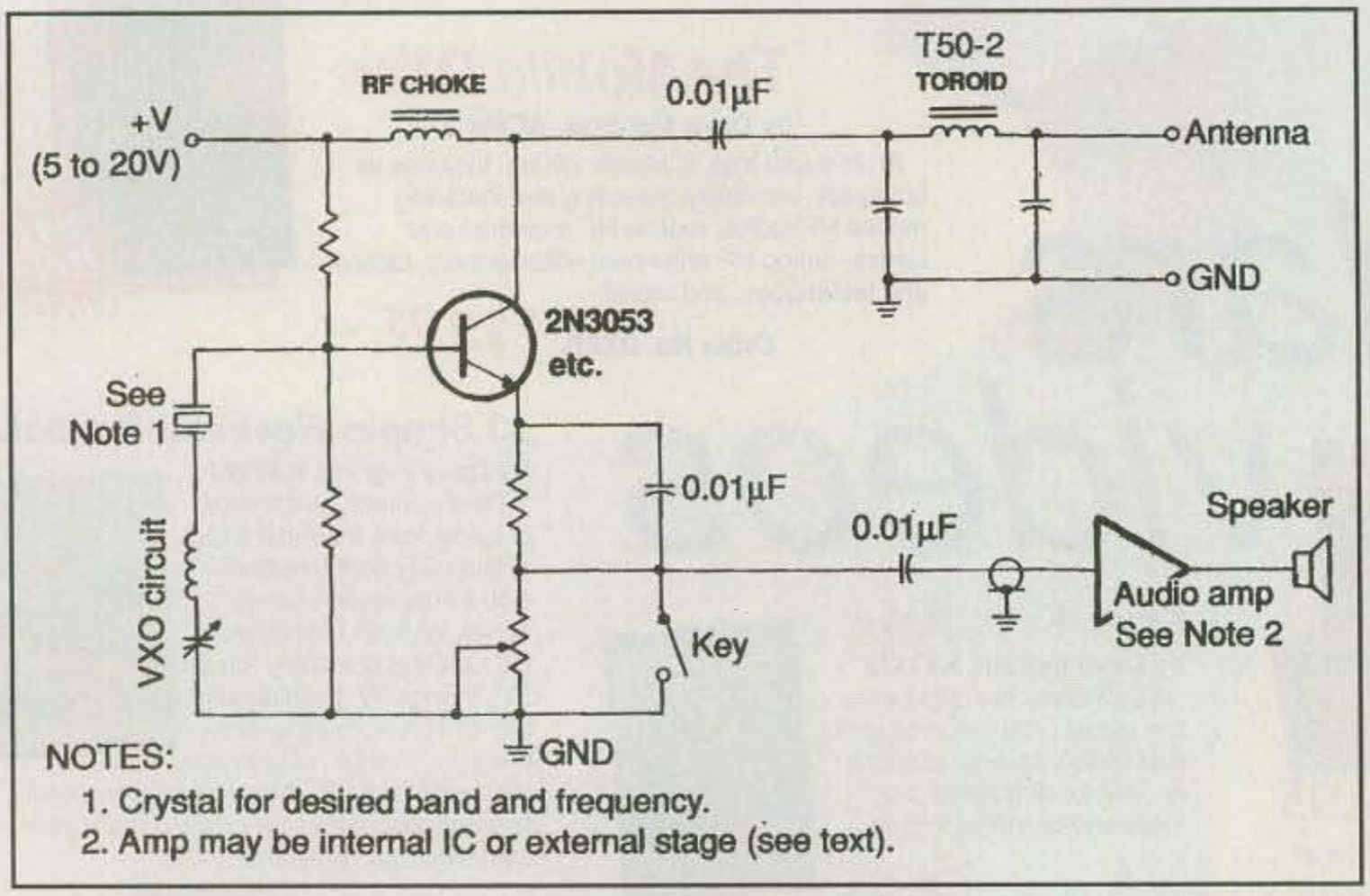

Fig. 3– My circuit of an experimental one-transistor transceiver. A higher power design similar to the Michigan Mighty Mite or Cubic Incher may work out better. My circuit is strictly an example to spark your creative thinking.

circuit and it even delivers enough receive audio to drive a small speaker.

The three previously mentioned weaknesses have been overcome with the FOXXIII design shown in fig. 2. It is shown as five sections, incidentally, because each section is described and built from separate instruction/assembly sheets to ensure success at first turn-on. I assumed you would like the mental exercise of "connecting the dots" (err . . . lines) to keep the study interesting. Notice the FOXX III's oscillator, power amplifier, and audio amplifier sections are essentially the same as those in the FOXXII, but a sidetone section comprised of Q4 and a control section with Q1, Q2, Q3, and an IC-size DPDT relay are added. A key connects at "CON3"; it activates Q2, which energizes the relay and mutes the receiver while Q1 passes CW keying voltage to the transmitter. T/R delay is set by the value of R6. Now answer truthfully, friends. Doesn't studying circuits give you a real adrenaline rush?

Jolly good, but how is the FOXX III's on-the-air performance? Quite good I would say, assuming you understand a direct-conversion receiver does not use a crystal filter and copies both sidebands of incoming signals. On the plus side, however, its full-bodied audio sounds similar to a classic vacuum-tube rig and adds sheer ham warmth to a shack. Direct-conversion receivers are also ideal for monitoring favorite "hot spots" (a hands-free scanner!), and using one

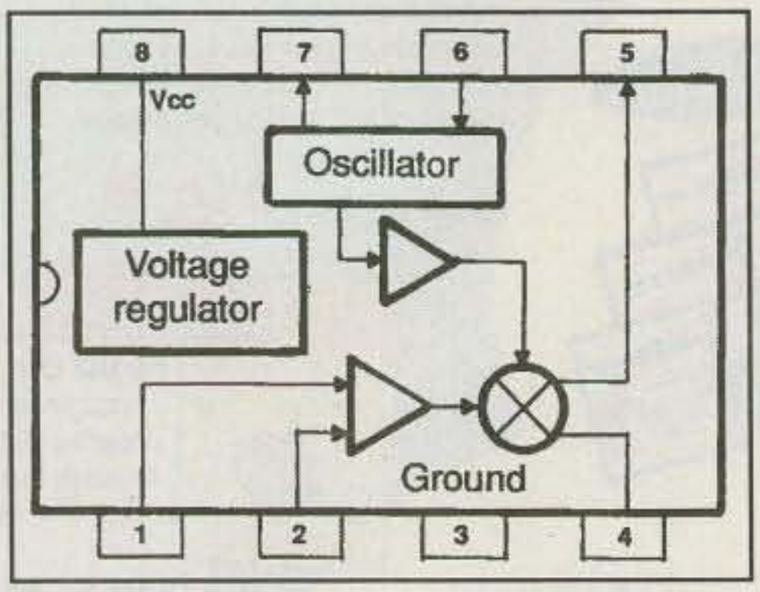

Fig. 4– Outline and internal block diagram of the popular NE602 IC used in numerous economy transceiver kits and homebrew projects. IC sports an oscillator, voltage regulator, and mixer with both balanced and unbalanced inputs and outputs. Technical data/info provided by Martin Jue, K5FLU. (Discussion in text.)

proves the operator rather than the rig makes the difference in success.

With a 30 meter FOXXIII tuned to 10.106 MHz and its audio routed to a small amplified speaker, I can monitor activity from roughly 10.102 to 10.110 MHz and follow each QSO by just concentrating on its CW tone. By adjusting the little rig's transmit offset control for a comfortable tone (I like 700 Hz), also setting its sidetone to 700 Hz and then tuning signals so their "clockwise on trimmer capacitor" sideband produces a 700 Hz note, I can call right on frequency. Then I ignore everyone except the station I am working. Yes, "mental filtering" works great. It can even give you a superiority complex! Seriously, however, the FOXXIII is a neat little pocket rig that is ideal for both light travels and emergency preparedness. It is available for around $35 from Kanga U.S., 3521 Spring Lake Drive, Findlay, OH 45840 (telephone 419-423-4604 or <www.bright.net/~kanga/kanga/>).

While you are connected with Kanga U.S., incidentally, check out some of their other treats such as a kit of the 10 meter "MicroMountaineer" featured in our July 2000 column. It is another mini-transceiver at a fair-and-square price. Also consider adding in a year's subscription to the G-QRP Club's newsletter/magazine *Sprat,* which is available for $14 through Kanga U.S. Every issue of *Sprat* is always loaded with terrific homebrew projects. You'll love it.

A One-Transistor Rig

The more one thinks about FOXX mini-transceivers, the more they inspire visions of a one-transistor transceiver. Now that's a dink project everyone should like! Impossible? Not really.

Visualize a basic transistor oscillator circuit capable of producing a couple of watts output and using double current-limiting emitter resistors as shown in fig. 3. The bypassed resistor (the one closest to emitter) will be a low value such as 3 to 9 ohms to limit current on transmit and prevent thermal runaway. The following (lower) resistor or potentiometer will be a higher value and reduce transistor current on receive so the oscillator's level will drop very low. Signals coming in through the PI filter can then be mixed and detected by the transistor, with resultant audio developed across the (unbypassed) pot and capacitively coupled to an audio amplifier. A single LM386 stage could be employed here, but using an external amplifier "borrowed" from a keyfob-size AM/FM micro radio would keep the transceiver's size extra small. As an alternative, cabling the audio output to a cassette adapter cartridge such as those used to interface a personal CD player to a tape deck or car radio holds good merit.

