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THE RADIO AMATEUR'S JOURNAL

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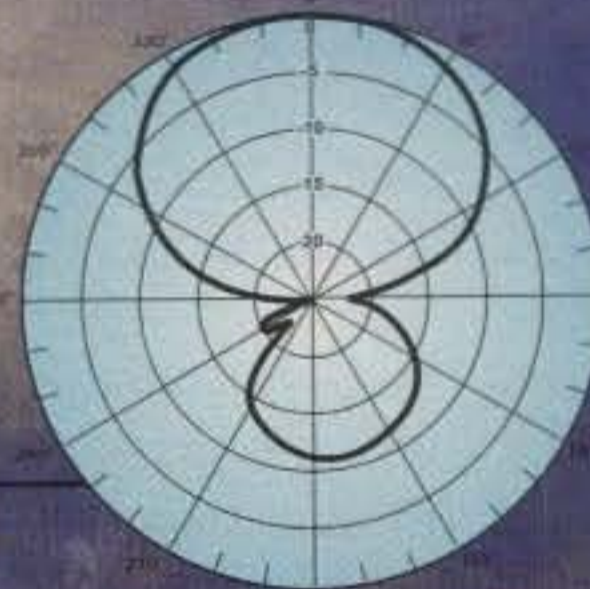
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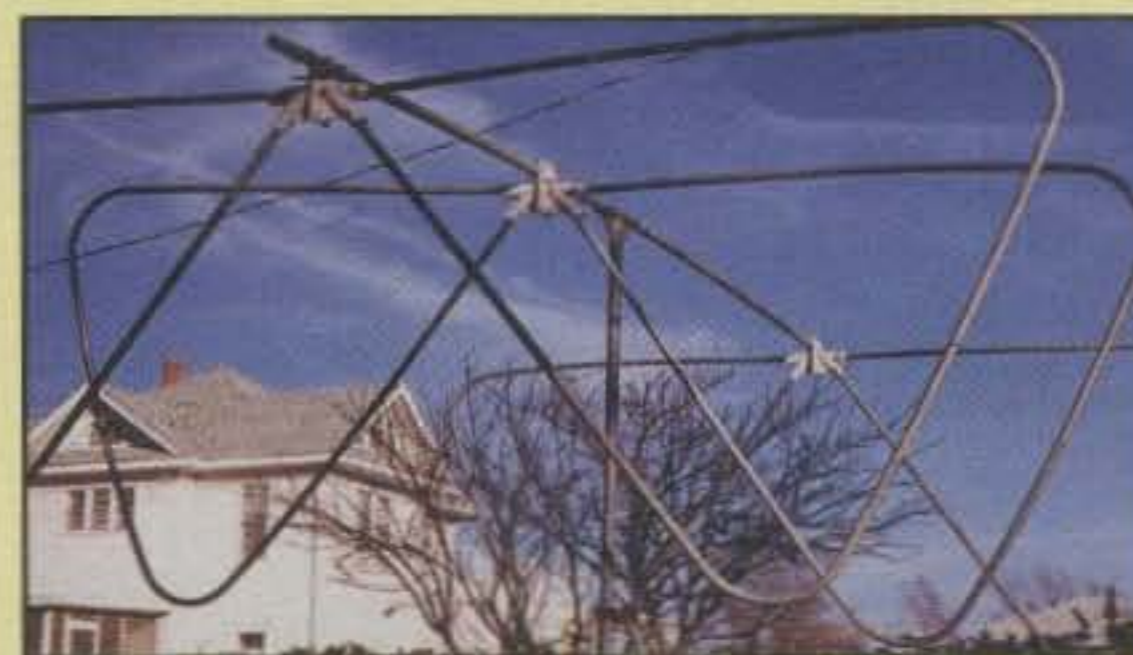
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Three Ham Satellites Launched

Three new satellites that operate on VHF and UHF amateur bands were launched in late September aboard a converted Soviet ballistic missile. The September 26 launch orbited two satellites from Saudi Arabia, Saudisat 1A and 1B, plus the Malaysian Tiungsat-1. All three have shared commercial and amateur payloads. For more info, see this month's "Amateur Satellites" column, page 60.

ARRL Seeks Nominations For Professional Media Award

Nominations are open for the ARRL's Bill Leonard, W2SKE, Professional Media Award. The award, named in memory of the late CBS News President and active ham, goes to a professional journalist whose coverage best reflects "the enjoyment, importance, and public service value of Amateur Radio," according to the *ARRL Letter*. The winner receives a plaque and \$500 cash. Deadline for nominations is December 15, 2000. For rules and/or entry forms, contact ARRL Media Relations Manager Jennifer Hagy, N1TDY, by e-mail to <jhagy@arrl.org>, or by phone at (860) 594-0238.

Baker Steps Down As AMSAT President

Keith Baker, KB1SF, has decided not to seek re-election as president of the AMSAT-NA, the amateur satellite organization. Baker was the group's president since 1998 and previously served as Executive Vice President. His main responsibility over the past two years was to oversee final launch preparations for the international Phase 3D satellite.

According to the AMSAT News Service, Baker said that business responsibilities were leaving him insufficient time for his AMSAT duties. The AMSAT Board of Directors was expected at its annual meeting in late October to elevate current Executive Vice President Robin Haighton, VE3FRH, to the top spot, and to bring back former EVP Ray Soifer, W2RS, to the number two position. Baker will remain on the group's board of directors.

Phase 3D Satellite Launch Delayed to Mid-November

November 14 is the newest (at press time) possible launch date for the international Phase 3D satellite, meaning there's a chance it may be in orbit by the time you read this. In late September the AMSAT News Service reported that the launch had been delayed from the previ-

ously announced October 31 to mid-November, and a subsequent announcement set November 14 as the new target date. According to ANS, one of the other satellites due to fly on the same launcher was delayed in arriving at the European Space Agency spaceport in Kourou, French Guiana. That delay, and the preparations that would be necessary once the satellite arrived, forced the launch delay.

AMSAT-DL Executive Vice President Peter Guelzow, DB2OS, also reports that all pre-launch tests on Phase 3D have been completed, and that the satellite is "ready to fly." We hope that, by the time you read this it is already in orbit. For more on the launch delay and P3D operating frequencies, see this month's "VHF Plus" column on page 62. For the latest launch updates, check the news page on the CQ website at <<http://www.cq-amateur-radio.com>>, or visit the P3D launch website at <<http://www.amsat-dl.org/launch/>>.

FCC Creates New License-Free CB Service

The FCC has quietly created a new radio service on five VHF-business band-frequencies for business and personal use. The Multi-Use Radio Service (MURS) will be unlicensed, and will permit voice, data, or image communications with a maximum of 2 watts effective radiated power (ERP). Also permitted are telemetry and radio-control transmissions, which may operate with a continuous carrier on four of the five frequencies. No station identification will be required.

MURS was created as part of the FCC's biennial review its rules governing the Private Land Mobile Radio Service, and was apparently an attempt to legitimize the unlicensed use of many handheld transceivers already sold for the so-called color-dot frequencies (named for the industry-standard of color codes for each frequency). The order creating MURS was adopted in late June and released in mid-July, but is only coming to light now.

For details, see "Washington Readout" (p. 44) and "Zero Bias" (p. 6).

FCC Catches Three "Disbarred" VEs

Three Puerto Rican amateurs who had been "dis-accredited" as Volunteer Examiners by the W5YI VEC were caught by the FCC apparently trying to become recertified through another testing coordinator, the W4VEC VEC. In letters to Jose Caballero, Ariel Cardona, and Ivan Valentin (no call signs provided by the FCC), FCC Special Counsel for Amateur Radio

Riley Hollingsworth, K4ZDH, asked all three to explain why their applications to W4VEC VEC indicated that they had never been disaccredited by another VEC. Hollingsworth also informed them that an October 19 testing session they had scheduled had been canceled. The three were given 20 days to respond to Hollingsworth's questions.

Beverly Hills Police Case Closed

The FCC has closed its long-running investigation of alleged use of an amateur repeater for regular police business by the Beverly Hills, California police department, without taking action. In a letter to Ronald Derderian, KB6VTN, FCC Special Counsel Riley Hollingsworth, K4ZDH, said that responses to his earlier letters by Derderian and by Police Captain Robert Curtis convinced him to drop the inquiry. "Inasmuch as the net consists of Amateur licensees organized as a disaster group, and only Amateur radio communications are carried out on the system," Hollingsworth wrote, "we find no violations of Commission rules." The investigation had garnered considerable publicity and even drew a letter from the national RACES Program Manager at the Federal Emergency Management Agency.

In another police-related case, the FCC is looking into reports that a Florida ham has allegedly "cross-banded an Amateur Radio repeater in your area ... with the Delray Beach Police Communications system..." William Agosto, Jr., with addresses in Deerfield and Pompano Beach, FL, was asked by the FCC's Riley Hollingsworth to provide his side of the story within 20 days of an October 4 letter. According to that letter, the alleged cross-banding "caused the police department to have to change channels and has resulted in destructive interference to the repeater."

FCC Puts Teeth in "Voluntary" Band Plans

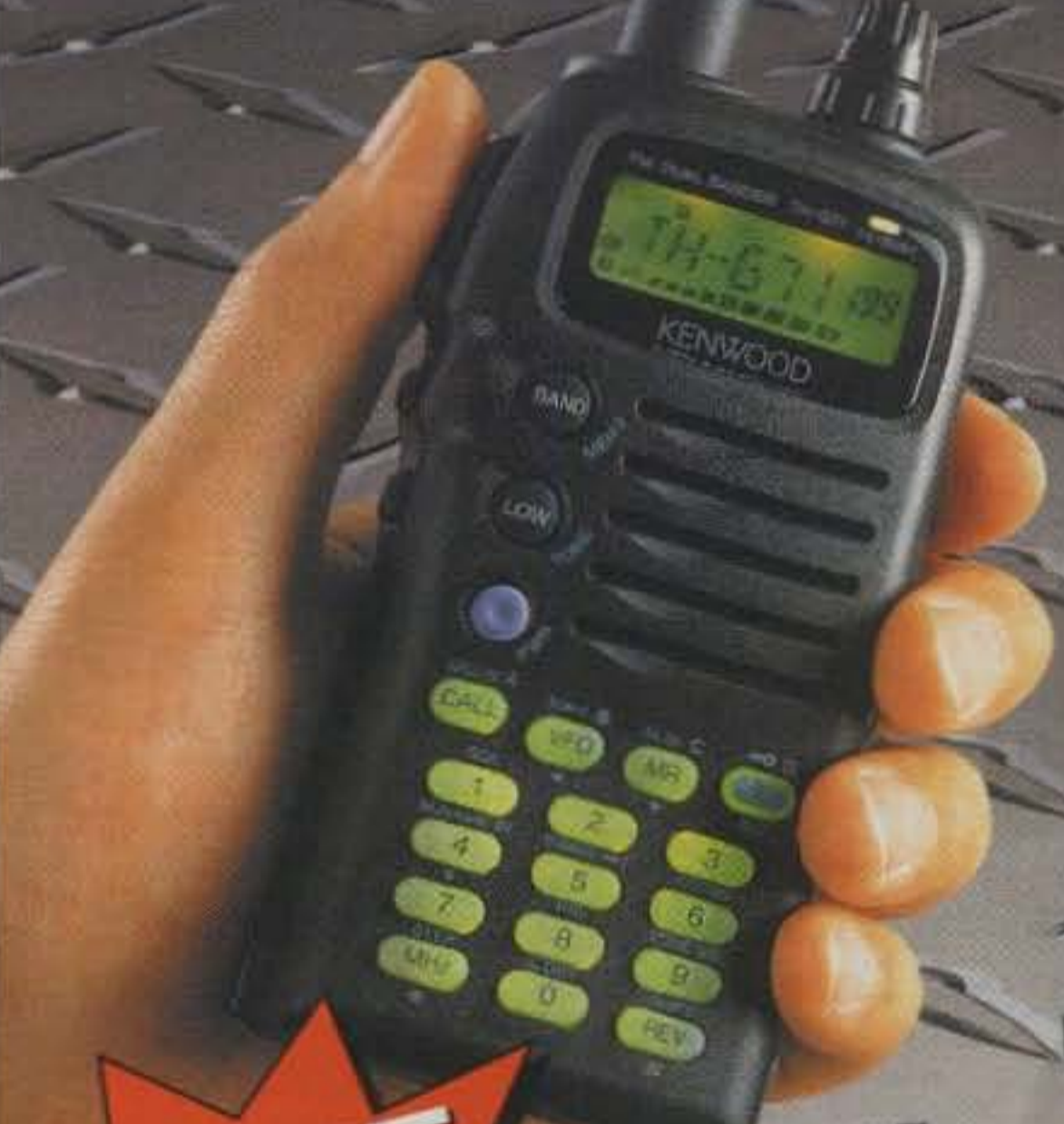
The FCC is asking the owner of a Connecticut repeater to explain why he is operating a 2 meter repeater on a reverse pair (output on what is usually an input frequency), and why his repeater is using AM "with IF stages wider than the FM repeater channel spacing as provided for by the general band plan." The letter to Alan Koepke, K1JCL, also says the repeater is interfering with two other coordinated repeaters in adjacent states.

While falling short of requiring compliance with voluntary band plans, FCC

(Continued on page 120)

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An Editorial

The FCC's "Secret" Radio Service

Imagine this: the FCC creates a new radio service for unlicensed personal and business use, a service that operates on VHF, allows up to 2 watts effective radiated power (ERP) output, and allows voice, image, data, telemetry, and radio/control transmissions. Tremendous potential, right? Now imagine that this service has been allocated a grand total of five frequencies. Tremendous potential for interference and overcrowding, right?

Perhaps that's why it's not hard to imagine that when the FCC created the Multi-Use Radio Service (MURS) last summer, it didn't make a big deal about it. In fact, it seems that the Commission did all it could to keep people from finding out about it. How so? It's a new CB service, under Part 95 of the FCC rules. But its creation and the rules for it are buried in a Report and Order on the 1998 Biennial Review of Part 90, the rules for the land mobile radio services. No news releases, no public announcements. That's why it took three months to come to our attention. Contributing Editor Fred Maia, W5YI, has all the details of this new service, along with invaluable perspective, in this month's "Washington Readout" column, which begins on page 44, so I'm only going to give you the basics here, along with a look at how MURS could affect amateur radio.

MURS: The Basics

What we basically have is another example (like CB in the '70s) of a service getting out of control and the FCC, rather than fighting a futile battle to rein it in, legitimizing what had so far been technically illegal operation. The five MURS frequencies, at 151 and 154 MHz, were previously part of the land mobile service, or business band. The FCC earlier had lifted the coordination requirements on these frequencies in order to let businesses set up temporary operations on them—for example, a film crew that would be shooting in a particular location for one or two days, then moving on. They became known as the "color dot" frequencies because of industry-standard color-coding used on the transceivers, and a variety of manufacturers started selling "color-dot" radios for general use, sometimes reminding purchasers that an FCC license was required, sometimes not. Widespread use for a variety of business and personal communications needs followed, and the FCC found itself faced with a service that basically had invented itself, but wasn't provided for anywhere in the rules. Aside from the difficulty of trying to stop thousands of people from using radios already in their possession, the FCC correctly realized that a public need

was being met here, and that the rules ought to be revised to accommodate that need.

So what we now have is a new, unlicensed service which permits voice, data, or image communications with a maximum of 2 watts effective radiated power (ERP), along with telemetry and radio-control transmissions. The only technical limitations on the service are bandwidth (11.25 kHz on the three 151 MHz frequencies and 12.5 kHz on the 154 MHz channels), frequency stability (5.0 parts per million, or 2.0 ppm if a 6.25 kHz bandwidth is used; no crystal control required), and power (no more than 2 watts ERP). FCC certification (formerly type-acceptance) of each MURS transmitter is required. All frequencies are to be shared, and users are supposed to cooperate in choosing and using channels in order to minimize interference and make the most effective use of the frequencies.

This is all very nice on paper, but I predict reality will be different. If 23 channels weren't enough for CB users when that service became popular, how can five work out here, even assuming compliance with power standards? Especially with incompatible modes (voice, data, video, radio/control, and telemetry) sharing the same frequency? Perhaps if everything was digital, it could be made to work with minimal interference. But with a maximum bandwidth of 12.5 kHz per channel, your digital signals couldn't be much faster than what we hams are doing right now on our VHF bands. Besides, there's a massive amount of analog equipment already out there, already in use on these frequencies, and the whole reason for creating this service was to legitimize the use of these radios.

There most certainly will be a clamor for additional MURS frequencies once the service catches on, something that already worries the two major trade groups representing current business band users. In fact, Motorola and Tandy, the major promoters of MURS, wanted UHF frequencies included as well. The FCC declined, but reserved the option to revisit the question in the future.

Impact on Ham Radio

MURS could have a tremendous impact on amateur radio. To the pessimists among us, it will just be one more thing helping to kill off our hobby (joining CB, computers, cell phones, and the internet). As I've said many times in the past, amateur radio has been successfully dying for at least the past 50 years.

True, many people who have been drawn to amateur radio as a personal intercom among friends and family members, and

who have been frustrated by the very short range of Family Radio Service transceivers, will migrate to MURS. It's likely that they'll also get some of the benefits ham radio currently offers, such as low-power repeaters, packet, and slow-scan TV—all of which will be permitted in the new service. But as we noted above, with only five frequencies allocated to the service, the channels will become overcrowded quickly, often with incompatible uses. This opens a door of opportunity for amateur radio (assuming we don't start bad-mouthing MURS users as we have CBers). Those who like what MURS offers but are frustrated with its limitations or crowding will become prime recruits for ham radio:

"You like using that 2 watt repeater with your 2 watt radio? Try ours."

"You like sending computer messages over the radio? See what you can do on the ham bands."

"You wondered what was going on when you occasionally heard faraway stations popping in on your radio? Let us teach you about tropo and meteor scatter, and show you what you can work when you don't have a 2 watt limit."

The people who were looking for a personal intercom will have it—and they can even talk business on it. We'll miss only their numbers, as by and large they have not contributed to the ham radio community. But their numbers could be more than made up by MURS users who discover the magic of radio and want to do more with it.

We recommend that as many hams as possible get a set of MURS radios when they become available (we're betting they'll be pretty cheap, since the currently available color-dot radios are already pretty cheap), use the band for voice, data, and image communications (remember, you'll be the experts), meet people, and when the time is right, recruit them and welcome them to amateur radio.

Hams, MURS and Scanner Laws

Involvement by hams in other radio activities is nothing unusual. Many hams also monitor emergency service (police, fire, and ambulance) communications, either as part of their amateur radio emergency communications activities or just to keep up on what's going on in their towns. Some use the extended receive range capabilities of their VHF/UHF ham rigs; others have separate scanners programmed to tune in a wide variety of frequencies (often including ham frequencies). And while emergency communications needs may require that

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Commercial Grade Rugged

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- 500 mW audio
- Mil spec 810, C/D/E**

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Worlds First 4-bander HT

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- Ni-MH battery standard
- AM, FM, WFM
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- RIT and VXO for 1200 MHz

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LOW PRICE

IC-Q7A Dual Band Transceiver

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- Monitor function
- Large built-in speaker, 100 mW audio
- Tone squelch with pocket beep
- Mil spec 810, C/D/E**

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IC-W32A Dual Band Transceiver

- Advanced 2M/440 MHz
- 5W @ 13.5 V
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- CTCSS encode/decode w/tone scan
- True dual band with V/V, U/U
- Optional PC programmable
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some hams be able to monitor emergency service frequencies, relatively few of our number really *need* to do this. However, when states restrict scanner use in vehicles, hams generally go to bat for themselves only and try to secure exemptions for licensed amateurs. What really differentiates the majority of hams from other radio listeners when it comes to monitoring emergency service communications? Why should those of us who aren't actively involved in emergency communications have special privileges? The main reason is that most of our radios cover these frequencies whether or not we listen to them, and laws against possession of radios capable of

receiving police frequencies will make most of our mobile and handheld rigs illegal. The same situation is likely to face MURS users: Why wouldn't manufacturers include extended receive range on MURS radios just as they do on ham radios? It would no doubt be a good selling point.

Then what happens in states that prohibit possession in cars of radios that can tune in police frequencies? In New York, for example, only licensed hams among the general population are exempted from the state's "scanner law." But with MURS, there's no FCC license on which to base an exemption. Will a federally-created radio service be declared illegal in certain states?

Will MURS users be subject to arrest if their radios happen to tune frequencies used by emergency service agencies?

Ham Elitism

New York's not the only such state. There are several others, most notably including Michigan, where hams apparently have signed off on a proposed anti-mobile scanner law because it exempts hams with Technician Class or higher licenses. First of all, what about the Novices? Aren't they hams, too? Don't they also have VHF/UHF privileges? And second, this creates an elitist attitude among hams that suggests we are deserving of special privileges not given to others. The emergency communications argument? Valid, certainly. But equally valid for REACT members who use GMRS (the General Mobile Radio Service), FRS (Family Radio Service), CB, and in the future, MURS, for emergency communications. Why shouldn't they get the same exemption? Don't they have the same need to be able to monitor emergency service communications for all of the same reasons hams have?

Also, what about the otherwise law-abiding scanner users who enjoy listening to a variety of communications while on the road as well as at home? Why should they be made into criminals if they are not interfering with police or using their radios to facilitate a crime? Nearly a decade ago, I was part of a team of hams in New Jersey that successfully changed a possession-based law here into a usage-based law, with no exemptions. Under the new law, you actually have to use the radio to do something wrong before owning the radio is a crime! This law was supported by the law enforcement community in New Jersey, because it extended the reach of the previous scanner law beyond automobiles to handhelds and even fixed locations, previously untouchable. States concerned with criminals monitoring police transmissions to facilitate a crime or to evade capture for a crime would be well advised to use New Jersey's law as a model. I have the text of this law sitting on my computer and will be happy to e-mail it to anyone who'd like a copy (drop me a note at <w2vu@cq-amateur-radio.com> and be sure to tell me what state you're in). Let's stop being elitists and help our state legislatures enact reasonable laws that crack down on criminal activities without making criminals out of our fellow radio enthusiasts.

Happy Holidays!

It's that time of year once again ... the daylight's getting short here in the northern hemisphere, and most of us observe one or more ancient traditions designed to bring additional light into our homes when daylight is in short supply. Whether you light a Christmas tree or a Hanukkah menorah or some other symbol of light and hope for a brighter future, we at CQ wish you and your family a very happy holiday season and a happy, healthy, and prosperous new year.

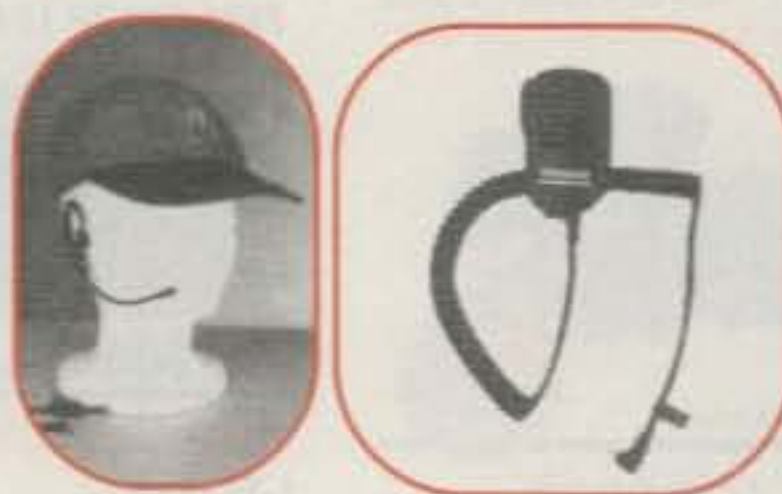
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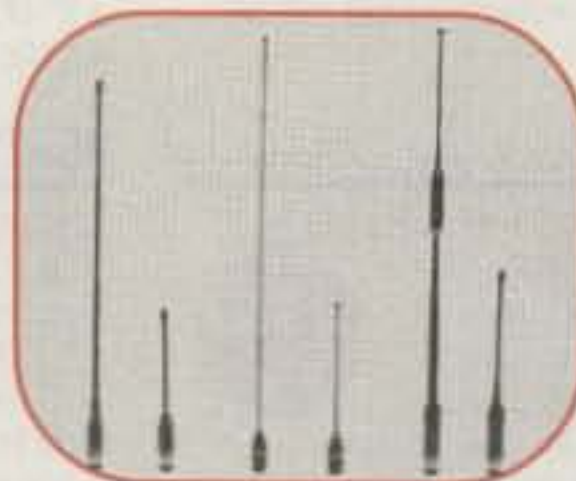
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Announcements

Dayton ARA Scholarships – The Dayton Amateur Radio Association is now accepting requests for their annual scholarships. Applicants must be a graduating high school senior in 2001 and have a valid FCC amateur license (any class). The DARA scholarships are awarded in varying amounts up to \$2000 as determined by the scholarship committee and may be used for tuition in an institution of higher learning as outlined in the application. Applications may be obtained by sending an SASE to: DARA Scholarships, 45 Cinnamon Ct., Springboro, OH 45066. Applications must be postmarked no later than June 1, 2001.

National Weather Service Special Event – The NWS special event, co-sponsored by the ARRL, will take place at National Weather Service offices across the country from 0000–2400Z, December 2, phone, RTTY, APRS, satellite, CW, PSK-31 on 2, 6, 10, 15, 20, 40, 80 meters and 70 cm. Log all NWSSE contacts during the event. No points, but special QSL certificates available. Check <<http://www.nws.noaa.gov/event2000>> for details.

"Lighthouse Christmas Lights" Special Event – Sponsored by the Amateur Radio Lighthouse Society to promote ham radio and lighthouses, this special event will take place from 0001Z December 18 through 2359Z January 2 on all modes (repeater operation also) on any authorized bands, including the WARC bands. Suggested frequencies (± 20 kHz): 1.970, 3.970, 7.270, 14.270, 21.370, 28.370. Call CQ Lighthouse or CQ/LH. Exchange: ARLS members give out callsign, ARLS membership number, name, state or province. Certificate available for working ten or more lighthouses/ships or five or more member ARLS stations. Send log info and 9x12 SASE plus \$1.00 for cer-

tificate to: ARLS, P.O. Box 2178, Cinnaminson, NJ 08077. Questions to Jim, K2JXW, at <weidner@waterw.com>.

W2W Special Event – In commemoration of Pearl Harbor, the Historical Electronics Museum ARC (W3GR) will be on from Baltimore, Maryland December 9 and 10 from 1400–2200Z in the General portion of HF bands SSB/CW; Navy TBL-13 on 40 meters CW. For a certificate (features the museum's Pearl Harbor radar) send two stamps with QSL to: HEMARC W2W, P.O. Box 746, MS 4015, Baltimore, MD 21203. Info: <w3gr@arrl.net>.

WX3MAS Season's Greetings – The Christmas City and Delaware-Lehigh ARCs will be on with their annual season's greetings from Bethlehem-Nazareth, Pennsylvania from 1200Z December 16 to 2400Z December 17 on 3.970, 7.270, 14.265, 21.365, 28.465. For a certificate, send QSL and 9x12 SASE to: CCARC/DLARC WX3MAS, Greystone Bldg., Gracedale Complex, RR 8, Nazareth, PA 18064-9211.

KC5OUR – The Valencia County ARA, from Bethlehem, New Mexico, will be on to celebrate the Christmas season December 16–24 on 7.250, 14.250, 21.350, 28.350 MHz. QSL to KC5OUR, P.O. Box 268, Peralta, NM 87042.

W9WWI – The Clark County ARC, from Bethlehem, Indiana, will celebrate the Christmas season from 1500Z December 8 to 2200Z December 9 in the General 75, 40, and 20 meter bands. For certificate send QSL to CCARC, 1805 E. Eighth St., Jeffersonville, IN 47130.

Tampa Bay Hamfest – December 2–3 at the Manatee County Convention & Civic Center, Palmetto, Florida. For more information: <www.fgcarc.org>, or e-mail: <n3bul@arrl.net>. (Exams 9:30 AM both days; Talk-in on 146.730 [-600])

Oops...

The word-processing gremlins snuck into N7NB's concluding segment of his review of the Ten-Tec Pegasus transceiver (August CQ, p. 30) and changed the "mu" (μ) symbols in Table I (receiver lab measurements) into the letter "m," causing a thousand-fold change in the readings! If you refer to Table I in that article, please note that all readings listed in *millivolts* (mV) should actually be *microvolts* (μ V); however, the time measurements in milliseconds (ms) are correct. We regret the error.

If you read "On the Cover" in last month's issue, you may have noticed that (a) the photo at the top of the column was different from the one on the cover; and (b) the description of what's where in the photo didn't match anything in the photo. Here's what happened: Cover photographer Larry Mulvehill, WB2ZPI, is in the process of moving from analog (slides) to digital (CD) photos for our covers. We selected the original photo (the one at the top of "On the Cover") from the slides, but at the last minute, found the one on the cover on the CD. We switched because it gave you a better look at WI5W's homebrew transceiver and microphone, which is what we were highlighting. Unfortunately, the interior page was already on its way to the printer, complete with the old photo and description! So... the text that describes the equipment layout in the photo applies to the *original* photo — the one seen in the "On the Cover" column but *not* on the cover! (Got that?) So look up as you read the column, then flip back to the cover for a better view of Randy's rig and microphone!

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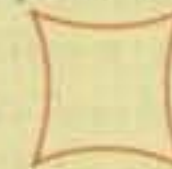
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Results of the 2000 CQ WW DX 160 Meter Contests

BY DAVID L. THOMPSON,* K4JRB

The high sunspot count means activity was down again this year. Scores and QSO counts showed the affect of poorer 160 meter conditions on both CW and SSB. There was plenty of activity on both mode, but Saturday night and Sunday morning were short on the number of casual contesters required to keep the competitors awake and excited. Nevertheless the winners on both modes turned in excellent scores and Mr. Low Band DXer, ON4UN, topped all contestants (single or multi-operator) with a CW score of nearly 863K. It is hoped that the million-points-plus scores will return once the sunspots drop.

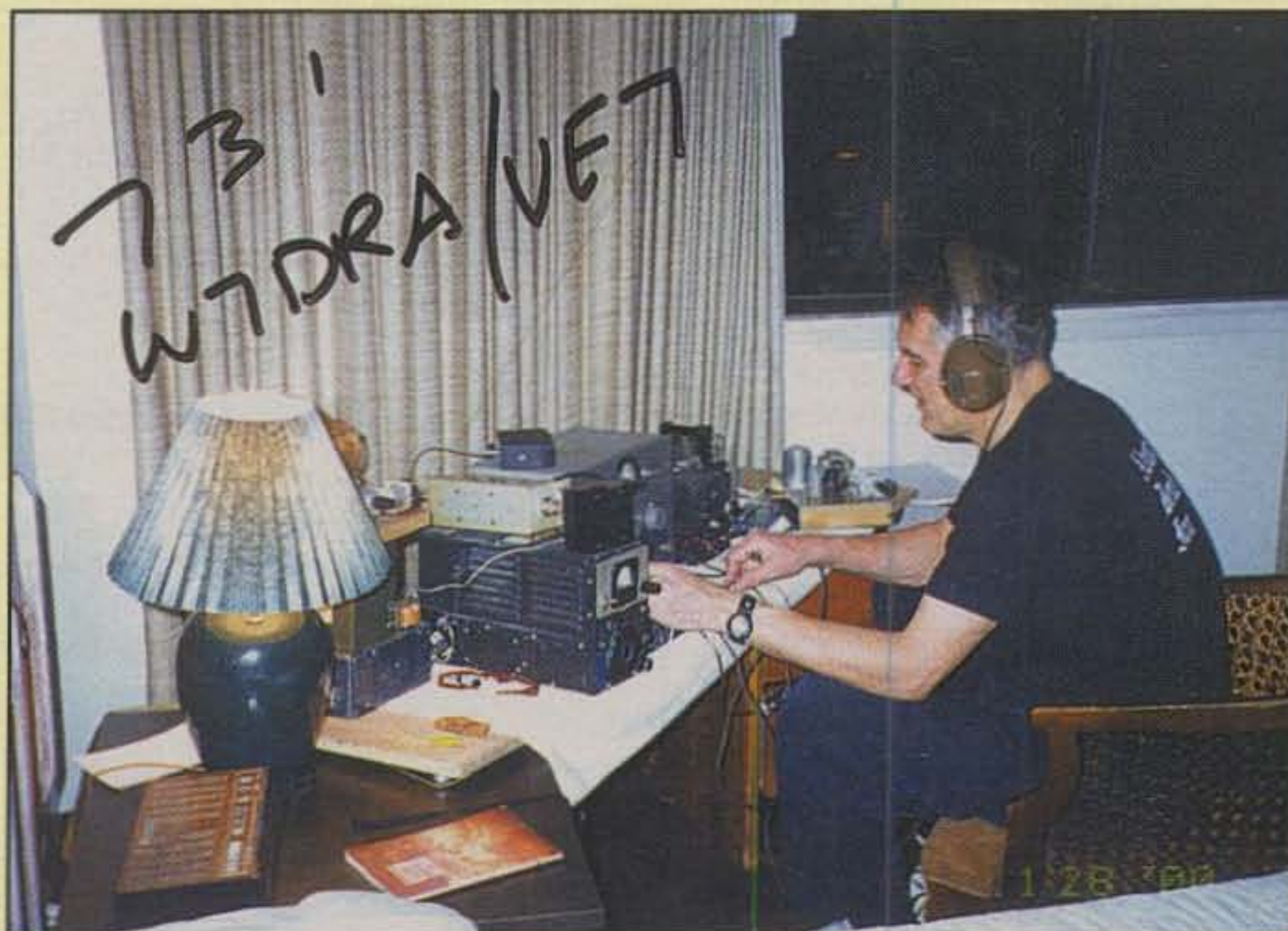
The master CW log showed 4512 different stations, or a slight increase over 1999. The SSB log contained 4606 different calls, or an increase of 116 over 1999. For both modes the band was full of stations, and many DX contacts between continents were made on both modes. There were 136 countries on CW and 131 on SSB, so the possibility of someone working DXCC could occur during the next sunspot minimum. This is the ideal chance for the low power and QRP types to add to the DXCC count and finish up that WAS. In fact, more stations can be worked during the two contest weekends than on any other weekend during the year. Try your luck in 2001 and be surprised!

CW

On CW, ON4UN overcame several difficulties to make not only the top CW single operator score, but also the highest score in the contests. 5B4ADA keyed C4A to second place single operator and second place overall in the contests. SP7GIQ, 4X4NJ, and last year's top CW station, 8P9DX, round out the top 5 DX CW single operator scores. VE3EJ won the top Canadian score at the same time, placing 4th overall on CW. Jon, AA1K, took the High USA score, nudging out

N2BA and K1VW. WK3I won top QRP score, edging out LY2FE. HG1S with HA1TJ at the key beat S50R for the world high low power score. Low power regular WA1LNP keyed WE1USA to the top USA low power score while placing 4th world high. The 9A1A gang used 9AY2K to stir up the world high multi-operator score. WW2Y and crew again used K2TOP to record the high US multi-operator score. This score was 9th world high.

The Top 10 boxes highlight the top scores in all categories. Congratulations to the ones who made the boxes. The challenge is to make the Top 10 boxes in 2001. Vital statistics for CW operators include most QSOs



QRP entrant W7DRA/VE7 with his classic QRP gear.

with ON4UN 1178; 9AY2K 1169*; VE3EJ 1115; K2TOP 1084*; and K8XXX 1076* making the top 5 (asterisk [*] indicates multi-operator). Twelve stations made more than 1000 QSOs on CW. UU7J* with 72 DXCC countries led 9AY2K (71)*; OK5W (70)*; ON4UN (70); and SP7GIQ (70). K2TOP* led the US with 57 countries. K9DX rang up 45 countries to lead all US CW single operators. The yardstick for DX stations is the W/VE multiplier count. 8P9DX recorded 52 mults to lead the DX, with ZL6QH* coming in second with 39. The DXCC and W/VE multipliers should begin to increase once the band becomes more active with low sun-

spots, but that won't happen for several more years. Plaque winners are listed in a separate box. Congratulations to all the CW winners, and we'll look for you again the end of next month (January 27-28).

SSB

On SSB, UU7J* was the overall high score with 354.7K. LY5A nudged out I4JMY for the high DX single operator SSB score. Jerry, WB9Z, again topped USA single operators with nearly 215K. VA3RU recorded the top Canadian score by a wide margin, and his countryman VY2MGY/VE3 had the world

high QRP score. CT3DL edged out VA3RU for world high low power score. K1PX nosed out K1NK for the high USA low power score. KB3TS was the high USA QRP scorer, just missing the Top 5 boxes at number 6 world high QRP. UU7J* (1227) and WB9Z (1122) were the only stations to make over 1000 QSOs this year on SSB. UU7J* with 61 DXCC countries led I4JMY, OT0T, and OM0WR with 57 countries. Top USA stations were K2TOP (39)* and AA1BU (32). AA1BU made a great score operating only 9 hours! K4JNY recorded 59 W/VE multipliers to top all stations on both modes. W3TS (58)

also on SSB was second, and there were several competitors with 57 W/VE multipliers on both CW and SSB. XE1RCS (51)* and P40V (47) were the top DX competitors in W/VE multipliers.

Read through the results and you will notice a number of close races plus a number with low scores. Did you miss out on a certificate this year because you only had a few hours to operate? Sometimes a few hours is all it takes, especially in view of AA1BU's score in just 9 hours.

Clubs

The Frankford Radio Club again repeated as the Club winner. They beat out second-place Slovenian Contest Club by over 1 million points. Fourteen clubs topped 1 million points in 2000, and the Tennessee Contest

*4166 Mill Stone Court, Norcross, GA 30092
e-mail: <thompson@mindspring.com>



8P9DX stringing radials in the sugar cane.

Group just missed the million mark at 989K. The UA2 Contest Club again led all the clubs in score per entry. Several clubs came up one entry short of the three necessary to be listed. Maybe next year!

Logs

Log checking was easier this year with the number of e-mail and electronic (diskette) logs received. The software provided enhanced cross-checking against the master logs this year and more QSOs were deleted for busts and not-in-log. All W/VE contacts were checked for state and province, so if you put the wrong state and province the contact was deleted.

Thanks for the check logs and the number of small logs, as this helps validate the master log and adjusts the scores in a more uniform and impersonal manner. In 2001 Cabrillo will be the standard, but if you can't submit Cabrillo then an ASCII log and summary will be acceptable. If you submit a computer-generated log, then a diskette will be required. Please don't make us ask! Hand logs will still be accepted, but they must be readable and you must send a dupe list for over 200 QSOs. Please try to send an electronic log if at all possible.

Another change this year allowed the checkers to identify all unique calls. The average per centage for uniques is about 1% for both modes, so the software started giving exception reports for those with over 3%.

The practice of leaving a frequency to work multipliers again was a concern for the committee. If you leave your run frequency for

PLAQUE WINNERS AND DONORS

SINGLE OPERATOR

CW

WORLD BY K5AAD (W5MBB MEMORIAL): Winner John Devoldere, ON4UN.
USA BY K4TEA: Winner Jon Zaines, AA1K.
CANADA BY K2UFT: Winner John Sluymer, VE3EJ.
ZONE 3 BY N5IA: Winner Ken Keeler, N6RO.
ZONE 4 BY K4WA: Winner John W. Battin, K9DX.
ZONE 5 BY N4XMX: Winner Brooke Allen, N2BA.
AFRICA BY K4MZW: Winner Martti Laine, EA8BH (OH2BH).
ASIA BY K4SX: Winner Ivo Pezer, C4A (5B4ADA).
EUROPE BY K9UWA: Winner Sobon Krzysztof, SP7GIQ.
OCEANIA: Winner Jack Wheeler, KH6CC.
SOUTH AMERICA BY W4NU (W4UUH Memorial): Winner Paolo L. Stradiotto, YV1DIG.
JAPAN BY W4ZV (JA1XAF Memorial): Winner Masaki Okano, JH4UYB.
NORTH AMERICA by CQ (N4IN Memorial): Winner Glenn Wyant, 8P9DX (VA3DX).

PHONE

WORLD BY K5AAD (W5MBB Memorial): Winner Dan Pavlov, LY5A.
USA BY K4JRB: Winner Jerry Rosalius, WB9Z.
CANADA by W0ETC: Winner Lajos Laki, VA3RU.
ZONE 3 BY N4TMW: Winner Ken Keeler, N6RO.
ZONE 4: Winner Gary Nichols, KD9SV.
ZONE 5 BY K4ODL: Winner Dana Michael, W3TS.
AFRICA BY WB4ZNH: Winner Pekka Kolehmainen, EA8AH (OH1RY).
ASIA BY AH2BE: Winner Berkin Aydogmus, TA3J.
EUROPE BY N4NX: Winner Maurizio Panicara, I4JMY.
OCEANIA BY N4PN: Winner Jack Wheeler, KH6CC.
SOUTH AMERICA BY K4EA: Winner Carl Cook, P40V (AI6V).
NORTH AMERICA by CQ (K2EEK Memorial): Winner Herbert L. Schoenbohm, KV4FZ.

MULTI-OPERATOR

CW

WORLD BY N4RJ: Winner Croatian DX Club 9AY2K.
USA BY W8UVZ and K8GG: Winner Garden State Top Band Club, K2TOP (at WW2Y).
Zone 3 by 4X4NJ: Winner Jim Wilsin, N7JW.

SSB

WORLD BY SOUTHEASTERN DX CLUB: Winner Crimea Contest Club, UU7J (at UU0JM).
USA BY WB9Z: Winner Garden State Top Band Club, K2TOP (at WW2Y).
Zone 3 by 4X4NJ: Winner Horned Toad Acres Wireless Association, N7KQ.



The W2GD site for the CQ 160.



The business end of KH6DX mobile 6.

more than 30 seconds, be prepared to lose the frequency. Another concern is having someone hold a frequency while a station works multipliers. If holding the frequency is pre-planned, this is clearly in violation of the rules and poor sportsmanship. Allowing someone to work the rare stations on your run frequency is common during the CQ 160 Contests (after all, this is the gentleman's band). I remember working Europe thanks to the multi-operator stations that often were looking for an excuse to rest a minute or so. We don't want to discourage this, but at the same time we don't want pre-planned holding of a run frequency either. A word to the wise should be sufficient.

Corrections

Two corrections to last year's CW contest should be noted. ND5S was somehow listed as WS5S. His score was second place in Michigan. The computer scoring added 85K to LY1DD's CW low power score. His corrected score is 94,410 and makes LY3BA the low power winner for Lithuania. The errors were made at the checking end and in no way reflect on either station.

The 2001 Contests

The 2001 CQ WW 160 will be run the last full weekend in January (CW) and the last full weekend in February for SSB. The dates are 2200Z January 26 to 1600Z January 28, 2001 for CW, and 2200Z February 23 to 1600Z February 25, 2001 for SSB. Logs can be submitted in handwritten form or electronic (3.5-inch disk, or via e-mail [preferred]). Electronic logs should be either the Cabrillo format (preferred) or ASCII log and summary sheet.

For paper log forms, send an SASE to CQ 160 Meter Contest, 25 Newbridge Road, Hicksville, NY 11801. Please put the sum-

mary sheet at the front of the log. The deadlines for sending the logs are February 28 for CW and March 31 for SSB. Logs e-mailed after those dates or postmarked after become check logs. The exception is both logs can be submitted together by March 31st.

Send all logs to the CQ 160 Meter Contest, 25 Newbridge Road, Hicksville, NY 11801 (please mark CW or SSB on the envelope). The e-mail address is <cq160@kkn.net>. Good luck!

73, Dave, K4JRB

W/VE Soapbox CW

Lost two hours on Saturday night to a vicious headache...K4VX (N9JF Op). Only previous contest was back in 1969...WL7YM/Ø. Thanks to super ops VP6BR, ZL6QH, ZL2SQ, and ZM2AZ for hearing my weak signal...WØETT. Decent conditions to Europe this year...VE3DO. Highlights were breaking South American pile-ups, working VP6BR, and having VP2EJ call me...VE7SL. My 125 foot J-shaped vertical heard a lot better than my 100 watts transmitted...VE3ZT. Surprised at how well 5 watts got out. Arizona and Alabama called me for new multipliers...VE3KZ/QRP. Where were North America and South America DX?...VE5RI. My first experience from a portable location. Had RF problems in the cabin so lowered output to 40 to 50 watts to assure a clean signal...CF7DX/VE7. Took my 5 watt station to a remote location this year...W7DRA/VE7. State-side-to-stateside QSOs in the DX window were most objectionable. One W2 called the DX I was working right over me. I am sure he could hear me...W1OP (W1GS Op).

My computer time and date was out 3 days and 11 hours...AB1BX. Worked over 100 Europeans in 4 hours Friday night...K5ZD. New Gladiator vertical kicked butt!!!...KR1G. Worked some good DX on Saturday night...AA1SU. Sleep is the number one enemy of topband contesters...WO1N. Six to 8 inches of new snow, freezing temperatures, and a 30 below wind-chill factor contributed to a plethora of problems this year...W2GD. Have been in the hospital of late. Sorry the log is late...W2KHQ. After 30 years of working 160 I finally worked

TOP 10 SCORES

SINGLE OPERATOR

USA CW		USA SSB	
AA1K	331,200	WB9Z	214,974
N2BA	312,543	W3TS	156,492
K1VW	310,576	W3GH	133,200
K9DX	301,182	W1NA	131,840
W4MYA	254,790	KB2BF	131,140
KR1G	253,890	ND8DX	120,533
W3BGN	252,434	AA1BU	115,101
K5NA	237,408	KD9SV	113,084
WB9Z	224,448	WØETC	110,080
WE1USA	208,636	W4MYA	108,914

VE (TOP 5)

CW		SSB	
VE3EJ	695,836	VA3RU	159,828
VE2IM	362,440	VE2IM	55,272
VE3DO	352,512	VE6JY	44,391
VE3PN	202,824	VE7SL	35,300
CF3RU	171,258	VY2MGY/3	21,982

QRP (TOP 5)

CW		SSB	
WK3I	84,318	VY2MGY/3	21,982
LY2FE	76,566	UA9OMT	17,766
UR5FEO	72,756	UU4JO	11,078
YT7TY	59,000	UR5YDZ	10,556
NO9Z	42,192	VE3KZ	7,260

DX CW

ON4UN	862,914	LY5A	278,915
C4A	728,730	I4JMY	264,303
SP7GIQ	680,626	P4ØV	251,394
4X4NJ	506,692	OTØT	230,052
8P9DX	504,210	EABAH	187,544
GØIVZ	498,088	SV8CS	183,372
HA8FM	474,408	CT3DL	160,857
S57M	461,188	OMØWR	158,238
EA8BH	458,490	S5ØS	158,236
S58A	457,746	SP7VC	153,352

DX SSB

LOW POWER (TOP 5)

HG1S	283,632	CT3DL	160,057
S5ØR	277,368	VA3RU	159,828
9A7T	236,232	TA3J	62,064
WE1USA	208,636	DJ8UV/P	61,662
DL9YX	207,130	9A2EU	61,570

MULTI-OPERATOR

CW (WW)		SSB (WW)	
9AY2K	735,832	UU7J	354,672
OK5W	658,746	XE1RCS	257,295
IV3TAN	643,632	K2TOP	242,345
HG3DX	639,030	VE3DC	188,045
I4JMY	586,173	IV3OWC	181,500
OM7M	581,922	K8KS	165,088
RW2F	573,717	N8TR	162,948
UU7J	544,800	HG1S	162,604
K2TOP	519,384	LY7A	158,850
OK5DX	402,840	S51TA	154,755

VK's...K8FC. I had a blast although limited on time...KG2NO. Great contest and beat last year's score...W2JEK. The DX window only benefits a few big guns in Europe and is not fulfilling its stated goal of attracting more DX...AA1K. My first ever 160 meter contest...W3BBO. A very fast-paced contest, but not as hectic or strenuous as some of the 48-hour marathons...NA3V. My old copy of CT did not like Y2K. Had to change the date in the word processor...W8PC.

Good conditions the first night, but I fell asleep before the European opening...WJ9B. My call was WY2 Oh Oh Oh not zero, zero, zero...WY2000 (AA4NN Op). Great DX from the Pacific. Worked 3 ZL's and a VK...K7SV. Looks like its time for some "real" serious antennas for 160...K1KY. Better conditions than expected with a high A index of 25 to 33...KØEJ. This was the first time we used WriteLog and it worked flawlessly...K4TW. Using two radios worked well. One was left in the DX portion and the other scanned the band...AA4Z.

AGGREGATE CW AND SSB CLUB SCORES

(Minimum of three entries required for listing.)

CLUB	SCORE	CLUB	SCORE
FRANKFORD RADIO CLUB	4,450,586	NORTHERN CALIFORNIA CONTEST CLUB	557,460
SLOVENIAN CONTEST CLUB	3,428,966	ROCHESTER DX ASSOCIATION	453,923
POTOMAC VALLEY RADIO CLUB	2,668,269	GRAND MESA CONTESTERS	429,168
YANKEE CLIPPER CONTEST CLUB	2,550,001	SOUTHERN CALIFORNIA CONTEST CLUB	366,682
SOCIETY OF MIDWEST CONTESTERS	2,034,113	DAUBERVILLE DX ASSOCIATION	356,515
HA DX CLUB (HUNGARY)	2,027,666	LITHUANIAN DX GROUP	351,712
RHEIN RHUR DX ASSOCIATION	1,869,501	SOUTHEASTERN DX CLUB	340,277
MARCONI CONTEST CLUB (ITALY)	1,814,789	URAL CONTEST GROUP	315,461
CONTEST CLUB FINLAND	1,779,795	UARL (UKRAINE)	305,129
CROATIAN CONTEST CLUB	1,762,364	SP DX CLUB	290,174
NORTH COAST CONTESTERS	1,536,911	CAROLINA DX ASSOCIATION	282,825
BAVARIAN CONTEST CLUB	1,406,779	HUDSON VALLEY CONTESTERS	277,491
MAD RIVER RADIO CLUB	1,239,186	CENTRAL ARIZONA DX ASSOCIATION	269,593
KTU RADIO CLUB (LY)	1,062,281	DARC (GERMANY)	196,527
TENNESSEE CONTEST CLUB	989,042	TEXAS DX SOCIETY	195,499
UA2 CONTEST CLUB	832,293	FOX CONTEST CLUB (YU)	139,745
RUSSIAN CONTEST CLUB	732,999	FLORIDA CONTEST GROUP	134,802
SOUTH EAST CONTEST CLUB	714,189	NORTHERN ARIZONA DX ASSOCIATION	95,646
NL DX GROUP (LITHUANIA)	676,587	MLDXCC (W6)	94,469
NORTH TEXAS CONTEST CLUB	668,493	MINNESOTA WIRELESS ASSOCIATION	77,632
UKRAINIAN CONTEST CLUB	628,013	WEST PARK RADIO OPERATORS	63,360
		WNYDX ASSOCIATION	58,177

Finally an antenna that I can actually make contacts with...*KN4Y*. First time submitting a log to *CQ* despite having written for the magazine since 1968...*N4XX*. My hat is off to those who run this contest on low power...*WD5R* (*Op. W5ECT*). Operating from South Texas is not like the Midwest...*W9YYG*. *K0UB* called me from Nebraska to save me from another 49 state weekend...*K5RX*. Lost my 160 antenna so loaded up my *R7*...*KT5Q*.

Could only spend half the time and made about half as many QSOs as I planned. I did have fun and that's all that counts...*KJ5WX*. Operated from my truck again this year. Location was Magic Mountain at 4600 feet...*KH6DX/6*. Power was completely independent of commercial utility mains. Solar power charged by battery and supplemented by a generator...*N6KB*. Operated from very salty Koehn Dry Lake this year...*K6SE*. Thanks to *W7RM* for the use of his super station. Even though the going was slow I nearly doubled last year's score...*W7RM* (*K17Y Op.*). Worked *WAS* and 35 *JA*'s, but the second night stunk...*W7GG*. Worked a few new states this time around...*WO7Y*. The *W9XT* board was broken so I keyed by hand...*K8ND*. This is my 29th consecutive year I've entered the contest...*K8OQL*. 100 watts from apartment with a hidden dipole antenna...*WB8T*. Ten inches of snow and an improved beverage let me hear better than I could work...*N8BJQ*. I had a black hole to the NW...*K8SIA*. No beverage, so hearing assisted by DSP filter...*AF8C*.

DX Soapbox CW

Conditions no good to NA. Only made two QSOs with USA...*G6QQ*. Too much work means too little contest...*PA0JED*. QRM from a neighbor's leaky cable TV system made it hard to work 160...*G3UFY*. My temporary antenna limited contacts. So does the limited band in *JA*...*JA1YNE* (*JP1OGL Op.*). Could only work part of the time this year. 500 watts and a single sloper heading west limited my receive capabilities...*UA9CDC*. Hard to make QSOs with 30 watts and low wire...*OH3TZ*. *OK1YM* made most of the QSOs. Surprise was *XZ0A* returning our *CQ*...*SV1DKR*. My linear blew up a few days before the contest. With low power its still a fun contest...*YC0LOW*. Worked new countries even with QRP...*UT5UUF*. My first *CQ* 160 CW but not my last...*IK3SSJ*. Good activity and plenty of ham spirit...*SM7GXR*. First time ever to hear Texas and Wyoming. Maybe next

year I contact them...*OK8ANM*. Homemade tube-type transmitter and old USSR- made 17-tube receiver...*SP6LV*. My 17th *CQ* 160 CW contest...*YU7SF*. Poor DX this year. Not a single USA or *JA* QSO...*OH5UX*. I was excited by a rare opening to USA east coast...*JH4UYB*.

Heavy QRM because of rain static here...*DL7MAE*. I am in Bosnia until May 2000...*T99RM* (*DL2JRM Op.*). Highlights were being called by *XZ0A*, *VK*'s, and *KV4FZ*. I love this contest...*UA2FZ*. Conditions very good to USA except for west coast...*HG3DX*. Thunderstorms (in winter) and poor conditions...*OE2VEL*. My first time and had fun with 300 watts...*YV1DIG*. The locations given were often very confusing. Why not always use the DXCC prefix?...*DL2KUW*. Most difficult QSO was *VK6HD* in all the *QRM*...*OT0U* (*ON7TK Op.*). Surprised at the activity in my first *CQ* 160. I do need a better antenna and an amplifier...*UA6LBS*. My antenna is very poor...*JK2VOC*. Snowstorm destroyed my antenna...*OH8CW*. I don't know what possessed me to play in the contest with low power and a simple dipole...*T17/N4MO*. Storms with QRM reaching 30 dB over nine make it hard to hear DX...*VP2EJ* (*W5SJ Op.*). Standard of operating has improved dramatically over the years...*M2D* (*G4BYG Op.*).

Biggest surprise was *VP6BR* calling me for a new one on any band. Thanks, *Jukka*...*C4A* (*5B4ADA Op.*). Its very difficult to make points in Japan with low power...*JE1SPY*. This year we used our special millennium call...*9AY2K* (*9A1A club*). Good contest but nothing from South America, Central America, or Africa...*VK3IO*. Thanks to *HA5JJ/7* for his help with HA logs again this year...*K4JRB*. Only operated 13 hours this year, but one of the few in Europe to work *VP6BR*...*9A2TW*. Did not finish antenna work until 0430Z on Saturday...*XE2/W6RW*. Thanks to *CQ* magazine for another fun contest. See everyone again in 2001...*ZL6QH*.

WVE Soapbox SSB

Sorry for the low score, but QRM S9 plus 40...*VE6CKG*. Thank goodness no ice this year...*W4DMB*. Despite not planning to enter the SSB contest I managed to play for 20+ hours...*K1KY*. The computer crashed writing out to the floppy disk...*W2MF*. Family obligations limited operating to just 9 hours...*AA1BU*. Thanks to *K4HA* for hosting me again...*NX9T*. Lost antenna the second night...*WA9TZE*. Band not hot this year...*N3BUD*. Strong short-skip signals but few DX and no West

Coast...*K3SA*. Operator etiquette was superb...*KE4SCY*. Just a small effort, as hosted a hamfest the same weekend...*AA1SU*. My signal became a lot louder when I moved that little switch on the amp from standby to operate...*KG0JP*. Nice to have *HC8N* call in during a run...*K4WI*. I was unaware that a storm had hooked my ladderline to a portion of my tower. Results the next day were much better...*WB6NFO*. Should have been operating from 2 to 4 AM Saturday morning, but slept through...*W7MC*. I said low power on 160 was nuts until *HC8N* and *P40V* both answered my *CQ*...*W9LVN*. No DX this year as signals were too weak to hear my QRP...*N8XA*. Boy, was static bad...*KC0FUD*. Sure could have used a beverage or *EWE* for receive...*N2NFG*. I think I worked all the hams in Ohio. Many thanks to them...*N8YEL*. My operators were right out of Winnie the Pooh...*N7DF*.

Glad to be back on 160...*N4NX*. Where were the stations Sunday morning?...*N5IA*. My inverted-L is mounted on a pier 150 feet out in the salt water...*AA4V*. One-half-wave balloon-supported vertical over salt marsh sure helped...*KB2BF*. Too many sunspots???...*N7ZT*. Could not hear Europe from Michigan the first night. We did work a few stations on the 2nd night...*K8KS*. Sorry we were so deaf the first night...*N7KQ*. The second night was quiet but conditions to Europe were poor...*N8TR*. Every year I say the band can't be any noisier and again this year I was wrong...*W0ETC*.

DX Soapbox SSB

First day conditions were so good that the band was S9+ QRM...*DL8PC*. My first experience on the 160 meter band. I need more space for antennas...*IK5WGK*. Lost the first day due to broken antenna...*OZ5EV*. I had local interference that I did not locate until the week after the contest...*PA0IJM*. No place for the ordinary station with all the QRM...*OK1TC*. Last 5 QSOs corrupted by the logging software...*DL9NEI*. Just installed antenna for this contest. My first time on 160 SSB...*EA6LP*. No DX between EU and NA according to my antenna...*I0KHP*. No antenna tuner so low power output...*SP9BQJ*. Arrived at ZF just hours before the contest ended. Quickly set up a low dipole and had fun for 3 hours...*ZF2JB* (*KK9A Op.*). Somehow the SSB section was missing from the local contest calendar so *VK* activity was very low...*VK3IO*. Strong signals in Atlantic Ocean...*EM1KY/MM*. Poor conditions in G land...*G3NAS*.

GUEST OPERATORS

CW

Call	Operator	UA4FWD.....UA4FAO
9A7T	9A2EU	UP6P.....UN6P
C4A	5B4ADA	UY1M.....UR9MM
EA8BH	OH2BH	UZ5U.....UT4UU
EU5A	EU1FC	VE2IM.....VA3UZ
HG1S	HA1TJ	VE3TDG.....VA3SYL
JA1YNE	JP1OGL	VP2EJ.....W5SJ
JA2ZJW	JH2CMI	VP6BR.....OH2BR
JA6ZLI	JJ6WYS	W2SEX.....K2YW
K0CAT	K9WIE	W3AO.....KE3Q
K2UG	WA2JQK	W3PP.....AA5B
K4VX	N9JF	W6YRA.....WA6AYI
K5XR	W5ASP	W7RM.....K17Y
LY3MR	LY1FF	W9SMC.....KJ9C
M2D	G4BYG	W9XG.....KE0FT
OG1F	OH1NOA	WD5R.....N5ECT
OG9A	OH1EH	WE1USA.....WA1LNP
OK8L	OK2SWD	WY2000.....AA4NN
SM3R	SM3CBR	YL8M.....YL2KL
SM6R	SM6HRR	YU1AAX.....YU1ZZ
T99RM	DL2JRM	ZA/OK1JR.....OK1JR

SSB

Call	Operator	SP7VC.....SP7GIQ
4U1WB	AJ3H	UT0D.....UT7DX
EA8AH	OH1RY	W1OP.....K1PLX
EU1KY	UT1KY	V47KP.....W2OX
K5ZD	K9XD	W4BCV.....K4JRB
OG2R	OH2BH	W5DDX.....WM9M
OT0T	ON4MA	W9XG.....KB0KRO
P40V	AI6V	ZF2JB.....KK9A
SM6R	SM6HRR	

VE3IMG. VE5RI: VE5FF, VE5FN, VE5WI, VE6EZ. VE6JY & packet. VQ9IO: VQ9QM/W4QM, VQ9DX/AA5DX, VQ9NL/W4NML. W1FJ & NB1B, W1KM. W1GD & packet. W1OP: W1GS, KA1KWE, K1DT, W1IUX. W2GD & W2RQ, K8NZ, W2CG, W2NO, W1GD, KU2C, N2AA, KB5U, KA2JKQ. W2RW & WB2KAO. W2YR & packet. W3FV & packet. W3OV & packet. W5ON: K5LG, K5GO, K0NI, N5OE. W5SB & WA8GHZ, K1OJ, W5IDX, KK5LD, W5MJ. W6UE: N6VI, AA6RX. W7CW & W7CW, W7GS, WU7Y, WG7Y. W8BAR: W1TO, W8WEJ, WA8SDA, W8VVE, K8BOT. W8TOP: K8GG, W8UVZ. WA4QDM & packet. WN90 & WN90, W9IU. WS4Y & K4WA. WY3T & KA3PVA, W3DSX, W3KGL, WR3H. XZ0A: WA6CDR, N5IA, G3NOM, V73GT. YZ7A: YU7CN, Tibi. ZL6QH: ZL2BSJ, ZL1AZE.

Station Ops SSB Multi-Op

AA4V & N4SF. AB2DE & packet. CS1A: CT1DXQ, CT1FAC, CT2FVL. DL2DBH & DJ9DZ. DL5RMH & DJ5MN, DL5RBW, DL5R8K. EA3BCP & EA3MR. G3UEG & packet. HB2CXZ & HB9AUS, HB9BLQ. HG1S: HA1TJ, HA1DAC, HA1DAE. IT9CHU & packet. IV3OWC & IV3TAN, IV3YK, IV3SHF, IV3TRK. IV3TDM & IV3JVJ, IW3SMA, IV3IHF, IV3NTA. K2FL & packet. K2TOP: WW2Y, K2WI, N2NU. K3DI & pack-

et. K3IXD & packet. K3KO & packet. K3WW & packet. K5KG: K5RC, K8KS & KG8CO, K8AA, W8TTH, K8BK, N8CC, K8AEM. K8OQL & packet. K9NR & N9LCR, AK9F, KF9IF. KF4ZR & packet. KK1DX & packet. KU3X & packet. LY2WJ & Giedre, Emigijus, Marius, Einaras. LY7A: LY3IT, LYR 346, LYR 728, A. Toleikis. N2VW & packet. N2WM & N2ATE, KB2LHH, K2BM. N3COB & K3DML. N4RV & packet. N7DF & J. Radford, D. Radford, Tigger, Keyore. N7KQ: W7CPA, K7OX, W7GNP, Keith Priest. N8TR & WB8K, N8Z, KF8UN, W8BIN, N8DMM. NA5B & packet. NE3F & KS3F. N02R & packet. N0KOV & N0RWB, N0UJQ, WB0SRP. NY3C & packet.

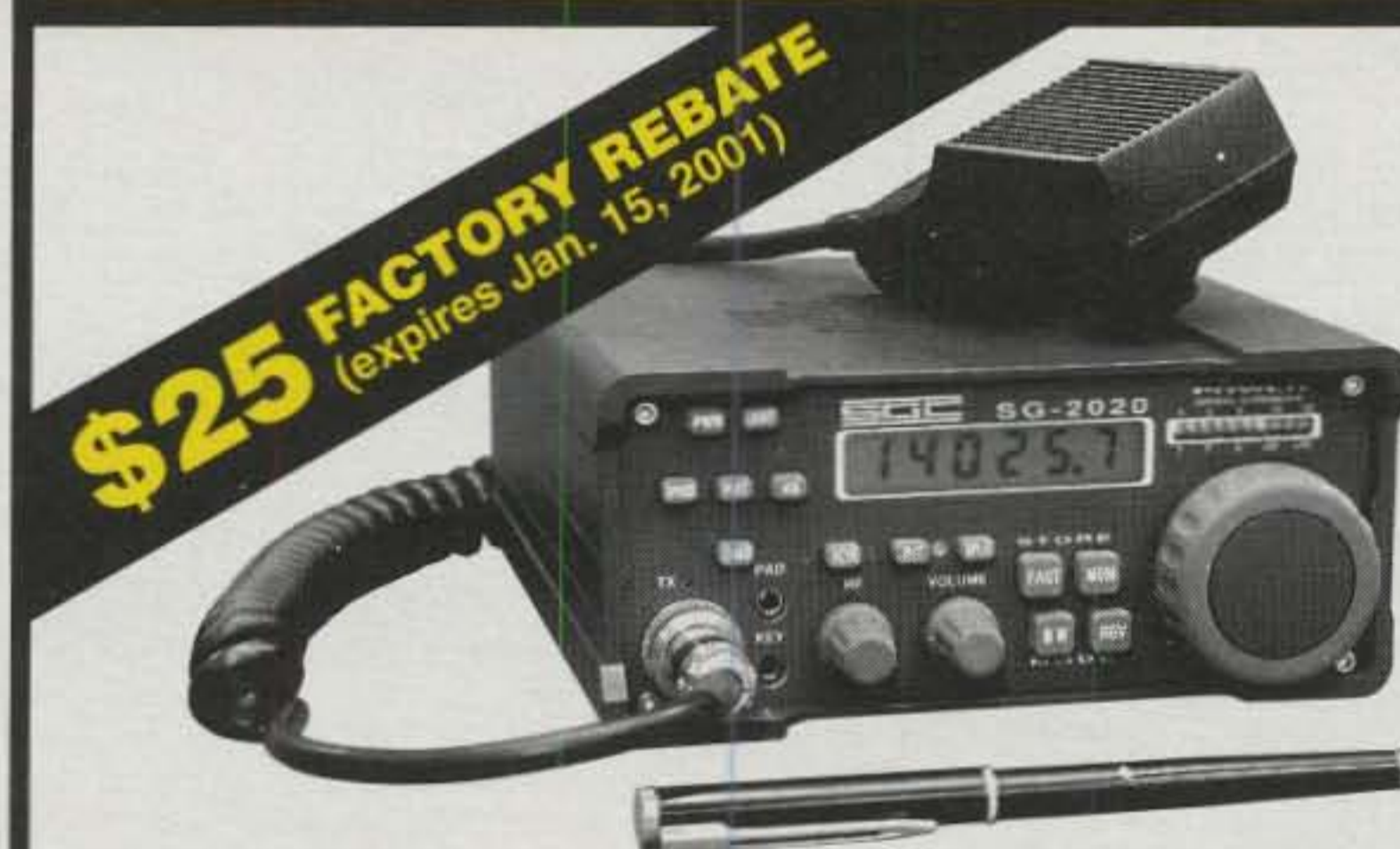
OA40: OA4AHW, OA4BHY, OA4CVT, OA4DJW, OA4DKC. OG4AB: OH4KBC, OH4MFA, OH4KEC, OH4KZM, OH4MDY, OH4YR. OM3KZA: OM3CUG, OM6FN, OM3TYC, OM3YDX. PA3GCV & PA4WM, PA7KW. R29WXX: Vlad Noskov, Rustem Timergazsasha, Ivanov. S50Q & S56M, S57AW. S51TA & S57M. U07J: UU0JM, UU8JK, UU6JM, UUSJBO, UU4JDD, UU4JMG. VE2UMS: VE2FAB, VA2FRU, VE2AC. VE3DC: VE3SS, VE3AHQ, VE3BK, VE3FBO, VE3OCY, VE3SST, VE3YOC, VE3VMO. W1GD & packet. W1TO & packet. W3UL & packet. W8FJ & packet. WA4RS: N830, WB3FUM, KF4ZFY. WN90 & W9IU. W01N & packet. WY3T & W3RH, KA3PVA, WA3BFP, W3MEL. XE1RCS: XE1JG, XE1ME, XW1VIC, XE1JY, XE1KK.

(Continued on page 121)

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Few signals on 160 from here. Only NP4A could hear me...CE0ZY (DL3DXX Op). Top guns took over the band so the low power guys could not make many QSOs...9A2EU. Conditions not as good to NA as last year...PA3GCV. Compliments to I4JMY for his efforts...IV3OWC. Hope we had better signals to Europe this time...XE1RCS. Only 50 QSOs between midnight and 6 AM...OT0T (ON4MA Op.).

Station Ops CW Multi-Op

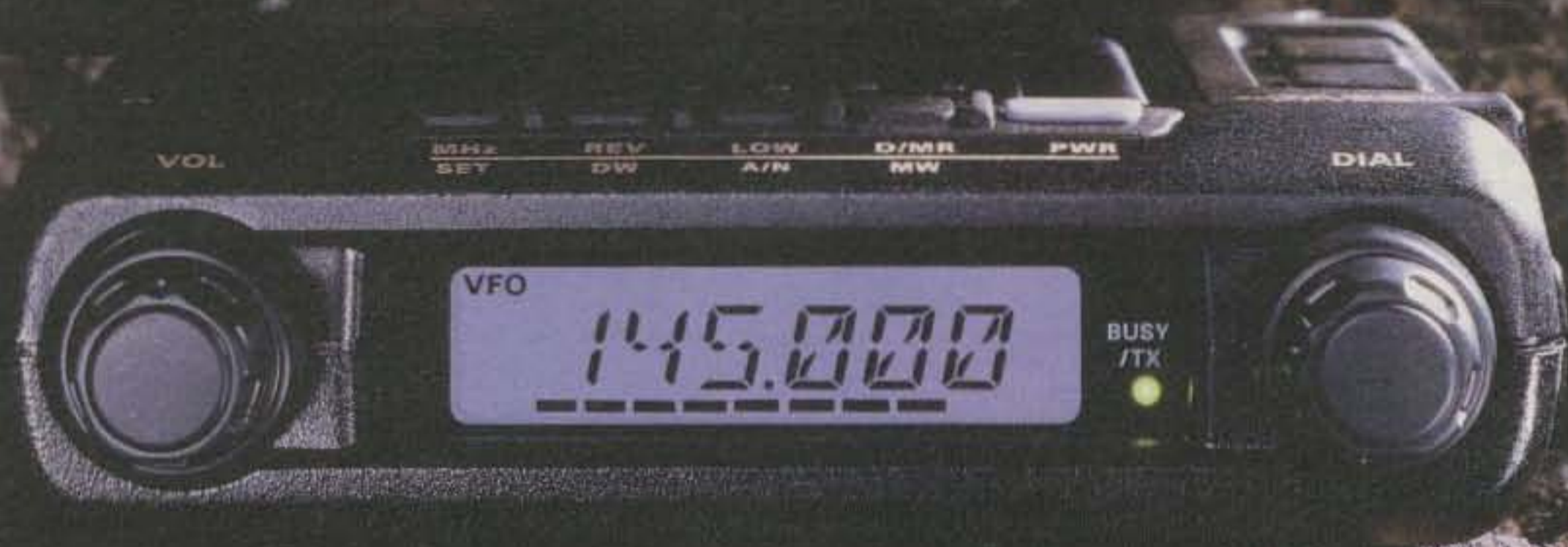
9A1CIG: 9A6C, 9A3MR, 9A5DI. 9AY2K: 9A5W, 9A6A, 9A7R, 9A3GW, 9A9A. AA3B & packet. AA4GA & W4WA. AA4V & packet. AB4RU: W4WA, packet. DF3CB & packet. DJ5IW & DF3CB, DJ8QP. DJ8QP & packet. DK0IU: DJ4KW, DJ6TK. DK2OY & packet. DL2KUW & DK3LT. DL2MDZ & packet. DL3DXX & packet. DL5RBW & DL5R8K, DJ5MN, DL5RMH. ES2X: ES2RJ, ES2NA. G3ASR: G3WUX, G4IUZ, G0IGP, G%0RM. G0WAT. HG3DX: HA3KW, HA3MY, HA3UU. HG6N: HA6PX, HA6NY. I4JMY & IK2QEI, IK4MTF, I22AAJ. IV3TAN & IK2NCJ, IK2PFL, IV3SHF, IV3YK. JA0ZRY: JE5UMJ, JG0EBW, JG0CSW, JH5XDD, JL16JE, JP1NOM, JP1OGO, JR0NRG, JR0BQD, W47K1DBH. JI5SKS & packet. JK1GKG & packet. JY9QJ & packet. K0DU & K0CL. K0RF & W0UA. K0SX & KJ0G. K1VV & packet. K20WE & packet. K2SB & packet. K2TOP: K1ZM, K2WI, N2NC, N2NU, WW2Y. K3II & packet. K3KO & packet. K3ND & packet. K3NZ & packet. K3WW & packet. K4IQ & packet. K4PB & packet. K4TW & K4EA. K5MDX: WQ5L, W5UE, N5FG. K6SE & K6NDV, KR6C, K6NR, N6HB. K70A & NS7K, NS7B. K8OQL & packet. K8XXX: N8CC, N8Z, K8AQM, K8JM, K8BK, K8CA, K8AEM. K9NR & K9CS. K9F. K87N & N7VMV. KD9SV & K9A, K9LA, K5ZG. KE3VN & packet. K0BE & N8VW, K9NW, W4EF/6.

LY2TA & packet. LY2VAD: LY1FZ, LY3BS, LY-728. N1MD & packet. N2BIM & packet. N2XI & W2RE, N1NY, AB2BK, KC2CMA, N2IX. N3AD & packet. N3MKZ & packet. N4RV & packet. N4XX & packet. N6KB & K6SUY, KF6TQI. N6KI & KU7I. N7JW & K7CA, W4UT. N7KQ: K5AWO, W7CPA, K7OX, KJ7TX, W7GNP. N8TR & packet. NA5B & W5AO, W0RRY. NB30 & WA1LWS. NE3F & KS3F. NN7A & NE7I, KA7TDH. N02R & packet. NT4DX: AA4GA, W4WA. NZ3A & packet. OE2VEL & packet. OG6K: OH6KSR, OH6NJ, OH6UV, EX-OH6NU. OK5DX: OK1TA, OK1CW. OK5W: OK1AEZ, OK1CF, OK1FKD, OK1JKT. OL5Q: OK1HRA, OK1FLC, OK1FFU. OM0U: OM3BH, OM8AU. OM3KZA: OM6FN, OM3TPN, OM6MW, OM3YDX. OM7M: OM2XW, OM3PA, OM3TQZ, OM5RM, OM5RW, OM5ZW. OT0U: ON500, ON7SS, ON7TK.

PI4ZLD: PA5KT, NL8884. RM6A: RN6BN, RA6CO, RA6CN. RU1A: RW1AC, RV1AW, RL1AA, RN1AM, RA1ARZ, ALEX. RW2F: RA2FA, RN2FA, UA2FF. RY9C: RU9CK, UA9CGA. S50A & packet. S50Q & S56M, S57AW. S51TA & S56A, S5500. S54X & S54X, S50X, S57MVU. SK6TW: SM6DOI, SM6DER. SP5ZCC: SP5UAF, S05GVX. SP9KRT: SP9ADU, SP9EMI, SP9-1703. SV1DKR & SV/OK1YM. US4QWX: operators. UT7L: UY5LW, UR4LRG, US4LW. UU7J: UU4JMG, UU8JK, UU0JM, Andrey, Denid. VE3MIS: VA3UA, VE3XAP,

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If you've discovered the joys of 222 MHz, or you'd like to (and you should), then ADI's AR-247 FM mobile rig is an excellent choice on a very short list.

CQ Reviews:

The ADI AR-247 222 MHz FM Mobile Transceiver

BY RICH MOSESON,* W2VU

In any market dominated by a few large companies, smaller firms must do something different in order to compete, whether it's offering lower-priced products or variations that the "big guys" don't have. That rule applies in amateur radio, where three large companies dominate the equipment marketplace. How does a smaller company set itself apart to "stay in the game"? In the case of ADI, one way has been through the bold step of introducing the first new mobile rig in years for the 222 MHz band—the AR-247.

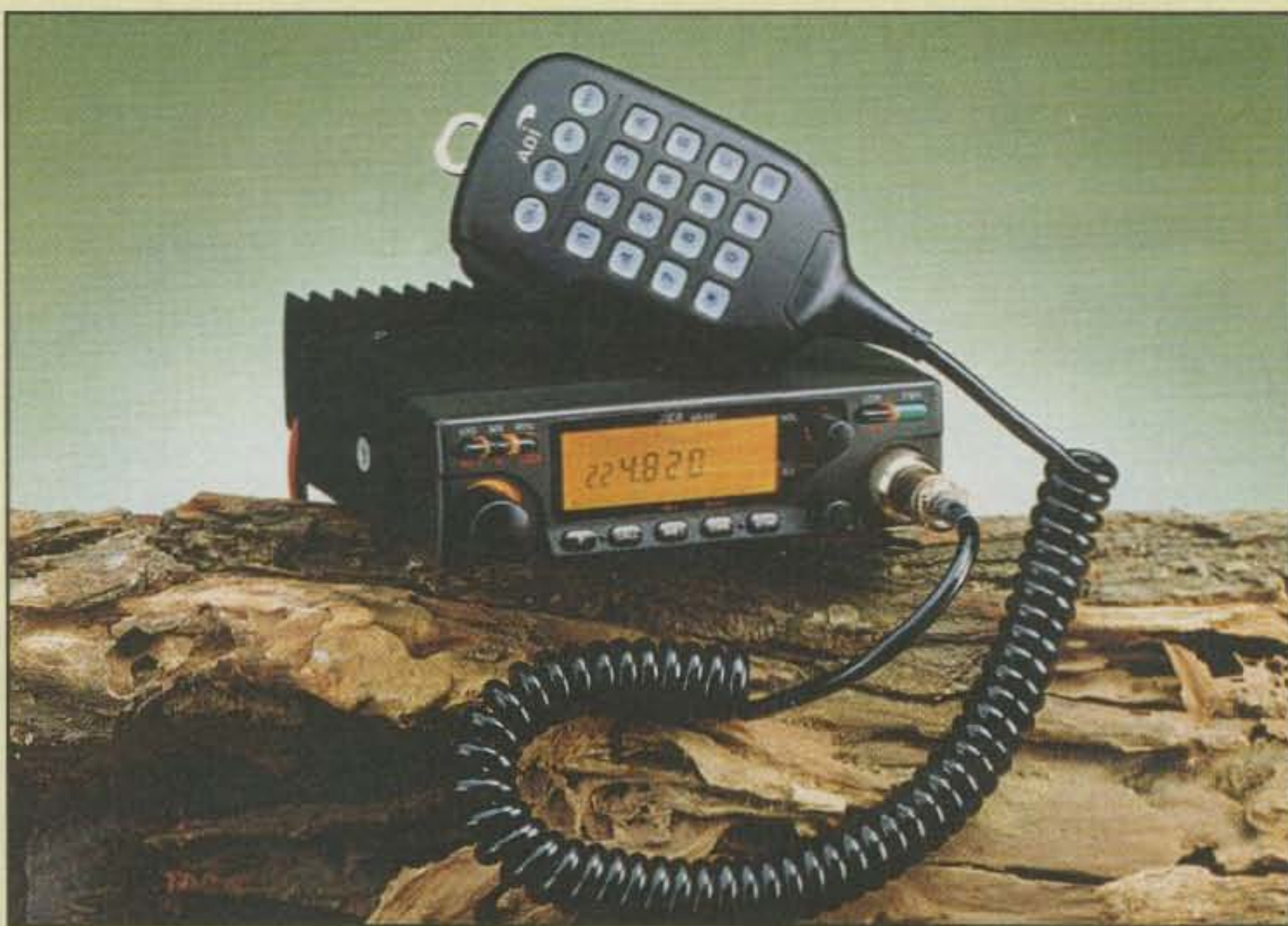
Before we talk about the radio, though, let's take a few minutes to explore the band and its recent history.

The 222 MHz Band

Amateur radio in the United States has a primary allocation at 222–225 MHz. However, the band is so lightly used that it's been called "the forgotten band," and the FCC even took away two megahertz of it several years ago. Why is this band so lightly used and why should you consider investing in equipment for it?

First, let's look at the characteristics of the band. Halfway between 2 meters and 70 centimeters, 1.35 meters (also known as 135 centimeters, 1.25 meters, and 125 centimeters) shares some of the best features of each of those bands. Its normal ground-wave range is similar to that of 2 meters, but its shorter wavelength allows signals to more readily penetrate buildings. On the other hand, signals here are *less* likely than those at 440 MHz to bounce off

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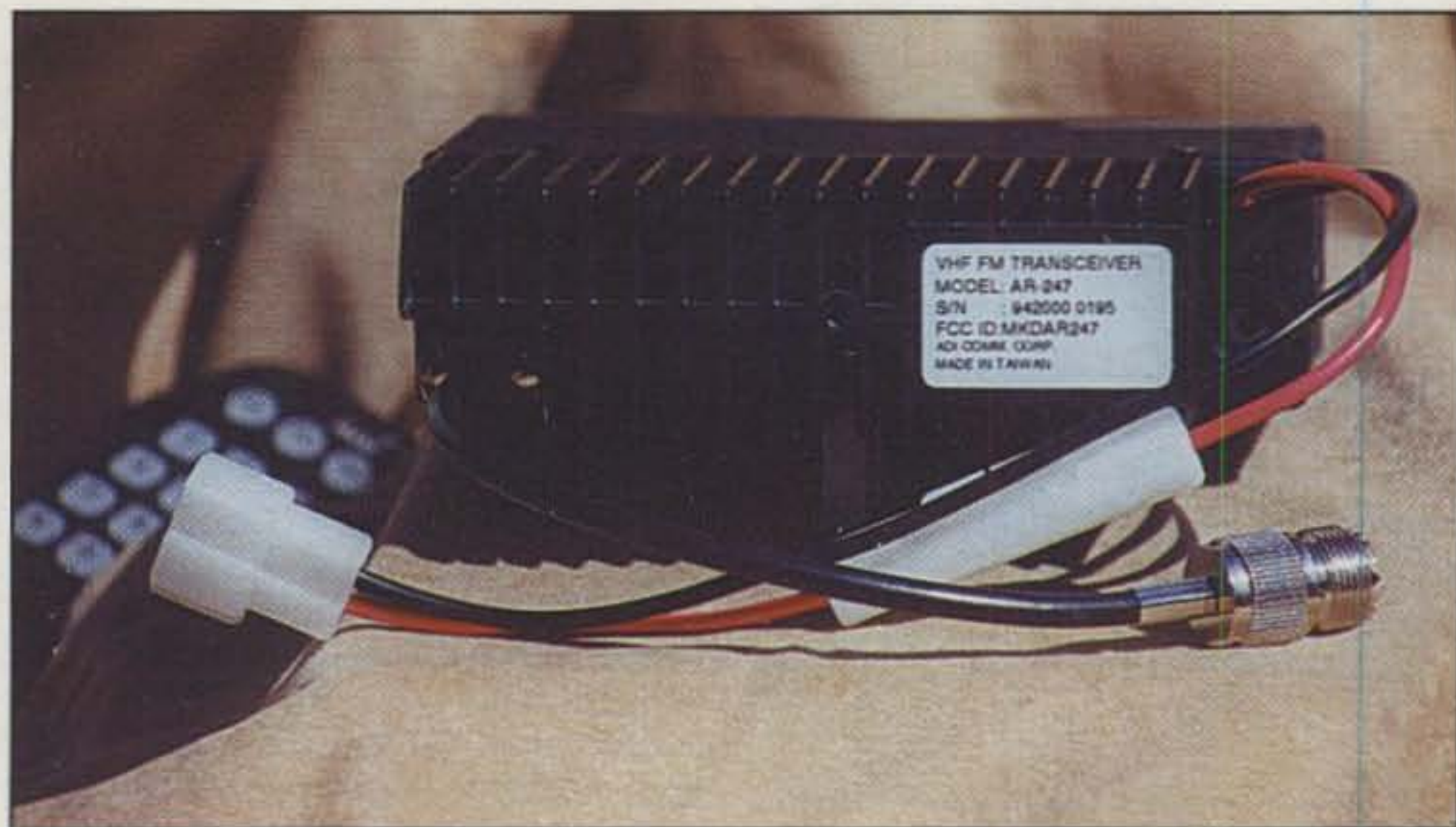


Front panel of ADI's AR-247 mobile rig for 222–225 MHz. The controls are easy to access, even without looking at the radio, and the big LCD display makes for easy viewing when you do look at it. (Photo courtesy of ADI.)

buildings and other objects, resulting in multipath (picket-fencing). Tropo "openings" and distances are similar to those on 2 meters, and you'll find aurora and meteor-scatter possibilities here as well. There have even been a few documented cases of sporadic-E propagation reaching as high as 222 MHz, an area in which greater research and experimentation are needed. Hams who operate 222 will tell you that it also has a distinctive "personality" that's hard to define in words. You just have to experience it. In addition, the band is less crowded than either 2 meters or 70 cen-

timeters (for reasons we'll discuss in a moment), so if you're looking for a place to get away from the crowds but still have good VHF coverage, this is the place. One other benefit: It is the *only* band below the microwaves where *all* hams have voice privileges, regardless of license class.

So why is the band less crowded than its neighbors? First of all, the amateur allocation at 1.35 meters is *not* worldwide. It is not available to hams in Europe, or perhaps most important from an equipment perspective, in Japan. Here in the U.S., the band used to extend



Rear view of the AR-247. Note the large heat sink and pigtail connections for power and antenna. (W2VU photos)

from 220–225 MHz, and amateur radio was a secondary allocation (although the primary user, government radiolocation, rarely used it, so it was effectively an exclusive amateur allocation). Because it's not a worldwide amateur band, equipment has been rather limited, and because equipment is limited, so is usage. Another problem is that the FCC spent nearly a decade deciding whether to reallocate some or all of the band to other services, and this "limbo" status for the band was an even greater deterrent for manufacturers and amateurs alike to invest in equipment for 220. Why build or buy a radio for a band that might soon be taken away?

Fortunately, the FCC finally made up its mind (in 1991), taking 220–222 away from amateurs, but at the same time making 222–225 a primary amateur allocation. In a later action, the FCC also gave hams limited access to 218–219 MHz for high-speed data links. Not a single amateur station has been put on the air on 218–219, but that's a whole other issue. In any event, even though it's been nearly a decade since the FCC realigned the band, the pattern had been established that typical dual-band FM rigs covered 2 meters and 440, but not 222.

Now some equipment makers are starting to test the waters by including 222 in multiband VHF/UHF rigs, and ADI has taken the somewhat risky step of introducing the AR-247, the first new FM mobile rig in years devoted exclusively to the 1.35 meter band.

The AR-247

The AR-247 joins ADI's single-band radios for 2 meters (AR-147) and 70

centimeters (AR-447), and it has all the standard features that you'd expect in a modern FM mobile rig. It receives from 215–230 MHz, transmits only from 222–225¹, and offers three power levels—5, 15, and 30 watts. The radio has 81 memory channels, including one quick-access "call" channel (I put 223.500 MHz, the national simplex frequency, into that slot). Each memory can store a dozen different parameters, including receive frequency, transmit frequency offset and direction (on 222, the standard for all repeater frequencies is negative offset, 1.6 MHz), CTCSS tones or DCS (digital coded squelch) codes, and more. There is an option for code squelch (C.SQ) on receive which keeps your receiver muted until a three-digit digital code is received. This also permits the system to be used (in a network with other similarly equipped radios) for paging. Memory contents may be shifted into the VFO, if you would like to tune from a preset frequency.