Now visualize this little rig's overall operation. On key-up, RF output is reduced so other stations cannot hear the oscillator's signal, but detected audio signals are developed across the potentiometer (With some luck, a medium-impedance earphone might even be substituted for the potentiometer.). Closing the key shorts the potentiometer,

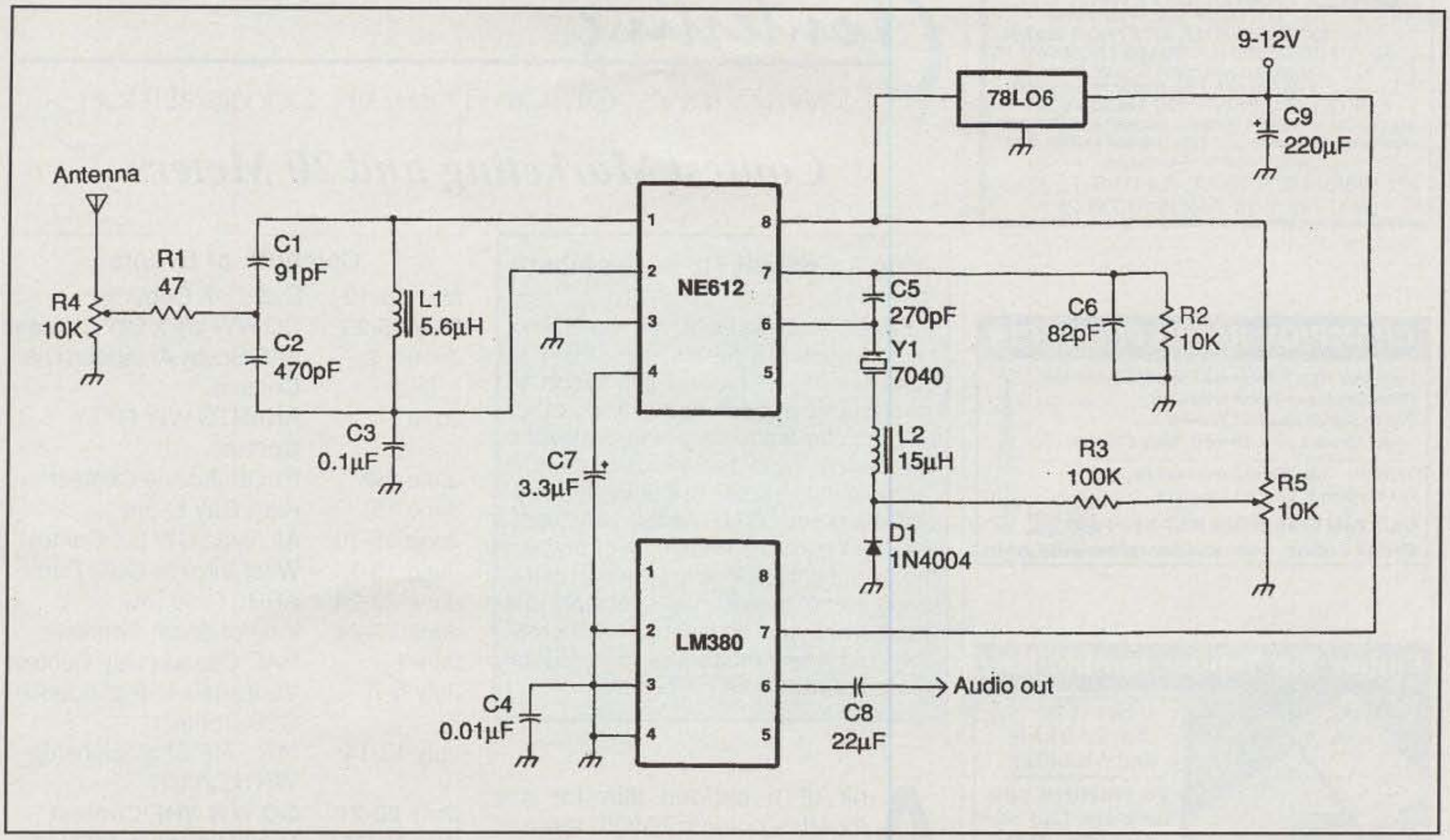

Fig. 5– This circuit diagram of the famous MRX-40 two-IC receiver designed by K8IDN is a shining example of traditional NE602/NE612 use. (Discussion in text.)

mutes the audio, and increases the oscillator's signal to maximum for transmitting—and works full break-in style to boot. In addition, the voltage change between key-up and key-down shifts the oscillator's frequency ever so slightly for TX offsetting. Since the oscillator is crystal controlled, any voltage from 5 or 6 to 12, 15, or 20 volts can be used.

Some of our readers are probably asking about specific component values to homebrew this micro-rig, and again I must emphasize that this is more of an experimental project to inspire your creative ingenuity rather than a ready-to-duplicate item. In fact, the circuit's overall design can be changed to another type of oscillator/transmitter and modified in a number of ways. Thinking further in that direction, this project can even be perfected and built surface-mount-style to make the world's smallest transceiver. It could then be entered in our second Survival Radio Challenge discussed in this month's "World of Ideas" column. Sound interesting? Give it a try!

The Versatile NE602

While on a "circuits and ideas" roll, incidentally, I encourage you to take a closer look at the unique Double SideBand transceiver designed by N3PFF and also highlighted in our "World of Ideas" column. Both the receive and transmit sections of this mini-rig use ever-popular NE602 ICs. In the receiver, one NE602 serves as a front-end mixer with good gain and a low noise floor. In the transmitter, a second NE602 serves as a balance modulator to null the carrier and leave the sidebands. What is in this IC, what makes it so versatile, and what else can it do? Fig. 4 gives us some answers.

The NE602 contains an oscillator that may be crystal-controlled, self-excited, or externally driven; a differential amplifier-driven mixer with balanced plus unbalanced inputs and outputs; and a voltage regulator. The oscillator and mixer can operate up to 200 MHz, and when used as an HF receiver's "front end," typically produce around 18 dB of conversion gain with a noise figure below 5 dB—quite good for a readily available and reasonably priced IC.

Now study the famous "MRX-40 Micronaut receiver designed by K8IDN and shown in fig. 5, and then compare it with the two-IC receiver designed by N3PFF and shown in our "World of Ideas" column. Notice you can use an NE602 to quickly brew a simple receiver, an IF stage, a frequency converter, and more. You just direct an input signal to Pin 1 and/or 2, use Pin 6 or 7 for oscillator support and extract the mixed sum or difference output from Pin 4 and/or 5. The NE602 is quite handy, and its audio amplifying cousin, the LM-386, is equally impressive. Together they are a "dynamic duo" ideal for both homebrew and kit receivers and transceivers.

Some folks have mentioned regular-size 8-pin DIP NE602s seem to be getting scarce (ditto other common "leaded" components), so I did some hunting and found MFJ Enterprises sells these (and more) components to homebrewers. Yes, and a large array of parts in both "leaded" and surface-mount styles are shown, cataloged, and available for on-line purchase from their website at <www.mfjenterprises.com>. The parts do not carry MFJ numbers, so web (or mail) rather than telephone ordering is necessary.

Hopefully our views and circuit discussions plus tips for finding parts kindled your enthusiasm to pursue at least one simple QRP project just for fun. I thus say, "Go for it!" and let's highlight your work here in *CQ* soon!

73, Dave, K4TWJ

Contesting

BY JOHN DORR, K1AR

News/Views Of On-The-Air Competition

Contest Marketing and 20 Meters

June's Contest Tip of the Month

For those of you who are big fans of packet spotting, here's something to consider. It's a natural inclination to ignore and/or filter spots from other parts of the world as being irrelevant. However, you'd be amazed at how many of those spots are actually workable from your QTH. At the very least, they can serve as bookmarks for when the band finally opens to your part of the world. Keep an eye on *all* spots, not just those from your continent. You'll probably add a few multipliers to your total score the next time.

Calendar of Events

May 18-19	Baltic DX Contest
May 25-26	**CQ WW WPX CW Contest**
June 1-2	WW South American CW Contest
June 1-2	ANARTS WW RTTY Contest
June 8-9	RSGB Jubilee Contest
June 15	Kid's Day Event
June 15-16	All Asian CW DX Contest
June 15-16	West Virginia QSO Party
June 23-24	ARRL Field Day
June 23-24	King of Spain Contest
July 1	RAC Canada Day Contest
July 6-7	Venezuela Independence SSB Contest
July 13-14	IARU HF Championship/ WRTC 2002
July 20-21	**CQ WW VHF Contest**
July 20-21	North American RTTY QSO Party
July 27-28	IOTA Contest

A bit of a curious title for this month's column? Well, there is some method to the madness if you hang in there with me.

This past sunspot cycle has been a good ride, hasn't it? In fact, just when we thought the party was over 18 months ago, we got a second bump from the sun that some say was better than the first peak. To be honest, when contemplating the effects of the current solar cycle 18 months ago, I was pretty disappointed. I remembered in previous solar highs when a variety of incredible openings existed to all parts of the world day and night. This time around the conditions seemed lackluster. Sure, 10 meters was open pretty much every day, but the depth and uniqueness of band openings didn't seem to be there. I remember midnight openings to deep Asia on 10 meters in the 1980s and '90s. This time around the band was almost always dead at that time. Then came the bump. We started to see outrageous openings to Europe and Asia on 15 and 10 meters. I was working YBØ's at 0200Z on 10 meters. This is what ham radio is supposed to be!

Not unlike most good times, however, it appears that we're finally seeing the mortality of this solar cycle. Yes, there still is the occasional freakish evening long-path opening to 8Q7 on 10 meters at 0400Z, but we're now starting to see some days where 10 meters barely opens to Europe at all from the U.S. Put another way, contest compression is beginning another cycle.

What is contest compression? It's the phenomenon where contesters move closer together in frequency usage as conditions deteriorate. It's when 10 meters is closed for DX and everyone moves to 15. It's when 10 and 15 meters are essentially dead and everyone moves to 20 meters. Its ultimate rendition is when this happens on a phone contest weekend. Thousands of hams are all vying for a sliver of a very crowded band, most failing to land a spot of their own due to someone's larger antennas and more advantageous location.

As our more experienced contest operators will say, "This is not a new situation." One of the unique characteristics of contesting is that activity is always defined by the available bandwidth that exists within a particular part of the solar cycle. Put another way, on a major contest weekend you'll never find a wide-open band that has little or no activity.

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e-mail: <K1AR@contesting.com>

The reality is that we are going to go through some pain over next few years. It's going to start this fall as we discover 10 meters isn't quite its normal self. In the following year more of us will be spending (or trying to spend) our time up on 15 and 20 meters. Finally, 15 meter openings will be a distant memory and we'll all become friends on 20 meters. Lest we become totally depressed, contesting has been through this before, and we've come out of it with more activity than ever. Will we this time?

Contest Marketing

This is where contest marketing comes into play. One of my questions in this year's *CQ* Contest Survey (see "Final Comments" at the end of this column) has to do with the importance of contest marketing in recruiting newcomers and maintaining interest in contesting for all. Years ago, the American Radio Relay League introduced a ground-breaking program for their Sweepstakes contest—simply offering a coffee mug to any competitor who worked each ARRL section in the contest. The response was incredible. Casual operators may not have worked a lot of QSOs, but you can bet they tried to work all sections. Old timers had renewed fire in their bellies as they strove to "get the mug."