There are three memories that are reserved for specific functions, so keep this in mind when you program them. Channel 1 is the "dual watch" channel, where the rig will periodically listen for activity, even if you're on another frequency (this feature may be turned on or off). Put in a frequency that you'll want to be able to keep track of, perhaps a favorite repeater. In addition, the frequencies in channels 11 and 12 set out the limits of the programmable band scan function. Be sure the frequency in channel 11 is lower than the one in channel 12, and that both represent the borders of the frequency range you want to scan in the band-scan mode. If



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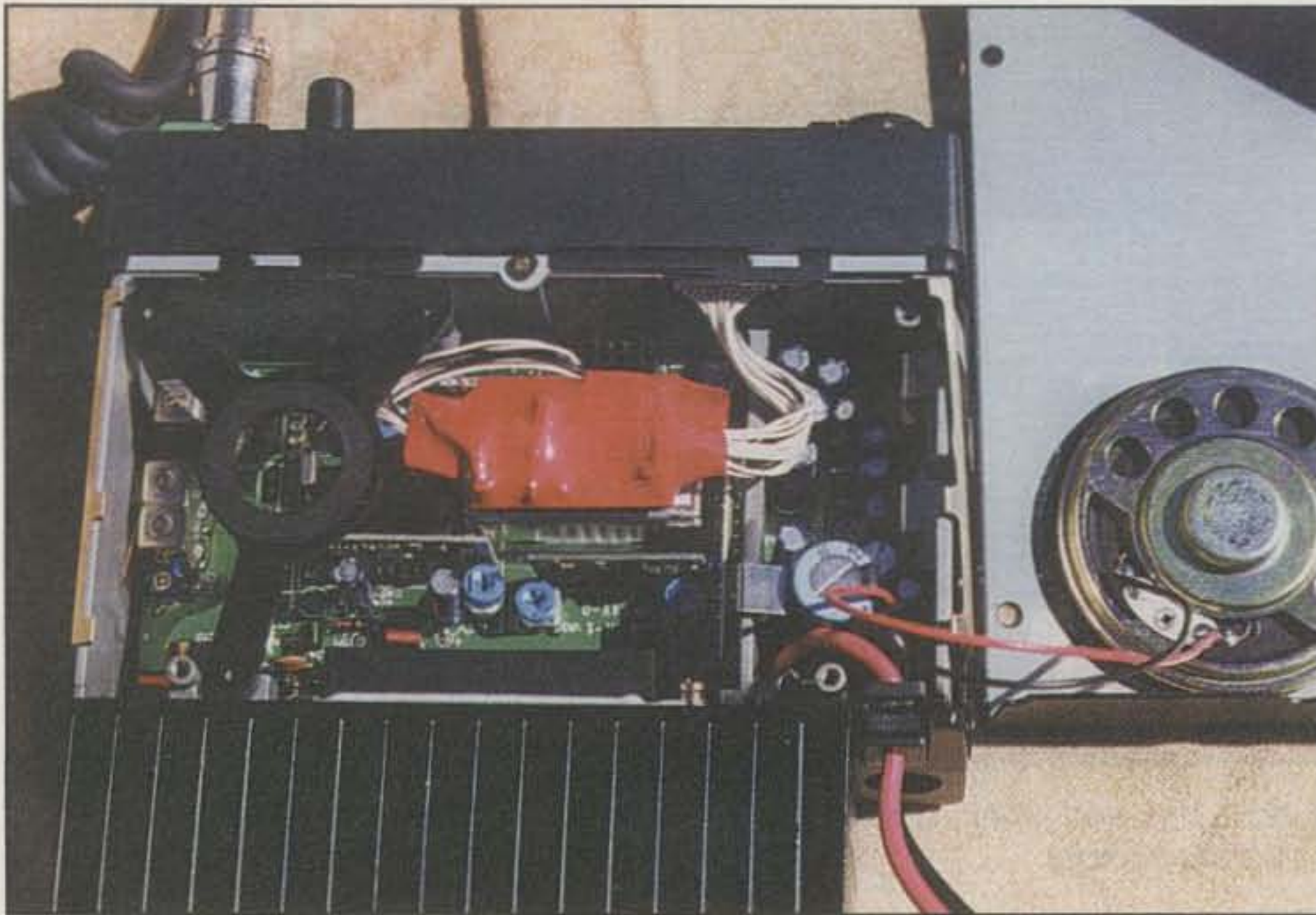
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Top inside view of the 247. The circle at the left is a bracket that fits around the speaker to keep it from vibrating.

channel 11 has the higher of the two frequencies, it will do a full band scan. The only memory-related feature found in many other mobile rigs that's missing here is alphanumeric memory labeling, so you'll have to remember which frequency is for which repeater.

There are three scanning options for the receiver: full band scan, programmable band scan (see above), and memory scan. You may also set the scan function to operate on either a time basis (about 3 seconds on each frequency) or a busy-channel basis (staying on a busy frequency until about 3 seconds after a signal drops). In addition, you may program any memory channel to be skipped during memory scanning. The receiver will also scan to identify an unknown CTCSS or DCS code on a received signal. The code can

then be quickly entered into memory just by clicking the press-to-talk (PTT) key on the microphone.

In VFO mode, frequency steps are user-selectable at either 5, 10, 12.5, 20, 25, or 50 kHz. Plus, there's a "MHz" button on both the radio and the microphone that lets you easily change frequency 1 MHz at a time.

A Quick Tour

The front panel of the AR-247 is well laid out, and the most commonly used controls are easy to learn for "no-look" operating while driving. In addition, the microphone contains frequency up/down keys and four buttons—call channel, VFO, memory, and MHz—for easily accessing a variety of frequencies. These four buttons duplicate front-

panel buttons, but are placed on the mic for safer use while driving.

The cable of the supplied mic has a lumpy thing right near the connector. This is an RF choke that was added to eliminate problems that had been encountered with direct frequency entry from the microphone's tone pad. The manual says the microphone jack has a pin containing receive audio, but ADI tells us this was eliminated at the last minute because of PC board layout problems. Therefore, if you're using the 247 for digital communication, you'll need to run two wires between the radio and the computer or TNC—one from the rear speaker jack for receive audio and another to the mic jack for transmit audio and PTT.

The radio's back end is taken up mostly with a large heat sink, which does its job well. Other radios I've had get quite hot after extended high-power use. This one doesn't. Also on the back side are the power and antenna connectors, both on pigtailed with connectors attached, in order to minimize the radio's overall size. The case is metal, and the circuitry inside is neatly laid out and well-manufactured. There's even a three-point device to hold the speaker in place. Presumably, this is to help prevent speaker damage in high-vibration settings.

On the Air

Of course, the true test of any radio is on-the-air performance, and the AR-247 passed with flying colors. Signal reports were excellent, and received audio was loud and clear, even in a relatively noisy mobile environment. Operation is quite intuitive, and programming new repeaters on the fly was relatively easy. I am fortunate to live in an area where there is a reasonable amount of 1.35 meter activity, so I was able to make a variety of contacts on several different repeaters.

ADI has taken a risk by bringing a 222 MHz mobile rig onto the market. The other manufacturers are certainly watching to see if it succeeds. If you want to see 222 become a "mainstream" ham band and want to have a similar level of equipment choices for this band as we do for 2 meters and 70 centimeters—and you want an excellent radio at the same time—then you certainly should consider the AR-247. It is virtually the only high-powered 1.35 meter transceiver with the features most of us have come to expect from our VHF mobile rigs today. List price is \$324.95, and it's generally selling in the \$275 range.

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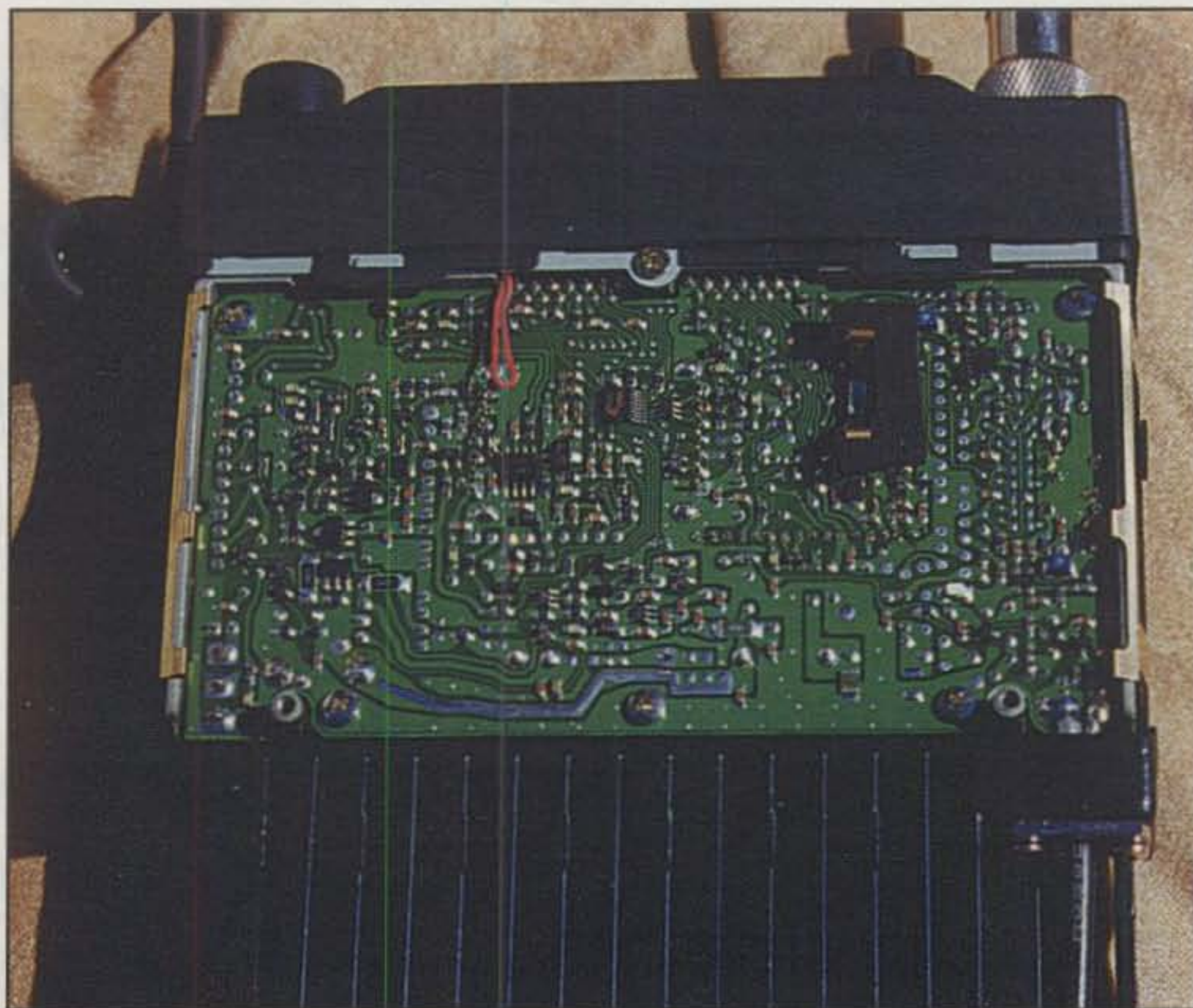
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Before you buy anything, though, try to find out about 220 activity in your area. If there isn't much, don't let it stop you. Just find another equally-interested ham and buy *two* radios! Then start telling everyone else how great the band is and stir up more activity. ■

Note

1. Transmit range can be extended to cover the radio's entire 215–230 MHz tuning range. This will be particularly helpful for hams in Canada, where 220–222 is still an amateur allocation, and for MARS members who have nets in the MARS allocation above 225 MHz. In the unlikely event that anyone is able to jump through the necessary hoops to get permission to run high-speed packet on 218–219 MHz, this modification will allow the AR-247 to operate there as well. To make the mod, remove the bottom cover and find the red wire loop (the only wire visible). Cut it, cover both ends with electrical tape or heat-shrink tubing, and then do a soft reset of the radio by turning it on while holding down the MR key on the front panel.



Bottom interior view of the AR-247. Note the wire loop that can be cut to expand transmit range to 215–230 MHz. (See note 1 for possible applications and instructions.)

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If our review of ADI's 222 MHz mobile rig elsewhere in this issue whetted your appetite for operating on 1.35 meters, but you can't find any 220 repeaters in your area, here's VE7IJJ to tell you just how easy it is to put one on the air and create your own activity on the band.

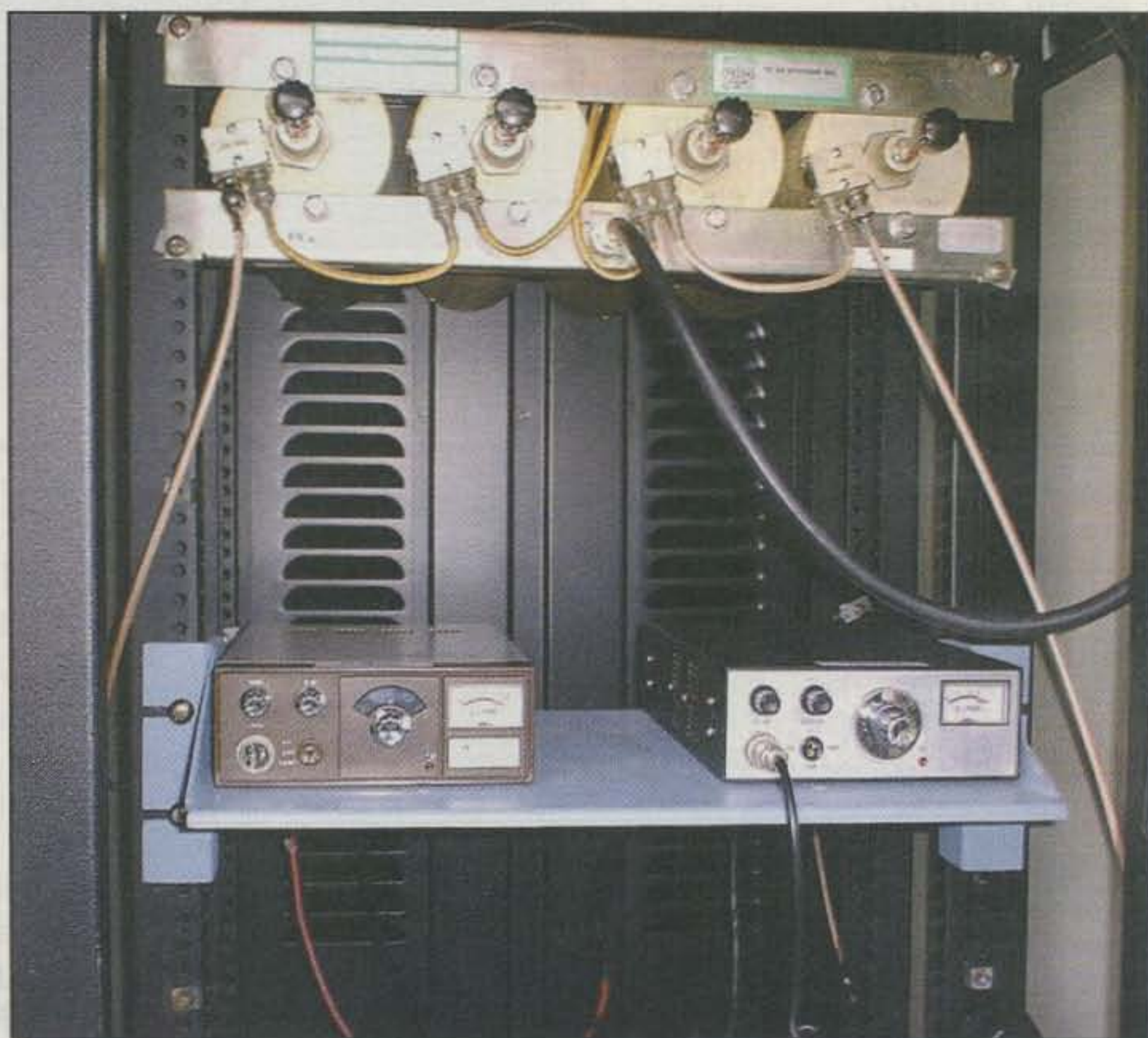
From Junkbox to E-Bay The Birth of a 220 Repeater

BY DENNIS WIGHT,* VE7IJJ

I have always been interested in 220 MHz radio, but a serious shortage of available equipment kept me off the band. One evening over coffee, though, I heard of a used KDK 4033 FM rig that was available. I made the deal and became the proud owner. Put together a simple 1/4-wave antenna, and I was on the air.

A few repeaters were within range (I live in a suburb of Vancouver, British Columbia), and after a few calls I began to get some results. The guys I talked to were very friendly and had lots of advice. My observations at this point are that if you announce yourself on any of the 220 repeaters in a given area, you probably will get a response, unlike 2 meters, where you probably will *not* get a response in many areas. One thing became very obvious, very quickly: very little traffic, and about six repeaters and 20 users within range of my station, and this includes two high-profile repeaters in the state of Washington.

Most hams have never used 220 MHz. In many ways, it truly has become the *forgotten band*. Rather than simply lamenting its under-use, some friends and I decided to do something about the lack of operators and equipment. I purchased two used Midland 13-509 transceivers and a Clegg FM-76. The Clegg and one of the Midlands would make a nice local repeater at about 10 watts, I figured. (These are crystal-controlled, 1970s-vintage radios, but are still occasionally found in flea markets. They tend to be workhorses and are ideal for a use such as a low-power repeater, in



The VE7RUG 220 MHz repeater system, showing cavity filters (top) and the two 1970s-vintage radios—a Midland 13-509 (lower left) and Clegg FM-76 (lower right) used as receiver and transmitter.

which frequency agility is not needed. — ed.).

I did need some help, which was provided enthusiastically by Gerry, VE7IIR; Marty, VE7MTY; Rich, VE7MNC; and Jason, VE7JFB. In addition, Tom Bigelow, KG7IK, who owns one of those two high-profile 220 repeaters in Washington State, took plenty of time to explain how his system worked and of-

fered us all sorts of advice on how to set up our repeater.

The "E-Bay Repeater"

Marty and Rich started looking on E-Bay for cavities (for those of you who aren't into the technology of repeaters, cavities are highly selective filters that permit simultaneous reception and

*21728 Mountainview Crescent, Maple Ridge BC V2X 3V1 CANADA
e-mail: <dfwight@attcanada.ca>

What Equipment Is Available For 220?

Since one of the main obstacles for many people in getting on the 220 MHz band is a perceived shortage of equipment, here is a quick guide to currently available new FM gear. Contact your favorite ham dealer for prices and ordering information. Additional, older equipment is available on the used market.

Mobile/Base Radios

ADI AR-247: 35 watt, full-featured mobile transceiver for 222–225 MHz. (See review, this issue.)

Kenwood TM-331: 25 watt, single-band mobile rig. Slightly older technology, but still an excellent radio.

Kenwood TM-642/742: 220 is one of two standard bands on the tri-band TM-642 (2 meters is the other), and is an optional third band on the TM-742 (2 and 440 are standard).

Ten-Tec 1230: 20 watt, single-band transceiver *kit*. Figure on approximately 20 hours to build it. Ten-Tec does not sell through dealers, so you will have to contact them directly.

Handhelds

ADI/Pryme 222: 5 watt, single-band handheld, receive coverage from 216–229 MHz.

Alinco 280: 4 watt, single-band handheld, receive coverage from 210–240 MHz.

Yaesu FT-33R: 5 watt, single-band handheld, in-band receive only.

transmission on the same band from the same location without the receiver being overloaded by the transmitter.—ed.) There were some in Seattle, and we were the highest bidders. Next we needed a controller. Back to E-Bay, we found there was one in Alaska, and we were the highest bidders again. (If our luck continued, we would be broke before the repeater got on the air.) With the basic equipment in hand, Jason, VE7JFB, agreed to help, and we were off to the races. Jason is a radio technician who works in a very large shop.

The Midland and the Clegg are crystal-controlled radios, and I contacted West Crystal of Kelowna, BC (trying to buy Canadian whenever possible) about getting them made for us.

Next I contacted the British Columbia Frequency Allocation Committee for a frequency. Their representative, Rob, VE7BKU, explained why we had to use the Allocation Committee (*This is the*

Canadian equivalent of frequency coordinators in the U.S.—ed.). This is probably the most crucial step in the whole implementation procedure. You cannot just decide to put a repeater on the air without any coordination.

We were given a choice of two frequencies—224.880 or 224.820. After extensive RF testing, we picked 224.8800 as the frequency for VE7RUG, the call-sign which Marty, VE7MTY, had already obtained from Industry Canada (*Industry Canada is the Canadian equivalent of the FCC, and its rules require repeaters to have their own calls—ed.*).

On the Air!

The big day came on Tuesday, 22 August. "RUG Radio" was on the air, and after a bit of fine tuning it worked very well. Output of the transmitter through the cavities was 5.8 watts and into a 5 dB gain antenna 40 feet above the ground. The repeater can be used from

as far south as The Glen in Washington State, throughout the Fraser Valley and up into North Vancouver.

The only problem we encountered was limited availability of equipment for our group. We tried to purchase within Canada, but the supplier kept stating the radios were on back order (*see sidebar for a list of currently available 220 MHz equipment*). Some of our users decided to order from one of the major US dealers and had their radios two days later.

Establishing this repeater was in itself a very simple exercise and did not involve a tremendous investment in either time or money, particularly when the costs were shared. I would estimate the time frame from conception to fruition was six months, and the approximate cost, in US dollars, was less than \$800, broken down as follows:

Cavities:	\$ 500.00
Radios (used):	100.00
Callsign:	60.00
Controller:	100.00
Crystals:	35.00

Power supply, rack, antenna, and lab were all donated or scrounged.

The one item that I cannot account for is the time we spent getting the repeater operational. However, it was fun. We must have enjoyed the experience, because we have plans for a 6 meter and 440 repeater within the next year. We also learned a lot in the process, and maybe we moved away from being a bunch of appliance operators to understanding a little more about the technical side of our hobby. We are currently looking for more 220 MHz gear, in the hopes that if we can locate more equipment, we can increase the size of our user group.

Lesson: If there is no activity on a band of interest in your area, don't just complain. Go out and do something about it! You'll be glad you did. ■

Let's Not Make the "Forgotten Band" the "Former Band"

Hams have largely forgotten the 220MHz band, and the manufacturers will not produce radios if the market is too limited. If this trend continues, the frequencies will be taken over by others or our user status will change from primary to secondary. Look to the USA for what may come. The bottom two megahertz of the 220 band there (220 to 222) has been reassigned for commercial use. The commercial pressure for our bands is increasing day by day. Even the 430 to 450 band is underutilized—lots of repeaters but very few users. When (not if) we lose these bands, we will not be able to blame anyone but ourselves. The writing is on the wall: "Use them or lose them." —VE7IJJ

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If there's one thing hams love to do, it's talk. Well, just imagine that you couldn't. At all. KD4HTX has combined computer technology with ham ingenuity to provide help for those who, temporarily or permanently, find themselves unable to speak.

CHIPSpeaking

"Free Speech for the Vocally Disabled"

BY JOHN T. McF. MOOD, S.F.O.,* KD4HTX**

Imagine what would happen if you suddenly lost the ability to speak. It would be as if someone stole all the microphones in your station. You would have no real alternative other than Morse code or a computer keyboard to make your needs known or to use the radio. On a number of occasions, I have found myself temporarily unable to speak, due to a bad cold or laryngitis. However, doing something about it never really crossed my mind until someone in my life became permanently speechless due to disease.

About four years ago, my only brother, Chip, was diagnosed with Amyotrophic Lateral Sclerosis, commonly known as Lou Gehrig's Disease. It is called Motor Neuron Disease in Europe and *maladie de Charcot* in France, where a Dr. Charcot first differentiated it from other neurological diseases. ALS has no known cure, and there is only one treatment that exists as of now to extend the lifespan of its victims, and only slightly.

Lou Gehrig, Jim "Catfish" Hunter, actors Michael Zaslow and David Niven, NFL player Glen Montgomery and U.S. Senator Jacob Javits¹ all succumbed to this disease. It usually takes the life of the individual within two to three years of diagnosis, although some, including

physicist Stephen Hawking and my brother Chip, manage to hang on longer.

All of this left me more or less clueless as to what I could do for my brother and his fellow ALS patients. The doc-

costs prohibitive, so I set about writing a speech-synthesis program to help Chip and other PALS with the problem of being understood. Since in most cases ALS care costs a great deal, I thought it would be an appropriate use of my spare time.

Development was not as difficult as I thought it might be. I looked around and found that Microsoft has technology called Agent 2.0² which can easily produce speech, provided you know a little about programming in any of the Microsoft family of languages. I chose Visual Basic 6.0 since I had some experience with basic BASIC (Beginners All-purpose Symbolic Instruction Code). It's a far cry, as I found out, from BASIC/GWBASIC to Visual Basic 6.

I had to learn the interface, learn the language, design the screen, fill in the code, beta test it, and run it by several PALS for comments and suggestions. In the space of about five months and much of my spare time, I came up with something that appears to be quite workable. I call the software CHIPSpeaking³, in honor of my brother. It's also an acronym for *Conversational Help for Individuals with Problems Speaking*.

Introducing CHIPSpeaking

The software features an onscreen keyboard for use with trackball mice or with Windows-compatible eye-tracking devices commonly used by people with disabilities. While eye trackers are expensive, they often provide the only way for some people to use a computer.



The author's brother, George McF. "Chip" Mood, III, for whom the CHIPSpeaking software is named. (Photos by the author)

tors can't do much, but they are trying their best, and deserve all our support to help them find a cure. The ALS community prefers the term *PALS* for *People with ALS*, when referring to someone with this disease.

PALS often lose their voices in the progression of the disease, leaving them unable to ask for help, indicate needs, or even just talk to family or friends. My brother asked me to find something he could use to communicate. There is commercial speech synthesis software on the market, but it costs \$800 to \$1300, not including any of the computer hardware. I found the

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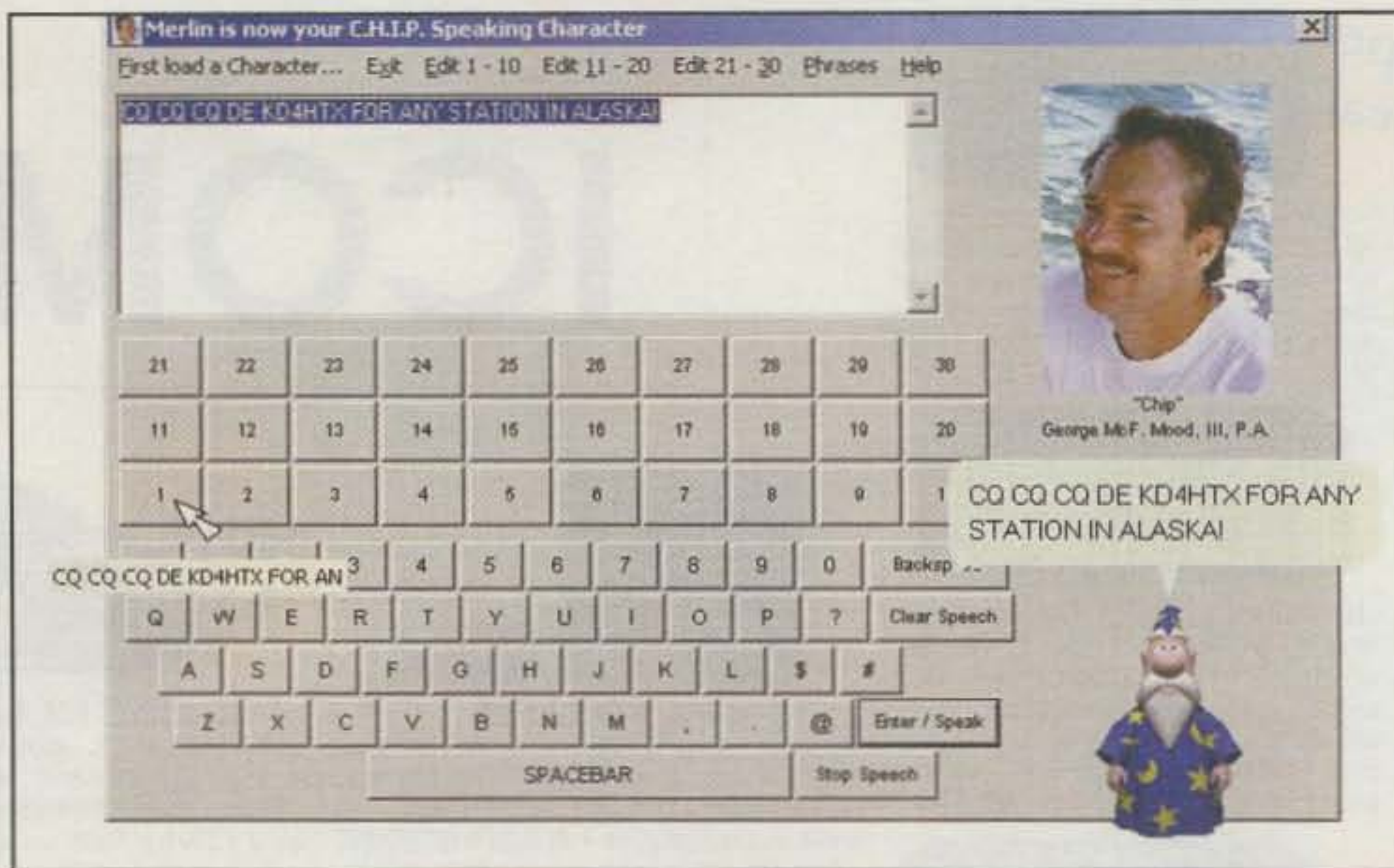
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Screen shot of CHIPSpeaking screen with on-screen keyboard.

CHIPSpeaking also has what I call *speech macros*, programmable from a menu in the program. This feature can allow a user to say the same thing a number of times, such as in ham radio contesting, or when a PALS needs assistance. There are some hard coded phrases intended to help PALS, but they could also come in handy for other folks, so explore them and feel free to e-mail me suggestions.

Since I found it obscene to charge people huge sums of money for software they can't afford, I decided to "market" the software myself and give it away. Go to <<http://www.chipspeaking.com>> or America Online and use the keywords SPEECH SYNTHESIS to find the download on AOL's file forum.

I would like to thank ALSA, the ALS Association, for helping me with this project. They made suggestions on the user interface, agreed to use it for testing purposes, and later allowed copies to be sent to their main office so they could give the software to PALS who need it.

Ham Radio Applications?

ALS is only one of many disorders that rob people of their ability to speak clearly and easily. For many people with such disorders, amateur radio can be a door to the outside world, especially if their mobility is impaired as well. CHIPSpeaking may be able to provide hams (or future hams) who have lost their natural speech with the ability, again or for the first time, to speak on the radio. Even hams without permanent speech difficulties may find it valuable if laryngitis strikes during a contest!

Feel free to send me e-mail at <CHIPSpeaking@aol.com> with suggestions or comments. I will happily add features as my limited programming abilities allow. If you like the software, you will find a list of addresses in "Resources" to which you may write to assist the ALSA or research clinics. It's welcome help!

Notes

1. This list of famous people who had ALS courtesy of The ALS Association National office. Their address is listed in Resources.

2. I am licensed by Microsoft to redistribute Agent 2.0, and it is available on my web site <<http://chipspeaking.50megs.com>> or at Microsoft's <<http://www.microsoft.com>>. My web site will direct you where to get assistance if you cannot download it.

3. Trademarks: All trademarks mentioned in this article are copyright their respective holders. CHIPSpeaking is a trademark of CHIPSpeaking Software. Agent 2.0 is a trademark of Microsoft Corporation. ■

Resources

For more information on ALS or to help support ALS research, contact any of the following:

The ALS Association, Suite 150, 27001 Agoura Road, Calabasas Hills, CA 91301. ALSA can direct you to ALS Association offices around the country.

Dr. Walter Bradley, University of Miami Department of Neurology, Suite 700, 1150 N.W. 14th Street, Miami, FL 33136

Dr. Jeffrey Rosenfeld, Carolinas ALS Center, P.O. Box 32861, Charlotte, NC 28232.

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If you're a 1970s-vintage ham, there's a good chance you got your start on HF with a Heathkit HW-16 novice rig. WB8VGE not only stokes the fires of your memory, he shows you how to restore one of these classics to put on the air today.

Keeping the Green Flame Burning

Part I – Restoring an HW-16

BY MIKE BRYCE,* WB8VGE

Heathkit. The name alone triggers smiles and sparks memories. When Heathkit was producing electronic kits, many hams got their start in amateur radio via Heathkit gear. Even today, it's hard to find a ham who has never owned or operated a piece of Heathkit equipment.

In occasional articles over the next several months, I'll take a close look at some of the classic Heathkit radios. I'll show you some simple repairs and a few modifications along the way. In the process, I hope this series will inspire you to take a closer look at ham radio's living legend—Heathkit. We will start out with one of the most popular transceivers ever sold to get new Novices on the air—the famous Heathkit HW-16.

The HW-16

The Heathkit HW-16 is a handsome tabletop unit that was very easy to build and simple to operate. The transceiver was designed with the Novice ham operator in mind, but could easily be updated when you got your General class license.

The HW-16 is a CW-only rig, designed to operate on crystal-control transmit, although you could add the matching HG-10B VFO. This reflected the license privileges of the time. Novice stations could operate only CW, at no more than 75 watts, and had to be crystal-controlled! Only after you got your General class or higher license were you allowed to have a VFO and/or use phone. Likewise, the HW-16 operated only on 80, 40, and 15 meters, the three



Front panel of the classic Heathkit HW-16 Novice transceiver. The tuning dial at right is for receive only, as FCC rules at the time required Novices to use crystal-controlled transmitters. Note the two crystal sockets at the far left. (Photos by the author)

most popular Novice bands (the only other Novice allocation at the time was on 10 meters).

The HW-16 transmitter uses 80 meter crystals for the 80 and 40 meter bands and 40 meter crystals for the 40 and 15 meter bands. Input power to the final amplifier is adjustable from 50 to 90 watts, with a mark on the meter face that represents the maximum Novice input power of 75 watts. The transmitter uses grid-block keying, and all three stages of the transmitter are keyed. Designed with simplicity in mind, the only control you need to tune is a single knob that sets both the transmitter and receiver.

The receiver is based on a superhet design, is VFO controlled, and covers the lower 250 kHz of the 80, 40, and 15

meter bands. High selectivity is possible due to the 500 Hz crystal filter. The receiver will easily drive a speaker to room-filling volume. Receiver sensitivity is excellent.

The receiver is automatically muted each time the key is depressed, providing full break-in operation. Think about that. The HW-16 uses full QSK! I find this amazing, considering the age of the rig. The QSK is silent and works perfectly. There's no need for an external antenna relay. The HW-16 also provides its own sidetone.

The HW-16 came out just as solid-state technology was beginning to work its way into amateur equipment, and it contains one—just one—transistor. A complement of nine electron tubes

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e-mail: <prosolar@sssnet.com>



One of the first things the author had to do after acquiring his HW-16 was replace a capacitor in the power supply (he "smoked" the original). The new (blue) one, while not an exact replacement for the 30-year-old component, fit right across the tube socket used by the original.

rounds out the HW-16. The final PA (power amplifier) tube is a 6GE5 Compactron. An internal high-voltage supply provides all the necessary voltages.

A new HW-16 ran about \$150 in the early 1970s. It was discontinued by Heathkit in the mid-'70s.

Finding Your Own HW-16

An HW-16 is by no means a rare find. They are everywhere. Any good-size hamfest should produce a handful of them, many with the matching HG-10B VFO. Plus, on any given day on the internet, E-Bay has several up for bid. Depending on condition and whether the rig has any accessories, plan on spending anywhere from \$35 to about \$100 for an HW-16. The HG-10B VFO should run you another \$45 to \$150 or so, again depending on condition and whether the unit comes with the manuals.

Having manuals is very important, as it's highly unlikely that you'll find an HW-16, as is, in perfect operating condition. Repairing a radio as old as some of these Heathkits often requires hunting down the manuals and schematics. There are several individuals and companies that offer manuals for discontinued radios (I'll try to list them in the next installment.), but believe it or not, you can still get manuals and schematics for the HW-16 from Heathkit! Just call the number listed in "Resources" and they will supply you with a condensed man-

ual consisting of alignment and schematics for not only the HW-16, but for just about any piece of gear Heathkit ever made.

Working on the Green Boxes

In today's world of microprocessors and surface-mount components, working on a vintage Heathkit has an odd feel

HW-16 Reviews & Mods

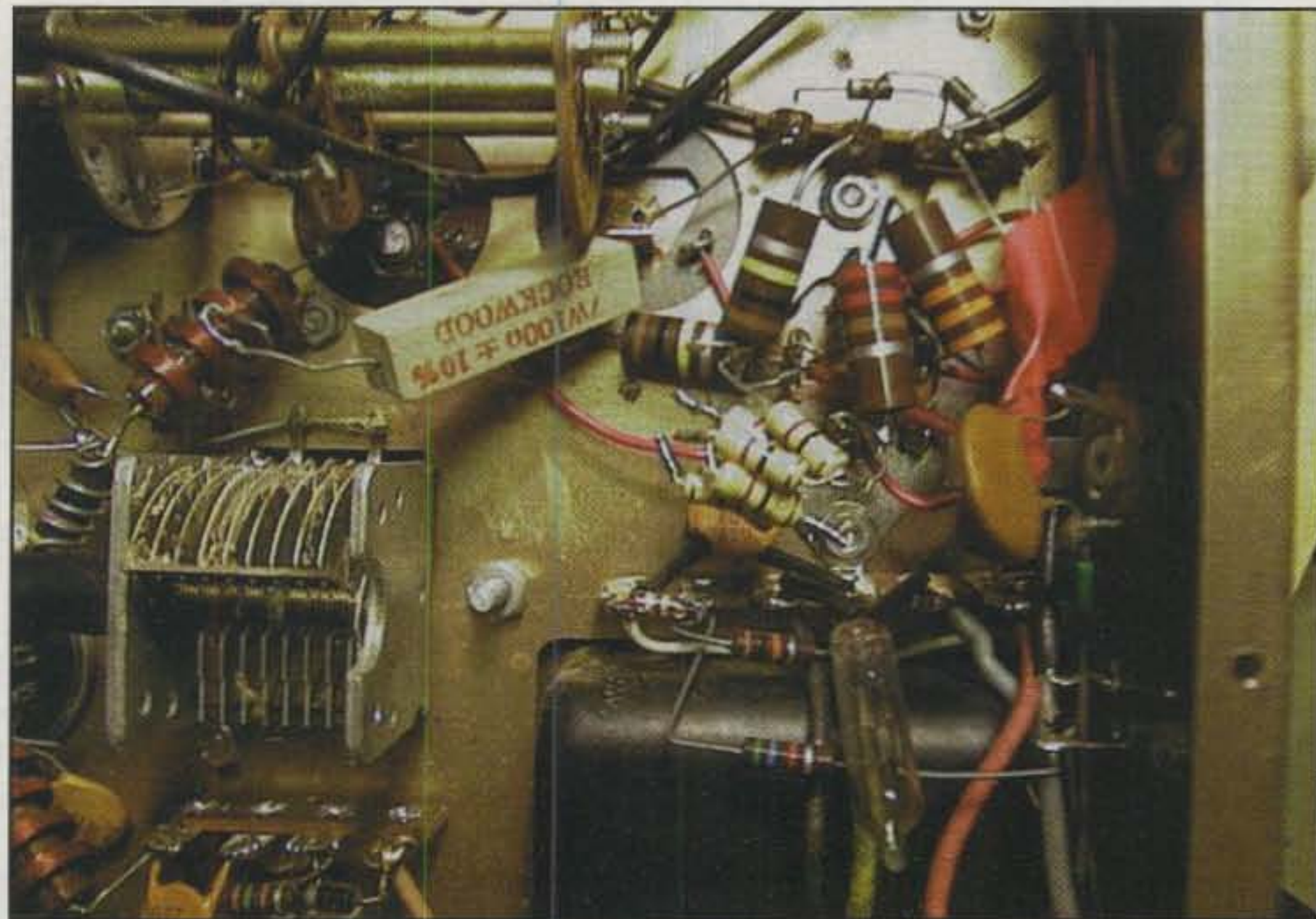
The Heathkit HW-16 has been modified many times by many hams. Here is a list of references for those changes published:

- Dec. 67 CQ, p. 18, review
- Jan. 68 QST, p. 53, review
- Nov. 68 CQ, p. 117, use on 20 meters
- Feb. 69 CQ, p. 84, use with SB-200
- Oct. 71 CQ, p. 96, use on 20 meters (brief)
- Dec. 71 CQ, p. 72, use on 20 meters (more)
- Aug. 72 QST, p. 51, use on 20 meters
- Nov. 74 QST, p. 20, adapting VFOs for
- Nov. 75 QST, p. 35, use on 20 meters
- Feb. 76 CQ, p. 43, calibration control for
- May 76 CQ, p. 35, use on 20 meters
- May 77 QST, p. 48, sidetone level adjust
- May 78 QST, p. 29, improvements
- Aug. 79 QST, p. 50, help for

as you work with vacuum tubes and discrete components. First of all, you'll need to arm yourself with a different set of tools than you normally would use.

Most of the components in this vintage gear are mounted to tie strips. To remove them, you'll need at least a 45 watt soldering iron. A soldering "gun" will also work. Along with the soldering iron, you'll need some desoldering braid. Get the widest width you can. A wide braid will suck up much more solder than the thinner stuff. This is important, because the less time you spend on the connections, the less likely it will be that the components are damaged by excess heat.

You'll also need a pair of long needle-nose pliers and a few rubber bands, to be used as a heatsink. The rubber



The power supply for the HW-16 hides in a back corner. The wad of resistors was installed to test the fix (see text). They were replaced with the proper size resistor before the unit was put on the air.

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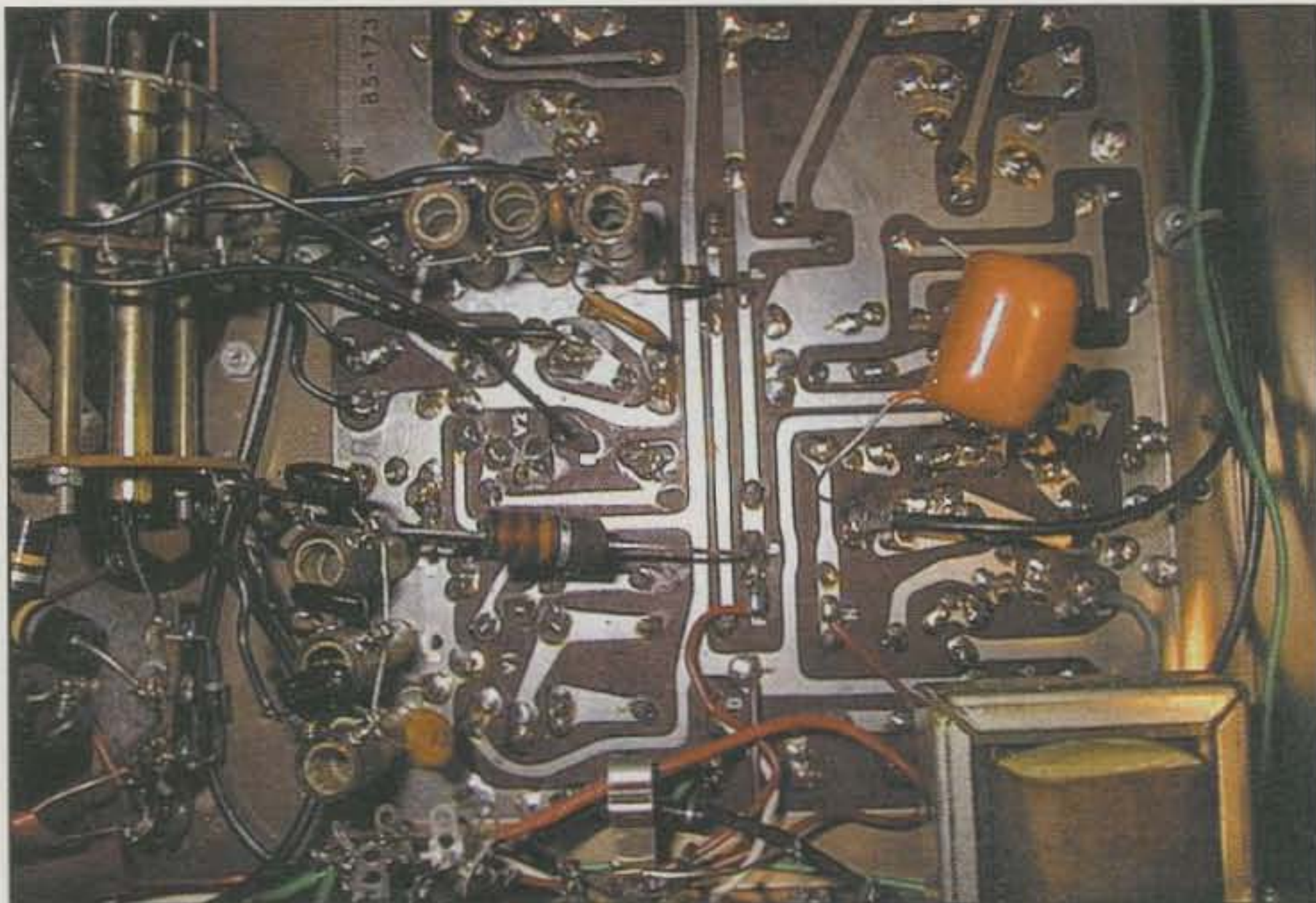
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The large resistor in the middle of the photo fails. Replace with same value but higher wattage unit. The large capacitor was tack-soldered into place to check the audio stages.



"Real radios glow in the dark," claim tube aficionados. If that's the case, then the HW-16, with nine tubes and only one transistor, is a "real radio." The final compartment consists of three tubes. The largest of the three is the final amplifier tube, a 6GE5 Compactron.

bands hold the pliers together. Clip this onto the leads of components you are removing from a tie strip. This pliers will soak up the heat, preventing damage to the part.

Pick up a good VTVM (Vacuum Tube Volt Meter)—a Heathkit, of course—to use in troubleshooting. While the digital ones are slick, many of the alignment steps require peaking a signal for max-

imum reading on a VTVM. Of course, your digital meter will work, but I find using the analog VTVM much easier.

An HW-16 on the Bench

My HW-16 is kind of rare. I purchased it from a gentleman whose dad had built the rig. Well, dad lost interest and the HW-16 was never completed! It sat

unfinished on a basement shelf for nearly 30 years. To say that the front and case were "mint" would be an understatement. On the other hand, because the radio had been sitting in storage for so long, the odds of it working were kind of slim.

On a radio this old, it's good practice to use a Variac transformer and slowly increase the supply voltage. That way, you can get the capacitors in the power supply to reform slowly. It also reduces the initial shock of having full power applied after sitting dormant all these years. But, alas, I did not use the Variac this time. I plugged the power cord directly into the 110 VAC socket. I flipped the switch and the soft glow of the tubes greeted me—at least for a few seconds.

After a few minutes I could smell the distinct odor of frying capacitors. A moment later and I was greeted with fingers of white smoke venting from one of the large twist-lock electrolytic capacitors. Now any sane person would have yanked out the power cord or at least flipped off the power switch. Nope, not me. I was a driven man! It had been a long time since I'd smelled capacitor smoke, so I just sat and watched until the smoke stopped. A few seconds later the smoke detector in the house tripped!

The HW-16 is an unusual radio to work on. It's a mix of point-to-point wiring with chassis-mounted tubes and a large printed-circuit board thrown in for good measure. The entire receiver, including the receiver's VFO, is mounted on the PC board. However, the transmitter section is all point-to-point wiring. The HW-16 has a high-voltage power supply that runs the tubes as well as a bias supply for the transmitter. There's also low-voltage AC for the tube filaments. The power supply is all solid state and is located in the lower part of the chassis. It too is wired point-to-point. The high-voltage section of the power supply uses a string of voltage dividers to generate the necessary voltages required by the receiver and transmitter. High-wattage, low-ohm resistors make up these dividers.

The capacitor that failed (remember the smoke?) was in the power supply. That's simple enough. The cap was not formed or had simply dried out. Now, finding a replacement capacitor for a radio that is 30 years old is not so simple. In fact, I could not find one anywhere. (Later on I did find a supply of twist electrolytic caps. They are available from Surplus Sales of Nebraska, contact info in "Resources." The going price for one is about \$24.) Thus, I

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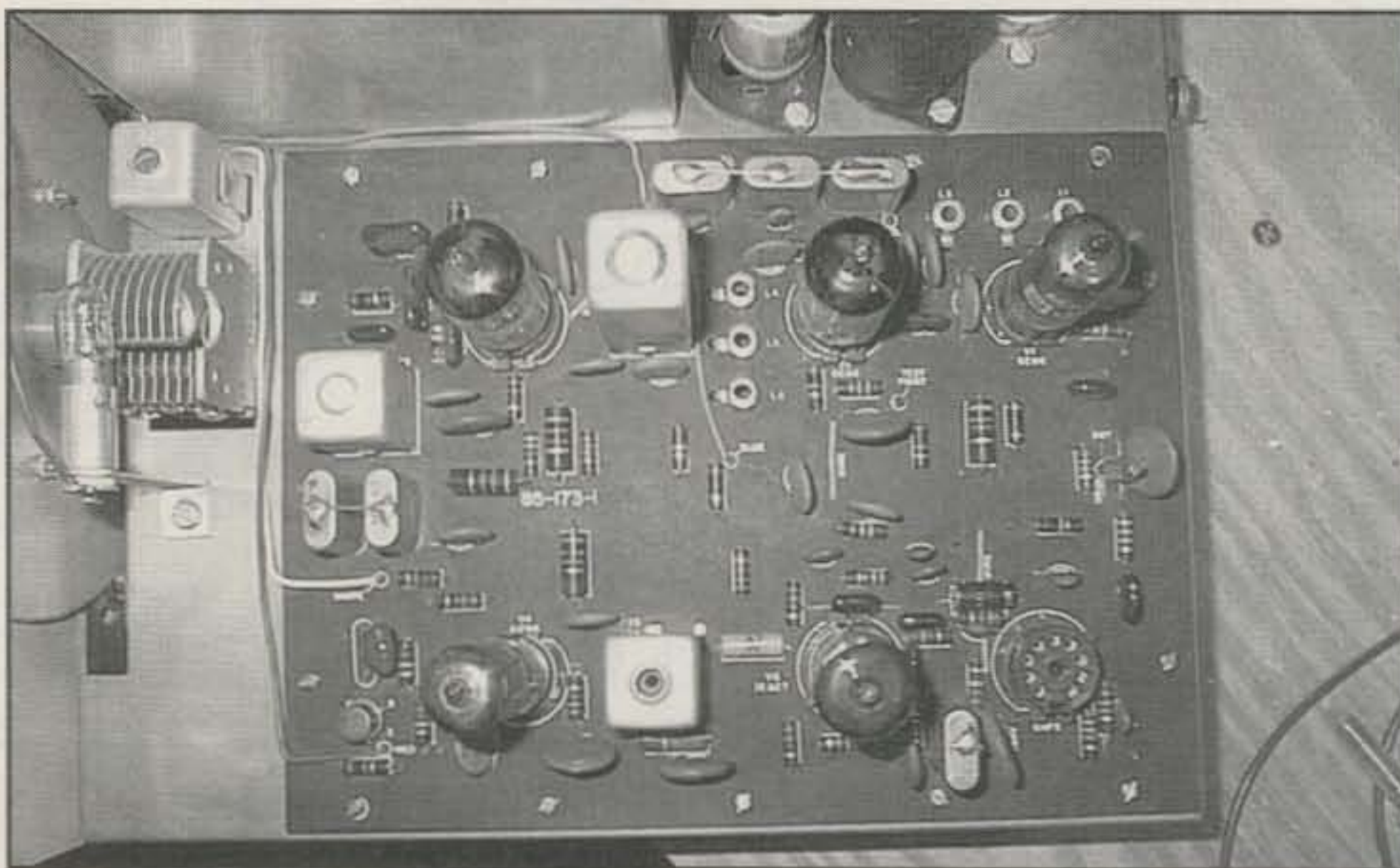
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The HW-16 receiver is built entirely on this printed circuit board, the only one in the radio. The missing tube is the audio driver. While called a transceiver, it was actually a transmitter/receiver, with all receive functions on this board. The only shared circuits between receiver and transmitter are the power supply and T/R switch.

chose an NEC replacement part instead. The only trouble was that the new part was not a drop-in replacement for the old cap. The old cap was about the size of a tube; the new part was one-tenth the size. Luckily, the old cap was a twist mount, which mounted to a tube socket. The new cap, while much smaller, fit right on the socket and was held in place by a glob of RTV cement.

After the new part was installed, it was time to try the smoke test once more. This time, no smoke, but the capacitor I had just installed got very hot and started making noise. Now I studied "broke" in high school, and I knew that resistors get hot; capacitors do not. The new capacitor was 40 mF at 450 volts DC. The old one had a rating of 43 mF at 350 volts. With my DVM, I found 680 volts on the capacitor. Well, that explained the smoke.

The Hunt for High Voltage

Clearly, the high voltage was, in fact, too high. I also noticed, before my replacement cap got too hot, that there was no B+ voltage on the receiver. Both of these voltages are generated by a voltage divider. These resistors generate the necessary voltages for the various stages of the rig. With the plate voltage for the transmitter way too high and the receiver B+ non-existent, I deduced one of the resistors in the voltage divider must be open or way out of spec.

Here's why the old cap smoked: Resistor R205 (if you happen to have an HW-16 schematic handy) had changed its value from 330 ohms to

over 100K. In effect, there was no voltage divider at work. Result: Too much voltage was sent to the capacitor, and virtually none was sent to the receiver. That's why there was no B+ there.

The fix is simple enough—replace the resistor. But instead of just replacing the 5 watt resistor, I put in a 7 watt device. Mouser Electronics (see "Resources") handles high-wattage, low-value resistors. I ordered a few extra, just for my junk box. As it turned out, after talking with other hams using the HW-16, that resistor seems to go bad quite often. It's a good place to look for trouble if you're working on an HW-16.

General Hints

While you have the covers off the radio, you might as well check all the resistors in the high-voltage power supply. Also, while you're at it, check the 22k resistor between location "G" on the PC board and lug 2 of L3. This resistor tends to overheat. Replace with a higher wattage resistor of the same value.

Tube sockets, especially the ones on the PC board, have a tendency to corrode. Pop out each tube and clean the sockets with a toothbrush dipped in a bit of alcohol. Don't use WD40 or any other solvent that contains oil. This stuff will come back and bite you later on.

If your HW-16 has been in storage for a while, check to see if all the tubes are in fact in their correct locations. Sometimes the tubes fall out and are put back into whatever socket they fit. Also, check to see if the electrolytic capaci-

tors in the power supply have a powder-like fuzz on their bottoms. If they do, then the caps will have to be replaced. Check the electrolytic capacitors on the PC board, too. If they're growing hair, then replace them.

Today you just can't drive to the local drug store and get your tubes tested. I don't have a tube tester either, so I swap out suspect tubes with known good ones. If you are going to be working on vintage tube gear, you'd better start collecting spare tubes. I find hamfests are a good source. If you can't make the hamfests, then Surplus Sales of Nebraska has tubes, as does Antique Electronic Supply.

Check for B+ at the plates of all the tubes. Often, resistors on the PC board feeding one or more tubes may be open. Also, check for open cathode resistors if you have oscillation in the first mixer.

If the receiver breaks into oscillation at audio frequencies, check the two wires coming from the audio output transformer. Make sure the wires are pressed down against the chassis as tightly as possible. Never operate the HW-16 without a speaker connected. Doing so may damage the output transformer or audio driver tube.

While the HW-16 is called a transceiver, it is really a transmitter/receiver. The only thing in common between the two is the power supply and T/R switching. If the receiver is working, but the transmitter is dead, there's no need to dig into the receiver PC board.

Operating Your HW-16

Once you have everything working, the HW-16 is very simple to use. If you are going to use crystal control, you plug your favorite crystal into one of the two sockets on the front panel. A peak of the "tune" control adjusts the final tuning as well as the receiver front end. Key the rig, and you're on the air!

The HW-16 is really at home on 80 and 40 meters. It can hold its own on those bands even today. On 15 meters, the receiver is not as sensitive as some of the state-of-the-art radios we have today. Generally, though, if you can hear a signal on 15, you will be able to work the station. The transmitter produces up to 45 watts output on 80 meters. On 15 the power is lower. The Compactron sweep tube in the final is quite robust. With the output resonant, the tube will last a long time.

Loose Ends

I hope you have enjoyed this look at the HW-16. If you do, please let me know. If you would like to see a specific Heathkit featured in this series, by all

means contact me, too. If it's doable, we'll give it a shot.

Next time we meet, I'll take on one of the most popular single-sideband ra-

dios ever made in kit form—the Heathkit HW-101, or as it was known to a generation of hams, the "Hot Water 101." 73, and keep the green flame burning!

Resources

For a schematic and alignment instructions for the HW-16, call Heathkit at (616) 925-5899.

Replacement parts for this and other vintage radios are available from the following: Antique Electronic Supply, 6221 S. Maple Ave., Tempe, AZ 85283 (phone 800-706-6789; fax 602-820-4643).

Mouser Electronics, 958 N. Main St., Mansfield, TX 76063 (phone 800-346-6873; fax 817-483-7011; e-mail: <sales@mouser.com>; web: <www.mouser.com>).

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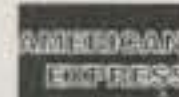
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Having a radio set up to receive severe weather warnings won't help you respond if you're away from your radio. KC5RTH and his Oklahoma radio club have come up with two clever ways to use amateur radio technology for instant severe-weather notifications.

Paging & APRS

Two Ways to Get Out the Word About Severe Weather

BY JEFF SCOVILLE,* KC5RTH

The introduction several years ago of the Kantronics KPC-9612 terminal node controller (TNC) opened up a whole new mode of communicating severe weather conditions—Amateur Paging. Software designers cleverly included programming in the TNC to support full-blown commercial paging (POCSAG) encoding and decoding. Plug your 9612 into a “data-ready” receiver, and you can decode all the bleeps and bloops broadcast by your local paging company. Plug it into a data-ready transmitter, order a few alphanumeric pagers, and become your own “paging company.”¹

Sounds like we could all cancel our commercial-pager contracts and just “home brew” our own systems, right? Well, not quite. Keep in mind that the Amateur Service rules specifically prohibit communications from which you derive commercial benefit—no “the contract is ready to be signed” messages. Many of us have grown accustomed to using our pagers all the time for commercial stuff, so what's left to do?

Weather Alerts

The Broken Arrow Amateur Radio Club (BAARC) in Oklahoma developed a unique “Weathernode Pager” system in 1997 utilizing the KPC-9612 to send out severe-weather warnings and related messages. This article describes that system and our experience with it. The 9600 bps port of the 9612 was con-

*44575 Savery Drive, Canton, MI 48187
e-mail: <scoville@sprynet.com>

¹ For more technical information on using paging in amateur radio, see “Ham Radio Paging: Putting ‘POCSAG’ on Packet,” by Phil Anderson, WØXI, in the July 1996, issue of CQ VHF.

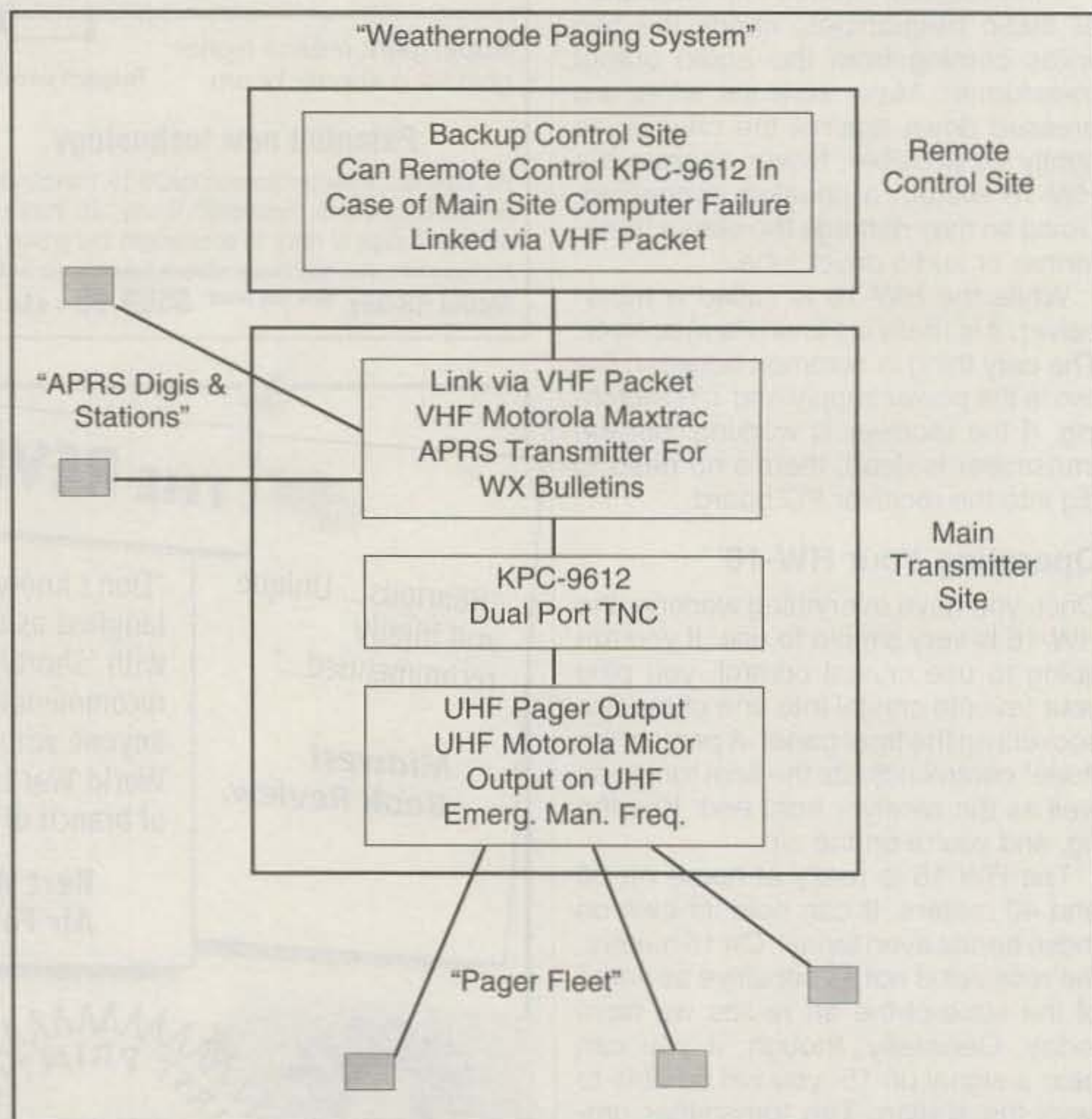


Fig 1—Block diagram of the Weathernode Paging system as set up in the Broken Arrow/Tulsa, Oklahoma, area.

nected to a modified Motorola Mitrek for use on the city's emergency management frequency. The decision to this frequency was based upon availability of equipment and cooperation of emergency management, not on any FCC

rules. The BAARC could just as easily have used any amateur frequency in the 2 meter or 70 cm bands.

You must be careful what transmitter you use for the paging capabilities of the 9612. POCSAG requires a great deal of

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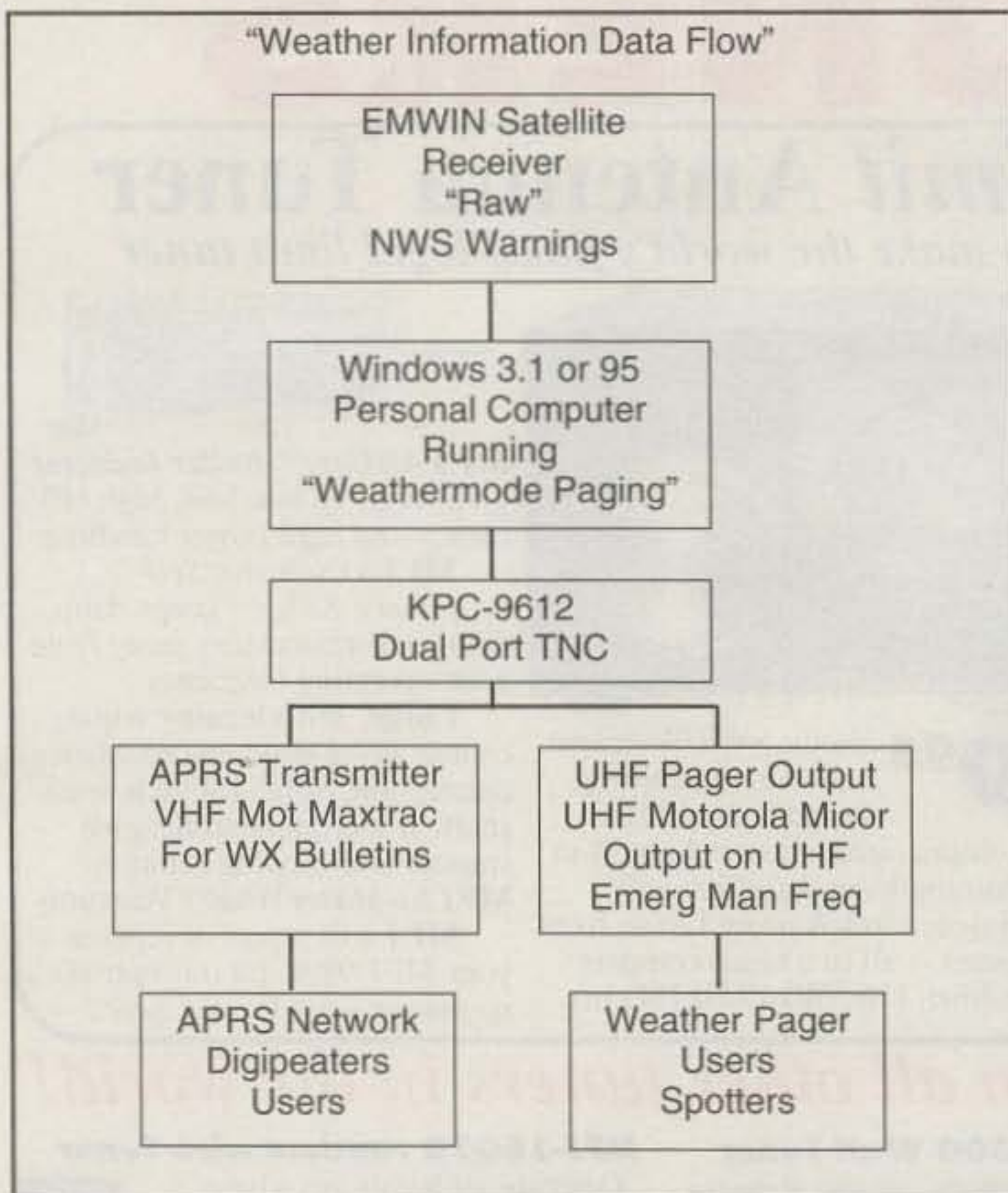


Fig. 2— Flow chart of data flow through the system from EMWIN receiver to users' pagers and APRS receivers.

low-frequency content in the signal. Most standard voice radios simply distort and filter out too much of the frequency range. Unlike 1200 baud packet, you can't just plug it into your favorite 2 meter rig and be off and going.

Several ham radio manufacturers sell 9600 bps capable (also called "data ready") radios. While most 9600 bps capable radios will work well for paging, 9600 bps capability is not a 100% guarantee. When in doubt, test the radio first with the 9612 to make sure it's going to work.

Another route is to modify an existing radio. There are many modifications listed on the internet for different types of radios. The BAARC successfully modified and tested a Motorola Mitrek for our local system.

Individuals purchased re-crystallized alphanumeric pagers tuned to the "Weathermode Pager" frequency and proper CAPCODE (an identifier that allows pagers on a common frequency to be individually set off). The cost of the pager to the individual was approximately \$50, but there are no monthly fees, etc., as the service is completely non-commercial.

Introducing EMWIN

Now that we've briefly discussed transmission of warnings, the next question is where do we get the warnings from? Or, more appropriately, how do we get the warnings to go out automatically so that someone doesn't have to sit behind the computer keyboard 24 hours a day waiting for something to happen? The answer is "EMWIN," short for the Emergency Managers' Weather Information Network (also called the "Weathermode"), a system developed by the National Weather Service for delivering weather information to emergency management officials.

All types of weather information are broadcast 24 hours a day to two GOES satellites in geosynchronous orbits above

the Earth. The information includes up-to-the-minute severe-weather warnings for the entire U.S. All you need is a satellite dish, an EMWIN receiver/demodulator, and a computer.

To keep the ownership cost reasonable for most individuals, several groups have set up local retransmission sites on VHF and UHF. In this setup you only need a VHF or UHF receiver, demodulator, and computer. The cost (assuming you already have the computer) is around \$100–200, depending on whether you want 1200 bps or the faster 9600 bps. Both systems carry exactly the same warnings, but the 9600 bps system has more hi-resolution graphics, such as satellite pictures.

EMWIN is great when you are home or at the office and have a computer nearby. However, you will normally miss out on weather warnings if you are driving or talking a walk, unless you bring a laptop along. I don't know about you, but my wife rolls her eyes when I try to bring just my mini-HT along on a walk. I'm sure she wouldn't be enthusiastic about my bringing a whole laptop, mini-HT, batteries, and EMWIN decoder! I'm not sure I'd want to try to lug all that with me for some of our walks. Does that mean we all have to become couch potatoes to keep up with the weather? No, we just need to get the information to people on a more portable system. That's where the pagers come in handy.

EMWIN and Paging

In the final configuration we have married the technology of EMWIN with paging. The BAARC "Weathermode Pager" System takes the live warnings from EMWIN and sends out a shortened version to the pagers. This is accomplished with a 486DX-66 computer running "Weathermode Pager" software written by the author of this article.

Users of the system gain the flexibility to go anywhere in the Broken Arrow/ Tulsa, Oklahoma area by replacing that heavy laptop with a small pager. Early warnings sent to amateur pagers result in a higher and quicker turnout of weather spotters. This is a big boost for local emergency management and allows for faster decisions dealing with pending severe-weather conditions.

What About Commercial Weather Paging?

We are aware of roughly a half-dozen commercial paging companies that provide a similar weather-bulletin service to their users. If cost was not an issue, why didn't we just contract with an existing paging company?

Commercial systems are extremely reliable during normal everyday use. However, when do most systems go down? In times of natural disasters! Peak paging traffic often occurs during and after severe-weather events ("Are you okay?"). Power surges and outages may be common. The phone system may be down, and most systems won't let you send a page unless you can telephone them.

I am not trying to infer that the commercial paging providers are unreliable. On the contrary, most are extremely reliable, considering the technical situations they face everyday. I very strongly encourage the efforts they have taken to add weather bulletins to their services. The more information we can get out to the public, the better.

What I am trying to illustrate is that amateur radio has consistently come forward when disasters occur, whether it be through local VHF/UHF emergency voice communications, digital packet, or HF. Weather paging gives us yet another way to demonstrate our disaster preparedness. Not only can we give advance warning to the system users during the storm, we can also direct them to emergency shelters, etc.,

after it's over, when other conventional communication systems may be barely functioning.

The BAARC "Weathernode Pager" system is on a UPS (uninterruptible power supply) with a backup gas-powered generator in the event of an extended power outage.

Then There's APRS

The KPC-9612 is a dual-port TNC. We've already discussed the paging capabilities on the 9600 bps port. It also has a 1200 bps port for conventional packet use. Early on, we used this port for remote control of the TNC. The firmware allows a remote packet user to log in and send out pages. Thus, even if your favorite operating system does a number on your EMWIN computer, you can still send out pages manually. All you need is another remote computer, radio, and TNC.

I was bitten by the APRS (Automatic Position Reporting System) bug in early 1999. You have probably seen APRS at the local hamfests. It's the system that shows the neat maps with everyone's callsign and location on them. Mobile stations carrying GPS (Global Positioning System) receivers can transmit their paths.

In early 1999 the National Weather Service in Tulsa became interested in using APRS as a tool for tracking storm spotters and to help improve the reliability of spotter reports. Since that time several APRS digipeaters have been installed in Oklahoma to improve coverage across the state.

While the APRS digis were growing by leaps and bounds, I began checking into a neat little feature in Mark and Keith Sproul's WINAPRS program that lights up counties on their program upon receipt of NWS weather warnings. There is even an audible alarm that goes off to catch your attention.

In July 1999 the BAARC "Weathernode Pager" program was modified to send out APRS weather bulletins on the 1200 bps port while simultaneously sending weather pages out on the 9600 bps port of the KPC-9612. Digipeaters across eastern Oklahoma pass on the APRS traffic so that all mobile and base spotters are aware of NWS warnings.

You Can Do It, Too!

I hope that figs. 1 and 2 give you a good overview of how to build the hardware part of the system. The real "brains" of the system is the "Weathernode Pager" software that converts the information from EMWIN format for download to

paggers and to APRS. At this time, the software has been customized for use at the BAARC site. However, if there is enough interest, the program may be modified for general use at any site. If you have any questions about how to set up a system, I can be reached via e-mail at <scoville@sprynet.com>.

Acknowledgements

I would like to thank the Broken Arrow Amateur Radio Club for its financial

support of the "Weathernode Pager" project. Thanks to Steve Bradley, KB5ZSD, and the City of Broken Arrow for use of their tower site for the equipment. Thanks also to the emergency management personnel involved in testing the system, and to Bob Buford, W5RAB, for modifying our Motorola Mitrek for paging use. Special thanks also go to Russell Self, KC5FCA, Ed Covington, and Zephyrus Electronics for the EMWIN receiver system that was donated for this project. ■

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With the FCC's RF safety rules now applying to all licensees—hams and commercial users alike—KD4DSX looks at compliance issues on shared rooftop sites and the possible effects on amateur repeater owners.

Amateur Operating in a Commercial Environment

BY RICHARD P. BIBY, P.E.,* KD4DSX

Recent changes in FCC rules on human exposure to Radio Frequency (RF) energy have put a new twist on the relationship between amateur repeater operators and many commercial rooftop and tower owners and management companies.

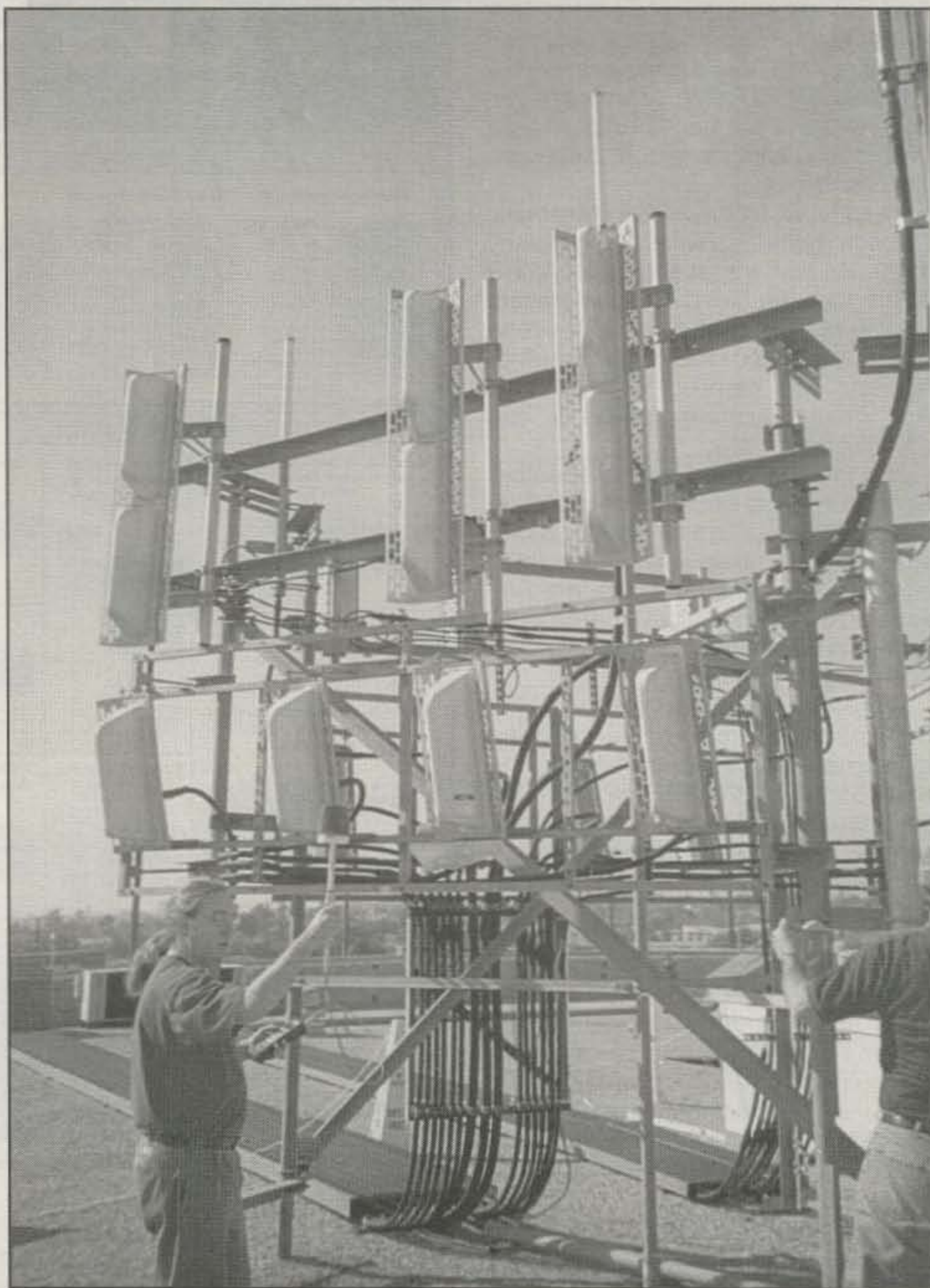
As part of the Telecommunications Act of 1996, the FCC was required to enact an updated rule on RF exposure to humans. That rule went into effect on August 15, 1999, and has slowly been applied to amateurs as well as other radio operators. The amateur community was able to negotiate successfully with the FCC for very clear, concise, and easy-to-administer rules regarding amateur-generated RF human exposure. There is an outstanding book on the subject you can order from the ARRL (*RF Exposure and YOU*, by Ed Hare, W1RFI), which answers almost every question you might ask, at least as far as amateur radio is concerned. Our friends in the non-amateur community were not so lucky.

In this article, I will not attempt to completely explain what a commercial carrier must do to be in compliance with the FCC rules. That would take a lot more space, and may be more appropriate for another time or place. However, let's sum up compliance by telling you what it is, if not necessarily defining it completely, with a focus on building rooftops used by commercial as well as amateur stations. Towers and home-QTH operations are not the focus here.

What Constitutes Compliance?

Compliance can be thought of as assuring that people who have access to a "controlled" area are not exposed to RF

*205 N. Evergreen Street, Arlington, VA 22203
e-mail: <kd4dsx@arrl.net>



The author on a typical commercial rooftop, performing RF energy density measurements. All FCC licensees using a rooftop, including amateurs, must demonstrate collective compliance with RF exposure rules. Cooperation is essential in showing compliance. (Photo by Robert P. Kelly, Jr.)

energy in excess of the limit for "occupational" individuals and that no member of the general public is exposed to RF energy in excess of the "general population" limit. The rules allow a higher exposure level for individuals who have been made aware of their potential for exposure—so-called "occupational individuals"—and that would include just about everyone who has reason to have access to a rooftop which has RF transmission equipment on it. The "general population" is everyone else—people who are completely unaware that they could be exposed to RF energy by being in a certain place (e.g., someone walking down a street near a transmitter, or on an observation deck or pool area of an apartment building.).

The maximum exposure limit for the general public is five times more restrictive (reduced by 5:1) than the occupational limit. The difference between the categories is that if there is a "controlled" environment (all the doors to the roof are locked) and people who have access to the roof (have keys) have had proper awareness training to RF exposure, then they can be exposed to the higher level. It might seem counterintuitive, but we *want* to be able to expose people to the higher "occupational" level. This is because someone who is "occupational" can have access to areas much closer to the antennas than members of the general public. The direct impact to a rooftop management company is that if people are meeting the conditions for occupational exposure, there are much smaller areas which are in excess of the applicable maximum permissible exposure limits, and thus the areas people are not allowed to enter ("exclusion" areas) are much smaller.

What is the FCC really saying? If you are someone who knows what you are doing around RF energy, then you can be exposed to higher levels, because you know that you are being exposed and should have had proper training and know of potential biological hazards (*the word "potential" is key here, as studies into direct links between RF and health problems have been inconclusive and/or contradictory.—ed.*). Anyone who does not know anything about RF should be exposed to more conservative levels. A member of the general public has no knowledge of RF. It might sound a little strange, but there is good reason for it and it makes sense—again, probably a topic for another whole article.

To a non-amateur licensee, compliance with the FCC rules and regulations

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means: identification of areas above the "general population" limits; safety training for anyone needing access to controlled areas; and any physical mechanism necessary to segregate "general population" and "occupational" areas.

Key Points in Compliance

A brief explanation of the key points to understand are below. Keep in mind that these are the highlights of what the commercial operators are facing. After we review those requirements, it should be clear how this can affect an amateur repeater.

- At license renewal, modification of a license, or new licensing of a communications operation between August 15, 1997 and August 31, 2000, any FCC licensee must be in compliance with exposure limits (some licensees need to file appropriate written documentation of compliance). Now that we are beyond August 31, *all* licensees are required to be in compliance, even if they have not filed any licensing paperwork with the FCC.

- If you are an FCC licensee (amateur or commercial), limits on human exposure are limits applied to anyone who might be exposed by energy of your creation. Additionally, the composite (total) exposure of all sources must be considered. This means that if someone is standing in the middle of a roof, a licensee needs to address exposure not only from his/her own operation but *also* from that of any other licensee which may be generating RF energy on the building (and neighboring sites, too!).

- One licensee on a rooftop who needs to demonstrate compliance may need the cooperation of other co-located licensees, *including amateurs*, which may cause a domino effect by which all licensees at a site will become compliant.

- Some compliance methods may be equally applicable to *all* licensees at a site, at once, requiring all licensees to agree to adhere to safety standards applicable to everyone on the rooftop or tower. For example, if a rooftop is locked, and it is agreed that everyone gaining access to the roof is to use a personal monitoring device (a device which sounds an alarm if the RF field gets too high), then anyone and everyone who enters the rooftop must use such a device—commercial, amateur, painting contractor, or window washer! Everyone *does* mean everyone.

- Some sites will be modeled with appropriate software, to determine the possibility for exposure in excess of the

FCC rules. In this instance, information about the amateur operation will be needed to make a complete and accurate model.

How Does This Affect Repeater Operators?

Basically, all of this means that people who install and maintain amateur repeaters on shared rooftops are going to need to act like commercial operators in many respects. You are going to need to work with anyone who is attempting to determine compliance for purposes of his/her non-amateur FCC license. Fortunately, that is not hard to do. In fact, it is rather easy.

The number one thing you can do is put contact information on your repeater cabinet. Be sure to put frequencies, number of carriers (usually there is only one frequency being transmitted by a repeater), effective radiated power (ERP), and the name and phone number of a good, reliable, technically knowledgeable contact person. I would recommend drawing a little diagram of where your antennas are on the roof or tower. If you have multiple antennas, state the purpose of each—e.g., "Yagi at 50 degrees north is receive only. The Diamond X200A is a 6 dB gain transmit antenna. TX frequency 146.625 MHz, 250 W ERP, Transmitter output power ("TPO") is 37 watts." That is the level of information which should help anyone determine compliance.

You may be contacted and asked (or required) to follow new safety procedures when you access the site. In most circumstances these procedures should be easy to follow. Read them carefully and make sure you strictly adhere to them when on the site. If they are not clear, ask appropriate and well-thought-out questions. Simple safety procedures may be as easy as "don't go on the east half of the roof," or "your antennas are located on the main rooftop. You have no reason to go on the roof of the penthouse, and should not do so at any time." Another example might be "remain 10 feet from (some specified antenna) at all times." Safety procedures should be clear and easy to follow. If they are not, then ask for clarification.

At some sites, compliance may be accomplished by use of a personal monitor when on-site. This presents many problems with which the entire communications and site management industries are currently struggling. A single personal monitor costs approximately \$800. They are also frequency dependent, and two monitors may be required

to cover the operating frequencies in use at many rooftop locations.

Who should pay for these monitors? Who should possess them? How are they to be maintained? Should the rooftop management company pay for the monitors and have them available at the building? Should individual licensees contribute to a cash pool to pay for monitors? If monitors are to be used for compliance, OSHA (Occupational Health and Safety Administration) requires training to assure their proper use. How will training be accomplished? A big one-time class? A quarterly class, whereby you are denied access if you have not attended? CD-ROM-based interactive training? These are questions with which the industry is still wrestling, and different solutions may emerge in different locations. In my opinion, the best answer would be to have the licensees at a site pool resources to acquire a number of monitors for a site, and make them available to anyone who has been properly trained to use them. Of course, there are also security issues: At \$800 each, they may go through an evolutionary period and quickly develop legs!

Cost Impact on Hams

Most of the amateur repeater sites I know of are cost-free to the amateur. These are almost always developed communications sites where others are paying considerable money to locate their equipment. Until now, we amateurs have not cost the building company any money, except for a little power, which most management companies overlook. Now, for the first time, you may have a financial impact on a rooftop manager.

Make sure you are not summarily asked to relocate. Educate yourself as to their predicament, make it easy for them to communicate with you, and make it easy for other non-amateur licensees to comply with the FCC rules. Also be prepared to pay your share of any direct costs related to compliance activities (e.g., monitors and training).

One more note regarding the serious impact of this rule to the non-amateur community: OSHA is also enforcing RF exposure to workers. Thus, any company which employs people (Think of the number of "workers" on a rooftop!) has a potential OSHA liability. OSHA compliance extends to employees anywhere in their work environment. So let's say a paging company has a transmitter in the middle of a rooftop. It is responsible to the FCC as a licensee to

assure compliance within the area around its transmitter (more accurately, its antenna) and as an employer to assure that anyone working for the company is safe anywhere on the rooftop, including working around everyone else's antennas. Now extend the OSHA coverage to everyone on a rooftop, including anyone who may be working on heating or air-conditioning units, roof repair, painting, elevator maintenance, etc. You can see the number of questions and concerns facing the commercial rooftop management industry.

In review, the non-amateur community has a daunting task of compliance with the FCC and OSHA rules and regulation regarding human exposure to RF energy. Do your part to make it easy for these licensees to make their facilities compliant. This will ensure your continued enjoyment of the site and will help keep amateur radio alive and well.

Rich Biby, KD4DSX, is a Professional Engineer and a principal in Sitesafe, Inc., a company specializing in RF propagation analysis and RF safety issues.