The early returns from your survey responses have indicated that "cute" trinkets are not the answer to the doldrums of contesting that many of us expect over the next few years. However, a strong case can be made that we need new incentives to deal with the inevitable frustration that's going to come from a very crowded 20 meter band and very dead 10 and 15 meter segments. The challenges from the pending solar decline are going to be unique in comparison to previous years. We have always benefited after a decline by the support of a well-entrenched group of enthusiastic contesters ready to pounce on the first European who comes across the pond on 10 meters. This time around we're continuing to age, and while most of us hopefully will still be around, the reality is that we will need the help of new contesters in seven or eight years; it's that simple.

It is my contention that while contest marketing is generally a hokey concept, when used correctly and with the right objectives it can be an effective tool in recruiting new contest operators and maintaining the interest level within our existing corps. Here are some examples:

- Participation awards for xxx contacts in a contest.
- Special recognition awards for targeted accomplishments (e.g., working all zones on a single band, DXCC in a single weekend, etc.).
- Little-pistol awards (criterion to be defined).
- Newcomer awards.

Defining the actual "deliverable" as a paper award, mug, T-shirt, or the keys to a new Jaguar is relatively immaterial. The key is that we need to seize the moment and rise to the challenge today, being prepared to respond when times get tough.

Now I know I'm asking a lot of a system that's already stressed by the burdens of contest log checking, costs, and other factors. However, I've seen over and over again that there are many volunteers willing to help if the plea for assistance is made.Also, with the ability of the internet to widely broadcast needs of this ilk and do so with great speed, there's really no excuse. If you're interested in helping, I'd like to challenge you to direct your energy towards those who can benefit from it. Drop me a line and let me know.

It seems ironic that as we become bandwidth challenged over the next few years, we would want to develop programs that increase activity. My view is that we're not simply increasing activity, but also interest from the casual operator as well. There's no way to lose when the passion we have for contesting is shared with others—sunspots or no sunspots!

Final Comments

As a reminder, you are encouraged to submit your responses to my 2002 *CQ* Contest Survey published in the May issue. In case you missed it, you can find the questions and submit your responses via the internet at <http://hamgallery.com/survey>. I've received well over 1000 responses to date.

Also, for those of you who are not aware of it, *CQ* has been publishing links to most major contest sponsor websites via its own site at <http://www.cq-amateur-radio.com>. Check it out for the latest contest rules and other information. See you next month!

73, John, K1AR

Awards

BY TED MELINOSKY, K1BV

News Of Certificate And Award Collecting

This month I first want to go over the USA-CA rule regarding the altering of QSL cards. Rule B.3 of the rules says, "Any QSL card found to be altered in any way disqualifies the applicant."

That's pretty strong medicine, and to reassure you, this means that the penalty for the alteration applies only when it was performed by the person requesting the award. It does not apply to the label or card that the station you worked happened to paste over his old callsign, or if the station wrote over the old call with his new one. It also does not apply to stations you worked who were portable or mobile at the time and who wrote in the location and county in their handwriting on the face of the card, nor does this apply to those stations who paste a new address label over their old address.

The rule applies to you if you deliberately imitate the writing of the mobile and add a few needed counties to the mobile reply card (MRC) you receive. That is clearly wrong, but chances are you probably will get away with it. You also will know that the award and recognition you receive is unearned. Last, you will be in a definite minority. In the three years I've been doing this job, I've found county hunters to be super honest.

Enough of this, though. Just do the right thing!

"Finishing the Puzzle"

This month we hear from Richard Weil, KWØU, USA-CA All Counties #1038, February 25, 2002.

Early on amateur radio was part of my life. We had a neighbor whose voice got on our TV, and I found it interesting to watch him operate at his station. The idea of talking around the world seemed amazing. Later when my father got a shortwave receiver, I spent hours listening to distant stations.

With school, marriage, and a career, I didn't become licensed until I was in my mid-20s and then wasn't on the air for years. After the thrill of actually getting a Heathkit's signal across town on 15 meters CW, I started teaching at a college that had a decent antenna and a Drake TR-7. Trying to work all states, I stumbled across a group of people who seemed to be everywhere in the U.S. After a few hesitant tries, I learned enough to join in the fun. The WAS Award came really fast, and by then I was hooked.

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e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

Jeff Reinhardt, AA6JR
USA-CA All Counties #1039
March 4, 2002

David Kustra, N7LYR
USA-CA All Counties #1040
March 22, 2002

With 151 counties confirmed, we moved to the Minneapolis area, where I got a 1963-vintage Yaesu rig and a low-slung dipole that only worked on 20 meters. Making a virtue out of necessity, I stayed on that band, and before the rig wore out I ran the total number of counties past 1000.

By this time I had put up a U.S. counties map, and I filled in each county as it was confirmed. As a professional photographer, it was fascinating to watch the dark areas crawl across the country. County hunters are an independent lot, and all sorts of odd spots were contacted. The map was like a giant jigsaw puzzle recording the travels of many participants. If there were annoying white spots that hung on for years, it just made it more of a challenge.

Moving up to '70s technology with a Kenwood 820S bought from a net member (wow—digital readout!), it was time to buckle down. Several years later that rig died. Now the total was around 2500 counties, 220 countries, and 1300 prefixes. The next upgrade was to a Kenwood 830. Becoming busier at work slowed down the hunt, and at 2800 counties, getting them all seemed impossible. Getting them all on 20 meters phone with 100 watts and a dipole seemed ridiculous.