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FCC Creates New Unlicensed VHF CB Service

"Multi-Use Radio Service" Virtually Unknown

Fifty-five years ago FCC Chairman E. K. "Jack" Jett was the first FCC official to propose extending the use of short-range two-way radio to private citizens. His imagination had been fired by meetings and discussions with communications pioneer Al Gross, W8PAL, a young and avid amateur radio operator who developed a portable two-way VHF/UHF walkie-talkie radio just prior to World War II. It was used extensively by the military behind enemy lines during the war.

W8PAL obtained his amateur radio license in 1934 (at age 16), and it is still current to this day. In the late 1930s Al discovered a way to cause miniature vacuum tubes to operate in the unexplored VHF/UHF region of the radio spectrum. These radios were used to communicate successfully with other amateur operators over a distance of 30 miles.

In July 1945, about three weeks before the war ended, a feature article entitled "Phone me by Air," written by Jett, appeared in the *Saturday Evening Post*. In the article he said 460–470 MHz was "admirably suited to the new service." At the time, frequencies above 300 MHz were considered "useless."

Jett's proposal resulted in the issuance of an FCC report on a "Proposed Allocation from 25,000 kilocycles to 30,000,000 kilocycles (25–300 MHz)" on January 15, 1945. Docket 6651 said that "if warranted, the original citizens band could be expanded at some future time."

On April 10, 1947 the FCC allocated Jett's proposed spectrum (460–470 MHz) to the Class A Citizens Radiocommunication Service. The band could have supported up to 400 FM channels with 25 kHz spacing. However, these "useless" frequencies soon became valuable to the business community, and the demand for the spectrum ultimately resulted in a reduction to only 16 Class A paired channels (eight channels for base-mobile and eight for mo-



Al Gross, W8PAL, was a true pioneer of the wireless personal communications revolution and played a major role in establishing miniaturized portable communications. He is widely considered the inventor of the handie-talkie radio transceiver.

bile only). It seemed the thing to do, because at the time there was not much use of Class A CB by the public.

Towards the end of World War II, US tanks and vehicles were also effectively communicating on 27 MHz. To encourage and provide for more use by citizens, on August 4, 1958, the FCC established the Class D citizens band—22 channels at first, then 23, and finally (in 1976) 40 channels in the former 11 meter ham band. The 11 meter band was chosen for the Citizens Band because it was another "useless" band.

This lower frequency was practically unused by radioamateurs and was considered the "junk band" of ham radio. It was jammed with electrical garbage from industrial machinery, medical diathermy machines, and a host of other strange scientific gadgets and noise that made effective communications difficult. Even though they didn't use it, hams did not want to give up 11 meters and "Save 11" contests were hurriedly organized to show the FCC that the band was indeed being used.

The advantage of an 11 meter home for Citizens Radio was that it was much easier and less costly to design and build equipment at 27 MHz than at 460 MHz. The disadvantage was that signals were propagated much farther than what was envisioned by E. K. Jett. Still, the FCC went ahead in 1957 with

Docket 11994. It bore little resemblance to 1945's Docket 6651.

The original Class D CB rules were simple: no examination required, may be used for personal or business purposes, must be 18 years old, power input 5 watts AM . . . "Just fill out FCC Form 505D and mail it in." The distance dilemma was "solved" by limiting communications to a range of no more than 150 miles.

A couple of decades later, looking for "Smoky" and gasoline would cause the Citizens Band Radio Service to skyrocket to some 30 million users, more than ten million alone in 1976 and 1977. Licensing and callsigns were discontinued, and CB became almost totally unusable due to the heavy saturation of signals from everywhere. It certainly was not the short-range FM CB that Chairman Jett had in mind.

Fast Forward to Half a Century Later...

I give you this background, because it appears now, some 55 years later, CB radio is about to return to the service Jack Jett had in mind. It happened this past summer with extremely little fanfare. The FCC did not even release a Public Notice on their new unlicensed Multi-Use Radio Service (MURS). The rules took effect in October.

MURS is the latest Citizens Band Radio Service. With a respectable 2 watts maximum effective radiated power (ERP) and very few regulations, we expect MURS to be used for general CB, phone patch, packet, paging, image, repeater, telemetry, and remote-control operation.

Continuous transmission on four of the five channels is permitted when MURS is used for remote-control purposes. No MURS license is issued and no station identification is necessary.

MURS has received virtually no publicity from the FCC or from hobby or commercial trade publications. FCC Commissioners usually issue celebratory statements when they create new services, but they have been silent on MURS. As an unlicensed service, we expect little or no FCC enforcement in

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New Part 95 Personal Radio Service Rules...

...took effect on November 13, 2000, thirty days after publishing in the Federal Register (October 13, 2000). The Part 95 Rules have been amended as follows:

95.401 (CB Rule 1)

What are the Citizens Band Radio Services?

(f) The Multi-Use Radio Service (MURS) a private, two-way, short-distance voice, data, or image communications service for personal or business activities of the general public. The rules for this service are contained in subpart J of this part.

95.601 Basis and purpose.

Subpart J – Multi-Use Radio Service (MURS)

95.603 Certification required.

(g) Each Multi-Use Radio Service transmitter (a transmitter that operates or is intended to operate in the MURS) must be certified in accordance with §90.203 of this chapter.

95.605 Certification procedures.

Any entity may request certification for its transmitter when the transmitter is used in the GMRS, FRS, R/C, CB, IVDS, LPRS, MURS, or MICS following the procedures in part 2 of this chapter.

95.631 Emission types.

(i) A MURS station may transmit any emission type as specified in §90.207 of this Chapter.

95.632 MURS transmitter frequencies.

(a) The MURS transmitter channel frequencies are 151.820 MHz, 151.880 MHz, 151.940 MHz, 154.570 MHz, 154.600 MHz.

(b) The authorized bandwidth is 11.25 kHz on frequencies 151.820 MHz, 151.880 MHz, and 151.940 MHz. The authorized bandwidth is 12.5 kHz on frequencies 154.570 and 154.600 kHz.

(c) MURS transmitters must maintain a frequency stability of 5.0 ppm, or 2.0 ppm if designed to operate with a 6.25 kHz bandwidth.

95.633 Emission bandwidth.

(f) The authorized bandwidth for any emission type transmitted by a MURS transmitter is specified in §90.209 of this Chapter.

95.635 Unwanted radiation.

(e) For transmitters designed to operate in the MURS, transmitters shall comply with §90.210 of this chapter.

95.639 Maximum transmitter power.

(g) No MURS unit, under any condition of modulation, shall exceed 2 watts effective radiated power (ERP).

95.649 Power capability

No CB, R/C, LPRS, FRS, MICS, MURS, or WMTS unit shall incorporate provisions for increasing its transmitter power to any level in excess of the limits specified in §95.639.

95.651 Crystal control required.

All transmitters used in the Personal Radio Services must be crystal controlled, except an R/C station that transmits in the 26–27 MHz frequency band, a FRS unit, a LPRS unit, a MURS unit, a MICS transmitter, or a WMTS unit.

(Note: This means that crystal control is not required for MURS radios—ed.)

95.1301 Eligibility.

An entity is authorized by rule to operate a MURS transmitter if it is not a foreign government or a representative of a foreign government and if it uses the transmitter in accordance with 95.1309 and otherwise operates in accordance with the rules contained in this subpart. No license will be issued.

95.1303 Authorized locations.

(a) MURS operation is authorized:

(1) Anywhere CB station operation is permitted under §95.405; and

(2) Aboard any vessel of the United States, with the permission of the captain, while the vessel is traveling either domestically or in international waters.

(b) MURS operation is not authorized aboard aircraft in flight.

(c) Anyone intending to operate a MURS unit on the islands of Puerto Rico, Desecheo, Mona, Vieques, and Culebra in a manner that could pose an interference threat to the Arecibo Observatory...

95.1305 Station identification.

A MURS station is not required to transmit a station identification announcement.

95.1307 Permissible communications.

(a) MURS stations may transmit voice, data, or image signals as permitted in this subpart.

(b) A MURS station may transmit any emission type, subject to the limitations contained in §90.207 of this Chapter.

(c) MURS frequencies may be used for remote control and telemetering functions. Emission types A1D, A2D, F1D, F2D are authorized and stations used to control remote objects or devices may be operated on the continuous carrier transmit mode, except on frequency 154.600 MHz.

§95.1309 Channel use policy.

(a) The channels authorized to MURS systems by this part are available on a shared basis only and will not be assigned for the exclusive use of any entity.

(b) Those using MURS transmitters must cooperate in the selection and use of channels in order to reduce interference and make the most effective use of authorized facilities. Channels must be selected in an effort to avoid interference to other MURS transmissions.

MURS. We draw this conclusion from the peculiar history of this service.

The FCC created MURS on July 12, 2000 (Wireless Telecommunications Docket 98-182). MURS began as an FCC reaction to rampant unlicensed operation on certain Industrial/Business Pool radio frequencies. These frequencies are informally known as "color dots," named after colored stickers identifying the channel. (By way of explanation, the former Business Radio Service, and many other industrial services, are now "pooled" together in the

"Industrial/Business Pool" of frequencies in Part 90 of the Rules.)

Color-dot radios are pretuned, off-the-shelf, low-priced business radios sold by two-way radio shops and in national consumer-electronics chain stores and hardware stores such as Home Depot. Some color dots are on VHF, others are on UHF.

"Many advertisements imply that these radios can be used by anybody for any purpose, whether commercial or recreational, and make no mention of the licensing requirement," the FCC

has stated. "Manufacturers have informally indicated to us that it is their belief that only a small percentage of persons buying these radios actually apply for a license." The FCC proposed to move VHF color-dot frequencies to CB by creating a new class of Citizens Band Service.

Radio Shack—who made popular another CB service, the Family Radio Service (FRS) in the UHF spectrum—strongly supported the idea. Such a new service could "offer the general public the utility of features and accessories

not currently available in the Family Radio Service," the company said.

Radio Shack and Motorola asked the FCC to add frequencies in the UHF band to the new service. However, trade associations for the wireless industry asked that "other frequencies in the Industrial Business Pool not become a haven in which manufacturers are allowed to promote unlicensed consumer radios." The "further erosion of critical Private Land Mobile Radio spectrum must be avoided in the future," they said.

"Against this backdrop," the FCC said, "we are not persuaded that there is sufficient support in the record to justify reallocation of additional Part 90 frequencies at this time. We may, however, revisit this issue at a later date should additional support develop. We will therefore include in the new Multi-Use Radio Service only the five frequencies listed in our original proposal."

MURSS Channels	Authorized Bandwidth
151.820 MHz	11.25 kHz
151.880 MHz	11.25 kHz
151.940 MHz	11.25 kHz
154.570 MHz	12.5 kHz
154.600 MHz	12.5 kHz

The FCC officially defined MURS as "a private, two-way, short-distance voice, data, or image communications service for personal or business activities of the general public." [FCC Rule 95.401(e)]

It permitted 2 watt operation on all MURS frequencies, including those formerly limited to 1 watt, for "consistency and ease of use and administration," the FCC said.

There are key differences between FRS and MURS. Data transmission, except for certain signals to establish voice QSO, is prohibited in FRS but permitted in MURS. FRS is UHF (462/467 MHz) while MURS is VHF, with attendant benefits to MURS signal propagation. Unlike FRS, external, detachable antennas are allowed in MURS.

What the Rules Don't Say

"The significance of the rules governing the Multi-Use Radio Service is not in what they say, but in what they don't say," according to Corwin D. Moore, Jr., WB8UPM, coordinator of the Personal Radio Steering Group (see: <<http://www.provide.net/~prsg>>). He observed that MURS does not restrain content of communications or station operator eligibility (other than the usual exclusions related to foreign governments). The rules will now permit what the FCC used

to prohibit: unlimited personal communications on frequencies that used to be for business use only.

"MURS has no restriction on connecting to external antennas, nor on antenna height, so long as the 2 watts ERP restriction is observed. Two watts at an even modest height could produce great coverage," he said.

"There is no constraint on communications with other radio services, or with retransmitting signals from other MURS (or other) radio stations. How soon will we see repeaters? And there is no restriction on interconnection with the Public Switched Telephone Network."

Moore said that the FCC may have created a "completely unmanageable monster" in MURS.

How the Service Came About

Radioamateurs who have heard about the new Multi-Use Radio Service want to know how this new CB service which permits unlicensed VHF 2 watt (150 MHz) operation came into being, since practically no one knew it was coming or were given the opportunity to comment on the rulemaking.

Actually, MURS went through more than two years of intensive rulemaking. The concept actually started some five years ago when frequencies were allocated for low-power use in the Business Radio Service (1995 "Refarming" Report and Order). The issue of an unlicensed non-coordinated radio service was later incorporated into the 1998 Biennial Regulatory Review of the (Part 90) Private Land Mobile Radio Services (PLMRS). This review, which looks toward streamlining rules, is the same regulatory vehicle that simplified the Amateur Service last April.

It escaped most radio enthusiasts since it was business band and not CB or amateur radio oriented. They should not feel bad, however, since most radio equipment manufacturers were also blind-sided by MURS. Also, it may not be too long before you see ICOM, Kenwood, Yaesu, and Alinco MURS hand-holds in hobby radio stores.

Remember that one of the objectives of Class D CB was to provide businesses with a way to communicate between the main office and on-the-road service vehicles. It was very high tech and fashionable back in the '50s and '60s to have a "radio controlled" sign splashed on the side of a truck.

MURS has a similar goal. Construction workers, farmers, warehouse employees, and other service personnel needed a way to communicate short

range among themselves. Actually, most business band users never bothered with the licensing function. They just bought and used the low-power radios.

In WT Docket No. 97-153, the so-called Part 90 Omnibus NPRM (Released February 19, 1999), the FCC exempted five Part 90 frequencies from the frequency coordination requirement of Section §90.175 of the Rules. Two of those frequencies, 154.570 MHz and 154.600 MHz, were commonly referred to as "color dot" frequencies in the PLMR community.

The 154.570 MHz radio was frequently identified with a blue dot; 154.600 MHz had a red dot. These entry-level, low-power hand-held NBFM radios were extremely popular because of their low cost. The other three coordination exempted frequencies are 151.820 MHz, 151.880 MHz, and 151.940 MHz.

The NPRM

The objective of WT Docket No. 98-182 (a Notice of Proposed Rulemaking) was to complete a comprehensive review of the PLMR (business band) Service and to revise various procedures and policies. One of the things the FCC wanted to know was whether they should go ahead with a utilitarian unlicensed VHF radio service.

The September 1998 NPRM stated "These five frequencies are licensed as mobile frequencies and the station license, therefore, does not contain station coordinates. We stated that frequency coordination for these frequencies no longer serves a regulatory purpose, particularly given that the frequency coordinator does not know the precise location of the user. Thus, the combination of two circumstances—(1) the existence of our current proposal to eliminate the coordination requirement for these frequencies; and (2) the claim that most users of these frequencies probably are not licensed—cause us now to invite comments on whether these five frequencies should be further deregulated by eliminating the requirement that they be licensed.

"Should we decide to take this action, we would reallocate the frequencies from Part 90 to a radio service that does not require licensing, such as the Citizens Band, Low Power Radio, or the Family Radio Service," FCC said.

"We invite comments on the effect such a reallocation would have on existing Part 90 licensees of these frequencies. We also invite comments on whether there are other frequencies in

Part 90 for which we could eliminate the licensing requirement."

The Report and Order

The Report and Order on WT Docket No. 98-182 was adopted on June 28, 2000 (released July 12, 2000). The R&O basically incorporated the changes that were proposed in the September 1998 Part 90 NPRM, including the reassignment of the five low-power VHF frequencies identified in the Notice from the Part 90 Private Land Mobile Radio (PLMR) Services to the Part 95 Citizens Band Radio Service, and elimination of the licensing requirement for these frequencies.

The FCC said in the Order, "Traditionally, the PLMR services have provided for the private, internal communications needs of public-safety entities, state and local government entities, large and small businesses, transportation providers, the medical community, and other diverse users of two-way radio systems." There was no mention of personal or hobby radio.

Another quote from the Order: "In the Notice, we invited comments on whether five 'color-dot' frequencies should be reallocated from the Part 90 Private Land Mobile Radio Services to one of the Citizens Band Radio (CB) Services in Part 95 (such as the Low Power Radio Service, LPRS).

MURS is Born

"After reviewing the record," the FCC said, "we conclude that the licensing requirement for the five low-power VHF frequencies identified in the Notice should be eliminated and these frequencies reallocated from Part 90 to one of the CB services in Part 95. All comments support our proposal. We agree with the commenters that because of the manner in which manufacturers have chosen to market radios that operate on these frequencies and our elimination of the frequency coordination requirements on the low-power frequencies, it would be in the public interest to eliminate the licensing requirement for them.

"Two of the three existing CB services, CB Radio and Family Radio, only allow voice communications. The third, LPRS (Low Power Radio Service), prohibits two-way voice communications. The color-dot frequencies, on the other hand, are intended for voice, data, and imaging. Therefore, we are following the suggestion of Motorola and Tandy (Radio Shack) by placing these fre-

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quencies in a new radio service category in the CB services, to be called the Multi-Use Radio Service (MURS).

"For consistency and ease of use and administration, we will also allow 2 watt operation on all of the frequencies, including those for which operation only at 1 watt is currently permitted."

Motorola wanted four additional UHF frequencies (467.850 MHz, 467.875 MHz, 467.900 MHz, and 467.925 MHz) relocated to unlicensed low-power use. Motorola said, "These four frequencies have been serving low-tier business needs for several decades." Tandy/Radio Shack requested four more 150 MHz frequencies be added to the list, which it said, "...are already commonly included on currently available business band radios."

Business band user groups generally opposed further expansion beyond the five channels. The Commission acknowledged the differing views and decided there was not sufficient support to justify reallocation of additional Part 90 frequencies at this time. But the FCC could expand MURS if it proves popular (and I predict it will be!). It said, "We may revisit this issue at a later date should additional support develop." Only the five frequencies listed in the original proposal are included in the new Multi-Use Radio Service (MURS).

The 150.8 to 152 MHz band, which previously was allocated only to Part 90

PLMS use, was expanded to include Personal Radio use under Part 95.

The Future of Unlicensed VHF Operation

While not the original intention, 11 meter CB radio more or less became an unlicensed HF hobby service. The most popular Amateur Service band is, of course, the 2 meter ham band. One can not help but wonder, therefore, what will be the eventual outcome of "2 meter" unlicensed CB radio. What will be its impact on amateur radio? That is, will we see a similar expansion at the VHF level?

I predict that we will, but its popularity will take several years to develop. Remember that 27 MHz Citizen's Band Radio took nearly two decades to reach its peak after the rules took effect. One of the positive things to come out of 27 MHz CB is that the Amateur Service clearly benefitted in terms of growth from the 11 meter CB phenomena.

The greatest infusion of new radio amateurs took place during the mid-1970s as radio enthusiasts migrated from the Citizens to the Amateur Radio Service. There is every reason to believe that 2 meter unlicensed CB radio will have a similar impact on the licensed Amateur Service. (See this month's "Zero Bias" for more on this subject.—ed.)

73, Fred, W5YI

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If you have questions or want to discuss something that's on your mind, join the Forums on the CQ website. You can post questions or comments on a variety of topics and get responses either from CQ editors or your fellow readers.

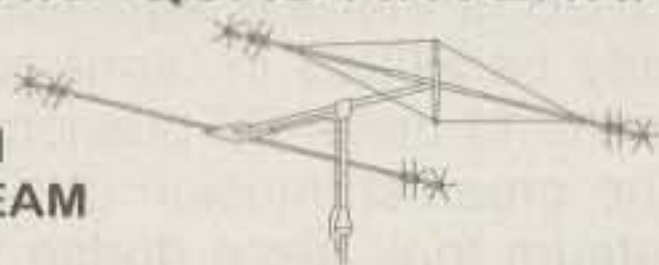
To reach the forums, point your browser to the CQ website, <<http://www.cq-amateur-radio.com>>, click the button on the left that says "The CQ Forums," and then select your forum of interest. Currently we have "Q&A," "Webmaster," "DXing," "Public Service and Emergency," and "Beginner's Corner." You may read current messages, post a reply, or open a new topic within each forum. If there's another forum you'd like to see, talk to us about it. Be careful, though ... we might make *you* the moderator!

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**Reader Survey
 December 2000**

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'd like to know how you research and make ham radio equipment purchases.

Please indicate...	Circle Reader Service #
1. ... whether you have made a ham radio equipment purchase in the past 12 months:	
Yes	1
No.....	2
2. ... whether you plan to make a ham radio equipment purchase in the next 12 months:	
Yes	3
No.....	4
3. ... if you answered yes to either Question 1 or Question 2, whether the equipment you bought/plan to buy is	
New.....	5
Used.....	6
4. ... your primary method of researching equipment purchases (select one):	
Magazine ads.....	7
Manufacturer websites.....	8
Manufacturer brochures.....	9
Dealer recommendations.....	10
Friends' recommendations.....	11
On-the-air recommendations.....	12
Other 13	
5. ... your primary method of making ham radio equipment purchases (select one):	
From a dealer...	
...online	13
... in store	14
... by mail order	15
... at a hamfest	16
Direct from manufacturer...	
...online	17
... by mail order	18
... at a hamfest	19
From other hams...	
...online (including auction sites).....	20
... by mail (including classified ads)	21
... in person (including at hamfests).....	22
6. ... the price range (in US dollars) of your most recent ham radio equipment purchase or of your next planned equipment purchase	
Under \$100	23
\$100-\$500	24
\$500-\$1000	25
\$1000-\$1500	26
Over \$1500	27
No recent purchases or plans to purchase soon.....	28

Thank you for your responses. We'll have more questions for you next month.

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Not every DXpedition has to be a big, expensive, or complicated venture, as NØODK discovered on his one-man DXpedition to Vietnam as 3W6DK.

DXpedition to Ho Chi Minh City

BY MICHAEL D. PASKEURIC,* NØODK / 3W6DK

Going on a DXpedition is one of the many things in ham radio that I have always wanted to do. When I received my Tech license around 1991, I became very active in VHF and UHF and had fun in contests and club activities. During the time of the Heard Island DXpedition, I read a lot about the operators and their experiences on the island and wished I could QSO with them or even *be* with them.

During the last couple of years I went through a couple of major events in my life that changed many things. I became very active in the Stillwater Amateur Radio Association (KBØSCE), doing MAP (Member Assistance Program) activities such as setting up antennas, stations, field days, special events, and our eyeball QSO get-togethers every Thursday night. Then I upgraded to General in November 1999, after passing the written and 13 wpm CW tests.

An already planned visit to Vietnam presented me with an almost immediate opportunity to exercise my new HF privileges and to make my dream a reality by operating from a rare DX location. I think the main reason I chose Vietnam for my vacation was because I have many Vietnamese friends and I have listened to their stories about the country and culture. Also at that time, Vietnam did not have many radio operations. Those friendships enabled me to lay the groundwork for operating from 3W6.

Just two weeks after passing the General exam, I landed in Ho Chi Minh City (formerly Saigon), Vietnam for my first time outside the US and my first DXpedition. I had a *long* flight from Minnesota to Los Angeles, then to Taipei, and on to Ho Chi Minh City, landing in a country that made me feel as if I had gone back in time about 20 years.

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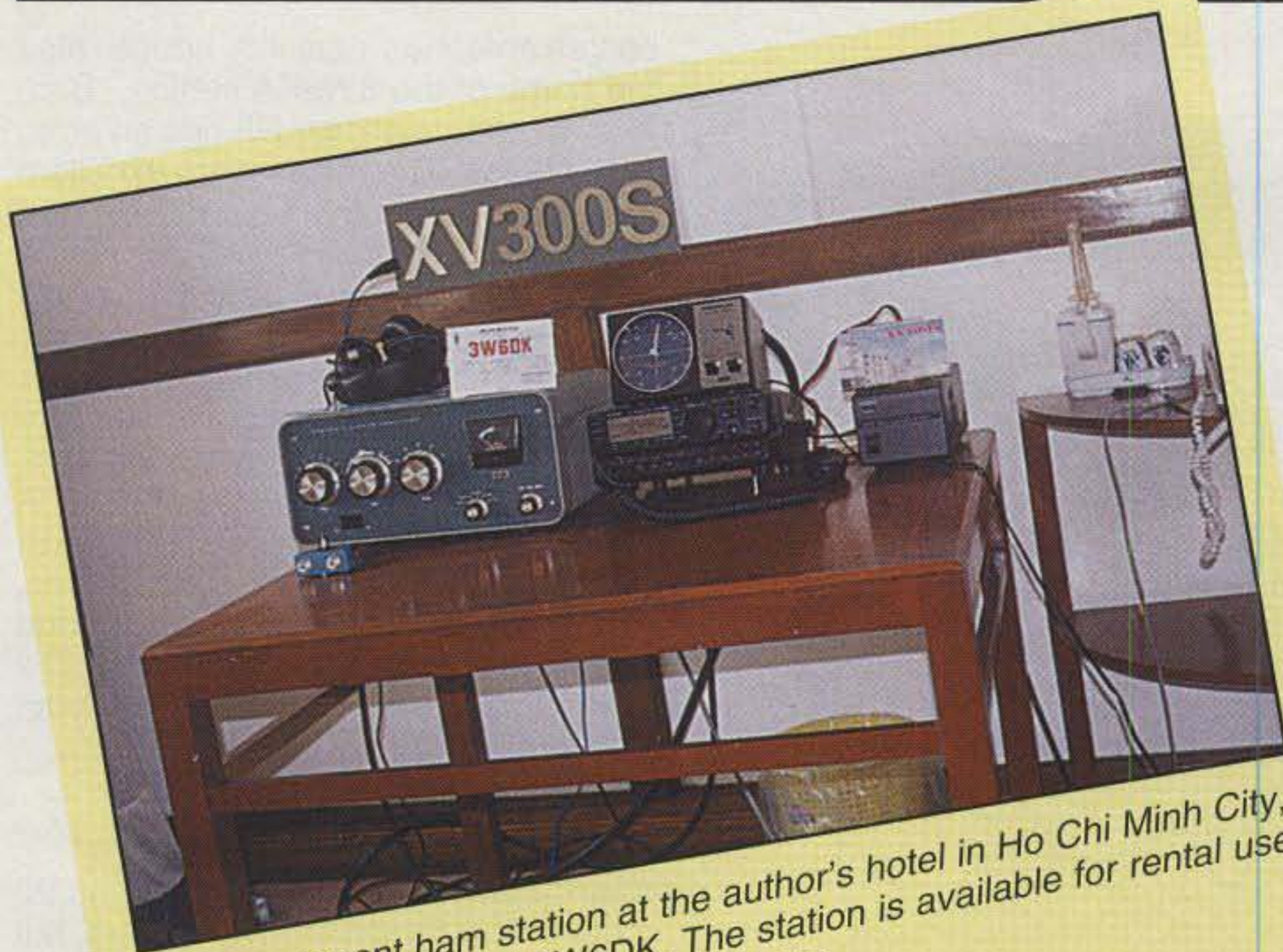
The author's QSL card from Vietnam, showing the old city hall in Ho Chi Minh City (formerly Saigon). It was built by the French in the late 18th century. (All photos courtesy of the author)

Getting through the airport and customs was no problem, but as I walked outside, there were hundreds of people looking at those who had just arrived. I felt out of place, being six foot seven, with brown hair and blue eyes. As I looked around, though, I saw my NØODK callsign on a card being waved at me by Hau Trinh, 3W6LI.

Hau gave me a quick taxi-ride tour. I noticed many of the houses in Vietnam have "stores" in the front to help generate income. Not very many automobiles are available, but bicycles, cyclos, and mopeds are everywhere, like New York traffic. A cyclo is kind of a bicycle without a front end. It has two wheels and a double seat for passengers up front, and a single wheel and driver's seat in the rear.

Now here's something you won't find in every city: a hotel with a permanent ham station! The Kimdo Hotel has a complete station, available to licensed guests, that was left there on permanent loan by a Japanese amateur who was one of the first hams to operate from Vietnam in recent years. The hotel rents the station to visiting hams!

On arrival at the hotel, we first visited the station, which consists of an FT-900 transceiver, a small power supply, an SB-200 amplifier (which I didn't use), and a three-element Yagi antenna. The hotel rooms were very nice and clean with TV, shower, beds, and air-conditioning. I received a newspaper every morning and went down for free breakfast in the hotel restaurant, which was very good. The staff was great to me



The permanent ham station at the author's hotel in Ho Chi Minh City, where he operated as 3W6DK. The station is available for rental use by visiting hams.

and their English was okay. Later that day, I met BacAi Nguyen, as he handed me my Vietnamese license, 3W6DK. We talked about some of the hows and wheres of touring around Vietnam. I was happy to know that both Hau and BacAi spoke English well, and with big smiles all the time.

Where's My Pile-up?

The first evening operating on 20 and 15 meters was *very* slow, even though the bands didn't seem to be bad. I was getting worried and thought I would never experience a pile-up. On the second day I dialed around for someone calling "CQ DX" and heard a US station. After explaining that I was not "W6DK" and it should be 3W6DK, I ended the QSO and he gave me the frequency, on which I then put out a CQ from 3W6DK. I heard a big buzz which puzzled me. I then said "QRZ," which finally clued me in on my first pile-up. Out of the buzz I heard an "A," so I asked for the "A" station. Well, I got about 25 people calling with "A" in their calls. I quickly learned to work through the pile-up and heard many "thanks for the new one" comments. I was happy to add a new DXCC country to someone's list. My favorite experience over the two weeks of operating was answering a "CQ DX" call and hearing the happy voices on the other side of the world.

Working the pile-ups in Vietnam can be a problem. Many operators are rude, don't listen to the DX station, and trans-

mit on top of everyone. It taught me how some of the DXpeditions deal with pile-ups. The JA's were the most polite and efficient operators. They would give out one call, wait, and listen for me answering someone. The QSO rate was very fast and fun with the JA's. One time, though, I tried working JA's by the numbers, and then the pile-up disappeared. It seems that JA's do not work by numbers. I listened to other DXpeditions while at my home QTH and heard the same situation. From my experience, the JA's and other Asian DX stations love to operate mostly on 15 meters.

Most of the time I pointed the Yagi north and just left it there. Signals stayed the same whether it was the US or Europe. Some of the pile-ups I operated split were "wall to wall" with people calling me for a QSO. Generally, I worked Asian countries during the day and early evening, while at night I worked the US and Europe. I had long daytime QSOs with many nice VU, BV, ZS, and VK stations. I received helpful operating hints from E21CJN and HSØ/DL2VK, among others. First in my log book was VU2RTF. My second QSO was with a YL, Linda, BY5QE, who told me, "Please don't forget a Chinese girl." I also had a lot of fun talking to about eight friends back in Minnesota.

While in QSO with many stations, I came to the conclusion that antenna size and design are more important than power. Power higher than 100 watts helps, but there were many who con-

tacted me who kept up with or sounded the same as the "high power" guys and just had a good antenna. Multi-element Yagis or quads sounded very good to me. Verticals and dipoles did well on days with good propagation.

I had a few problems with unscheduled power outages and rain/lightning storms that snuck up quickly, mostly during the evening pile-ups. Sorry if you were one of those fellows. You can get a QSO with me on my next trip to Vietnam! Another problem was electrical noise. There are about 50 to 100 lines on each power-line pole throughout the city, and I'm sure the neon signs don't help, either. Weak signals are hard to pull out.

Out of curiosity one night, I dialed up WWV and heard the chimes but not the voices. One evening I had a QSO with Peter, 3W6EA; Hau, 3W6LI; and Torsten, XV7TH. I had fun during the QSO and wished I had this opportunity at home. It lasted until a K6 jumped in and scared off everyone except me. The only Vietnamese I met but never managed to contact on the air was 3W6AR. I had QSOs mostly with European, JA, and US stations, with a few African and Caribbean contacts as well.

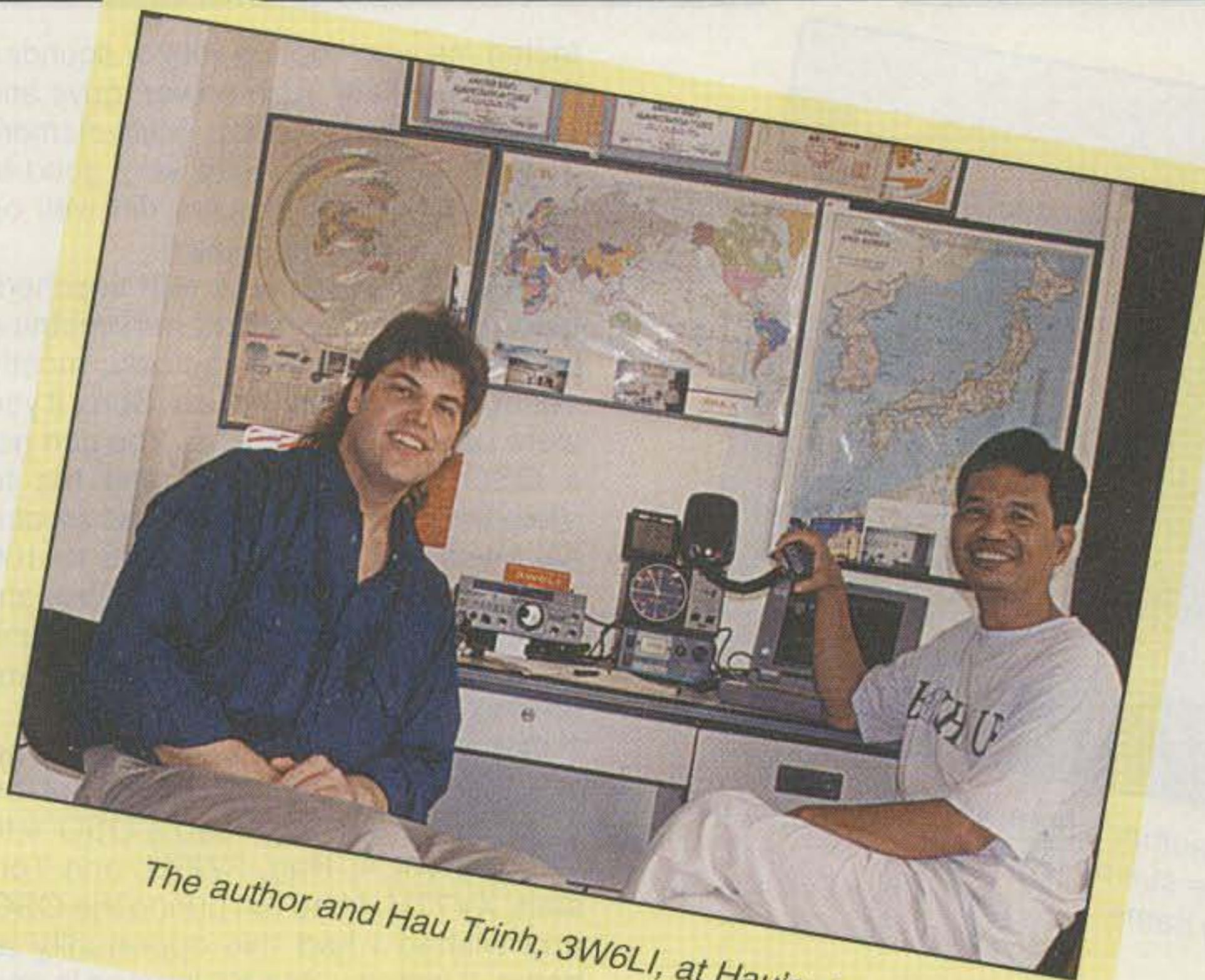
Off the Air

Touring Vietnam is interesting in its own right. I visited many areas. When crossing streets, I learned that once you start crossing, you don't stop walking for everyone times their passing around you. It is always busy with bikes and mopeds, and it is very easy to get hurt if you're not careful.

I visited the beautiful countryside and the Chu Chi tunnels. These are tunnels where the Viet Cong hid during the war. Today the area is very beautiful and quiet, with large memorials. I tried going through the tunnels, but gave up after the third one because I was just too tall.

As I was touring around Ho Chi Minh city in taxis, I noticed the drivers were using Kenwood VHF monoband radios operating in the 146 MHz amateur band! Foreign tourists are not allowed to drive in Vietnam, so traveling is done via taxi, cyclo, or moped. Via taxi I saw the different styles of living, the stores, and some of the flooded areas, as at the time central Vietnam was suffering major floods which displaced millions from their homes.

At night most people are indoors with little or no touring. I was told it was safe, but I stayed in because there were only street cleaners out at night and businesses were closed. I did my touring during the day and operating at night.

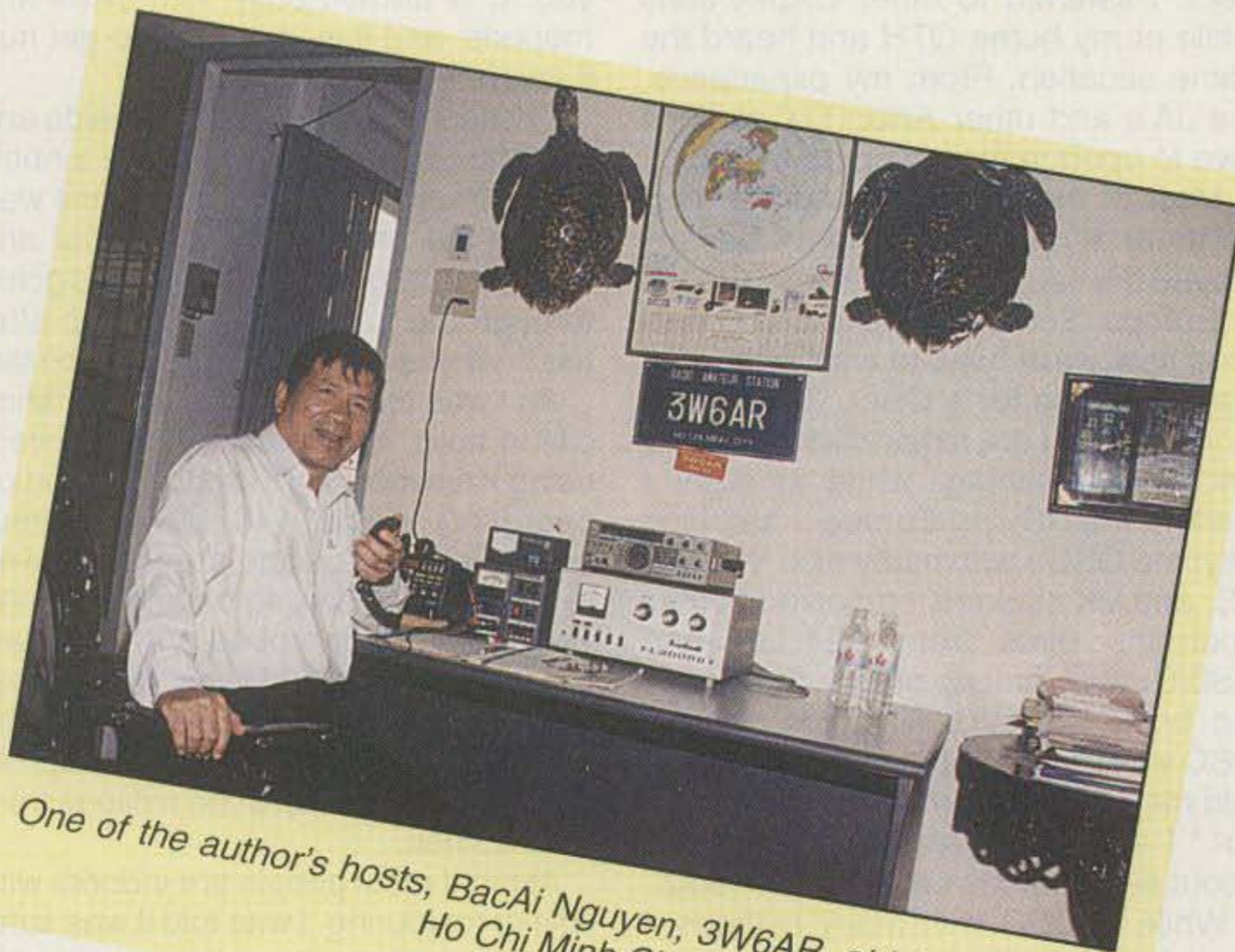


The author and Hau Trinh, 3W6LI, at Hau's station.

Vietnam is making progress cleaning up the city and trying to attract tourists, although there are many beggars on the streets. The main language is Vietnamese, although some of the people at major hotels and business speak Japanese, French, and some English. I spent a lot of time in Thu Duc, north of Ho Chi Minh City, where virtually everyone

speaks only Vietnamese. I didn't have any problems with the language barrier, but then I was with someone who lives in Vietnam.

BacAi, 3W6AR, gave me a tour of his house and a boat ride down the river, during which we watched a play of a traditional Vietnamese wedding. I got to see some of the telecommunication



One of the author's hosts, BacAi Nguyen, 3W6AR, at his station in Ho Chi Minh City.

center antennas near his house, also the home of the 3W6KA station. BacAi's HF setup has two HF rigs, an amp, and dipoles. The meals were excellent (but don't drink the water!) and the scenery was beautiful.

Hau, 3W6LI, gave me a tour of his house and introduced me to his family. Hau's two sons are also ham operators. One knows English as a second language and the other knows Japanese. Hau showed me how to operate SSTV, and I made three contacts with JA's. Hau's setup includes HF rigs, an amp, a computer for SSTV, and a tri-band antenna. I think he enjoys the SSTV most. On my next trip to Vietnam, I plan to operate more SSTV.

Pse QSL

After 1700 contacts on 10, 15, and 20 meters SSB (I also tried 40 meters, but had no takers), I am a little disappointed in the low rate of 3W6DK QSL card requests, even from the US stations. I have received about 250 cards direct and about 50 via the US bureau. I have received about eight SWL cards, and I was happy to reply. I QSL 100% direct (with SASE) or via the bureau through my NØODK call. Please QSL!!

I am hoping to return to Vietnam every other year, and plan to operate again from the mainland as 3W6DK and maybe open up a new IOTA (Islands on the Air) island as 3W2DK. On future trips to Vietnam, I will be trying out other modes and bands, relearning CW, and maybe even trying a beacon on 20 meters. I will be trying to work more WØ calls, for zeros always seem to get shorted or skipped on DXpeditions. Nicer 3W6DK QSL cards were made for future trips. I took the photograph of the old city hall in Ho Chi Minh City.

In the last couple of months I have noticed several DXpeditions to some of the Vietnamese islands and the mainland. There are now some regular operators living in Vietnam, so with myself and a couple of other people going there on a more regular basis in the future, you should not have a problem getting a QSO sooner or later.

I would like to thank Trinh Hau, 3W6LI; Nguyen BacAi, 3W6AR; Gary Hosler, WØAW; Tinh Chi; and many local hams for all their help and planning. Maybe some time in the future I will be involved in a major DXpedition to some rare or hard-to-get-to country or island. I was thinking about traveling to Cambodia as part of a trip to Vietnam to operate from there.

Listen for me on the HF bands while I am at home or back in 3W land. I would be happy to hear comments from you.