USA-CA Honor Roll

500

WA2JIM	3184
PY2DBU	3185
SM4AIO	3186
AA6JR	3187
CU3EJ	3188
F6ACV	3189
KB9KOA	3190

1000

PY2DBU	1591
SM4AIO	1592
AA6JR	1593

1500

AA6JR	1331
KA4NZG	1332

2000

AA6JR	1230

2500

AA6JR	1151

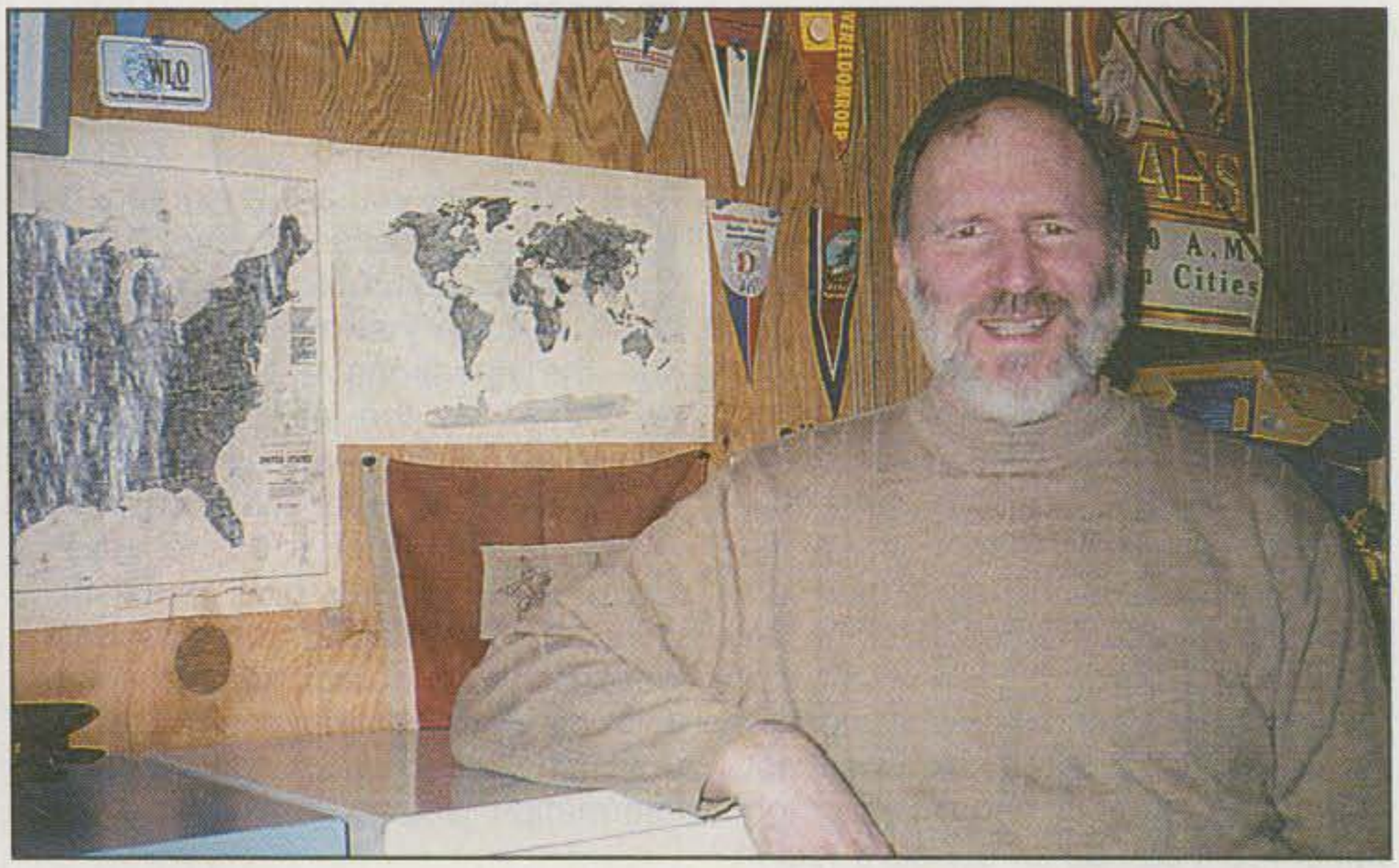
3000

K4HBH	1060
AA6JR	1061
N7LYR	1062

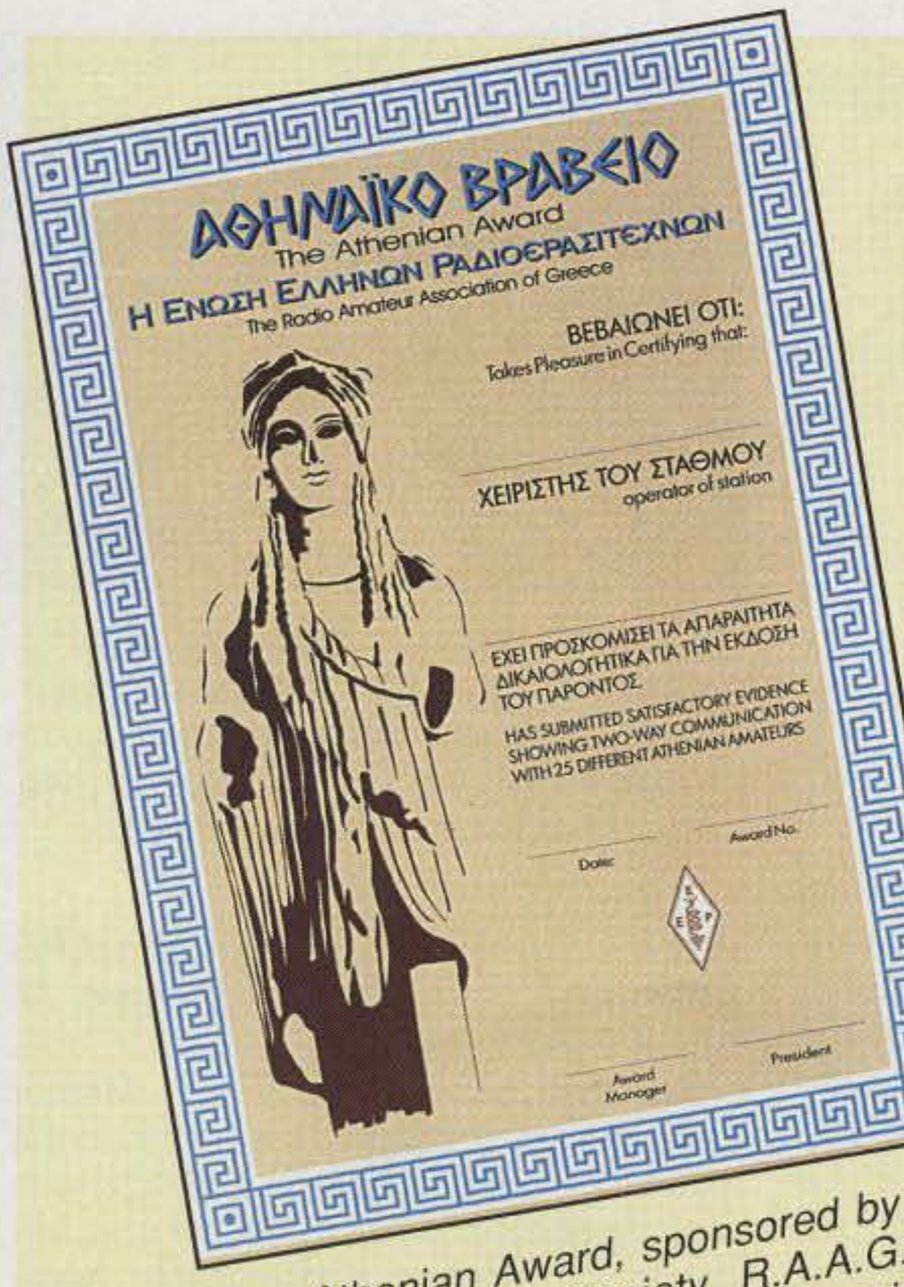
The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application 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, 65 Glebe Road, Spofford, NH 03462-4411 USA. DX stations must include extra postage for airmail reply.

Then something funny happened. The counties started popping up in bunches. I figured that everything within a 1000 km radius of the station was going to be chancy, but sometimes for days or weeks short skip was great, while at other times it was workable minimums. Suddenly the total was hanging at 3000.

There's an old saying that the last 10 percent of a project takes as long as the other 90 percent. For county hunting that sure



Richard Weil, KWØU, USA-CA All Counties #1038.



The Athenian Award, sponsored by the Greek National Society R.A.A.G., is issued for contacts with 25 stations in the Athens area.

Work and confirm ten stations in at least three groups of the Greek islands as listed in the text to earn the Greek Islands Award. ←

Contacts with at least seven Greek stations from any of the nine call areas, SV1 to SV9, are required for the R.A.A.G. Award. →

The Alexander The Great Award may be earned by amateurs or SWLs who have confirmed contacts with countries crossed by Alexander The Great. →

seemed true! Slowly though, one by one, the number needed dropped. The last dozen took a year. I posted the final three on the forum at K3IMC's website. Several people replied, offering to drive across entire states just to put them out. Jerry, WØGXQ, got me my last two on the Lincoln-Pipestone, Minnesota line. It was late, with static from a coming storm, but we did it.

Throughout this journey it was the members of the net who made it worthwhile. Nearly 90 percent of all my county contacts were with mobiles, which meant meeting hundreds of people. My one regret is that I was never able to join them on the road. However, their general level of friendliness, their help with the tough ones, and the outpouring of assistance at the end were wonderful. All of this says a lot about these folks, and I want to thank them all.

When I first heard my neighbor's CQing, I thought of amateur radio as a solitary endeavor. In some ways it is. We sit alone and talk to people far away, most of whom we'll never meet. At the same time, though, you can be part of a group, such as the county hunters, and they can be the best of companions. *—73, Richard, KWØU*

The R.A.A.G. Awards Series

Here is the awards program of the Greek National Society, the R.A.A.G. Greek stations are not as prevalent as other European stations, but they are generally workable in contests and for regular QSOs if you keep your ear tuned for their distinctive prefixes. Each summer you will find stations operating from vacation QTHs on the many Greek islands, as well as providing the rare SV7, SV8, and SV9 prefixes.

General Requirements: The fee for each award is $US5, or 10 IRCs. Endorsements are 4 IRCs. Apply to: R.A.A.G., Award Manager, P.O. Box 3564, 10210 Athens, Greece. Awards are issued for SSB and CW, mixed or single mode.

Athenian Award. Issued for contacts with 25 stations in the Athens area of Greece, for each mode, in the following three classes:

1st class—QSOs on 160 and 80 meters
2nd class—QSOs on 40 and 30 meters
3rd class—QSOs on other bands

Endorsement stickers for each 25 new contacts.

Greek Islands Award. Work and confirm ten stations in at least three groups of the Greek islands as listed:

1. Crete
2. Dodecanese
3. Ionian
4. Cyclades
5. Sporades
6. Euboea
7. Lesbos
8. Khios
9. Thasos-Samothraki
10. Ikaria-Limnos

Mixed mode or single band endorsement stickers for every ten different islands.

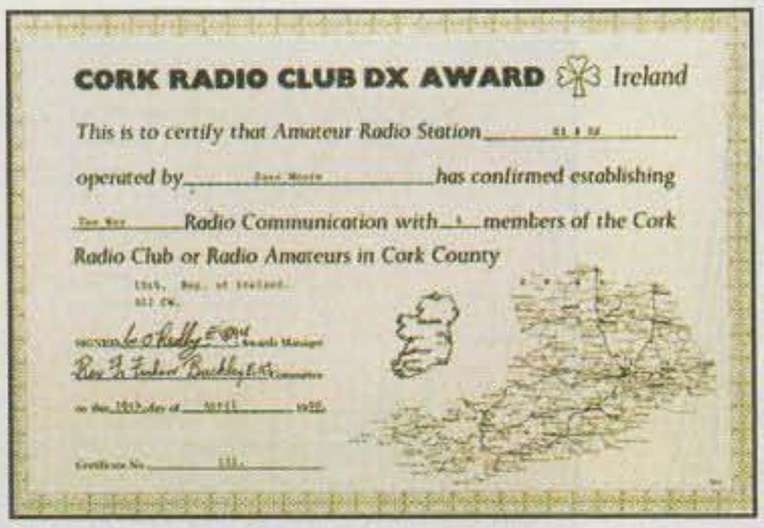
R.A.A.G. Award. Contacts with stations located in Greece after 1 January 1975. Submit a verified list of contacts with at least seven Greek stations from any of the nine call areas, SV1 to SV9. No band or mode limitations.

Alexander The Great Award. This award may be earned by amateurs or SWLs who have confirmed contacts with countries crossed by Alexander The Great. One contact from each country is needed, except two must be with Greece, and one of these must be with an SV2 call area of Macedonia. Contacts must be after 1 January 1958. This award may be endorsed for CW, SSB, RTTY, or mixed modes. It is available in two levels:

1. Contacts with 15 countries (SV2 and SV/SV5 required). Fee is 5 IRCs.

2. Contacts with all of the countries listed below. Fee is 25 IRCs.

Prefixes of countries valid for the Alexander The Great Award: SV Greece, SV2 Macedonia, SV2/A Mt. Athos, SV5 Dodecanese, ZA Albania, Z3 Fyrom/Macedonia, LZ Bulgaria, VU India, 4K Azerbaijan, E4 Palestine, TA Turkey, YK Syria, 4X Israel, OD Lebanon, SU Egypt, 5A Libya, YI Iraq, EP Iran, AP Pakistan, YA Afghanistan, EZ Turkmenistan, EY Tajikistan, UJ Uzbekistan, JY Jordan, and EK Armenia.



To earn the Cork Radio Club DX Award contact members of the club or EI stations in County Cork.

The GMS Master Operator Award, sponsored by the Georgia Mafiar Society, requires the applicant to have earned other challenging awards (see text) before applying for this one.

Cork Radio Club DX Award

Last month's column went to press before we could add one more award from Ireland, kindly provided by John, EI7GL. The artwork for this one may not reproduce very well here in the column, because the basic color is, yes, as you might have guessed, light green. It's been around for a while, and the requirements and cost both are moderate, so get out those EI cards and look for Cork Radio Club members!

Contact members of the Cork RC or EI stations in County Cork as follows: DX stations need two contacts, Europeans need three contacts, and EI/GI stations need four.

All bands and modes. SWL okay. Available for VHF contacts via the Cork repeater from outside of a 250 mile radius. Endorsements for mode or band upon request. Send GCR list and fee of 6 IRCs, or $US4, for DX stations; fee for EIs is two punts (postal order), and £2 for G stations. Apply to: Awards Manager, Frank Mason, EI6EVB, 27 Dundanion Court, Blackrock Road, Blackrock, County Cork, Ireland.