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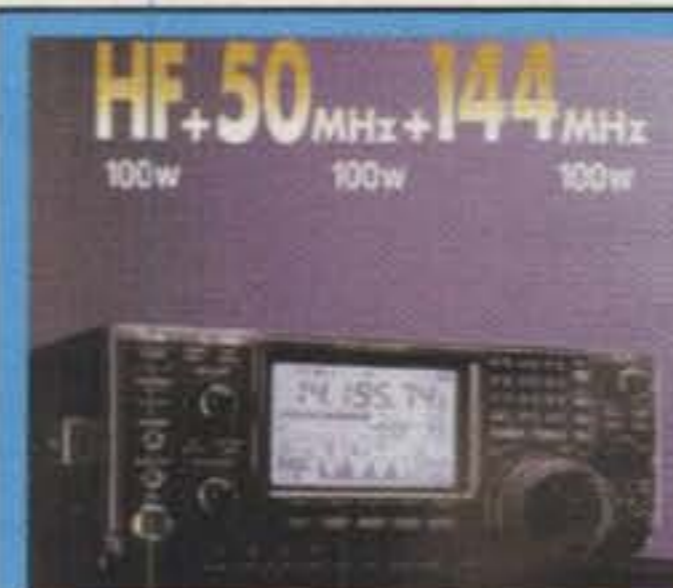
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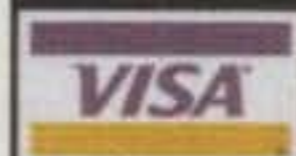
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If you've recently upgraded and are looking for DX action on 40 meters, you may be having trouble finding it. Well, there's a secret, and Contributing Editor WB2AMU is going to let you in on it...

A 40 Meter DXing Primer

BY KEN NEUBECK,* WB2AMU

The 40 meter band may be unfamiliar, confusing territory to those hams who have recently upgraded to General. Working DX on phone (voice) on most other HF bands is relatively easy because US and DX stations generally share the same phone band allocations. However, this is *not* true on 40 meters, where phone band allocations are significantly different in different parts of the world.

Where Is All the DX?

Perhaps you have already listened to 40 meter phone in the General portion of the band. Maybe you are on the east coast of the US and you hear the Midwest or even the west coast of the US coming in during the late evening hours. However, you still don't hear European hams. You start to listen later in the evening in hopes of finding some DX stations coming in. You hear the international broadcast stations from overseas coming in very nicely between 7.225 and 7.300 MHz, but no hams are to be heard from the same areas. You start to wonder whether it is something to do with propagation or the fact that these broadcast stations are running very high power compared to hams. Where are the DX ham radio stations on 40?

Believe it or not, there are DX stations on 40 meter phone every night, and they usually can be heard without much difficulty. It is just that they are in a *different part of the band*. This is because (in case you haven't already figured this out) the international broadcast stations from many of these countries are using frequencies inside the US phone band. Outside of the Western Hemisphere, in International Telecommunications Union (ITU) Regions 1 and 3, amateur radio is allowed only between 7.000 and

7.100 MHz, with 7.100–7.300 allocated to broadcasting.

The great majority of the DX phone operations are in the 7.040 to 7.100 region. (Please refer to fig. 1 for how every thing is basically situated on 40 meters.) This creates a complication for US stations wanting to work DX, as we are not allowed to use phone in this band segment. Because the 40 meter phone band in the US does not line up with most DX countries' phone allocations, a different strategy must be employed in order to work these stations.

A Different Strategy

One *could* do cross-mode operating by using CW to work DX stations using lower sideband (LSB) on the same frequency. However, the DX stations may want to work phone as much as you do, and in many contests cross-mode contacts are not allowed. What do you do?

What actually happens most nights, and particularly during a major phone DX contest such as the CQ World Wide (held during the last weekend of October) or the ARRL DX Contest (held during the first weekend in March), is that *split frequency* operation is used. Typically, a DX station will call CQ in the 7.050 to 7.100 portion—let's use 7.075 as an example—and then announce that he is listening on a frequency in the US phone band, such as 7.250. In order to call him, you will need to transmit on 7.250 while listening on 7.075. In other words, you will need a radio or radios capable of switching instantly between two separate frequencies in order to be able to work this DX station.

Back in the "olden days," prior to the mid-1970s, this typically was done by having a separate receiver and transmitter and using a Transmit/Receive (T/R) switch. This was a bit tricky in those days before digital frequency readouts were available, as finding the

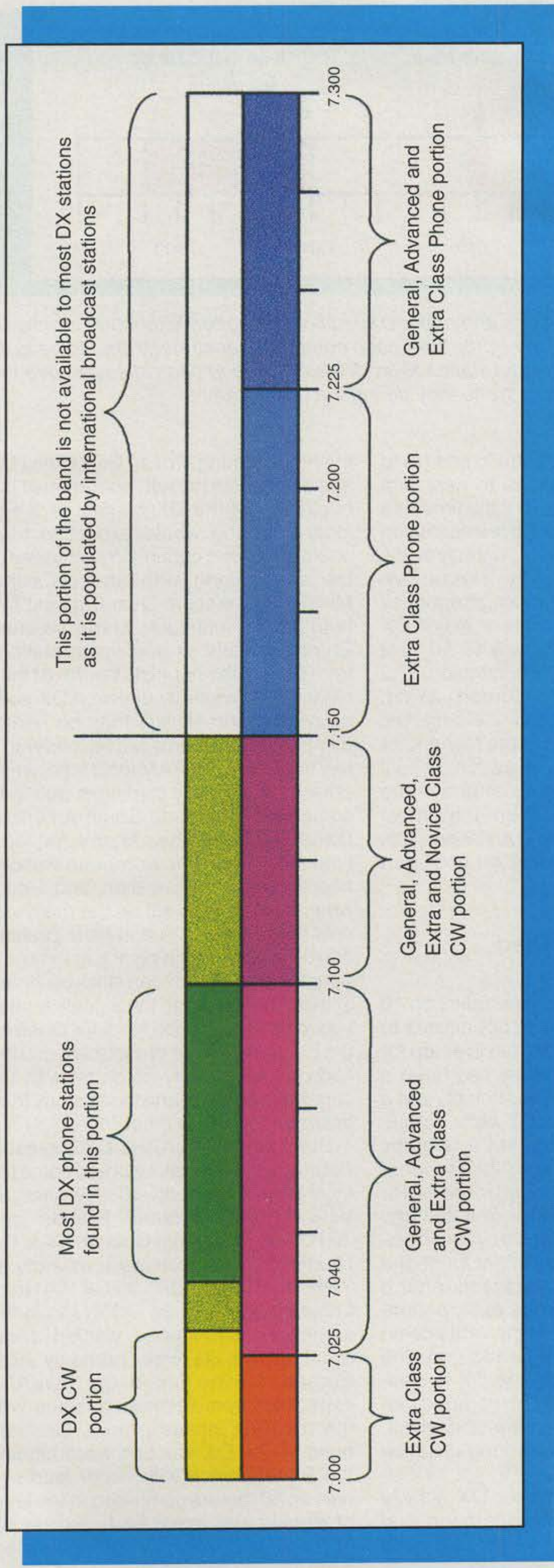
exact frequency on which the DX station was listening was often a trial- and-error process. Imagine if you had to work DX on 40 meters today using analog-type dials?

Today the most common way to operate split frequency is to use a transceiver (preferably with digital frequency display) that is equipped with *dual VFOs*—i.e., an A and a B VFO. The idea is to use one VFO, such as the A, for your listening frequency (where the DX stations are) and to set your B VFO as your transmit frequency. Now here is the *most important part* after you set up your VFOs: Be sure to *activate the split function* by hitting the split button on your transceiver. Why?

Well, sometimes during the heat of a major DX contest on 40 meters, some US operators forget to push the split button and as a result, you occasionally hear a US station inadvertently transmitting on the DX station's transmitting frequency. This is outside the US phone band! When this happens, another DX station (the one you're looking for is listening elsewhere) or a Canadian ham (Canadian stations may operate phone in this portion of the band) will often send a friendly reminder to the offending US station that he is transmitting out of band and that he should push the split button. Or, he may realize it himself after failing to make contact on repeated attempts. You should always pay particular attention to your transmit frequency when operating split! Big Brother may be watching!

Different radios have different ways of letting you set up split frequencies. On many you need to set each manually, one at a time. That can be a bit tiring, plus the station might have moved by the time you have everything set! Some radios, such as my TS-440s, have an additional feature, known as the *TF* button. Pressing this allows you to hear what is happening on your trans-

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e-mail: <wb2amu@cq-amateur-radio.com>



mit frequency and to move the frequency while holding down the button. This feature is especially useful when there is a DXpedition that is listening to a range of frequencies, as you can find the clearest spot in that range just above the last station that was worked. Some high-end radios have a right-tuning-knob/left-tuning-knob combination that allows you to set the transmit and receive frequencies independently. Carefully read your radio's manual to learn how to set up split operation and how to change frequencies while operating split.

You must also keep in mind any limitations imposed by your license class. If a DX station is listening, for example, on 7.195, an Extra Class ham would be able to work him, but a General Class licensee could not, since the General phone band begins at 7.225. Don't depend on the DX stations to be watching out for you with regard to which part of the band you can legally transmit on. During the heat of a contest, DX stations are typically looking for any reasonably clear frequency for listening in between the many commercial broadcast stations that are coming in on the band at night. They are not necessarily concerned about the fact that General Class hams cannot operate in certain areas of the band! However, the smarter stations looking to work as many stations as they can in order to place well will listen often in the General Class phone portion.

As cumbersome as split-frequency operation may seem, there is actually a tremendous advantage to this style of operating. During a DX contest you don't have to be subjected to hearing tremendously loud signals of local stations in your area while trying to pick out weak DX stations. You are listening only to the DX stations and adjusting your RF gain to their signals. By contrast, 40 meter CW operation during a DX contest can be a mind-numbing experience in which you are trying to pull out weaker DX signals from among the super-strong local stations.

40 Meter CW DX

Everything we've discussed so far has been about phone operation. Now let's say that you have your General ticket and you enjoy operating on CW. As per your license class privileges, you listen for DX on 40 meters above 7.025 MHz. Once in a great while you might hear some DX stations there, and during a contest you generally will hear a lot more. Outside of contests, though, we go back to the phone question: Where are the DX stations?

Unfortunately for US General Class hams, most of the DX CW stations are found in the 7.000 to 7.025 range, where only Extra Class licensees in the US may operate (*Many see this as an incentive to upgrade.—ed.*). Much of the world has simplified license classes, and many DX stations get this particular portion of the band with a general-type license. The same situation holds true for the 80 meter CW band, where most of the DX stations operate in the 3.500 to 3.525 range, and also the US Extra Class portion.

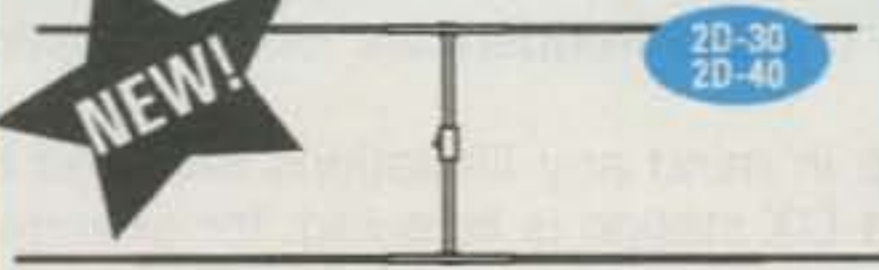
There are occasional split-frequency operations inside the CW band that you can take advantage of. This situation can occur when a major DXpedition takes place and the station listens above his transmitting frequency. This has two purposes: (1) to move the pileup of stations in order to thin them

← Fig. 1—General alignment of DX and US 40 meter amateur allocations, with DX (ITU Regions 1 and 3) on top and US on bottom. Region 2 countries outside the US (Canada and Latin America) generally have the same overall band allocation as in the US, but often have different borders of their phone and CW subbands.

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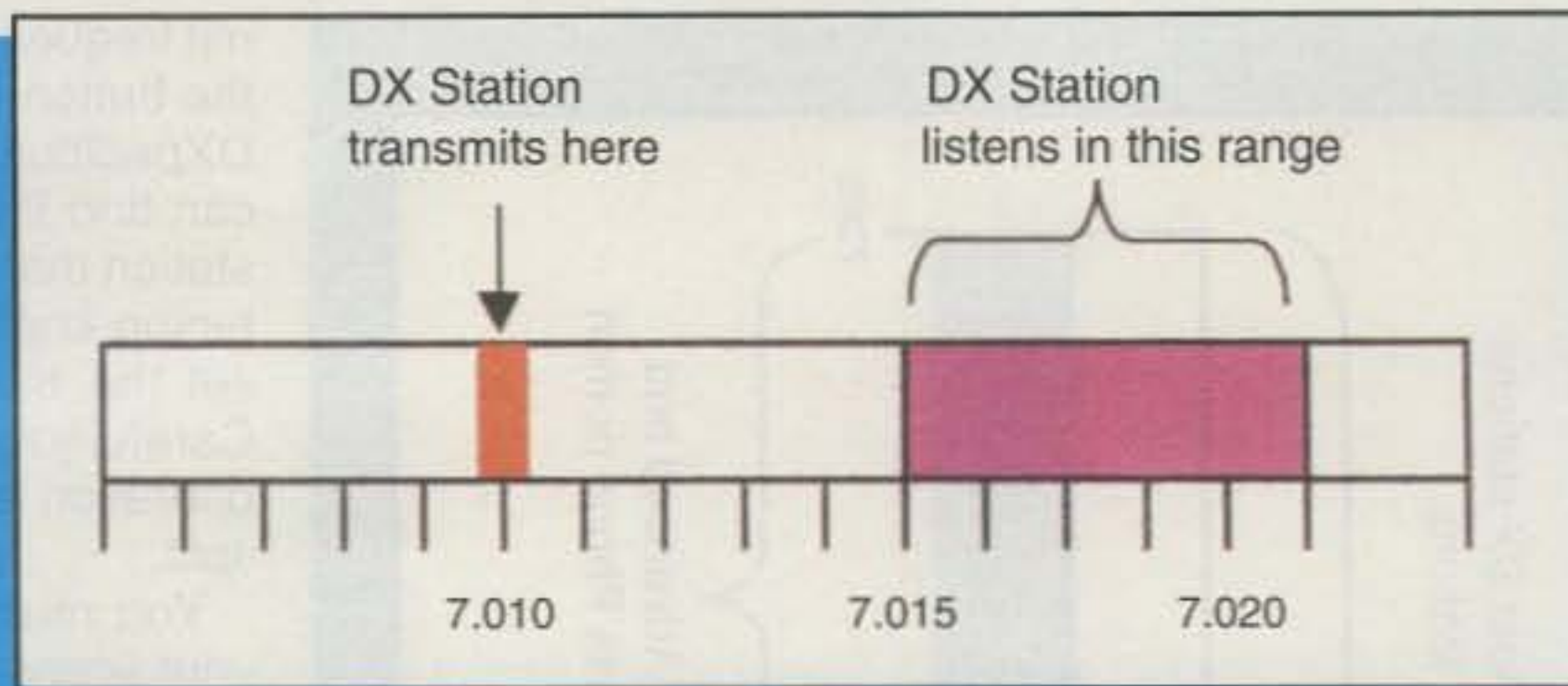


Fig. 2— Rare DX stations and major DXpeditions will often listen over a range of frequencies, tuning up slightly after each contact. Your strategy should be to listen for the last successful station to work the DX station and call just above that frequency during the next attempt.

out (and let him hear better); and (2) to allow the calling stations to hear him better in the clear. Most of the time, the DX station will say that he is listening up without specifying where. Usually in this case, you would start at 1 to 2 kHz above the DX station's transmitting frequency and work up. Sometimes a major DX operation will specify a 5 to 10 kHz range in which they are listening. CQ Contributing Editor Gordon West, WB6NOA, suggests that in a case like this, you should start at the low end of the range and use the TF switch (or dual tuning knobs) to move just above the frequency of the station that most recently contacted the DX station. This may take some practice on your part (see fig. 2).

What Can Be Worked On 40 Meters?

I would like to use my experience on 40 meters to show that it is not difficult to do well on this band. My basic setup for many years on 40 meters has been a simple dipole, up maybe 25 feet, and a TS-440S rig running 100 watts output. It is nothing elaborate, but it is pretty much all you need. With this general-type setup, I have operated in the ARRL DX Contest for a quarter of a century, with a great many of those years dedicated to operating only 40 meter phone for the entire contest weekend. After a while, you get used to the basic pattern of when certain parts of the world come in, particularly with regard to gray-line DX propagation. Gray-line DX is basically tracking the areas of the world that are just entering darkness or daylight, as this can lead to very long-distance contacts on 40.

Just about all 40 meter DX activity begins during the late afternoon and lasts through the entire night until early

the next morning. For an East Coast US station such as myself, operating at the beginning of the DX contest at 7 PM local time you would expect to hear eastern Europe coming in pretty well at the start, along with an occasional Middle East station. Over the next five hours until midnight, some western European stations and some stations from the south should be heard. At midnight, some westerly direction DX such as Alaska and Hawaii may be heard, although their signals will be louder in a few hours. By 2 or 3 AM local time, western Europe is really coming in well, with some Caribbean and South American DX added to the mix. After 4 AM local time there will be no European stations heard, and the Hawaiian and South American stations will be the main signals heard. Australia and New Zealand can be heard beginning at this time until about 7 AM. Japan can also be heard at this time, although the signals tend to be weak and tough to work for those on the East Coast. The West Coast and the Midwest will usually do better with the Japanese stations and the stations from down under at this time.

During the 2000 ARRL DX contest in February and March, I worked some big time DXpeditions on 40 CW such as V7G in the Marshall Islands and 3E1CW in Equatorial Guinea. Even the Middle East was coming in as early as 7 PM local time, with OD5/OK1MU from Lebanon and later on OD5NJ from the same country. Phone yielded some good results as well, primarily from Europe. I even heard the FO0AAA expedition from Clipperton Island with the resulting insane pile-up. Granted, none of the DX stations were pinning the S-meter here with super loud signals on 40 meters compared to the level of signals that would be heard on 10, 15, or 20 meters for the same stations.

However, they were loud enough to be worked, with careful listening and with a decent setup.

Forty meters is not a terribly difficult band on which to get set up. You need only a little bit of property to put up a dipole that is 66 feet long and as high as you can get it, preferably over 20 feet up. Just about all HF transceivers have 40 meters on them (except the occasional single-bander). I have done a good deal of my 40 meter DXing during the major contests. On a few occasions, I have worked all continents (WAC) during a 48-hour contest. Japan still seems to be elusive for me, even though I have heard several of these stations coming in weakly in the early morning hours.

Many of the top DX stations and contesters enjoy 40 meters because quite a few stations are running pretty much the same basic setup (dipole and moderate power). Certainly, there are many hams running amplifiers during contests, and there are even a few with a two- or three-element beam. However, you would be surprised as to how many DX stations, particularly those in eastern Europe, are running only 100 or 200 watts. You can see this when the exchange is given during the ARRL DX contest, as it includes the power output of the DX station. You should never feel overwhelmed on 40 meters, as you might on 20 or 15, where many stations are running beams and high power.

How difficult is it to work 100 countries on 40 meters in pursuit of the 5-Band DXCC award? Answer: It is very difficult without an Extra Class license and access to those exclusive areas of both the CW and phone portions of the band. I discovered that the lower 25 kHz of both the 80 and 40 meter bands was critical to my pursuit of 5-Band DXCC after I passed my Extra in 1988. General Class hams may find that 100 countries on 40 meters will take a much longer time without access to those frequencies. The good news, though, is that with the new requirements of 5 wpm for the Extra Class license, and a little studying for the written portion, this license is now reasonably achievable by most hams, more so than ever!

A Place to Call Home?

After reaching General Class, you may find that you like what you can do on 40 meters. You may find it advantageous at some point to go after that Extra Class license to achieve more awards, as well as to have the optimal amount of frequency space for contests that take place on 40 meters. In any event, I


would like to encourage General, Advanced, and Extra Class hams to try operating during one of the DX contests in the single-band category using 40 meters as the band entry. It is not difficult to make a lot of contacts as well as win this category for an ARRL section or for a call area.

Finally, it is worth mentioning that even though establishing a uniform worldwide amateur allocation on 40 meters is a top priority of the International Amateur Radio Union (IARU) for the next World Radiocommunications Conference in 2003 (WRC-2003), it is highly unlikely in this writer's opinion that things will change much or quickly. There are just too many overseas

broadcast stations populating the 7.150 to 7.300 MHz region, and it will be a tremendous effort to move them all. Therefore, it is very likely that split operation will have to continue as a standard practice on the 40 meter phone band for the foreseeable future. Nonetheless, as I hope I've shown you in this article, learning the secrets of 40 meter DXing success is not really difficult. It just takes a little knowledge and a little practice. CU on 40!

I would like to thank Gordon West, WB6NOA, for his help in getting some of the details on international band plans for this article.


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While We Wait for P3D . . . When is a Ham Satellite Not a Ham Satellite?

By the time you read this article in late November or early December, Phase 3-D, the largest and most sophisticated amateur satellite ever built, *may* be in orbit. As we go to press in mid-October, the launch was scheduled for mid-November. Hopefully, we'll know what happened in time for the January issue. In the meantime, here's what's happening elsewhere.

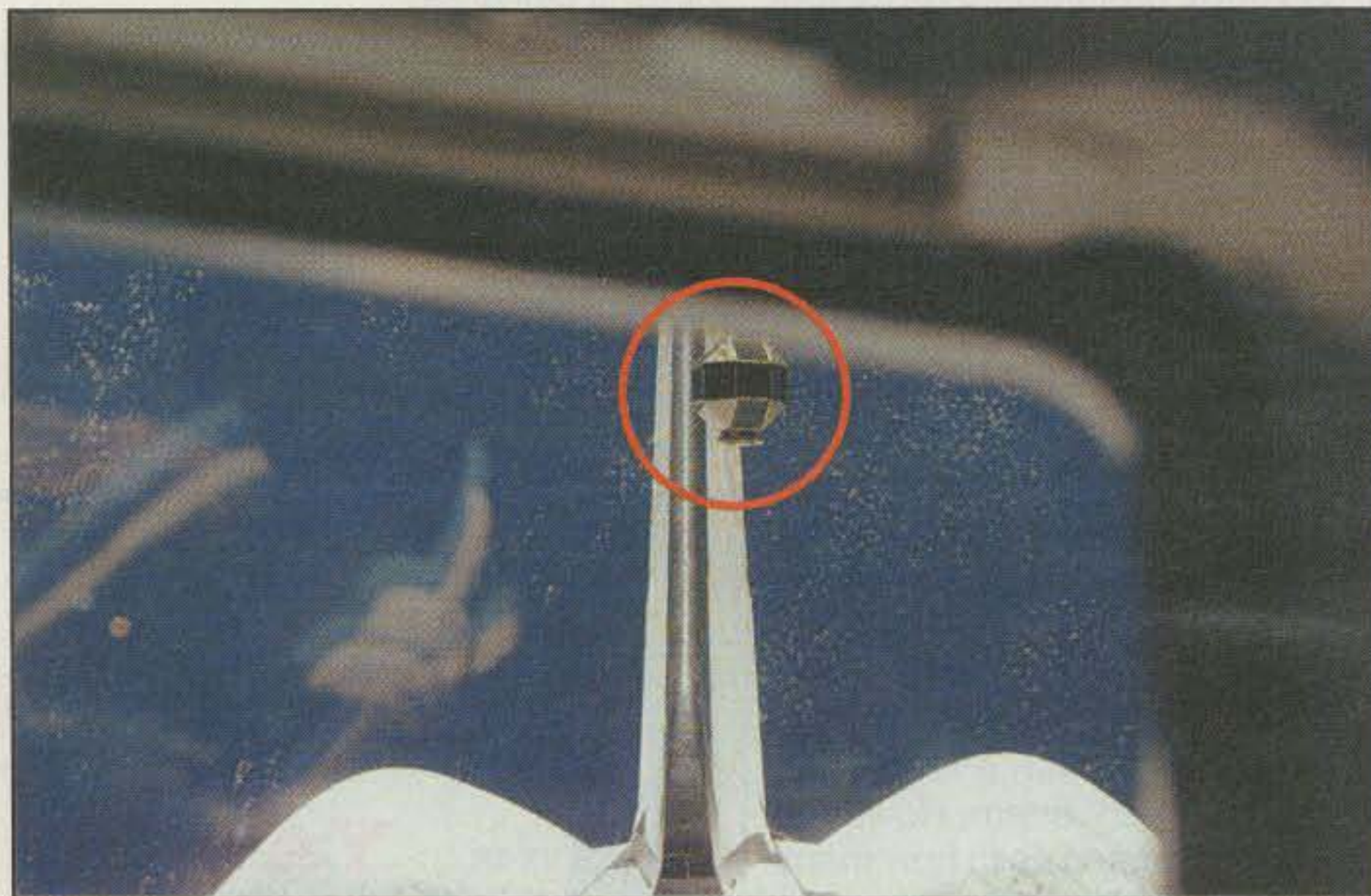
Semi-Ham Satellites

In the past couple of months, a handful of satellites with transmitters on amateur radio frequencies has been launched. But are they really amateur radio satellites? That remains to be determined.

Tiungsat-1, Megsat-1, Unisat, and Saudisat 1A and 1B were launched on a Dnepr launch vehicle, a retired Soviet missile, on September 26th (the 57th launch of the year 2000). Megsat and Unisat are Italian mini-sats which do not use amateur radio frequencies.

The Malaysian government's Astro-nautic Technology (M) Sdn. Bhd. (ATSB) is responsible for Tiungsat, which translates to a mynah bird. The Saudisats are sponsored by the Space Research Institute at the King Abdulaziz City for Science and Technology. These three satellites have downlinks in the 70 cm band, but does that necessarily make them amateur radio satellites? What many people forget is the 70 cm band is a shared band, occupied by other users besides amateur radio. In a country which permits 70 cm communications for non-amateur radio satellites, there's nothing illegal about somebody building a satellite with transmitters in the amateur radio band and using it for non-amateur purposes.

TiungSat's downlink frequency is 437.325 MHz. The downlinks for the Saudisats are 436.775 and 437.075 MHz. The Saudisat command team has announced that during the commissioning period, the transmitters will be on only when the satellites are over specified ground stations in Colorado, Washington D.C., and Saudi Arabia. Still, the footprint of any satellite in orbit is fairly large, so most of the U.S. can



Deployment of PANSAT from the shuttle Discovery during mission STS-95 on October 30, 1998. PANSAT is the tiny ball-shaped object that looks something like the device Luke Skywalker used for light-saber practice in "Star Wars." Despite being in orbit for over two years, PANSAT has not yet been made accessible to hams. (Photo courtesy NASA)

hear the Saudisats when they're passing over either U.S. ground station.

The big question is when—if ever—these satellites (and some others) are going to be made available to the general ham community. Pansat, launched on the STS-95 shuttle mission, uses 70 cm ham frequencies for experimental spread-spectrum functions. The team requested and was assigned the designation Pansat-OSCAR 34 (PO-34). However, the ground station has chosen to limit access to the satellite to its ground stations. It's been in orbit for two years. One would think that it could be opened up to the rest of the amateur radio community by now!

In a similar case, OPAL (Orbiting Picosat Launcher), OO-38, also has 70 cm downlinks. The ground command team has encouraged amateur radio operators to *listen* to the downlink and pass on reception reports and data received, but has not given out the satellite's receiver (uplink) frequencies and modes to permit others to access it. Both of these satellites, it should be pointed out, were built and launched by organizations in the United States (the Navy and Stanford University, respec-

tively). Besides the very questionable use of amateur radio frequencies by US-based satellites, these satellite owners are, in effect, asking hams to function as unpaid volunteer ground stations for their projects.

In the case of Tiungsat and the Saudisat birds, personnel working on commissioning these satellites have indicated that they will be opened up to the amateur radio community, possibly by the time you read this article. Presumably, the owners will request OSCAR designations, too, although as we've seen with Pansat and OPAL, that's no guarantee of amateur access. Information on Tiungsat is available on the World Wide Web at <http://www.yellowpages.com.my/tiungsat/tiung_main.htm>.

Who's Who?

Whenever there's a launch of several similar-size satellites, there's a lot of initial confusion about which satellite is which. USSPACECOM has a worldwide network of radar and optical tracking stations; however, it has no way of differentiating between similar-size

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USSPACECOM Designations

2000-057A	26545 TIUNGSAT-1	MALA
2000-057B	26546 MEGSAT-1	IT
2000-057C	26547 UNISAT	IT
2000-057D	26548 SAUDISAT 1A	SAUD
2000-057E	26549 SAUDISAT 1B	SAUD

Fig. 1—USSPACECOM designations for the five satellites launched together in September. Listings include international ID number, serial number, satellite name, and country of ownership (Malaysia, Italy, and Saudi Arabia, in this case). Three of these satellites, Tiungsat-1 and the two Saudisats, have downlinks in the 70 cm amateur band.

satellites. Launch-vehicle companies publish the number of satellites and anticipated additional objects and their anticipated orbits in advance, which gives indications what to expect and where to look. Of course, if there's a problem with the launch vehicle, the satellites may not end up in their planned orbits, or there could be additional objects (pieces falling off which shouldn't) or fewer objects (satellites which fail to deploy). USSPACECOM is excellent about tracking objects in space—over 26,000 to date, with about 8000 currently in orbit. However, telling apart similar-size objects with similar radar signatures is more of a challenge. Thus, USSPACECOM will either list the identity of the satellites as UNK (Unknown) or take a "best guess."

In some cases it's fairly easy to tell apart different satellites. If one satellite has laser reflectors and the others don't, then just zap a laser at the satellite and if you see a reflection you've found the correct satellite. Some satellites have their own GPS receivers and can transmit their locations in orbit with a lot of accuracy.

At first it may seem surprising that amateur radio operators can tell apart satellites from a multiple launch with more accuracy than USSPACECOM, but it's actually fairly simple. When the launch vehicle ejects its satellites, each one is ejected with a slightly different force and often in different directions. This minimizes the chances for an unwanted collision in space. At first all of the satellites are quite close to each other, but gradually over time they'll move apart. They'll still fly in roughly the same orbital plane, but be separated by time and distance. From your point of view the satellites will travel across the sky along the same path, but at different times. Each day the amount of time between the satellites will increase.

The simplest way to identify which satellite is which is to plot the paths for

all of the satellites in question and calculate when they're going to be over your horizon (Acquisition of Signal [AOS] to Loss of Signal [LOS]). Then listen to the satellite's beacons on each satellite's published frequency and compare the times with the predictions. While this is simple, it is limited by how accurately you can determine when a satellite is actually on your horizon versus when you determine the AOS and LOS times.

A more sophisticated approach is to use a frequency meter and listen to the Doppler shift—how the beacon's frequency changes over time. When the frequency is exactly equal to the satellite's actual transmitting frequency, it doesn't have any motion relative to you. For satellites in a north-south orbit this will occur as the satellite passes through your latitude. Comparing the Doppler data with your satellite program's predictions will determine to which satellite you're actually listening.

Often it can take months before USSPACECOM's identities match the actual identities of the satellites, but that's one of the limitations of launching multiple satellites. It can also provide some fun for us. Fig. 1 has the international IDs and serial numbers for each of the satellites from the Dnepr launch. See if you can determine if USSPACECOM is correct!

In Anticipation...

If Phase 3D did launch on schedule (this week's schedule, that is), we'll have special coverage in next month's issue. If it's delayed yet again, we'll bring you up to date in the next regular "Amateur Satellites" column in February. Meanwhile, watch the news page on the CQ website <www.cq-amateur-radio.com> and the AMSAT website <www.amsat.org> for between-issue updates. Members of CQ's internet newsletter list (details on the CQ website) will be notified as soon as news of the launch is received.

73, Phil, KC4YER

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3CX1500A7	3CX2000A7	4CX10000A	3-500Z
3CX2500A3	4CX250B & R	4CX10000D	3-500ZG
3CX2500F3	4CX350A & C	4CX15000A	3-1000Z
3CX2500H3	4CX400A	4CX20000A7	4-125A
3CX3000A7	4CX800A	5CX1500A & B	4-250A
3CX3000F7	4CX1000A	572B	4-400C
3CX6000A7	4CX1500A & B	811A	4-1000A
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Phase 3D Launch Delayed—Again

AMSAT-DL Executive Vice President Peter Guelzow, DB2OS, informed AMSAT News Service in mid-October that the launch of the Phase 3D satellite was to be delayed until mid-November. First reported that the launch was to take place no earlier than November 3, ANS later reported a possibility of an October 31st launch.

The November launch delay was caused by the non-arrival of one of P3D's launch partners and the subsequent launch preparations that this satellite needed to undergo. Assuming a successful launch last month, it is anticipated that P3D will be available for amateur radio operations some time early this month. See Table I for the frequencies used by the satellite.

For more information, go to AMSAT's URL, <www.amsat.org>.

Nobel Laureates' Research Has Ham Radio Applications

The Royal Swedish Academy of Sciences announced in mid-October that Alan J. Heeger of the University of California at Santa Barbara; Alan G. MacDiarmid of the University of Pennsylvania, Philadelphia; and Hideki Shirakawa of the University of Tsukuba, Japan, jointly won the Nobel prize for Chemistry for their discovery and development of conductive polymers. Simply put, these gentlemen have been discovering how to make polymers (in lay terms, plastics), heretofore known as insulators, into conductors.

Not only has it been discovered that these polymers can be conductors of electricity, they also can be used to form light-emitting diodes. By implication, polymers can be used as semiconductors, too.

The conductivity of polymers is achieved by doping the polymer with a substance, such as iodine. The doping dislodges an electron from the valence ring of the atom, thereby creating a pathway for electrons to flow through the polymer. Heeger, MacDiarmid, and Shirakawa found that oxidation with

chlorine, bromine, or iodine vapor made polyacetylene films 10^9 times more conductive than they were originally. The doped form of polyacetylene had a conductivity of 10^5 Siemens per meter. By contrast, Teflon has a conductivity of 10^{-16} Siemens per meter, and silver and copper have a conductivity of 10^8 Siemens per meter.

Significant to their discoveries is the applications of such technology in the use of polymers that contain areas that are conductive and areas that are semi-conductors and areas that are not conductive all on the same sheet of polyacetylene. Further, because polymers are inexpensive, products can be developed at a fraction of the cost as compared to metallic equivalents. The down-

VHF Plus Calendar

Dec. 1	Moon apogee.
Dec. 3	First quarter Moon. Moderate EME conditions.
Dec. 10	Moderate EME conditions.
Dec. 11	Full Moon.
Dec. 12	Highest Moon declination.
Dec. 13	Moon perigee and <i>Geminids</i> meteor shower predicted peak. (See text for details.)
Dec. 17	Last quarter Moon. Very good EME conditions.
Dec. 22	<i>Ursids</i> meteor shower predicted peak. (See text for details.)
Dec. 24	Very poor EME conditions.
Dec. 25	New Moon.
Dec. 26	Lowest Moon declination.
Dec. 29	Moon apogee.
Dec. 31	Moderate EME conditions.

—EME conditions courtesy W5LUU

P3-D Uplink Frequencies

UPLINK	Digital	Analog Passband
15 m	none	21.210–21.250 MHz
12 m	none	24.920–24.960 MHz
2 m	145.800–145.840 MHz	145.840–145.990 MHz
70 cm	435.300–435.550 MHz	435.550–435.800 MHz
23 cm (1)	1269.000–1269.250 MHz	1269.250–1269.500 MHz
23 cm (2)	1268.075–1268.325 MHz	1268.325–1268.575 MHz
13 cm (1)	2400.100–2400.350 MHz	2400.350–2400.600 MHz
13 cm (2)	2446.200–2446.450 MHz	2446.450–2446.700 MHz
6 cm	5668.300–5668.550 MHz	5668.550–5668.800 MHz

P3-D Downlink Frequencies

DOWNLINK	Digital	Analog Passband
2 m	145.955–145.990 MHz	145.805–145.955 MHz
70 cm	435.900–436.200 MHz	435.475–435.725 MHz
13 cm (1)	2400.650–2400.950 MHz	2400.225–2400.475 MHz
13 cm (2)	2401.650–2401.950 MHz	2401.225–2401.475 MHz
3 cm	10451.450–10451.750 MHz	10451.025–10451.275 MHz
1.5 cm	24048.450–24048.750 MHz	24048.025–24048.275 MHz

P3-D Telemetry Beacons (IHU)

BEACON	General Beacon (GB)	Middle Beacon (MB)	Engineering Beacon (EB)
2 m	none	145.880 MHz	none
70 cm	435.450 MHz	435.600 MHz	435.850 MHz
13 cm (1)	2400.200 MHz	2400.350 MHz	2400.600 MHz
13 cm (2)	2401.200 MHz	2401.350 MHz	2401.600 MHz
3 cm	10451.000 MHz	10451.150 MHz	10451.400 MHz
1.5 cm	24048.000 MHz	24048.150 MHz	24048.400 MHz

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The MB can be switched between IHU-1 or IHU-2 telemetry.

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Table I—Phase 3-D frequencies.

side is the impurities of the polymers presently cause a high rejection rate.

While the work that the laureates were cited for took place back in 1978, recent work being done by Heeger at UCSB in the area of laser technology also is promising. In a work in progress announcement by the Institute for Polymers and Organic Solids at UCSB concerning Conjugated Polymer Blends as Materials for Low Threshold Lasers, they reported, "The discovery (at IPOS) of Amplified Spontaneous Emission (ASE) in conjugated polymers has generated interest in these materials; research has focussed on making lasers using conjugated polymers as the active layers. Although optically pumped lasing has been reported using a number of organic systems in a variety of resonators, electrically pumped lasers have not yet been demonstrated. Research has focussed on making better cavities to lower the thresholds for lasing, and on reducing the optical losses in thin film waveguides to reduce the lasing/ASE thresholds. IPOS research has demonstrated that blends of conjugated polymers can be used to lower the optical losses and the ASE (and lasing) thresholds of optically pumped conjugated polymers. Förster energy transfer from the host polymer to the guest polymer leads to reduced self-absorption as a result of the red shift of the emission relative to the absorption in the blend. In recent studies, the dependences of energy transfer on the concentration of the guest polymer and on the photoluminescence quantum efficiencies in the blend were explored, and the thresholds for optically pumped ASE and lasing were measured in thin film planar waveguides of the host, the guest and the host-guest blends. The blends exhibited significantly reduced self-absorption losses; $\sim 3 \text{ cm}^{-1}$ compared to $\sim 85 \text{ cm}^{-1}$ in pure host."

Two noteworthy items from the above paragraph are the potential for development of electrically pumped lasing and the significant drop in absorption losses. Concerning the former, it would seem to this author that it would be easier to introduce modulation into the electrically pumped laser than the optically pumped laser. Concerning the latter, it would seem that waveguides composed of polymer could have applications in the microwave bands.

Bengt Nordén and Eva Krutmeijer, the authors of the prize announcement report, indicate other applications, most specifically in the area of size reduction of electronic components. They conclude, "The dream is thus to put elec-

tronic circuit properties into single molecules. Arrays of such molecules—possibly connected by conductive-polymer wires—on molecular scaffoldings would form molecular wafers. One may speculate that reduced dimensions from 200 nm to, say, 2 Å, and the concomitant shrinkage in circuit size could increase the speed and dynamic memory of computers by a factor of 10^8 . Such progress would correspond to 40 years of computer technology development. Conductive polymers may become crucial for the building of such a molecular electronics world."

For more information concerning the work of the Nobel laureates, see the Nobel Prize URL at <www.nobel.se>.

On the Air

The following is from **Ken Neubeck, WB2AMU**: "I was on vacation in San Francisco and listened on 6 meters a bit. I brought the FT-690 with me when I went to CM87 (San Francisco). On Thursday, 10/5 at 1530, I heard V31PC coming in at about 5 by 4. I could not work him with my 2.5 watts, but I heard him work K6QXY in CM88. K6QXY also worked an Argentina station during this period, but I could not hear the LU station.

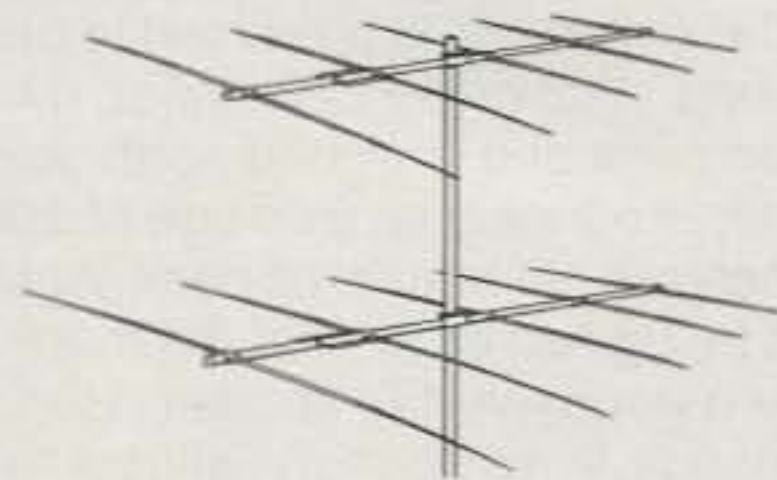
"Looking at the Kp index before this time shows that it reached 7 about 8 hours before. So, it is probable that this F2 opening was induced by the high geomagnetic activity that was associated with same type of stuff that induced the aurora hours earlier."

Sam Whitley, K5SW, also reports activity on 5 October. Sam writes, "Had two openings today. The first started at about 1440 UTC. I worked LU8MB (FF57), CE3RR (FF46), TI5KD (EJ79), TI5RVV (EK70), LU2DEK (GF02), LU3CGG (GF05), and CX3AN (GF15). I heard but did not work LU7DZ (FF78), HC8GR/B (EI59), CX1CCC/B, TI2NA/B, LU9EHF/B, and J87AB, all via F2. On backscatter, I heard KP4EIT, K0UO/B (EM07), K0ETC/B (EM27), along with OH, FL, TX, NM, CO, OK, and CA stations. The last signal was heard about 1650.

"For six hours beginning at 0000 UTC on 13 October the cumulative K-index was above 5; there was no report of aurora-caused propagation posted on the VHF reflector. I wonder if anyone noticed any propagation during this timeframe.

"The second opening started at about 1900 UTC. I worked LU6DRV (GF05), LW5DXN (FF97), CX1AO (GF15), and LU5EMM (GF11). I heard but did not work LU9EHF/B (50.016 MHz) and

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CX1CCC/B (50.020 MHz). The last signal heard was at about 2015 UTC."

Current Meteor Showers

Two showers occur this month. The first, the *Geminids*, is predicted to peak at around 1700 on 13 December. It has a broad peak and is a good north-south shower, producing an average of 100–110 meteors per hour at its peak. Again, with it being two days past full moon, it will be a poorly visible shower. Hence, our friends in astronomy will be very interested in our radio reports.

The second, the *Ursids*, is predicted to peak at around 0600 UTC, 22 December. It is an east-west shower, producing an average of greater than 12 meteors per hour, with the possibility of upwards of 90 at its peak.

Considering that the *Ursids* meteor shower peaks on 22 December, the 25th is new moon, the lowest moon declination is on 26 December, and the second moon apogee is 29 December, for EMEers, it's best to take the week off from ham radio and enjoy the holidays.

And Finally...

It goes without saying that it is during this time of year that our thoughts turn to family and friends. We gather with them to celebrate the holidays. It is also the time when we put closure on the end of the year and think of plans for the new year. Often we call these plans "New Year's resolutions."

Here is an idea for a New Year's res-

olution: Because so many of us have precious little time to devote to our hobby, we should consider prioritizing our hobby time. For example, rather than working on multiple goals at once, such as 6 meter DXCC and 2 meter WAS, and all the grid locators in the world awards, we should consider working on only one award at a time.

Here is something more challenging: All of us who work for someone else know what it means to add value. This is what our employer expects from us, that we add value by our working for him or her. If we don't add value to our employer's bottom line, then our employer will find a way to get rid of us. It is the same way with our hobby. We can choose to achieve goals or we can choose to add value to the hobby. I know that this may seem strange to some of us, but it is not likely that we will impress anyone but ourselves by having worked WAS on any of the bands on which anyone else has already done so.

With this in mind, considering that we have limited time to devote to our hobby, rather than trying to achieve a personal goal, we should consider what we can do to add value to our hobby.