Rules are also on the web: <http://www.club.ie/wai/ei-giawards.htm>.

GMS Master Operator Award

Here's a U.S.-based award to add to your radio achievements in earning an interesting selection of some fairly challenging awards out there.

The award is issued to those amateurs who meet the following established criteria. The applicant must submit photocopies of the following awards earned:

1. ARRL awards, both VUCC and DXCC;

2. *CQ*'s WAZ award; and

3. At least one of the following international awards: The Maple Leaf Award, Council of Europe Award "First Class," DL EWWA Award, Australian WA VK CA Award, Hong Kong ARS Catch 22 Award, Holy Land Award, All Africa Award.

Applications for the GMS Master Operator Award should be sent to to the following address (include an SASE with your application). Instructions and further information are also available. Apply to: T. Lowe, Historian GMS, 490 Sandpiper Rd., Richmond Hill, GA 31324 (e-mail: <trustee@gamafiar.com>).

URL of the Month

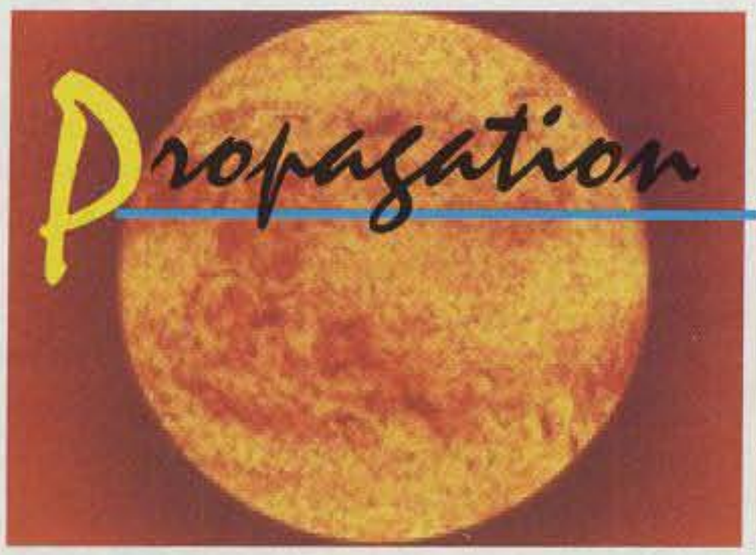
The Activity Group Wolfsburg Gifhorn (Germany) advertises its very large collection of awards at their internet site <http://awg.ath.cx/>. The fees are modest, and I can't suspect them of financing beer-hall meetings with certificate profits! They must have a brainstorming session after every club meeting to come up with more ideas for certificates and plaques.

If you or your club is having a hard time coming up with ideas, just reading about this group's eclectic collection will surely spur your collective imaginations. When you do develop or expand an awards program, be sure to let me know about it. Publicity is the key to a successful program.

73, Ted, K1BV

Job Description of the Ideal Awards Custodian

- Replies to all applications within a few days—or less.
- Enjoys the detailed work that goes with the task.
- Reports to the club or group on a regular basis.
- Changes rules pertaining to requirements and fees as needed.
- Ships certificates with sufficient protection against bending or other damage.
- Actively promotes the award program.



Propagation

BY TOMAS HOOD, NW7US

The Science Of Predicting Radio Conditions

What are Those Spots on the Sun?

Each month this column has a report on the smoothed sunspot number for the current sunspot cycle. What are those spots? Why do we keep watching the sun for them, and how do they affect radio propagation?

Sunspots are magnetic regions on the sun with magnetic field strengths thousands of times stronger than the Earth's magnetic field. Plasma flows in these magnetic field lines of the sun. Sunspots appear as dark spots on the surface of the sun. Temperatures in the dark centers of sunspots (the *umbra*) drop to about 3700 K, compared to 5700 K for the surrounding photosphere. This difference in temperatures makes the spots appear darker than elsewhere. Sunspots typically last for several days, although very large ones may live for several weeks. They are seen to rotate around the sun, since they are on the surface, and the sun rotates fully every 27.5 days.

Sunspots usually form in groups containing two sets of spots. One set will have a positive, or north, magnetic field, while the other set will have a negative, or south, magnetic field. The magnetic field is strongest in the darker parts of the sunspot. The field is weaker and more horizontal in the lighter part (the *penumbra*).

Galileo Galilei made the first European observations of sunspots in 1610. The Chinese and many other early civilizations have records of sunspots dating even earlier. Daily sunspot observations were started at the Zurich Observatory in 1749. By 1849, continuous sunspot observations were recorded.

The sunspot number is calculated by first counting the number of sunspot groups and then the number of individual sunspots. The *sunspot number* is then given by the sum of the number of individual sunspots and ten times the number of groups. Since most sunspot groups have, on average, about ten spots, this formula for counting sunspots gives reliable numbers even when the conditions of observation are less than ideal and small spots are hard to see. Monthly averages (updated each month) of the sunspot numbers show that the number of sunspots visible on the sun waxes and wanes with an approximate 11-year cycle.

Sunspot numbers give us a way to measure the sun's overall activity. The more active the sun, the higher the sunspot count. Scientists have studied the correlation between the sun's activity and the resulting events (such as a solar flare, or a coronal mass ejection [CME]), and our ionosphere and geomagnetic field activities. The sun directly influences the Earth's environment. By keeping a close record of the sunspot number and the overall propagation conditions, scientists have developed models that help us forecast HF openings on any given path.

Sunspots do not give us specific daily insight into the condition of our ionosphere and geomagnetic field. We also watch and forecast flares, coronal holes, coronal mass ejections, plasma streams, and other phenomena. Next month we'll take a look at solar flares.

P.O. Box 213, Brinnon, WA 98320-0213
e-mail: <cq-prop-man@hfradio.org>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for June 2002

	Expected Signal Quality			
Propagation Index.....	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 2, 15, 17, 27, 29	A	A	B	C
High Normal: 1, 3-4, 10-13, 18-19, 25-26, 28, 30	A	B	C	C-D
Low Normal: 5-8, 16, 21, 23-24	B	C-B	C-D	D-E
Below Normal: 9, 20, 22	C	C-D	D-E	E
Disturbed: 14	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.

2. With the *propagation index,* use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be good (B) on June 1st, excellent (A) on the 2nd, good (B) on the 3rd and 4th, fair to good (C-B) on the 5th through the 8th, etc.

Solar Activity

The World Data Center for the Sunspot Index (Belgium) reports a monthly observed mean sunspot number of 98.1 for March 2002, down from 108 for February. The 10.7 cm monthly observed mean solar flux for March 2002 is 179.5, down from 205.1. The observed monthly mean *Ap*-index for March is 10, up one point from an *Ap* of 9 for February 2002. The sunspot low for the month was 74 on March 9, and the high of 125 occurred on March 31.

The daily and weekly swing in solar activity still peaks somewhat higher than 200 at times, and has done so especially during the last few months. Both the sunspot count and the 10.7 cm solar flux index dive down at times, only to climb again to moderately good levels. The monthly smoothed average tells us the trend, but does not reveal the exciting bursts of activity that trigger great propagation conditions. While the cycle is gradually declining, high solar activity, and the resulting good to excellent propagation conditions, is still commonplace. June conditions will be generally good to excellent, barring solar events and geomagnetic storms.

Expect a smoothed sunspot level of about 101 and a 10.7 cm solar flux of about 170 for June 2002. The geomagnetic planetary *A*-index (*Ap*) will be higher, as we are in the summer season in the Northern Hemisphere. Aurora could occur at least once during June. Look at the Last-Minute Forecast for days with Below Normal or Disturbed conditions, when moderate to severe storminess might degrade signals. Since the sunspot cycle is still very much active, expect occasional CME and X-ray events.

June Propagation

June marks the changeover from equinoctial to summertime propagation con-

ditions on the shortwave (HF) bands. Solar absorption is expected to be at seasonally high levels, resulting in generally weaker signals during the hours of daylight when compared to reception during the winter and spring months.

Ten meter propagation to DX locations east and west is a rare event during the peak of summer. North and south paths on 10 meters may still be hot, especially around sunrise and sunset. Seventeen meters will be just a bit more reliable than 10, but 15 meters will show itself to be a hot DX band this summer. There will be times when the nighttime openings on 15 meters disappear as the solar flux dips lower. Watch for days when the flux peaks high. During those peaks 15 meters may support excellent European/USSR openings at night and during much of the day. Twenty meters will be excellent during the hours of darkness, but a bit weaker during daylight hours. The best openings on 20 will be found in the hours around sunrise. Maximum usable frequencies (MUFs) during the daytime hours are considerably lower during June and the summer months than during the other seasons. They are considerably higher during the hours of darkness. This changeover should have its greatest impact on the 20 and 15 meter bands.

Watch for major solar-flare activity and CMEs, as we are still in a very active part of Cycle 23. Solar-flare events will generally shut down the high frequencies, starting first with the lower bands (160 to 20 meters). CMEs will cause geomagnetic storminess, degrading higher latitude signal paths more than middle- and low-latitude paths. Thunderstorm noise and other natural static increases considerably during June and the summer months. These higher static levels should be noticeable on all HF bands, especially on 40, 80, and 160.

The 30 and 40 meter bands should offer good DX conditions during the night despite higher static. Look for Europe and Africa as early as sunset. After midnight start looking south and west for the Pacific, South America, and Asia. Short skip should be possible out to about 750 miles during the daytime.

Expect some openings on 80, similar to how 40 meters will be acting. Fairly frequent short-skip openings up to 1000 miles are possible during darkness, but expect very few daytime openings with all the static and absorption.

Sporadic-*E* propagation peaks during June and the summer months. Expect an increase in the number of short-skip openings on HF, and often on 6 and 2 meters, with paths open between 50 and 2300 miles.

VHF Conditions

The summertime sporadic-*E* (E_s) season for the Northern Hemisphere begins in force in May. Within the normal *E*-layer region of the ionosphere, regions of abnormally intense ionization are formed. We do not yet understand why these form, but we do know a lot about how they behave.

During the late spring and summer months a sharp increase of E_s propagation at mid-latitude occurs. Through June, you can expect to see 20 to 24 days with some E_s activity. Usually these openings are single-hop events with paths up to 1000 miles, but June's E_s openings are often double-hop. Europe generally can be worked from the east coast throughout June. Signals will be weaker than *F2* signals, but with so many more stations on the air, these E_s openings will be more utilized.

Solar activity continues to be high enough to support occasional *F*-layer DX openings. During the daylight hours, monitor 6 meters for transcontinental openings, as well as openings between Hawaii and the western states, and the Caribbean and Central and South America. The best time to look for these openings is during the afternoon hours, especially when conditions are High Normal or better.

Three minor meteor showers are expected during June. These are more significant as radio events than visual ones. The *Arietids* will peak on June 7 at 1600Z. The *zeta-Perseids* will peak on June 9 at 1600Z. The *beta-Taurids* will peak on June 28 at 1500Z. Signs of most of these peaks were found in radio data from 1994–2000, although some are difficult to define because of their proximity to other sources, while the *Arietid* and *zeta-Perseid* maxima tend to blend into one another, producing a strong radio signature for several days in early June. There is a slight possibility for *June Lyrids* to peak on June 16, but this is uncertain. For more information, take a look at <http://www.imo.net/calendar/>, and check N6CL's "VHF Plus" column in this issue.

There is usually a seasonal decline in transequatorial propagation (TE) during the summer months, but some 6 meter openings may still be possible during June. The best time to catch an opening across the geomagnetic equator is between 8 and 11 PM local daylight time.

With Cycle 23 still at the peak of activity, there is a chance of occasional aurora activity. Check the Last-Minute Forecast for days when conditions are Below Normal or Disturbed. Don't forget that you can also visit my propagation page, <http://propagation.hfradio.org/> to view current conditions, including aurora activity.

Field Day

It is that time again, when we grab tents, tables, batteries, generators, and if we are not very forgetful, some radio gear, and we head out to a park or other remote location to practice our emergency communications skills. We pick some trees, or perhaps raise a small tower or mast kit, and start stringing wire and cable to create some workable antenna system. Those living in the eastern United States try to point their wires in such a way as to favor the Midwest and Southwest, while those located in the western states aim east and south. Midwest operators engineer their antenna systems to be omni-directional. Somewhere scattered about the many Field Day sites are the small, lightweight beams.

This year the Field Day rules allow any station in Region 2 to participate fully in the exciting on-the-air activities.

From Eastern USA to:

Caribbean, Central America, and Northern Countries of South America	10 Meters: 1600 to 1800 15 Meters: 1400 to 2100 20 Meters: 0700 to 1000 1700 to 0300 40/80 Meters: 2300 to 0300 160 Meters: 2200 to 0500
Central and Southern South America	10 Meters: 1700 to 1800 15 Meters: 1700 to 2300 20 Meters: 1900 to 0200 40/80 Meters: 2200 to 0200 160 Meters: 2200 to 0300
Western United States	10 Meters: 1000 to 1400 15 Meters: 1400 to 2000 20 Meters: 1000 to 0100 40/80 Meters: 2100 to 0600 160 Meters: 0100 to 0500
Central United States	10 Meters: 1000 to 1400 15 Meters: 1400 to 2000 20 Meters: 1300 to 2100 40 Meters: 1800 to 2200 80 Meters: 2100 to 0600 160 Meters: 0100 to 0400

From Central USA to:

Caribbean, Central America, and Northern Countries of South America	10 Meters: 1500 to 1700 15 Meters: 1000 to 1200 1400 to 1900 20 Meters: 0700 to 0900 1700 to 0100 40/80 Meters: 2100 to 2300 160 Meters: 2200 to 0400
Central and Southern South America	10 Meters: 1600 to 1800 15 Meters: 1600 to 2200 20 Meters: 1800 to 0100 40/80 Meters: 2200 to 0200 160 Meters: 2000 to 0300
Western and Eastern United States	10 Meters: 1000 to 1400 15 Meters: 1800 to 2000 20 Meters: 1300 to 1900 40 Meters: 1800 to 0900 80 Meters: 2100 to 0600 160 Meters: 0100 to 0400

From Western USA to:

Caribbean, Central America, and Northern Countries of South America	10 Meters: 1400 to 1600 15 Meters: 1000 to 1200 1400 to 1900 20 Meters: 0600 to 0800 1700 to 0100 40/80 Meters: 2200 to 0400 160 Meters: 2300 to 0300
Central and Southern South America	10 Meters: 1600 to 1800 15 Meters: 1600 to 2300 20 Meters: 1800 to 0100 40/80 Meters: 0200 to 0300 160 Meters: 0200 to 0400
Central United States	10 Meters: 1000 to 1400 15 Meters: 1800 to 2000 20 Meters: 1300 to 1900 40 Meters: 1800 to 0900 80 Meters: 2100 to 0600 160 Meters: 0100 to 0400
Eastern United States	10 Meters: 1000 to 1400 15 Meters: 1400 to 2000 20 Meters: 1000 to 0100 40/80 Meters: 2100 to 0600 160 Meters: 0100 to 0500

Fig. 1– Possible openings between various areas in Region 2 for Field Day operation (June 22–23, 2002). Note that times are local.

Therefore, now we must consider antenna patterns that favor South and North American stations from Canada to the southern tip of South America. When should we point our beam south? West? East? Should we choose an omni-directional loop? When should we be looking for Brazil? Ontario? Imagine the number of QSOs we will see in this year's event! If you wish to maximize your on-the-air efforts, you'll want to check out the Last-Minute Forecast and the DX Propagation Charts.

Fig. 1 is a simple chart of possible openings from several areas of Region 2 to other areas in question. These are based on the DX and Short-Skip Charts for this time period, using the forecast smoothed 10.7cm solar flux value of 170 for June. If the flux is higher, conditions will be that much more reliable. If it is lower, then expect less-reliable conditions. Refer to the Short-Skip Charts in last month's column and this month's DX Propagation Charts for more detailed forecasts, using the Last-Minute Forecast if you wish to get specific details of possible openings.

The weekend of Field Day, June 22–23, 2002, will see more geomagnetic storminess and possible flare activity, so the more efficient your antenna system and the higher your antenna gain, the better you will make it through the marginal conditions that are forecast. Plan now!

I'd love to hear from you about your experiences, insights, and studies of propagation. You may e-mail me, write me a letter, or catch me on the HF amateur bands. I am planning on operating mostly CW during Field Day, while others on the team of the Brinnon Amateur Radio School Club will operate the voice modes. I hope to work you during this year's event. See you on the air!

73, Tomas, NW7US

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

June 15 - August 15, 2002
Time Zone: EDT (24-Hour Time)
EASTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	*Nil*	11-16 (1) 16-18 (2) 18-19 (1)	06-09 (2) 09-13 (1) 13-15 (2) 15-17 (3) 17-22 (4) 22-00 (3) 00-03 (2) 03-06 (1)	20-22 (1) 22-23 (2) 23-01 (3) 01-02 (2) 02-03 (1) 22-00 (1)* 00-01 (2)* 01-02 (1)*
Northern Europe & European CIS	*Nil*	14-18 (1)	09-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-23 (3) 23-02 (2) 02-07 (1) 07-09 (2)	21-22 (1) 22-00 (2) 00-02 (1) 21-00 (1)*
Eastern Mediter-anean & Middle East	*Nil*	11-16 (1) 16-18 (2) 18-19 (1)	12-14 (1) 14-17 (2) 17-19 (3) 19-23 (4) 23-01 (3) 01-03 (2) 03-06 (1) 06-08 (2) 08-09 (1)	20-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Western Africa	16-18 (1)	10-12 (1) 12-14 (2) 14-15 (3) 15-17 (4) 17-19 (3) 19-20 (2) 20-22 (1)	03-07 (1) 07-09 (2) 09-15 (1) 15-16 (2) 16-17 (3) 17-23 (4) 23-01 (3) 01-03 (2)	20-22 (1) 22-02 (2) 00-02 (1) 22-00 (1)*
Eastern & Central Africa	16-17 (1)	11-14 (1) 14-15 (2) 15-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-21 (4) 21-23 (3) 23-02 (2) 02-06 (1)	21-00 (1)
Southern Africa	10-13 (1)	09-11 (1) 11-12 (2) 12-13 (3) 13-14 (2) 14-15 (1)	00-01 (1) 01-05 (2) 05-07 (1) 15-16 (1) 16-18 (2) 18-19 (1)	21-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)*

Central & South Asia	*Nil*	10-12 (1) 19-22 (1)	17-20 (1) 20-23 (2) 23-03 (1) 06-09 (1)	19-21 (1)
Southeast Asia	*Nil*	10-12 (1) 19-21 (1)	19-21 (2) 21-23 (1) 23-01 (2) 01-02 (1) 06-07 (1) 07-09 (2) 09-11 (1)	*Nil*
Far East	*Nil*	10-12 (1) 17-18 (1) 18-20 (2) 20-21 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-12 (1) 19-20 (1) 20-23 (2) 23-00 (1)	*Nil*
South Pacific & New Zealand	18-21 (1)	15-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	18-21 (1) 21-23 (2) 23-01 (3) 01-03 (4) 03-04 (3) 04-07 (2) 07-09 (3) 09-10 (2) 10-12 (1)	01-03 (1) 03-06 (2) 06-08 (1) 04-06 (1)*
Austral-asia	18-20 (1)	10-12 (1) 18-19 (1) 19-20 (2) 20-21 (3) 21-22 (2) 22-23 (1)	23-01 (1) 01-02 (2) 02-04 (3) 04-05 (2) 05-07 (1) 07-09 (2) 09-10 (1) 16-18 (1)	03-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)*
Caribbean, Central America & Northern Countries of South America	09-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	08-09 (1) 09-11 (2) 11-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	07-10 (4) 10-16 (3) 16-00 (4) 00-03 (3) 03-06 (2) 06-07 (3)	19-21 (1) 21-23 (2) 23-03 (3) 03-05 (2) 05-06 (1) 22-23 (1)* 23-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-14 (1) 14-16 (2) 16-18 (3) 18-19 (1)	08-09 (1) 09-11 (2) 11-15 (1) 15-16 (2) 16-17 (3) 17-20 (4) 20-22 (3) 22-23 (2)	11-16 (1) 16-17 (2) 17-18 (3) 18-02 (4) 02-04 (3) 04-07 (2) 07-09 (3) 09-11 (2)	20-21 (1) 21-22 (2) 22-02 (3) 02-04 (2) 04-05 (1) 22-03 (1)*
McMurdo Sound, Antarctica	*Nil*	16-20 (1)	17-19 (1) 19-23 (2) 23-01 (3) 01-03 (2) 03-05 (1) 07-09 (1)	02-05 (1)