For example, maybe instead of spending money for enhancing our station, we could spend money for equipping a rover station. In equipping a rover station, we can add value two ways. First, as we go out in a contest, we can give points to other stations for our activities. Second, if we take someone new

Riley Hollingsworth's Ten Personal Suggestions For Amateur Radio Operators

1. Be proud of what you have and let your feelings be known. Let the public know what you are, what Amateur Radio is, and why it's valuable. Let your feelings be known to Congress, to the FCC, to the media, to your states, and to emergency agencies. Sprint does. AT&T does. Motorola does.

2. Operate as if the whole world is listening. It is!

3. Take nothing for granted. Bill Gates can't, and you can't either.

4. You're at a crossroads now. An old Chinese philosopher (or my grandmother—I can never remember which!) said, "Be careful what you wish for. You may get it." Seize the moment, and make this your finest hour. Ham radio has been at a crossroads before and has thrived. Continue that tradition.

5. Make sure that on your watch, Amateur Radio never becomes obsolete.

6. Teach the new licensees all you know. We've needed numbers for a long time. Respect this wonderful legacy known as Amateur Radio that our mentors and Elmers gave us. Every time you key the mike or hit the key, think about what a legacy you were given and your duty to pass it on.

7. Enjoy ham radio. Celebrate it. But realize it comes with responsibility. Every gift of lasting value always does.

8. Stay away from arrogant, negative operators who know all the answers. They just haven't thought of all the questions. Encourage them to take their anger and hate to the Internet. Every minute they are on the Internet is a minute they aren't on Amateur Radio.

9. Never allow Amateur Radio to become the audio version of *The Jerry Springer Show*.

10. You may not always agree with the ARRL, and that's fine. But I'm standing here before you tonight talking about enforcement because they never gave up. Take care of the one voice you have. You must never doubt that a small group of dedicated people can change the world. They just did. —K4ZDH, via *The ARRL Letter*

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to the hobby along for the ride, chances are pretty good that this person will be hooked! I don't have to tell you the rest of the story.

If you have a creative way in which you have added value to the hobby, please let me know so that I can share it with the rest of the readers. After all, this is what this column is all about—adding value to our hobby by publicizing our accomplishments in the wonderful world of the VHF plus ham bands.

Until next month...

73, Joe, N6CL

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Hazardous Materials—Get to Know Them!

How many times have you driven down the highway, seen a diamond-shaped placard on a truck, and not known what sign means or if the truck is carrying something dangerous? Are you driving along listening to your favorite broadcast radio station with your ham radio next to you and thinking about getting to your next destination?

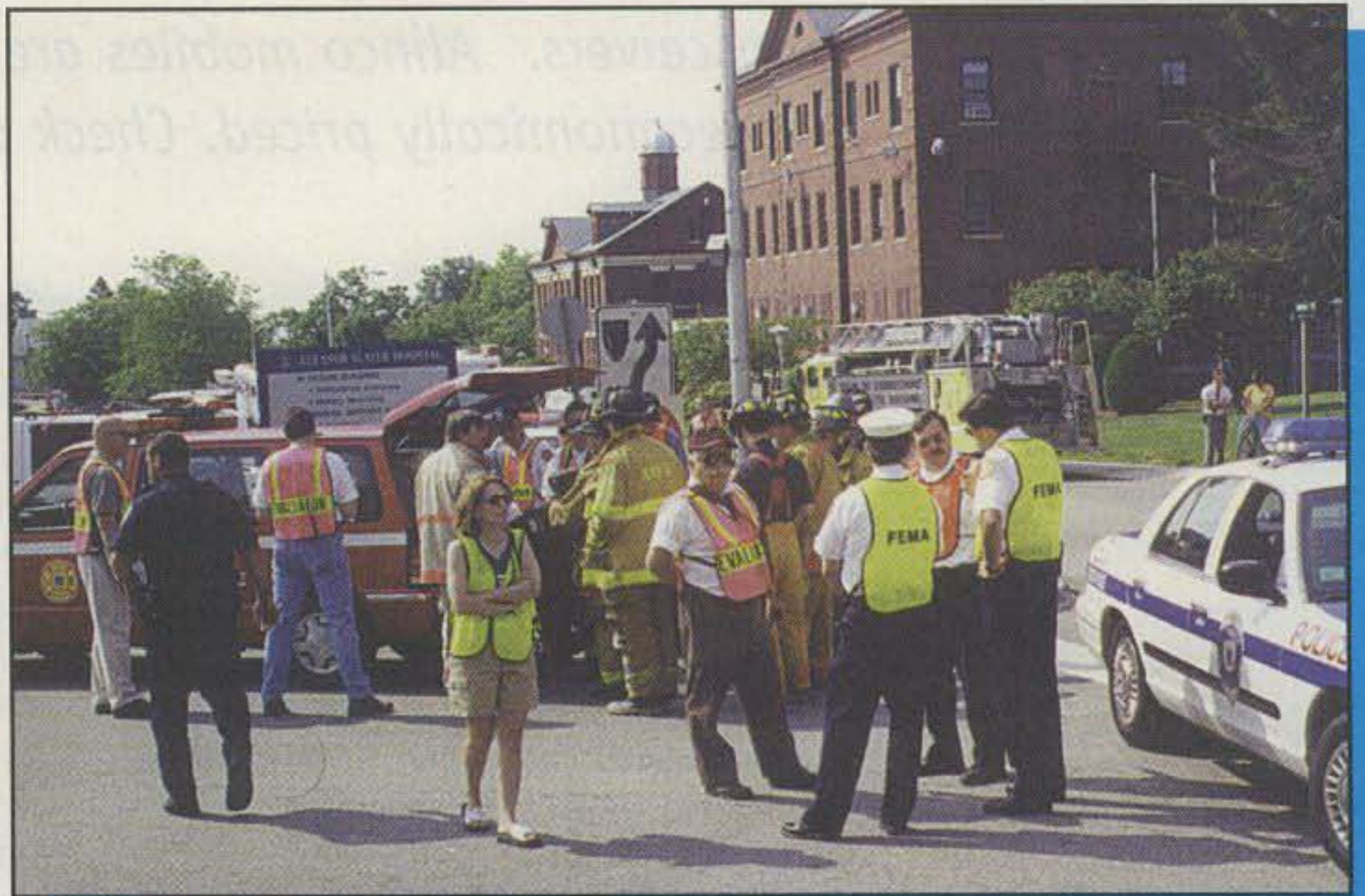
All of a sudden there is a traffic accident ahead of you. A car and a truck are involved. You pick up the microphone and put out a call on the local repeater for help. If you are using a repeater's autopatch and you call 911, would you know what information besides the location of the accident would be helpful?

A traffic accident was simulated in Cranston, Rhode Island this past summer as part of a hazardous materials (HAZMAT) exercise. A transportation van crashed into a tractor trailer truck. The truck was carrying several containers that had unknown chemicals in them. The containers ruptured. Several people were injured, and they were contaminated along with a nearby building. The building had to be evacuated.

Rhode Island ARRL Section Emergency Coordinator Martin Mendelson, N1JMA, described the drill as it unfolded: "First the Fire Department set up a command post. A decontamination area and a triage area were established for the victims before anyone could be transported to a local hospital."

A decontamination area is an area where harmful chemicals are either washed away or neutralized. In a triage area medical staff evaluate the condition of the victims and identify those needing immediate transportation for possible life-threatening injuries.

When called, Mendelson responded to the command post to get an update, and with details in hand he activated a RACES – ARES Emergency Net. Calls went out on a predetermined repeater for amateur radio operators to report to the command post near the crash site and to nearby Kent County Memorial Hospital in Warwick, RI. The hospital was set up to accept and decontaminate the injured.



Can you find the ham in this picture? Identification is important.

Two stations were assigned the task of keeping track of all of the logistics. Mendelson said, "This proved to be very beneficial in keeping track of all radio operators and all traffic.... During an incident we think active hams at the scene will be busy passing traffic and not writing everything down; therefore our home stations would keep track of all messages and be our backup."

As with most drills, radio operators were pre-assigned to the various communications assignments. In this drill a call went out for additional operators for more help. Several home-based stations checked in, and one additional operator reported to the hospital. Probably the most important piece of information relayed to the hospital was the name of the chemical—methyl ethyl keytone. Other information supplied to the hospital included the number of patients being transported and the extent of their injuries. It was important for the hams to be at both the command post and the hospitals.

"The chemical was unknown and was not identified for quite some time," said Mendelson. "As it turned out, the fire department could not contact their man at the hospital by cell phone and called on the hams to transmit the info on the chemical to the hospital so that the hos-

pital would know how to treat patients."

Mendelson offered some comments following their exercise: Contingency plans should be made in case a radio operator can't get into the local repeater. If an operator in a hospital can't make the local repeater, is it better to switch to another repeater or simply operate on a simplex frequency and let another station in a better position relay the information to all on the emergency repeater frequency? Every situation is different but it is important to know as much as possible about key emergency facilities.

CQ asked what type of message form they use in this type of situation. Mendelson said they use a form similar to the ARRL message form. It includes the message number, precedence, originating station and place of origin, time, and date. This is followed by the recipient's name and address, the message, and a signature. Each Wednesday night they hold a training net with a twist: They move between several local repeaters as well as simplex, so if a repeater goes down, they have a list of others to use. They also get repeater owners and clubs involved in their nets. They discuss batteries, antennas, radio gear, and anything else of interest. There is always room for training, too,

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2000 EMERGENCY RESPONSE GUIDEBOOK



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The Emergency Response Guide.

such as getting involved with the local hospitals.

As with any large-scale operation, there were many people involved. In this exercise, police, fire, emergency medical staff, and civilian evaluators all wore uniforms or identifying vests. According to Mendelson, "The amateur radio folks were all but invisible. Badges and hats won't do it! Orange or lime-green vests with reflective stripes and lettered 'communications, amateur radio' would be outstanding in any situation."

Just one month after the HAZMAT drill, FEMA reported a *real* HAZMAT incident in the same community when a tanker truck spilled 11,000 gallons of jet fuel on a highway underpass, down a highway ramp, and into a drainage ditch and the Pawtuxet River. The fuel ignited, creating a 3000° inferno. According to FEMA, Robert Warren, one of the two responding fire chiefs, credited the exercise with directly contributing to an effective response.

CHER-CAP (see next section) also enhances the work FEMA has begun in Project Impact by providing a technological hazards component toward building disaster resistant communities throughout our nation.

A Little Bit South...

You're sitting at home and receive a call from your local emergency coordinator or emergency management group requesting assistance of your local ARES,

RACES, or public-service group. The request is to help out with a HAZMAT incident at the local industrial park. The area is being evacuated, and there is a need to have amateur radio communications at several local hospitals.

This isn't a weather emergency. There are hazardous chemicals being released. Do you ask yourself, "Am I going to be in any danger?" I've been called out numerous times before, but never for a hazardous materials incident. Should my family be more concerned about me this time when I leave the house?

CQ spoke to Chris Post, N3SIG, Communication Coordinator for the Lehigh County Emergency Management Agency in eastern Pennsylvania. Post emphasized that any public-service-minded ham should become familiar with hazardous materials by taking some form of an introductory course. These courses are either taught by local emergency management agencies or by an arranged-for speaker. As a ham, you are only responding to areas that are identified as being safe by emergency personnel who have advanced training in hazardous materials. Mendelson said that while Rhode Island hams have not been trained by the state

Emergency Management Agency, "We stress common sense and do not go right into an incident, but go to the command post."

This fall Lehigh County hams participated in a Federal Emergency Management Agency Comprehensive HAZMAT Emergency Response-Capability Assessment Program (CHER-CAP). The new CHER-CAP Program assists local communities in obtaining a greater understanding of HAZMAT risks, identifying planning deficiencies, updating plans, training first responders, and simulating and testing the system for strengths and needed improvements. It is part of FEMA's preparedness training program and helps coordination and communication among various responding organizations in any type of incident.

Post explained, "As a voluntary program, CHER-CAP uses the skills and resources of federal, state, and local governments, and industry partners, to identify and address local jurisdictions' HAZMAT preparedness needs."

"This drill was unlike most others. It was located in a real chemical production facility and the scenario was real."

It was a full-scale HAZMAT exercise staged with "live" props, such as tanker trucks, railcars, or fixed facilities, with

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Amateurs Assist in International Relief Effort

In early October Hurricane Keith wreaked havoc on Belize. At deadline at least 14 deaths were attributed to this storm. According to the ARRL, an unconfirmed report indicated that a US amateur radio operator sailing off Ambergris Cay died while attempting to help rescue people from another vessel. Reports indicate that many vessels in the cove were destroyed.

The Hurricane Watch Net worked closely with National Hurricane Center Director Max Mayfield to collect damage reports. Many news agencies quoted ham radio reports indicating that more than 22 inches of rain had fallen to the west of Belize City in just a few days. The Hurricane Watch Net provided storm information in Mexico, where an AM broadcast station in the Yucatan Peninsula was airing information gathered via the net.

The Salvation Army Team Emergency Radio Network (SATERN) ran an Emergency Health and Welfare Network for several days in support of victims and responders. A SATERN team, headed by Quent Nelson, handled health and welfare inquiries via the Internet and amateur radio talking to the affected area. In just a few days SATERN had processed 120 inquiries since the operation began. The SATERN operation remained in effect 12 hours per day, assisted by amateurs operating on battery power from the affected area, and a host of other hams and amateur organizations.

Major Patrick McPherson, WW9E, the National Director of SATERN, offered these reminders when a net is operating in an emergency mode. While they are

directed at the SATERN net, they can be applied to any HF net operation.

1. This is an emergency net specific to handling emergency logistical, medical, and welfare operations for the affected area.

2. The affected area and stations from that area have priority. All net controls should point their beams to that area and take good advantage of relay stations. Net control should immediately acknowledge any station in the affected area.

3. All stations should avoid casual conversation on the net. It is not necessary to detail anything except the business you are about as clearly and concisely as possible. Use shortened expressions, rather than dissertation. Space transmissions so that stations with emergency traffic can check-in.

4. All relay stations should repeat all information so that the rest of the net and the affected area stations will be informed of all traffic. Please just don't roger the message. Repeat so that all stations on the net and the affected area can hear.

5. All net control stations as they come on should ask for relays who can hear the affected area and use them. Effective use of relays can overcome station, location, and propagation inadequacies.

6. All net control stations should orient the incoming net control completely at the change of the net control operator.

7. All malicious interference should never be acknowledged. If you cannot hear due to it, simply ask for a repeat or a relay. Do not ever indicate that you can't hear due to it, or engage in arguments with these individuals.

simulated smoke and leaking (dyed water) liquid and simulated casualties. The scenario for the incident involved the accidental release of a toxic chemical after a shooting at a plant. "Victims" wore identifying yellow armbands; responders dressed in the protective suits they would use in a real emergency. Fire, law enforcement, and medical staff and local industries participated in the activity designed to evaluate Lehigh County's emergency response procedures. Volunteer organizations included the American Red Cross and Lehigh County RACES.

RACES team members responded to this drill in force, staffing four area hospitals, a Red Cross shelter, and the mobile operations center stationed at the incident scene. RACES members honed their skills as operators while supporting an extremely delicate operation.

The members of the Lehigh County

RACES Team were alerted by the County Emergency Management Agency and were advised to activate and immediately staff the local hospitals. Within a few minutes the stations were manned and in contact with the net control station located at the incident scene. In this case the command post was upwind from the chemical spill and out of harm's way.

RACES operators continued to relay traffic to and from the hospitals, including chemical information and patient tracking reports. CQ asked why the patient information was not relayed via normal Emergency Medical Services (EMS) frequencies. Post explained that in a mass-casualty incident the normal EMS frequencies would become quite busy. By relaying it via ham radio, the information made it to the hospital before the patient did.

CQ asked Post whether the local

RACES group used any special forms or computer programs to keep track of all of the information being relayed. He explained that they like to keep things simple and only used a pencil and a pad to write down important information. It is important to make sure you get the chemical names correct.

Post used the following names to demonstrate the difference between two chemicals. *Hydrogen fluoride*, which is a corrosive gas, and *hydrogen peroxide*, which is an oxidizer. If someone gives you a hand-written note, make sure you can read the entire message. In a nuclear power plant incident the chemical abbreviation KI ("K" "eye") is used. With a little sloppy handwriting this could look like K1 ("K" "One") or KI ("K" "L"). They are not the same and it can make a difference!

Identifying Dangerous Chemicals

The United States Dept. of Transportation publishes the *Emergency Response Guide*, which can be downloaded on the web at <<http://hazmat.dot.gov/ohmforms.htm#erg>>. Follow instructions on that page. If you don't have web access, DOT officials recommend that you find someone who does and have them download it for you.

The guidebook, published yearly, was developed jointly by the US Department of Transportation, Transport Canada, and the Secretariat of Communications and Transportation of Mexico (SCT) for use by firefighters, police, and other emergency services personnel who may be the first to arrive at the scene of a transportation incident involving a hazardous material. It is primarily a guide to aid first responders in (1) quickly identifying the specific or generic classification of the material(s) involved in the incident, and (2) protecting themselves and the general public during this initial response phase of the incident. The ERG is updated every three years to accommodate new products and technology.

The guidebook recommends that you "Resist Rushing in! Stay clear of all spills, vapors, fumes, and smoke. If you can, help identify the material by finding any one of the following:

- "(a) The 4-digit ID number on a placard or orange panel.
- "(b) The 4-digit ID number (after UN/NA) on a shipping document or package.
- "(c) The name of the material on a shipping document or package."

"The times have changed," says Post, "and the RACES program needs to tai-



Decontamination is an integral part of a HAZMAT event.

lor its outlook towards all disasters, including manmade and natural."

This exercise also included a mass casualty scenario. It should be noted that by participating in a HAZMAT exercise, you could also be participating in an exercise to test your community's response to respond to a terrorist incident.

For questions or information regarding RACES involvement in a mass-casualty or HAZMAT setting, send an e-

mail to Chris Post of the Lehigh County Emergency Management Agency at <cpost@lehighema.org>.

With thanks to N3SIG, N1JMA, and WW9E for supplying the information for this month's story.

Do you have a story to tell of hams serving in the public interest? Send us a note. Happy Holidays to all! Until next time. . .

73, Bob, WA3PZO

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A New Column for A New Century

A Merry Millennial Christmas!

A very Happy Holidays and greetings of the season to all our readers—the first holiday season of our newly retitled “What’s New” column. This month we have a full plate. We’ll focus on some radio gear, accessories for the shack, antennas and antenna accessories, portable and mobile goodies, software and computers, new on the net, new books, and more—and all this with the view of possibly dropping Santa a subtle hint as to some of the goodies and stocking stuffers you might like to have!

Radio Gear

Elecraft K-1 QRP Transceiver. According to Bill Paul, KD6JUI, of Elecraft LLC, the firm has followed the launch of its K2 transceiver with the K1 (see photo A), a compact, dual-band HF transceiver. As small as a traditional QRP monobander, but packing many of the features of the K2, the radio runs up to 5 watts CW on two user-selected bands. Created by co-founders Wayne Burdick, N6KR, and Eric Swartz, WA6HHQ, the K1 is said to take small, backpack-friendly QRP transceivers to a new level.

The K1’s attractive front panel is similar to that of the K2, with an LCD frequency readout also capable of displaying output power, signal strength, supply voltage, keyer speed, and other information. Additional operating features include pushbutton band selection, 8–50 wpm internal keying with message memory and auto repeat, three crystal-filter bandwidths, and more. You can order the K1 with your choice of any two bands (40, 30, 20, or 15 meters), although the 40/20 band combination is expected to be the most popular one.

Did we mention that the K1 is a kit? It is, and it’s one intended for first-time builders. Wiring has been kept to an absolute minimum, and the only instrument you need for final testing and setup is a digital voltmeter.

The 2.2" H × 5.2" W × 5.6" D kit sells for \$269; options include a noise blanker (\$29) and a three-point, universal

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



Photo A— Elecraft has followed the launch of its popular K2 transceiver with the K1, a compact, dual-band HF transceiver. As small as a traditional QRP monobander, but packing many of the features of the K2, the new radio runs up to 5 watts CW on two user-selected bands. The new rig is said to take small, backpack-friendly QRP transceivers to a new level. (Photo courtesy Elecraft LLC)

mounting bracket (\$35). An internal automatic antenna tuner option is planned.

For more details, contact Elecraft LLC, P.O. Box 69, Aptos, CA 95001-0069 (831-662-8345; e-mail: <eric@elecraft.com>; on the web: <<http://www.elecraft.com>>).

Accessories for the Shack

Two from Jensen Tools. Although Jensen Tools largely serves business, industrial, and electronic service users, the company makes a number of products with possible amateur use. These include tool kits, cases and carts, test equipment, computer accessories, hand and power tools, soldering equipment and accessories, workshop supplies, safety products, and more.

Two interesting, new Jensen offerings caught my eye. One is the WireMap 620 Cable Tester (photo B), manufactured by Darkstar Technologies, designed mainly for networking and control cabling. Once connected, it looks for its remote unit (included) at the other end of the cable. When the remote is detected, the unit performs a full “wiremap test,” including tests for shorts, opens, miswires, shield, and split pairs. The results are then displayed on the WireMap 620’s LCD.

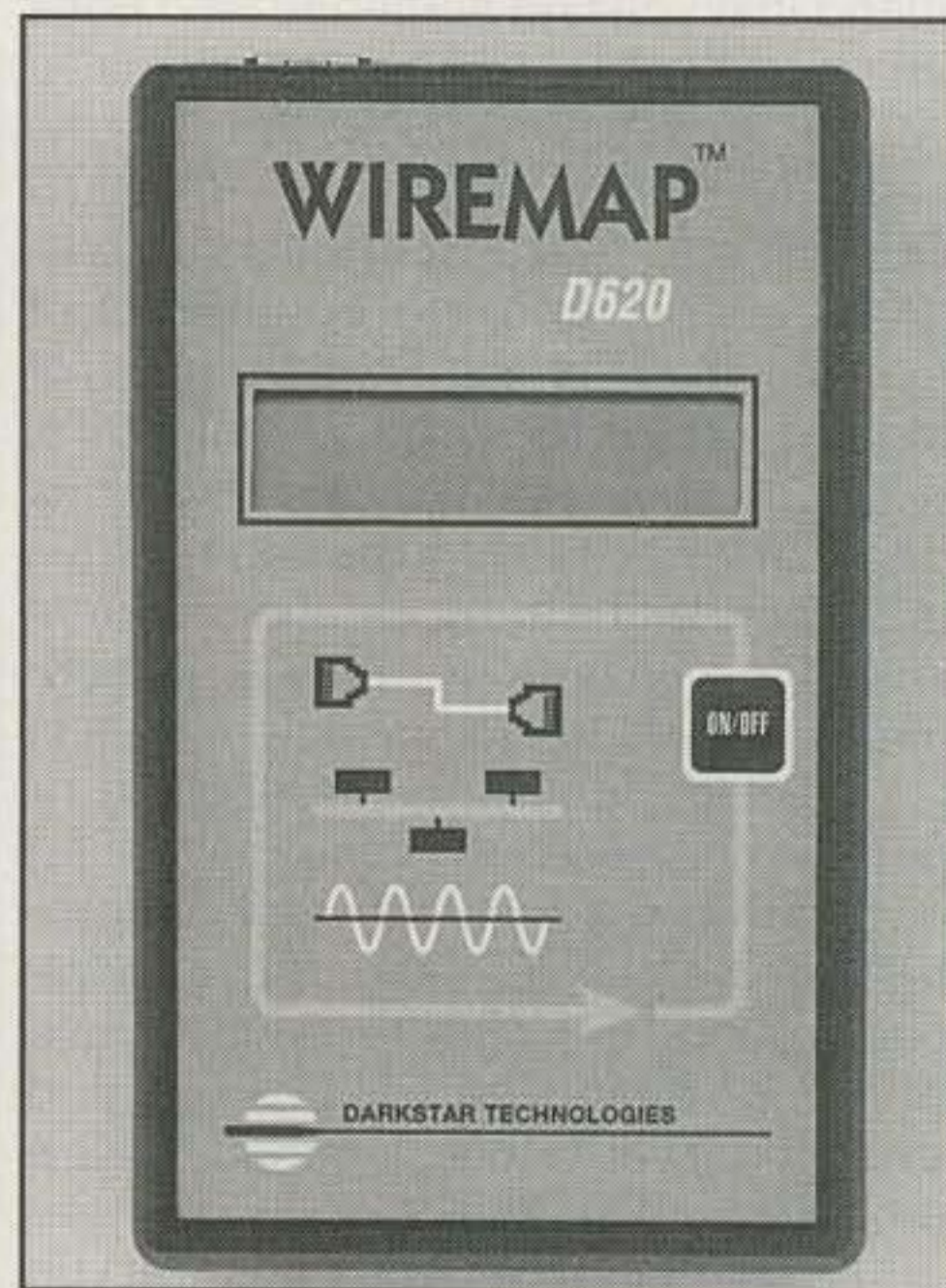


Photo B— The WireMap 620 Cable Tester by Darkstar Technologies mainly is for networking and control cabling. Once connected, it looks for its remote unit at the other end of the cable. When the remote is detected, the unit performs a full “wiremap test” including tests for shorts, opens, miswires, shield, and split pairs. The results are then displayed on the LCD. (Photo courtesy Jensen Tools)

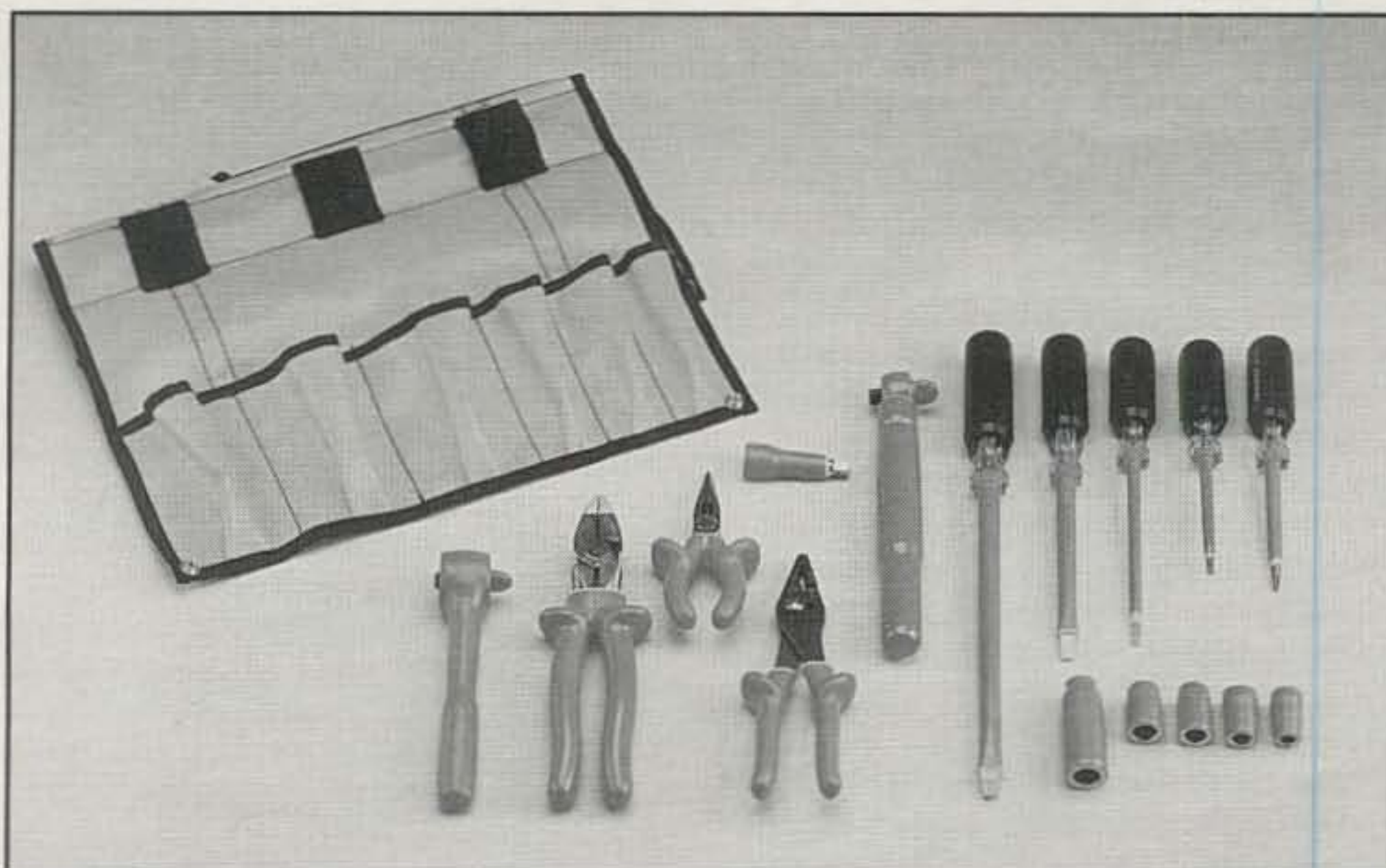


Photo C— The Telecommunications Tool Roll features 16 tools in the set, which are rated for use up to 1000 volts, but which have actually been tested at 10,000 volts. The tools feature two-color, double insulation, which offers protection from shock and flashover. All the tools are packaged in a roll pouch for easy transportation. (Photo courtesy Jensen Tools)

A second product is the Cementex Telecommunications Tool Roll (photo C). Sixteen tools are included, which are rated for use up to 1000 volts, but which actually have been tested at 10,000 volts. The tools feature two-color, double insulation, which offers protection from shock and flashover. Included are lineman's, needle nose, and slip-joint pliers; four slotted screwdrivers; a Philips screwdriver; a 3/8 inch drive reversible ratchet; a 3/8 inch drive 3 inch extension; four drive sockets; a 3/8 inch drive deep wall socket; and a 3/8 inch drive torque wrench. All the tools are packaged in a roll pouch for easy transportation.

Contact Jensen Tools, Inc., 7815 S. 46th Street, Phoenix, AZ 85044-5399 (telephone 1-800-426-1194; e-mail: <jensen@stanleyworks.com>; web: <http://www.jensentools.com>).

Antex G/3U Miniature Soldering Iron. A miniature soldering iron for precision electronic applications, which features a wide variety of tip styles and sizes, is available through M.M. Newman Corporation, the distributor for Antex products.

The Antex G/3U Miniature Soldering Iron (photo D) is designed with the heating element directly under the tip, not in the handle, for optimum comfort and thermal efficiency. Featuring a choice of over 40 specialized tips that slide directly over the heating element, the iron heats up to 750° F in just 45 seconds, and it recovers instantly after soldering

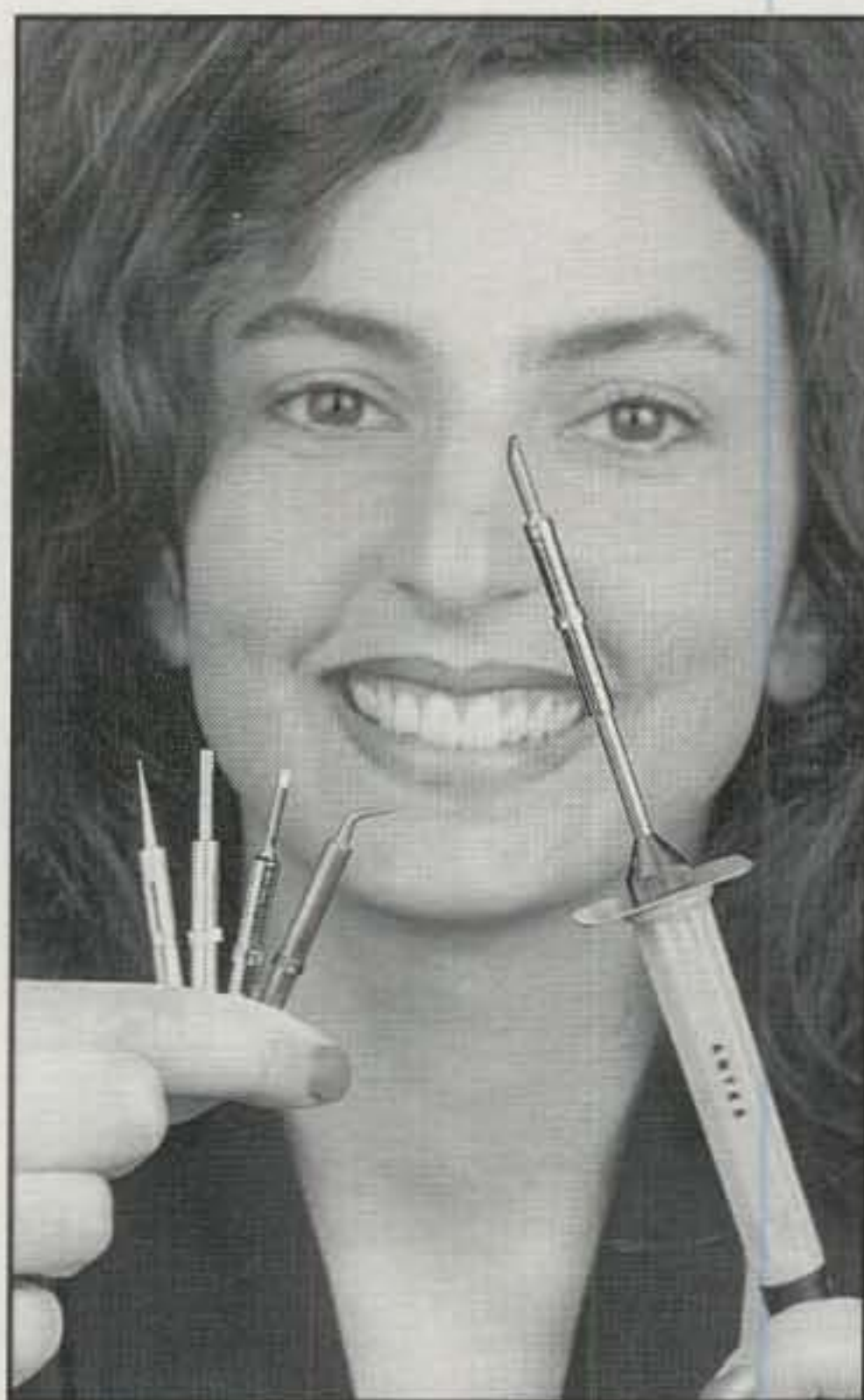

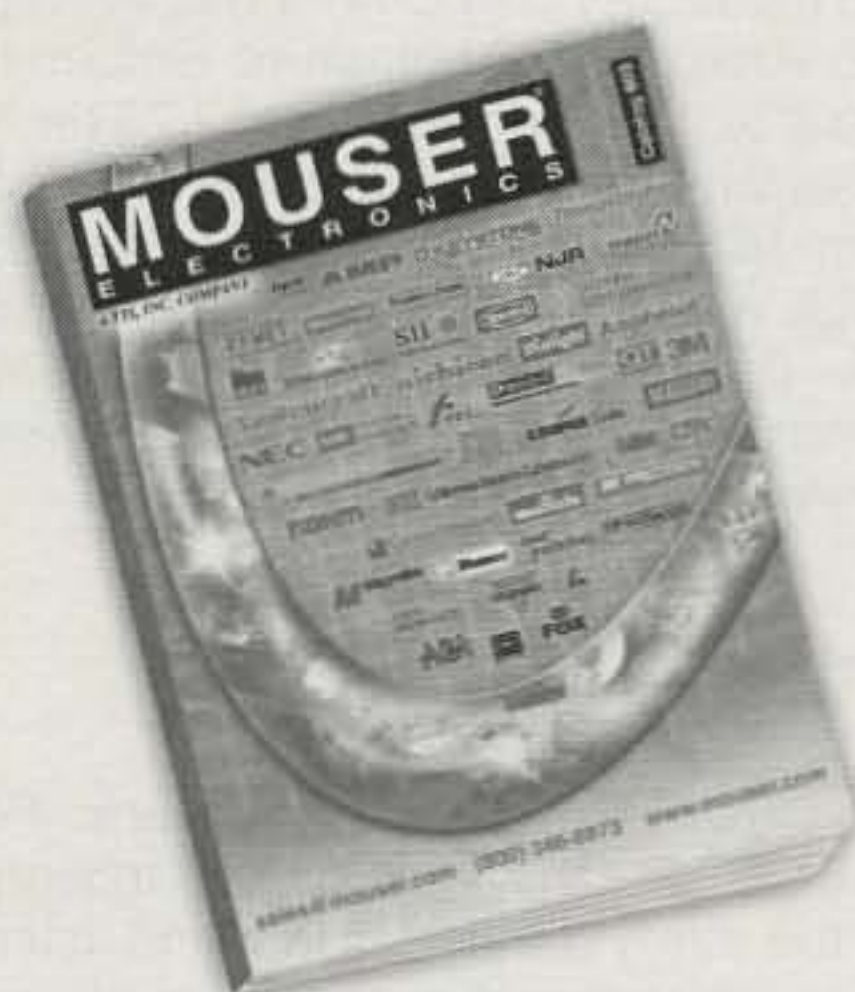


Photo D— The Antex G/3U Miniature Soldering Iron is for precision electronic applications and features a variety of tip styles and sizes. It's designed with the heating element directly under the tip, not in the handle, for optimum comfort and thermal efficiency. Featuring a choice of over 40 specialized tips that slide directly over the heating element, the iron heats up to 750° F in just 45 seconds. (Photo courtesy M.M. Newman Corp.)

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each joint. Made from a proprietary copper alloy that provides maximum strength and conductivity for prolonged use, tip styles include needle points, spaces, chisels, pyramids, cones, and blanks in several sizes. The unit has an ergonomically-designed plastic handle that stays cool, weighs just $\frac{3}{4}$ oz., and measures only $6\frac{1}{2}$ inches with tip. The Antex G/3U Miniature Soldering Iron is \$23.79, and tips cost \$2.75 each.

Literature and a catalog are available from M.M. Newman Corporation, 24 Tioga Way, P.O. Box 615, Marblehead, MA 01945 (718-631-7100; e-mail: <mmn@mmnewman.com>; on web: <www.mmnewman.com>).

Antennas and Antenna Accessories

New from Palomar Engineers. For well over 20 years, we have highlighted the many amateur radio and listener equipment and accessories offered by California-based Palomar Engineers. Under Jack Althouse, K6NY, the firm offers an assortment of accessories of interest to CQ readers.

Recently, Palomar Engineers introduced two current balun kits. Each contains 6 inches of ferrite beads that slip over coaxial cable, and three pieces of shrink tubing to hold the beads in place. The baluns are effective from 3.5 to 60 MHz (you can use two for 160 meters).

The balun ratio is 1:1. Kit BA-58 is for RG-58, RG-8X, and other cables up to $\frac{1}{4}$ inch diameter, priced at \$7.50 each. Kit BA-8 is for RG8, RG-213, 9913, and other cables up to one-half inch diameter, at \$15 each. Add \$6 s&h per order, for any number of balun kits.

While Jack has cut back somewhat on the variety of accessories he currently offers, he and his crew still offer some good-performing products, including the Tuner-Tuner™, VLF Converter, and Magnetic Longwire Balun™. Also offered are a wide assortment of ferrite and iron powder toroid cores, ferrite beads, and RFI and experimenter's toroid kits.

For a catalog and handy RFI tip sheet, contact Palomar Engineers, P.O. Box 462222, Escondido, CA 92046 (telephone 760-747-3343; e-mail: <Palomar@compuserve.com>; web: <http://www.PalomarEngineers.com>).

Pole/Zero® Digitally Tuned Filters and Preselectors. Pole/Zero Corporation offers a broad and fast-growing product line of electronic products combining RF, digital, DSP, and microprocessor expertise. New products include the MICRO-POLE™ digitally tuner filters and modular MOSFET Low Noise Amplifiers. All products are manufactured and tested using computer-automated equipment in the firm's modern Cincinnati facility.

For an illustrated catalog showing the

company's digitally tuned RF filters and preselectors, contact Pole/Zero Corporation, 5530 Union Centre Dr., West Chester, OH 45069 (513-870-9060; e-mail: <support@polezero.com>; web: <http://www.polezero.com>).

Radio Manual in Your Wallet!

Imagine being on a RACES or other emergency assignment, in a blinding rainstorm, and having the "quick reference card" from your radio soaked so badly that it falls apart when you remove it from your pocket. Or imagine trying to fumble with a full-size manual at a windy field location. "Just where did that manual go?" you might ask.

Say no more. Brent Walton, KF6FGB, has come up with a cool solution to such problems, with his "manual in a wallet," as he calls it. Taking up as much room as a few credit cards, his creation allows you to place important instructions for your rig in your wallet or shirt pocket.

The cards are not merely laminated instruction sheets. They are tough, 30 mil. thick, PVC/polyester composite cards, similar to credit cards. Also, since the printing on the cards actually is in the surface of the PVC, it won't rub or scratch off easily.

Each set of cards (photo E) contains summary information for operating your radio, the goal being to put enough information on the cards to let you do most anything you could do with the full manual in hand. Currently sets are available for the Yaesu VX-5R and VX-1R, and the Alinco DJ-180, DJ-S11T, and DJ-S41T radios. Both Yaesu sets contain five credit-card-size cards, which together measure about one-eighth inch in thickness. The other card sets have fewer cards.

The cost runs \$6 to \$10, depending on the number of cards in the set. Brent can create sets for other radios; contact him if you have a special request. He also makes repeater autopatch command cards for radio club and repeater groups, and offers credit-card-size QSL cards and ham radio ID cards.

For more information, contact Brent Walton, KF6FGB, 4303 Alcosta Pl., Pittsburg, CA 94565 (925-427-4308; e-mail: <hamcard@usa.com>; web: <http://HamCard.homestead.com>).



Photo E— Brent Walton, KF6FGB, has created a "manual in a wallet," as he calls it. Taking as much room as a few credit cards, his creation allows you to place instructions for your rig in your wallet or shirt pocket. Each set contains summary information for operating your radio, the goal being to put enough information on the cards to let you do most anything you could do with the full manual in hand.

(Digital graphic courtesy Brent Walton, KF6FGB)

Software and Computers

Hal Communications DXP38 DSP HF Radio Modem. Hal Communications Corp. has introduced the DXP38 DSP HF Radio Modem (photo F). Designed

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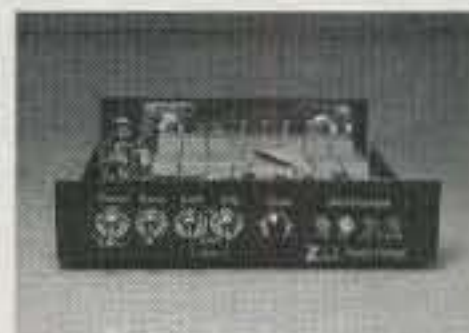


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Photo F— Hal Communications Corp. has introduced the DXP38 DSP HF Radio Modem, which offers all the features of their proven P38 plug-in card, plus some new twists. The tuning indicator has the "crossed-X" display of their Model RTTY-1 indicator, but the display works on all modes: RTTY, AMTOR, PMode, and CLOVER-II. The DXP38 comes with multi-screen, menu-driven software for both Windows® 95/98/NT 4.0 and DOS. (Photo from Hal Communications website)

to help you copy "all the weak ones," Hal's newest DSP modem offers all the features of their P38 plug-in card, plus some new twists (reviewed CQ August).

The DXP38's tuning indicator has the

"crossed-X" display of their Model RTTY-1 indicator, but the display works on all modes: RTTY, AMTOR, P-Mode, and CLOVER-II. The DXP38 has the popular zero-center frequency error tun-

ing (delta-f) switch. You can tune close with the "crossed-X" display, then switch to delta-f, and finally zero-in with 5 Hz increments. Rear-panel radio connections are simplified with standard photo connectors; just make a few connections and add a 9–18 VDC power supply.