Time Zones: CDT & MDT (24-Hour Time) CENTRAL USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	*Nil*	15-18 (1)	05-06 (1) 06-08 (2) 08-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-22 (3) 22-00 (2) 00-02 (1)	20-23 (1) 23-01 (2) 01-02 (1) 22-00 (1)*
Northern Europe & European CIS	*Nil*	13-17 (1)	05-06 (1) 06-09 (2) 09-15 (1) 15-18 (2) 18-21 (3) 21-00 (2) 00-01 (1)	20-00 (1)
Eastern Mediter-ranean & Middle East	*Nil*	15-18 (1)	13-16 (1) 16-18 (2) 18-22 (3) 22-00 (2) 00-01 (1) 07-09 (1)	21-23 (1)
Western Africa	16-18 (1)	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	14-15 (1) 15-16 (2) 16-18 (3) 18-21 (4) 21-23 (3) 23-01 (2) 01-03 (1)	20-00 (1) 22-00 (1)*
Eastern & Central Africa	16-18 (1)	13-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	15-17 (1) 17-18 (2) 18-21 (3) 21-23 (2) 23-01 (1)	20-23 (1)
Southern Africa	10-12 (1)	09-10 (1) 10-12 (2) 12-13 (1)	22-00 (1) 00-03 (2) 03-07 (1) 13-15 (1) 15-17 (2) 17-19 (1)	21-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Central & South Asia	*Nil*	10-12 (1) 18-21 (1)	17-19 (1) 19-22 (2) 22-03 (1) 05-07 (1) 07-09 (2) 09-10 (1)	*Nil*
Southeast Asia	*Nil*	10-12 (1) 19-22 (1)	04-07 (1) 07-09 (2) 09-10 (1) 22-23 (1) 23-01 (2) 01-02 (1)	03-05 (1)
Far East	*Nil*	10-15 (1) 18-20 (1) 20-22 (2) 22-23 (1)	05-07 (2) 07-09 (3) 09-10 (2) 10-12 (1) 20-22 (1) 22-00 (2) 00-02 (3) 02-03 (2) 03-05 (1)	04-05 (1) 05-06 (2) 06-07 (1) 04-06 (1)*
South Pacific & New Zealand	18-20 (1)	13-16 (1) 16-18 (2) 18-20 (3) 20-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	17-19 (1) 19-23 (2) 23-01 (4) 01-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-13 (1)	23-01 (1) 01-03 (2) 03-05 (3) 05-07 (2) 07-08 (1) 01-04 (1)* 04-06 (2)* 06-07 (1)*
Austral-Asia	17-20 (1)	14-15 (1) 15-17 (2) 17-19 (1) 19-20 (1) 20-21 (3) 21-22 (2) 22-23 (1)	22-00 (1) 00-01 (2) 01-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-12 (1)	01-03 (1) 03-07 (2) 07-08 (1) 03-06 (1)*
Caribbean, Central America & Northern Countries of South America	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-09 (1) 09-10 (2) 10-11 (3) 11-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	02-05 (2) 05-07 (3) 07-10 (4) 10-11 (3) 11-13 (2) 13-16 (3) 16-22 (4) 22-02 (3)	19-20 (1) 20-23 (4) 23-00 (3) 00-03 (2) 03-05 (3) 05-06 (1) 20-21 (1)* 21-23 (2)* 23-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-14 (1) 14-16 (2) 16-19 (4) 19-20 (3) 20-22 (2) 22-23 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-23 (4) 23-02 (3) 02-05 (1) 05-07 (2) 07-10 (1)	20-21 (1) 21-22 (2) 22-02 (3) 02-03 (2) 03-05 (1) 20-03 (1)*
McMurdo Sound	*Nil*	15-16 (1) 16-19 (2) 19-21 (1)	17-19 (1) 19-23 (2) 23-01 (3) 01-03 (2) 03-05 (1) 07-09 (1)	03-06 (1)

Time Zone: PDT (24-Hour Time) WESTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	*Nil*	09-11 (1) 15-17 (1)	05-06 (1) 06-08 (2) 08-15 (1) 15-21 (3) 21-23 (2) 23-03 (1)	20-23 (1)
Northern Europe & European CIS	*Nil*	14-16 (1)	00-06 (1) 06-08 (2) 08-10 (1) 13-16 (1) 16-20 (2) 20-22 (3) 22-00 (2)	20-22 (1)
Eastern Mediter-ranean & Middle East	*Nil*	13-15 (1)	14-16 (1) 16-20 (2) 20-22 (3)	20-21 (1)
Western Africa	16-18 (1)	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	13-15 (1) 15-16 (2) 16-18 (3) 18-21 (4) 21-23 (3) 23-01 (2) 01-03 (1)	20-00 (1) 22-00 (1)*
Eastern & Central Africa	16-18 (1)	13-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	15-17 (1) 17-18 (2) 18-21 (3) 21-23 (2) 23-01 (1)	20-23 (1)
Southern Africa	10-12 (1)	09-10 (1) 10-12 (2) 12-13 (1)	22-00 (1) 00-03 (2) 03-07 (1) 13-15 (1) 15-17 (2) 17-19 (1)	21-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Central & South Asia	*Nil*	10-12 (1) 18-21 (1)	17-19 (1) 19-22 (2) 22-03 (1) 05-07 (1) 07-09 (2) 09-10 (1)	*Nil*
Southeast Asia	*Nil*	10-12 (1) 19-22 (1)	04-07 (1) 07-09 (2) 09-10 (1) 22-23 (1) 23-01 (2) 01-02 (1)	03-05 (1)
Far East	*Nil*	10-15 (1) 18-20 (1) 20-22 (2) 22-23 (1)	05-07 (2) 07-09 (3) 09-10 (2) 10-12 (1) 20-22 (1) 22-00 (2) 00-02 (3) 02-03 (2) 03-05 (1)	04-05 (1) 05-06 (2) 06-07 (1) 04-06 (1)*
South Pacific & New Zealand	18-20 (1)	13-16 (1) 16-18 (2) 18-20 (3) 20-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	17-19 (1) 19-23 (2) 23-01 (4) 01-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-13 (1)	23-01 (1) 01-03 (2) 03-05 (3) 05-07 (2) 07-08 (1) 01-04 (1)* 04-06 (2)* 06-07 (1)*
Austral-Asia	17-20 (1)	14-15 (1) 15-17 (2) 17-19 (1) 19-20 (1) 20-21 (3) 21-22 (2) 22-23 (1)	22-00 (1) 00-01 (2) 01-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-12 (1)	01-03 (1) 03-07 (2) 07-08 (1) 03-06 (1)*
Caribbean, Central America & Northern Countries of South America	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-09 (1) 09-10 (2) 10-11 (3) 11-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	02-05 (2) 05-07 (3) 07-10 (4) 10-11 (3) 11-13 (2) 13-16 (3) 16-22 (4) 22-02 (3)	19-20 (1) 20-23 (4) 23-00 (3) 00-03 (2) 03-05 (3) 05-06 (1) 20-21 (1)* 21-23 (2)* 23-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-14 (1) 14-16 (2) 16-19 (4) 19-20 (3) 20-22 (2) 22-23 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-23 (4) 23-02 (3) 02-05 (1) 05-07 (2) 07-10 (1)	20-21 (1) 21-22 (2) 22-02 (3) 02-03 (2) 03-05 (1) 20-03 (1)*
McMurdo Sound	*Nil*	15-16 (1) 16-19 (2) 19-21 (1)	17-19 (1) 19-23 (2) 23-01 (3) 01-03 (2) 03-05 (1) 07-09 (1)	03-06 (1)
Middle East			22-23 (2) 23-00 (1) 06-08 (1)	
Western & Central Africa	14-16 (1)	07-09 (1) 11-13 (1) 13-17 (2) 17-18 (1)	14-16 (1) 16-18 (2) 18-20 (3) 20-21 (4) 21-23 (3) 23-03 (2) 03-04 (1) 07-09 (1)	20-22 (1)
Eastern Africa	*Nil*	13-16 (1)	16-19 (1) 19-22 (2) 22-00 (1)	*Nil*
Southern Africa	09-11 (1)	09-10 (1) 10-12 (2) 12-13 (1)	15-17 (1) 22-23 (1) 23-01 (2) 01-03 (1) 06-08 (1)	20-23 (1)
Central & South Asia	*Nil*	10-12 (1) 19-21 (1)	05-07 (1) 07-09 (2) 09-11 (1) 16-19 (1) 21-23 (2) 23-01 (2) 01-02 (1)	05-07 (1) 19-20 (1)
Southeast Asia	*Nil*	10-12 (1) 19-21 (1)	23-01 (1) 01-03 (2) 03-06 (3) 06-07 (2) 07-10 (1) 16-19 (1)	02-06 (1)
Far East	*Nil*	13-15 (1) 15-17 (2) 17-18 (2) 18-19 (2) 19-20 (1)	19-21 (1) 21-23 (2) 23-02 (3) 02-04 (4) 04-07 (2) 07-09 (3) 09-11 (2) 11-13 (1)	01-02 (1) 02-03 (2) 03-05 (3) 05-06 (2) 06-07 (1) 03-05 (1)*
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Austral-Asia	15-17 (1) 17-20 (2) 20-21 (1)	13-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	20-22 (1) 22-23 (2) 23-00 (3) 00-03 (4) 03-05 (3) 05-06 (2) 06-08 (3) 08-09 (2) 09-13 (1) 13-15 (2) 15-17 (1)	22-00 (1) 00-01 (2) 01-05 (3) 05-06 (2) 06-08 (1) 01-04 (1)*
Caribbean, Central, America & Northern Countries of South America	09-11 (1) 11-13 (2) 13-15 (1) 15-17 (2) 17-18 (1)	09-11 (1) 11-14 (2) 14-16 (3) 16-19 (4) 19-20 (2) 20-21 (1)	18-01 (4) 01-03 (3) 03-05 (2) 05-08 (3) 08-11 (2) 11-14 (1) 14-16 (2) 16-18 (3)	19-21 (1) 21-23 (3) 23-04 (2) 04-05 (1) 20-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	13-15 (1) 15-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	08-11 (1) 11-16 (2) 16-17 (3) 17-19 (4) 19-20 (2) 20-21 (1)	14-16 (1) 16-18 (2) 18-19 (3) 19-23 (4) 23-01 (3) 01-02 (2) 02-05 (1) 05-07 (2) 07-10 (1)	20-21 (1) 21-00 (2) 00-02 (1) 02-03 (3) 03-04 (2) 04-05 (1) 02-04 (1)*
McMurdo Sound, Antarctica	*Nil*	17-21 (1)	16-18 (1) 18-19 (2) 19-24 (3) 24-03 (2) 03-07 (1)	00-06 (1)

**Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.*
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 40 and 20 meter openings.

Propagation charts prepared by George Jacobs, W3ASK.

Young Ham of the Year Award
Last Call for Nominations

Nominations are due by May 30 for the 2002 Young Ham of the Year Award, presented by Amateur Radio Newsline and co-sponsored by *CQ* magazine. The award recognizes amateurs 18 years of age or younger who have made significant contributions to the hobby or to their communities through amateur radio (simply getting a license at a young age does not qualify). For complete details and an application form, go to <http://www.arnewsline.org/yhoty/yhoty2002info.htm> on the web, or request an application from: The Newsline Young Ham of the Year Award, 28197 Robin Avenue, Santa Clarita, CA 91350. Again, nomination deadline is May 30, 2002.

test. We can't really go beyond this now. Our stations are not yet sophisticated enough in all cases to allow scorers to accept contacts from one part of a given band but not from others.

Here is the limit of what we can do:

Thus sayeth CQ: **All amateurs at all times should adhere to the principles of "good amateur practice." This applies equally to contesters and non-contesters.**

Specifically, according to the FCC in its rules for US hams, this includes **sharing and "making the most effective use of the amateur service frequencies," giving priority to stations providing emergency communications, and refraining from "willfully or maliciously" causing interference to other stations.** Good amateur practice also includes knowing and observing generally accepted band plans and being considerate of your fellow operator. This means contesters should observe band plans, listen before "occupying" a frequency, **always** get out of the way of emergency traffic (or offer help if it's needed), and try to QSY a few kilohertz if possible to avoid interference to a net on an adjacent frequency.

However, it's a two-way street. The rules also state, **"No frequency will be assigned for the exclusive use of any station,"** and that priority for emergency communications does **not** apply to **"stations transmitting communications for training drills,"** which includes nets in normal operation. Net frequencies are always approximate, "plus or minus QRM," and nets have no greater claim to the use of a given frequency than any other amateur. At the same time, if due to the vagaries of propagation, a contester cannot hear ongoing net activity and is politely told that he's interfering, he should politely QSY.

What about those who don't believe in being polite and considerate? Can we and should we as a contest sponsor "enforce" courtesy and good operating practices? As a practical matter, no we can't. Our contests are administered by volunteers and assigning those volunteers to act as "contest cops" monitoring certain frequencies will do two things: 1) deprive them of the pleasure of competing in the contest, and as a result, 2) prompt them to resign as contest volunteers. In addition, it's impossible to "monitor" every frequency on which there might be other non-contest activity subject to interference.

But the bigger question is whether we *should* try to be contest cops. As long as an operator is not breaking his country's rules, who are we to say that his operation is less legitimate than that of an operator on an adjacent frequency? Who are we to impose sanctions? If the operator *is* breaking his country's rules (and remember, malicious interference and out-of-band operating are rules violations in most countries), then that operator should be reported to the appropriate licensing and enforcement authority, not to us. We have no authority to enforce amateur radio rules. About a year ago, I received a complaint from an amateur in France about a fellow French ham who supposedly was operating phone in a CW-only band segment. When I suggested that he refer the complaint to the French licensing authority, he replied that "it is not in my lifestyle" to report people to the government. Yet he expected us to take action against this amateur by virtue of the fact that he was a participant in a contest that we sponsor.

In summary, we respect the great public service performed by many nets, particularly those maritime mobile nets that meet on or around 14.300 and the Hurricane Watch Net on or around 14.325 MHz. We encourage participants in our contests to avoid interfering with these nets or any other ongoing communication, and certainly to QSY (or offer to help) if an actual emergency is in progress or if a storm is being tracked. Intentionally interfering with emergency communications is a significant violation of FCC rules, but again, it's up to the FCC to impose sanctions for such violations. We encourage participants in our contests to follow commonly-accepted band plans (such as the IARU band plan for 40 meters). At the same time, we encourage nets to be flexible in recognition that the bands get very crowded during certain contests (but in reality, only about 6 weekends out of the year for major HF SSB contests) and to remember that all amateur frequencies are shared. Courtesy and cooperation on all sides will go a long way. ■

On the Cover

"Ham radio is in my blood and always will be," says Rick Roderick, K5UR, who works the world from his home about 26 miles outside Little Rock, Arkansas. So is the urge for DX, whether it's trying to work every country on every HF band or setting new distance records on VHF and UHF.

Rick is active on all bands from 160 meters to 23 centimeters, and has recorded significant accomplishments on just about every one of them. He has a total of 19 Worked All Zones awards, including single-band awards from 160–6 meters, among his 80-plus certificates and plaques *just from CQ!* He also has been a member of *CQ*'s DX Awards Advisory Committee since 1976. Country-wise, Rick has "worked 'em all," and has 296 countries on 160 meters plus 341 on 80, among the top operators in the world on 80 meters. Rick also holds or has held various VHF grid and distance records, including 2 meter meteor scatter and 222 MHz tropo.

In our cover photo, you see Rick with one of his three Astatic D-104 microphones, operating on the VHF side of his station. From the left, there are radios for 1296 MHz, 222 MHz, 6 meters, 2 meters, and 70 centimeters; then a big Alpha amplifier for HF ("Alpha on the outside, K5UR on the inside," notes Rick.), which is connected to the Yaesu FT-1000 behind him. He runs a kilowatt on all bands from 160 meters through 70 centimeters. Outside, there are antennas on four towers, two of which are 100 feet tall, plus one at 160 feet and another at 200 feet.

Professionally, Rick is an attorney, and in his "spare time," he's the ARRL's Delta Division Director. But there's no place he'd rather be than on the air, chasing DX. "The idea of talking to people outside my country is what first got me interested in ham radio," explains Rick, "and it's still what keeps me interested after 35 years." (Cover photo by Larry Mulvehill, WB2ZPI)

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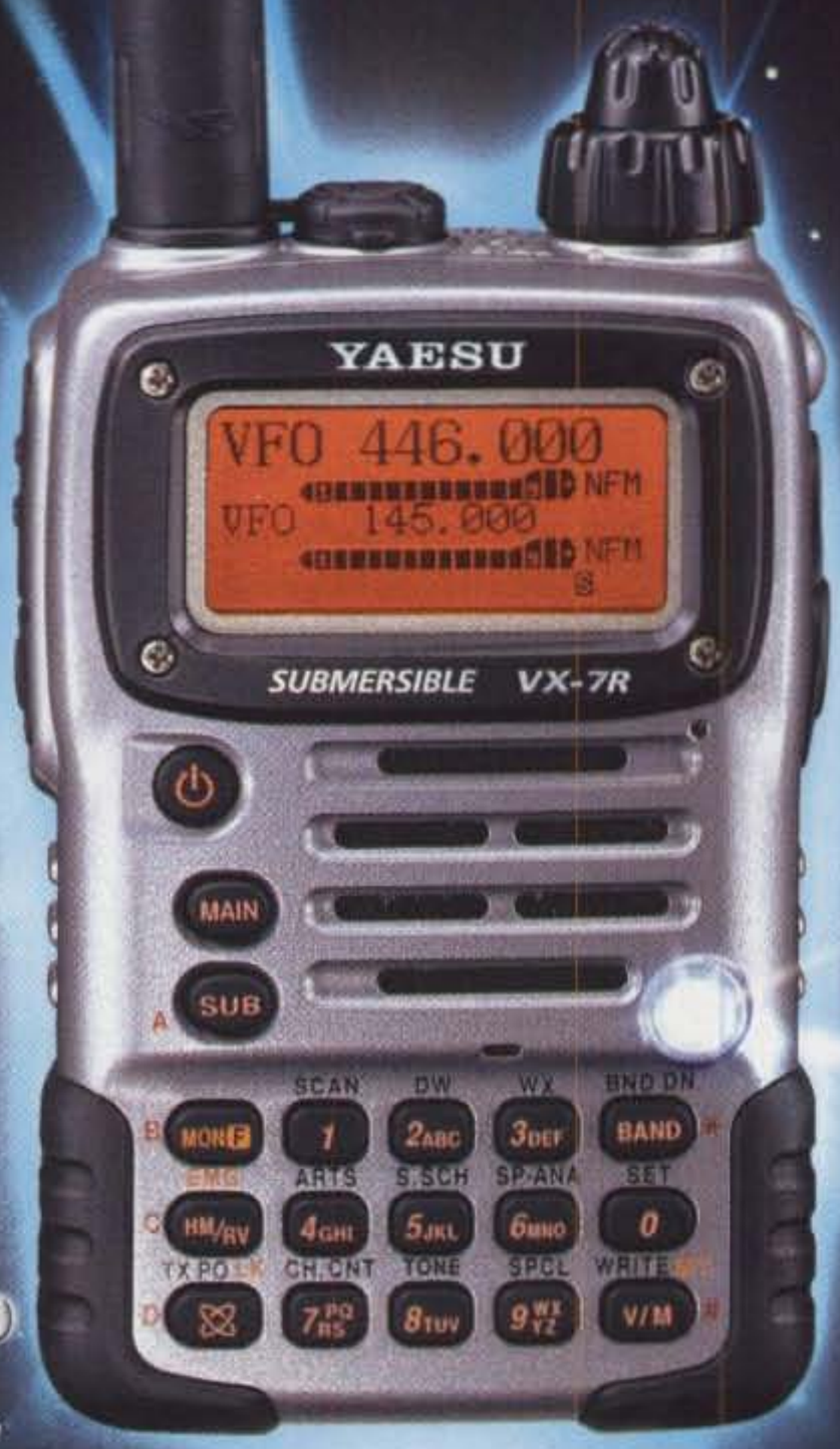

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