The DXP38 comes with multi-screen, menu-driven software for both Windows® 95/98/NT 4.0 and DOS. The price is \$395.

For more info, contact Hal Communications Corp., 1201 W. Kenyon Rd., P.O. Box 365, Urbana, IL, 61801-0365 (e-mail: <halcomm@halcomm.com>; web: <www.halcomm.com>).

New on the Net

NB6Z's Amateur HF Digital Radio Website. Richard Griffin, NB6Z, is a web pioneer, having established his popular "Dedicated to Amateur HF Digital Radio" website in 1996. He set up the website to provide a resource for, and promote use of, digital communications on the amateur HF radio bands.

The main feature of Richard's website is the detailed information it provides on modern digital HF radio operating modes—neatly arranged in one

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Photo G— If you're interested in classic AM radio gear, such as this impressive Johnson Viking Valiant II Transmitter, circa mid1950s, check out The AM Window Website. It features technical support, modification and restoration guidelines, and a bulletin board where you can pursue specific questions you may have about gear you've discovered or are considering for use. Check out The AM Window at <<http://www.thebizlink.com/am>>. (Photo via Electric Radio Magazine, Barry Wiseman, N6CSW/0, 14643 County Road G, Cortez, CO 81321-9575 [970-564-9185; e-mail: <er@frontier.net>])

convenient place. Most all digital modes are covered in detail, from RTTY to AMTOR to CLOVER and even Hell-schreiber, along with many non-amateur digital modes. The site includes comparisons between modes, a glossary of digital terminology, tips on getting started, and many sample on-the-air digital mode sounds to which you can listen.

Other resources accessible from the website's main "pushbutton menu of stuff" include general information about digital ham radio, ham radio software programs, antenna construction information, HF propagation updates, links to other amateur radio sites, and more.

Check out Richard's attractive and educational website at <<http://www.teleport.com/nb6z>>. I doubt you'll be disappointed.

The AM Window Website. Seems we're still receiving mail relating to our two-part "Classic Jurassics" article about vintage amateur radio and short-wave equipment and manufacturers that appeared in the November and December 1999 issues (photo G). In the article we included the AM Radio Network in our list of resources helpful to those contemplating their interest in vintage radio gear. To recall, the AM Radio Network is an informal association of members active in the AM amateur ra-

dio community. The network also handles SWL inquiries.

Paul Courson, WA3VJB, who operates the network, complimented us on our article and suggested that we make our classic equipment readers aware of a popular web page devoted to the use of AM on the HF amateur bands. The site Paul recommends is The AM Window Website, appropriately dubbed "the AMers' hangout on the web." It's a noncommercial subpage featuring technical support, modification and restoration guidelines, and a bulletin board where you can pursue specific questions you may have about gear you've discovered or are considering for use. Check out The AM Window at <<http://www.thebizlink.com/am>>.

From the Bookshelf

Philips ECG® Semiconductor Master Replacement Guide. Do you ever have the need to check out the specs on an obscure, hard-to-find semiconductor for that important construction project? You'll likely find what you need in the ECG® Semiconductor Master Replacement Guide, ECG212U. Philips ECG recently introduced the latest edition of the semiconductor guide, which features over 6,000 additional cross-

references and some 81 new devices. Philips ECG has been supplying "aftermarket" semiconductor replacement parts for over 34 years. With more than 306,000 "crosses" to U.S., Asian, and European part numbers, the new, 350-page edition is said to be the most comprehensive single source of semiconductor replacement information you can find.

The new guide is \$9.95, and it's available from Philips ECG distributors. To locate a distributor, call Philips ECG at 1-800-526-9354, or contact Philips ECG Products, 101 Snapps Ferry Rd., Greeneville, TN 37745-096 (423-636-5687; e-mail: <Frank.Gaston@philips.com>; web: <http://www.ecgproducts.com>).

More Useful Stuff

New Educational Products from Elenco Electronics. Are you ready for some fun electronic construction products in this holiday season? Elenco Electronics has introduced four new educational products. These include the Model AM-780K Radio Kit, a two-IC Tuned Radio Frequency (TRF) AM broadcast band radio; the Model RCC7K Radio-Controlled Car Kit, which lets you build a complete, seven-function R/C car; the Model XK-150 Digital/Analog Trainer, a mini-lab designed especially for prototyping; and the Model SL-5 Deluxe Soldering Station, which is available in 40 and 60 watt versions, either assembled or in kit form, along with a number of optional soldering and desoldering accessories for the soldering station.

Elenco is a major supplier of electronic test equipment and educational material to schools and hobbyists, with almost 500 products. The firm has been making electronic kits for over 27 years and has effectively used this experience to give its manuals well-illustrated, step-by-step assembly instructions that are easy to follow.

Contact Elenco Electronics, Inc., 150 West Carpenter Ave., Wheeling, IL 60090 (847-541-3800; e-mail: <elenco@elenco.com>; on the web: <http://www.elenco.com>).

Wrap-Up

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

Overheard: Wouldn't you know it? I've found that at local ham club meetings, if you make a suggestion about what the club needs to do, you often are asked to do exactly what you suggested!

73, Karl, W8FX



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A Look At The World Around Us

Holiday Treats for Hams

SeaSon's Greetings, gang! Here's wishing you good health, wealth, and happy hamming during the holidays and throughout the coming new year. May you enjoy using that special rig of your dreams every day, and may your logbook(s) overflow with great DX QSOs.

With those cheerful thoughts in mind, we are once again making our traditional holiday column diversion to highlight special treats and goodies for hams. A fascinating collection of gems to fit every interest and price range is lined up to show you, so let's jump right in and start thinking about making your life in amateur radio more enjoyable and exciting than ever before! One quick opening thought warrants mention, however. Remember I am only your printed-page guide on this tour, not the salesperson. Appealing items should be ordered directly from their listed sources, not from me. I also suggest ordering early to avoid shipping "bottle-necks" and sold-out dilemmas. Now on to the views!

Your Name in Lights

Leading our parade of holiday treats is a unique new item guaranteed to fill your

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

shack with real flash and class: the ham callsign lamp and desk night light shown in photo 1. The lamp is approximately 7 inches tall and 7 inches wide, with a black plastic base holding a 1/2 inch thick section of glazed clear acrylic. The clear acrylic is engraved with your name and call, plus one of several logos of your choice (such as a pump key, twin lightning bolts, ARRL symbol, etc.). A tubular neon lamp in the base shines up through the engraved acrylic plaque, illuminating its letters and logo so they appear to be suspended in mid-air.

A photo really cannot bring out all the beauty of this decorative item. It is absolutely dazzling—and it is rated for ultra-long life, so you can let your little light shine for many moons hence. What a terrific way to tell the world you are all ham and proud of it! These callsign lamps are made and sold by Tony Seran of Lamp Logic LLC, 1500 Watt Street, Reno, NV 89509 (775-786-2133). The lamps are also available online via <www.lamplogic.com> or through the <www.qrz.com> store. The price range is 49.95 to 69.95 plus s&h.

New Station Delights

Next up is the perfect accessory to mate with your new ham callsign lamps—a new HF transceiver! Ah, but wait, you say. New rigs are quite expensive, right?



Photo 1— Making its grand debut in our holiday goodies column is this new ham callsign lamp available from Lamp Logic LLC of Reno, Nevada. The tubular neon lamp in the black base illuminates the letters engraved in clear acrylic so they appear suspended in mid-air. This item adds a touch of genuine glitz and glamour to any station.

Some are, but some are surprisingly affordable and sort of "sleepers" to boot. You just need to look for their hidden beauty. Consider, for example, ICOM's new IC-718 shown in photo 2. It is mainly advertised as an easy-to-use rig for newcomers or casual operators, but it actually sports a number of "big time" assets you can use or ignore, as desired.

The IC-718 has all the usual features—such as 160–10 meter opera-



↑ Photo 2— A new transceiver is one of the best bargains going in amateur radio today, and this recently-introduced ICOM IC-718 is a good example of that fact. It is surprisingly low priced, yet includes (or offers as options) some of today's hottest features. (Photo courtesy ICOM America, Inc.)

Photo 3— Cushcraft's MA5B is a 5-band antenna with a boom length of just over 7 feet and a turning radius of less than 9 feet, and it's light enough to be supported on a tripod and turned with a lightweight TV rotor! (Photo courtesy Cushcraft) →

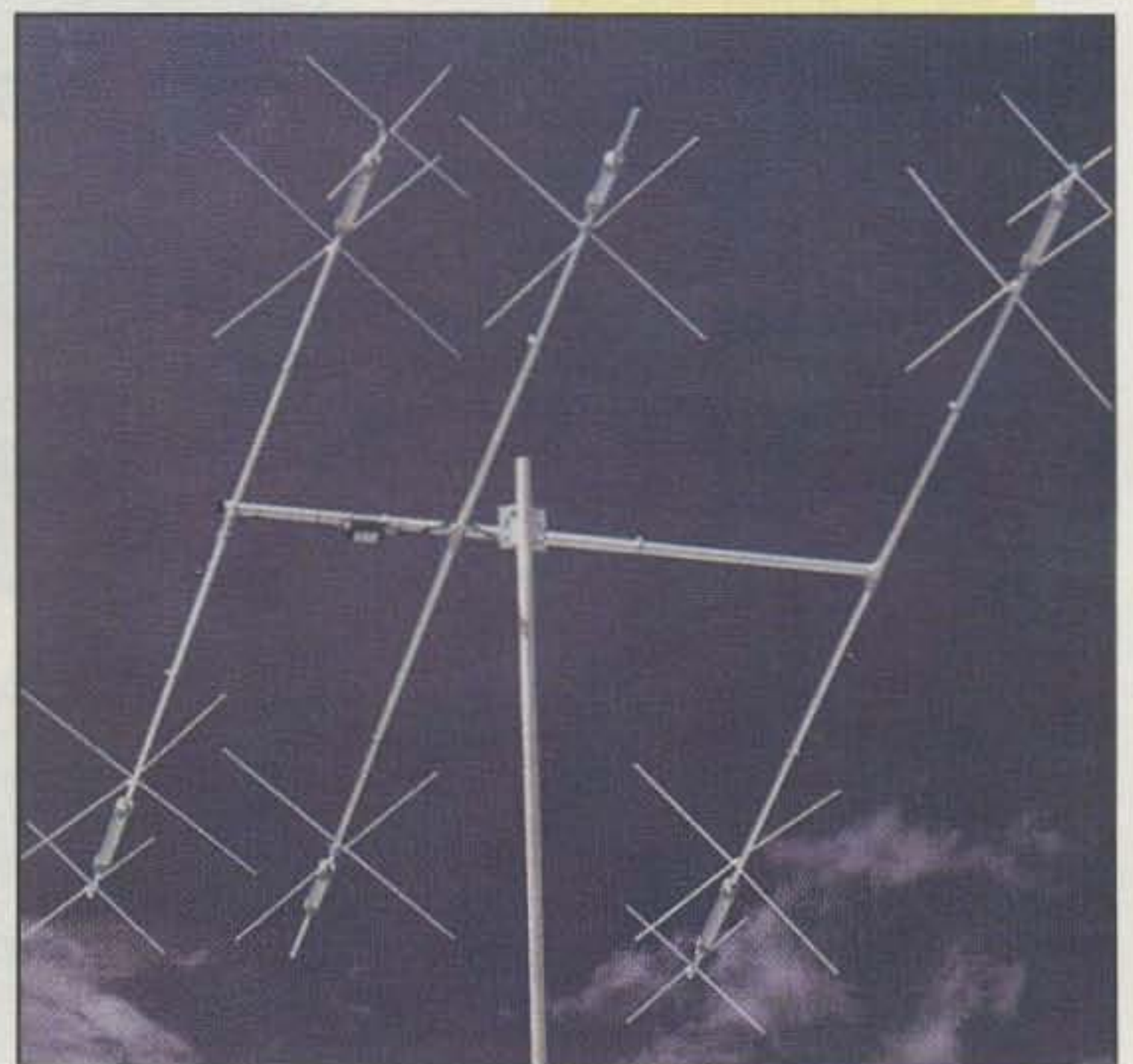




Photo 4— Thinking about an easy-up antenna that will give your station big signal clout? Hy-Gain's new $3/8$ -wave and ground-independent AV-640 gets our vote. The vertical covers 40 through 6 meters with low SWR and exceptionally wide bandwidth and "works out" like a champ.



Photo 5— Surely the most useful vertical-antenna mounting accessory ever devised is this clever pneumatically-dampened tilt-over mount from Alpha Delta Communications. It allows one person to raise or lower a vertical up to 29 feet tall in less than a minute—a real back saver!

tion, 101 memories, full shortwave reception, and 100 watts output—plus it includes an SSB speech compressor, VOX CW keyer, semi and full QSK, and SWR metering. Also available as options are a DSP unit with automatic noise reduction and automatic notch ("tuner upper") filter, and wide or narrow SSB and CW filters. A new extra-wide FL257/3.3-kHz SSB filter especially caught my attention, as it should make the little rig sound extra rich and full-bodied on receive. Add a Heil Goldline microphone to the IC-718, and it should also pump out some great-sounding audio on transmit—a wolf in sheep's clothing, so-to-speak.

ICOM IC-718 transceivers and mating options are available from ham dealers nationwide. Details are available from ICOM America, Inc., 2380 116th Ave. NE, Bellevue, WA 98004, telephone 425-454-8155 or at <<http://www.icomamerica.com/amateur>>.

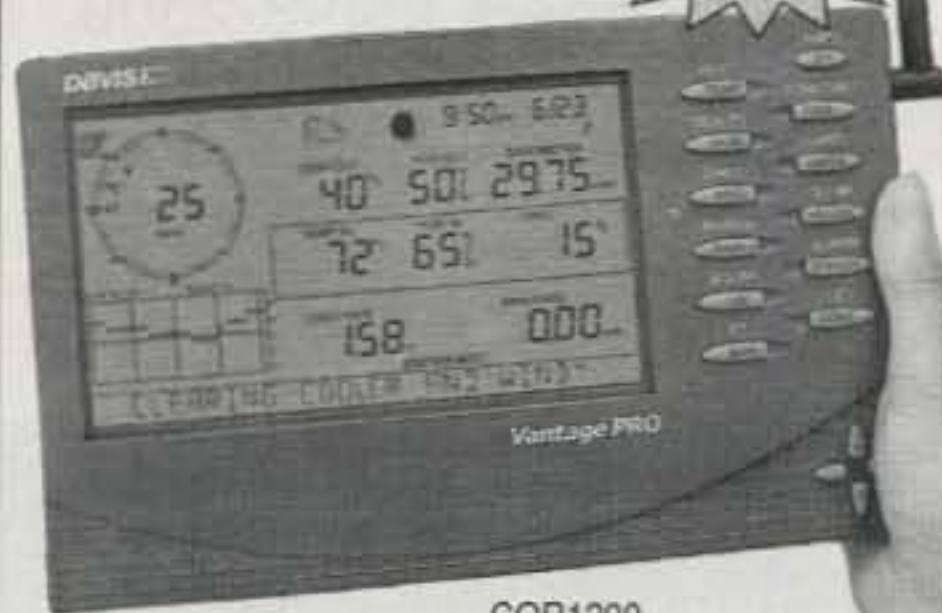
So what is the best way to complement a new transceiver or expand your existing HF setup? Why, with a new antenna, of course. We're going to take a quick look at two options for hams who want to be heard, but who don't have a lot of antenna space available.

First of all, if you really want the directivity of a Yagi but don't have room for a full-size beam, check out Cushcraft's MA5B (photo 3), a 5-band antenna with a boom length of just over 7 feet and a turning radius of less than 9 feet. Using traps and capacity hats like those you would find on some verticals, the MA5B works on 20, 17, 15, 12, and 10 meters, and offers up to 5 dBi of gain. It's an interesting 3-element design that behaves like a beam on 20, 15, and 10, and a rotatable dipole on 17 and 12 meters. Plus, with a total weight of about 27 pounds, it's light enough to be supported on a tripod and turned with a lightweight TV rotor! The MA5B is available from ham radio dealers nationwide and from Cushcraft Communications Antennas, 48 Perimeter Rd., Manchester, NH 03103 (phone 603-627-7877; fax 603-627-1764; website: <<http://www.cushcraft.com>>).

Another excellent option is the multi-band vertical, such as the Hy-Gain AV-640 shown in photo 4. This 25 foot tall vertical covers 40, 30, 20, 17, 15, 12, 10, and 6 meters with exceptionally low SWRs and very broad bandwidths, and it "works out" almost as well as my tri-band beam. The AV-640 is a $3/8$ -wave type antenna; it does not require a separate ground radial system, and it also has separate tuning adjustments for each band. The adjustments are so ac-

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curate that you can actually pre-tune/preset them by the manual and they will be almost "right on frequency" when the antenna is installed. Hy-Gain AV-640 antennas are available from Hy-Gain, 308 Industrial Park Road, Starkville, MS 39759 (1-800-647-1800) or through amateur radio dealers nationwide.

Given half a chance, verticals are good performers (the secret is mounting them so they have a fairly clear horizon view in most directions). Verticals are also amateur radio's most popular antennas, probably because they are more affordable and easier to install than beams and towers.

Due to physical handicaps and/or neighborhood restrictions, many of us find setting up a good vertical antenna system a formidable challenge, especially when working alone. That's when the tilt mount from Alpha Delta Communications shown in photo 5 really shines. This hydraulically dampened foldover fixture allows one person to raise or lower a vertical antenna up to 29 feet tall in less than a minute. Are those creative ideas beginning to blossom, friends? You can install the mount so your antenna can tilt down or lay horizontally out of open view when not in use, then just "whoosh" it up for on-the-air use. The mount is also a blessing when installing and tuning a new vertical, as it makes getting to those upper adjustments a cinch.

The foldover fixture comes pre-assembled and ready to install, and its piston-type damper can be adjusted so an attached vertical glides down in a rather cushioned manner. I use one on my AV-640 (photo 6) and I love it. Yes, and the older, weaker, and more self-reliant I get, the more it will be appreciated! These tilt mounts and our next featured item, a super coax switch, are both available from Alpha Delta Communications, Inc., P.O. Box 620, Manchester, KY 40962 (phone 606-598-2029; order line 1-888-302-8777; web: <http://www.alphadeltacom.com>). Alpha Delta products are also available from amateur radio dealers nationwide.

Another new and always-appreciated station accessory I am sure you will like is the Alpha Delta console-type coaxial antenna switch shown in photo 7. This heavy-duty unit lets you connect one of four antenna cables to your transceiver with the flip of a switch. As an alternative, you can "reverse" it and connect one of four rigs to one antenna, or use two of the switches for switching both rigs and antennas in a multi-multi setup. All switch connections are surge protected with a field-replaceable arc-plug

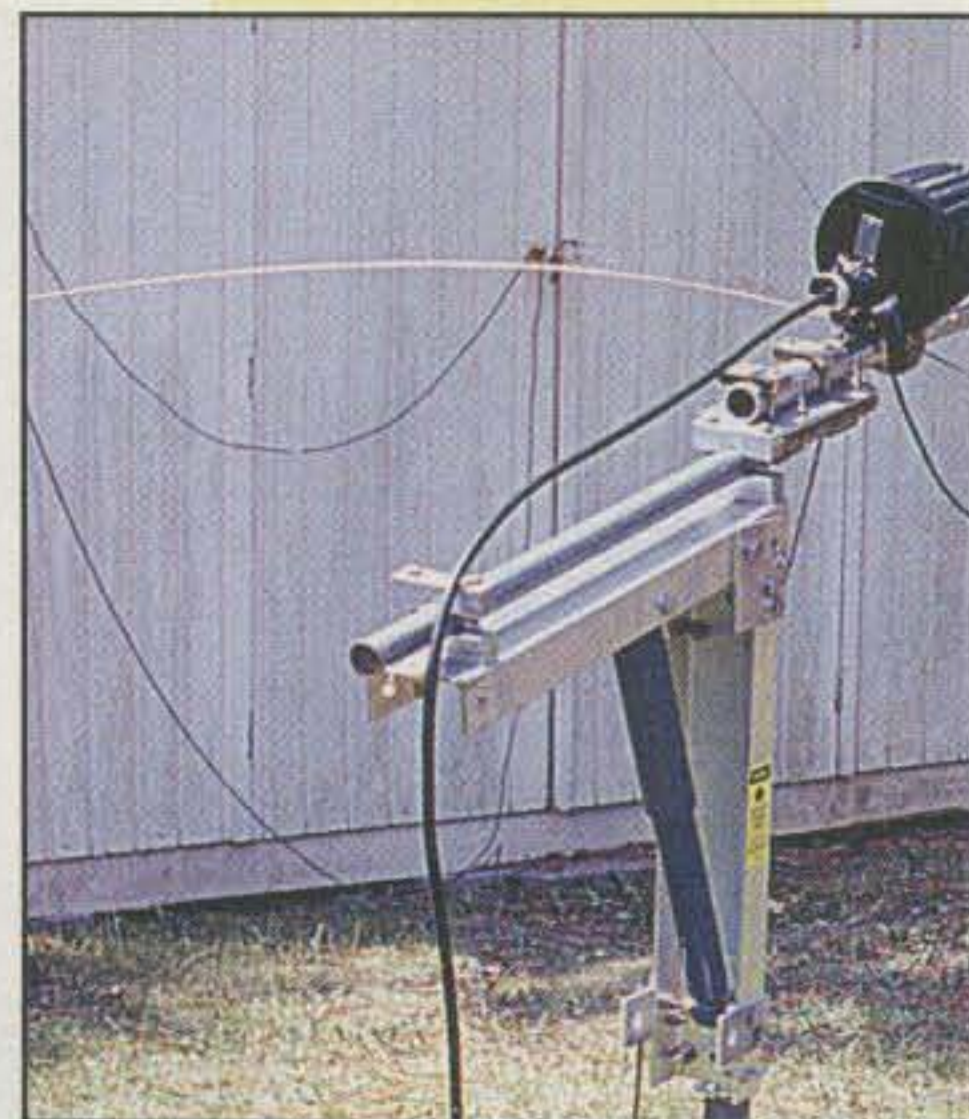


Photo 6— Here you see the Alpha Delta tilt-over mount opened to lower my AV-640 vertical for fine-tuning various bands. Notice the shock-absorber-type dampener inside the unit.



Photo 7— Need a quick and easy way to switch station antennas? Want lightning/surge protection to boot? This four-position Alpha Delta Console fills the bill in high style, and its arc-plug is field replaceable.

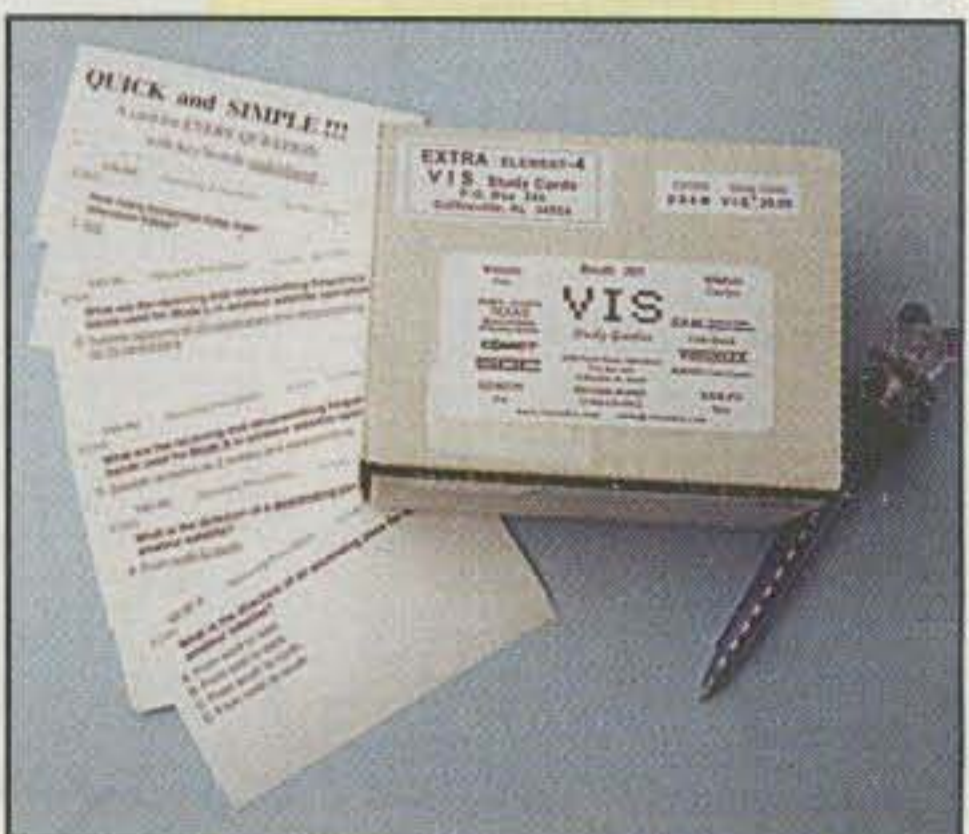


Photo 8— Upgrading to a higher class license opens new doors in amateur radio enjoyment, and these VIS flash-study cards will do the trick in record time. Adjacent pen is the latest goodie—err . . . innovation—in Morse sending devices.

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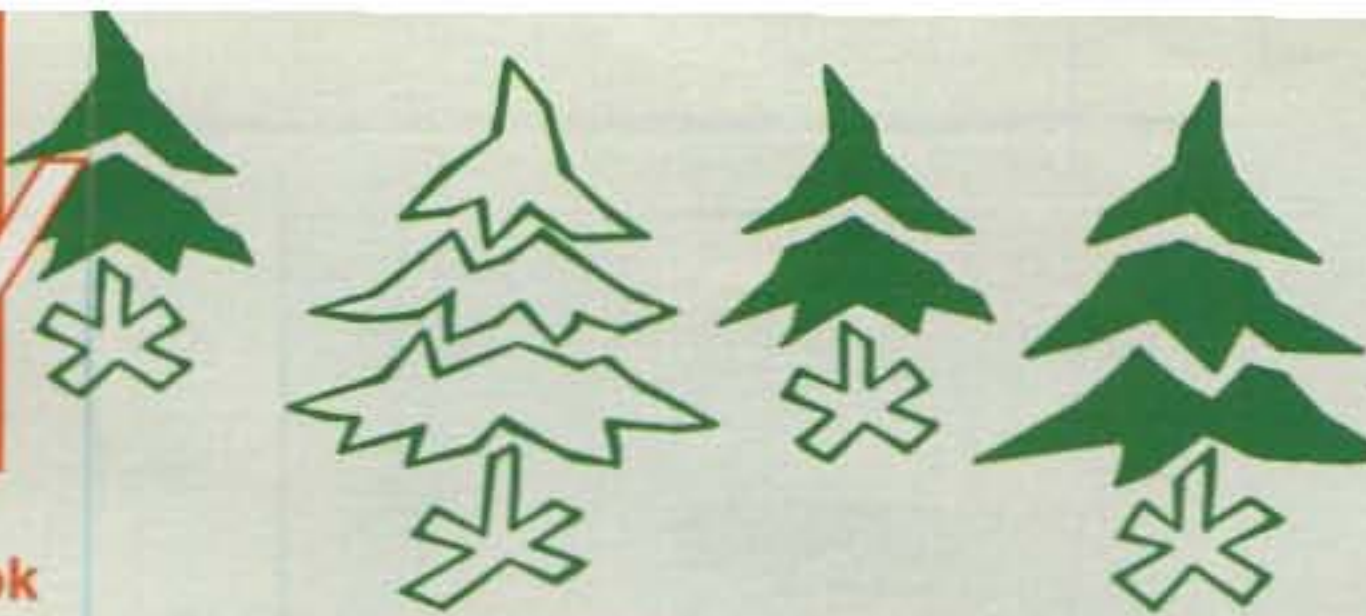
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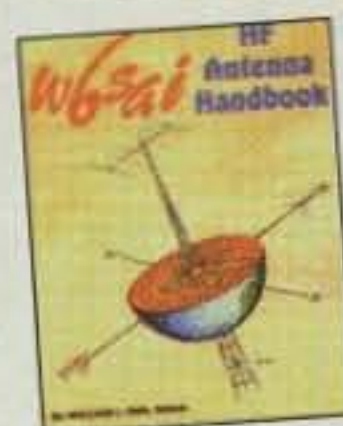
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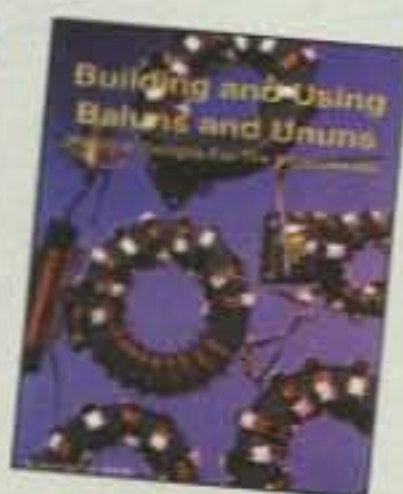
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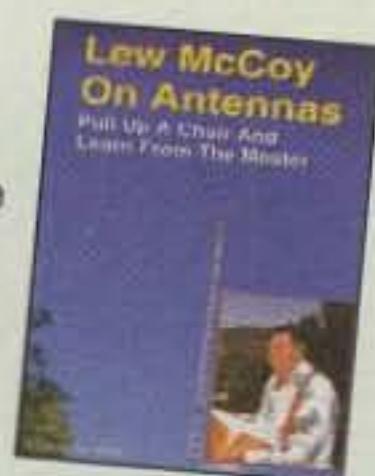
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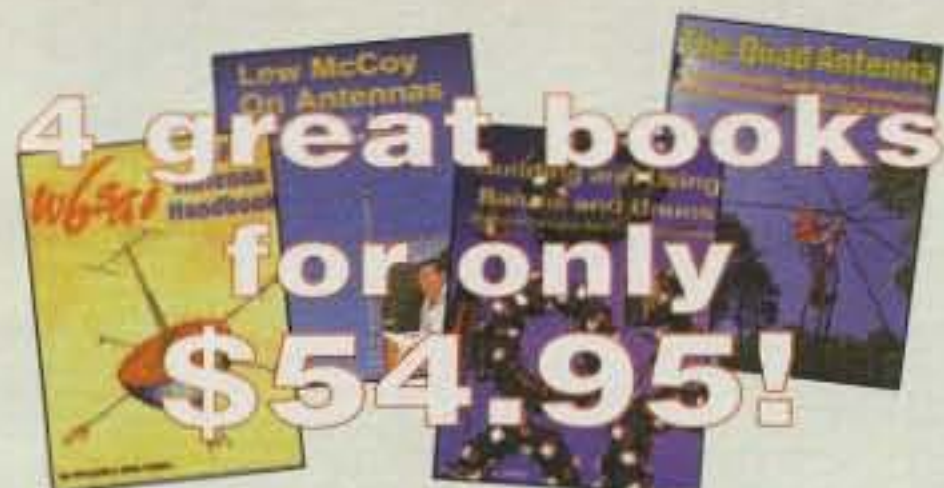
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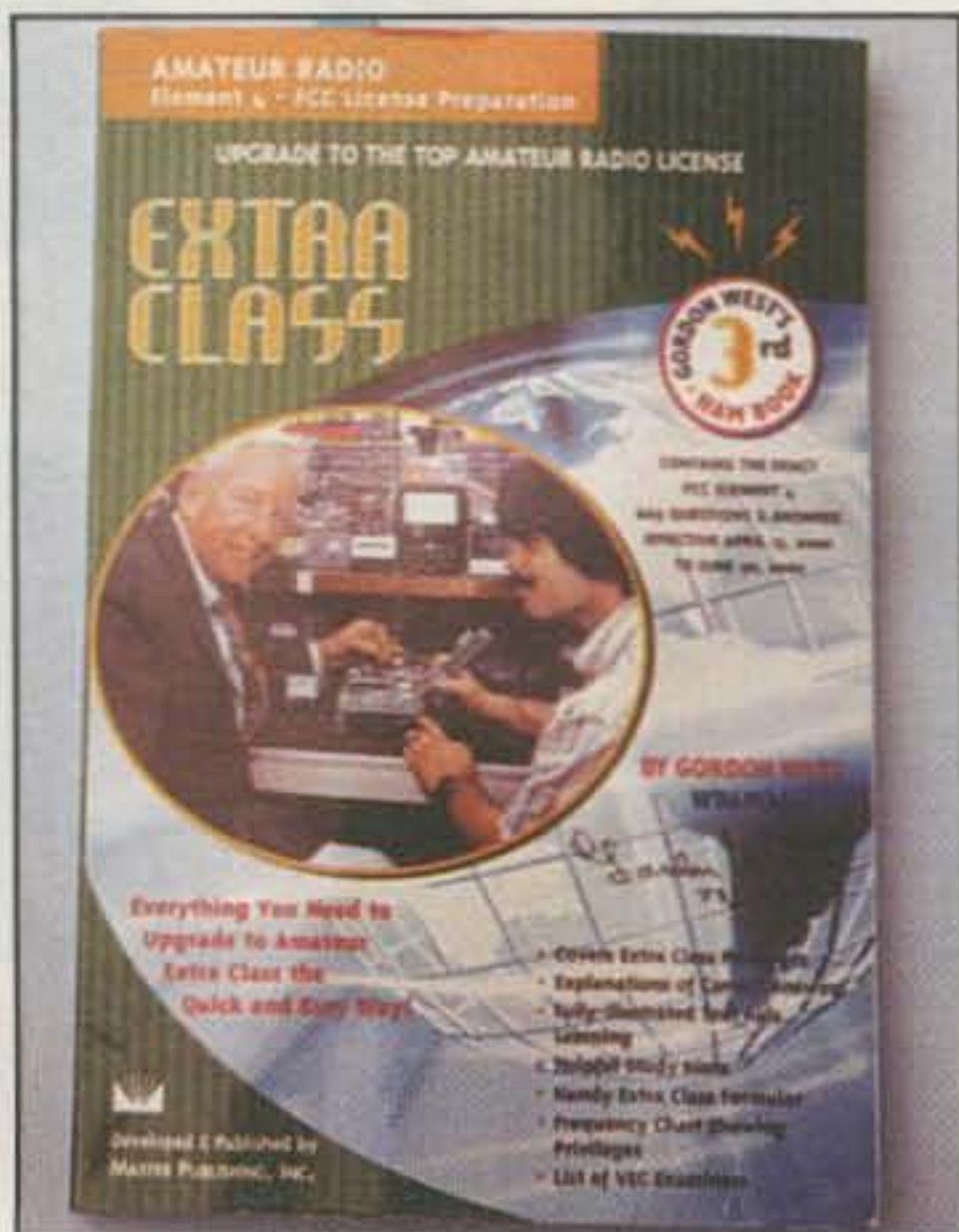


Photo 9—Gordon West's license study books are well known for their concise coverage of all exam questions and answers plus easy-to-understand explanations of complex topics. New books plus complete study courses are available for all license classes. Both Gordon and his license study books are first class!

and all unused switch positions are grounded, plus a center "off" or "com" position grounds all connections for maximum protection. The Alpha Delta switch console is 4.5"H x 6"W x 6"D,

has a black wrinkle finish, and it is built like a battleship. It is quite nice, and it too is available from Alpha Delta Communications and/or amateur radio dealers nationwide.

Reaching New Heights

Next in our holiday spotlight are two outstanding self-improvement aids guaranteed to expand your amateur radio enjoyment regardless of your station equipment. How so? They are success-proven study materials for passing the new "restructured" General and/or Extra Class license exams. Now those are gifts you can enjoy for life!

First are the VIS flash study cards shown in photo 8. You just carry 25 or 30 of these cards in a zip-lock bag or shirt pocket each day and go through them anywhere or anytime you have a few spare moments. As you study them, key words on each question begin to pop right out at you. After going through all the cards three or four times (deleting those you learn with each pass), you take (and pass!) the exam. It's that simple, and Carolyn of VIS has a scrapbook filled with success stories to prove it.

When asking about the cards, also ask Carolyn what's new in goodies. Recently it has been digital blinking pens that send CW as you write. A pen that blinks code as you write down words and letters? Well, not exactly, but in today's fast-paced and divided-atten-



Photo 12—The gifts that keep on giving throughout the year—subscriptions to CQ and Popular Communications. Go for both of them!

tion world, who knows the difference! You naturally press down when writing; that closes a spring-loaded switch and an LED atop the pen lights up. Cool! Flash cards and goodies are available from VIS study guides, 2595 Turner Road-West Bend, P.O. Box 284, Coffeeville, AL 36524 (telephone 1-800-655-4267, web: <www.visradio.com>).

Next is WB6NOA/Gordon West's new license study/prep books for restructured General and/or Extra Class licenses (photo 9). These books are superb. Each one covers all the ques-

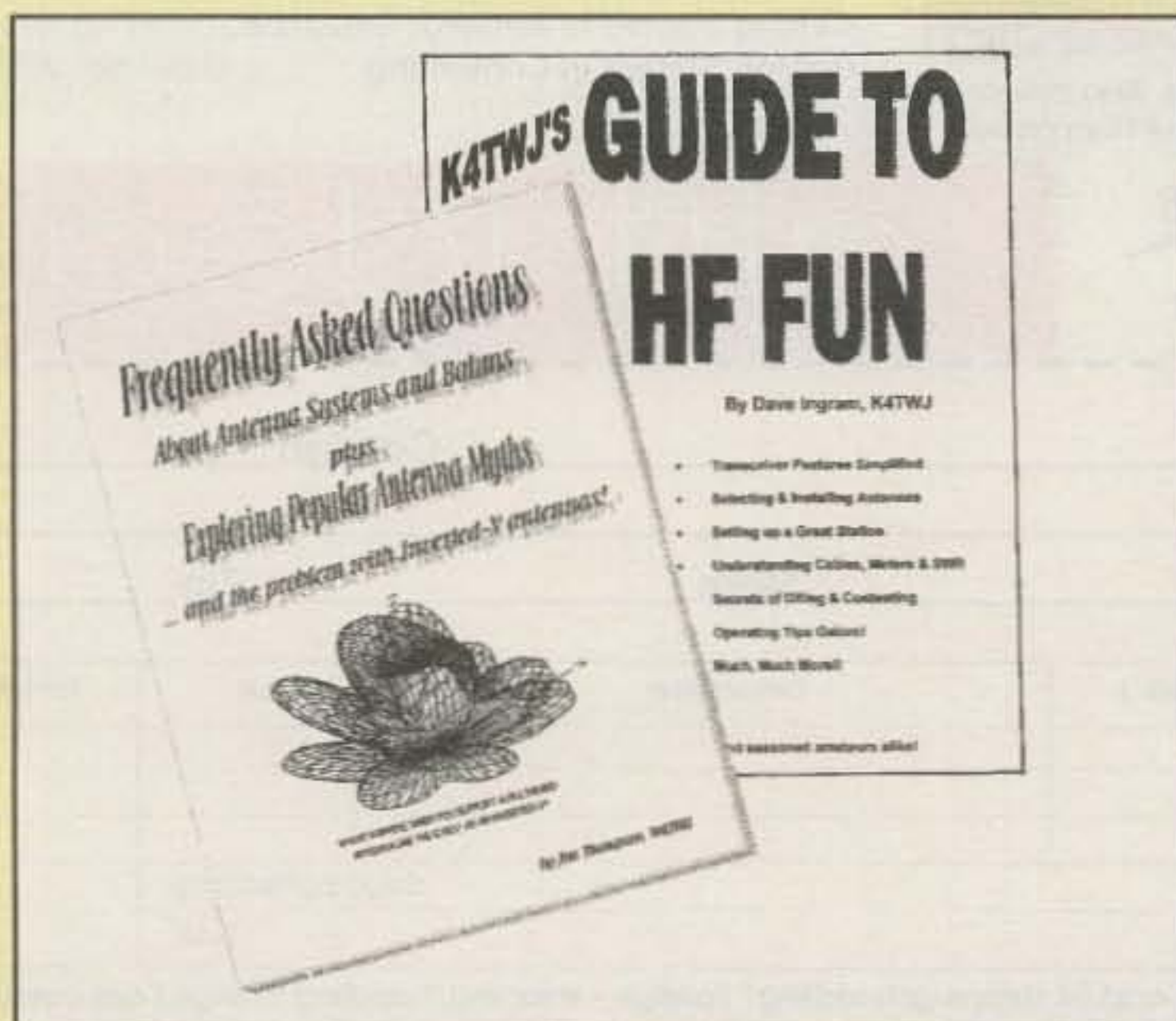


Photo 10—Two great reads I am sure you will like are Jim Thompson's new Frequently Asked Questions About Antenna Systems and Baluns and my own new K4TWJ's Guide to HF Fun. Both books contain a sheer wealth of great information useful to new hams and old pros alike.



Photo 11—From coffee mugs and key fobs to ID badges and desk nameplates, the Sign Man of Baton Rouge (NV5A) has it all—and every one makes a neat Christmas gift for a special ham!

tions and answers on its respective test, and each also includes simple explanations of confusing points plus study tips and shortcuts to help remember key points. Limited study time? Need more help? Gordon's famous weekend ham classes are the answer. They are conducted monthly throughout the western U.S. You study pre-class materials, attend a class, and emerge with that highly sought license. Gordon's books are available through ham dealers nationwide. Details on his classes are available on the web at <www.hamnet.net>. Just click on "radio school."

While on the subject of horizon-expanding aids, I also would like to tell you about two exciting new books debuting this month (photo 10). First is the *Frequently Asked Questions about Antenna Systems and Baluns*, written by Jim Thompson, W4THU, owner of The Radio Works. Jim has been producing top-notch wire antennas and discussing all aspects of antennas with amateurs for many years, and this book covers his most often asked questions, including how various wire antennas compare in performance, how they work, differences in coax cables and baluns, what constitutes a high SWR, and more. The book is superb, and copies are available directly from The Radio Works, Box 6159, Portsmouth, VA 23703 (telephone 1-800-280-8327, or online at <www.radioworks.com>).

Next is my own brand new *Guide To HF Fun*. This book is written for new hams and old pros alike. It covers everything from understanding technical jargon to selecting and installing rigs/equipment and antennas to fit your particular situation. It also explains how to estimate station power needs, find existing dedicated AC lines, select cables, and evaluate SWR, plus it includes numerous success-proven tips for DXing, contesting, and in general operating like a champ. If you want to enjoy HFing to the max, this book has you covered! Copies are \$16 plus postage (\$1.50 book rate, \$3 Priority Mail) and are available directly from me: Dave Ingram, K4TWJ, 4941 Scenic View Dr., Birmingham, AL 35210 (telephone [inquires only] 205-951-0162).

All-Time Favorite Delights

Coffee mugs and key fobs are always popular ham goodies (especially during the holidays), so I went on a foxhunt to find some snazzy new ones to spotlight this month.

I discovered Rick Pourciau, NV5A (better known on the hamfest circuit as the Sign Man of Baton Rouge), had just

what we envisioned plus a whole lot more (photo 11). His new mugs are glazed ceramic, ivory color, and of course personalized with your name and call plus favorite ham-related logo. Coordinate with Rick, and you can probably get a mug, name tag, key fob, desk nameplate, and front auto tag all with the same design. Now that's going first class! You can contact Rick at 879 Castle Kirk Drive, Baton Rouge, LA 70808 (telephone 1-888-HAM TAG1 [1-888-426-8241] or online at <www.thesignman.com>).

Closing up this holiday column are two more special treats to make your new year grand—subscriptions to *CQ* and/or *Popular Communications* magazines (photo 12). Every monthly issue is loaded with great articles and super info, and it can be delivered right to your door every month for only \$31.95 for *CQ* and \$28.95 for *Pop Comm* (see the order form and ads in this issue). Considering the articles, the ads, and the info, every issue of *CQ* and *Pop Comm* is like a hamfest by mail. Go for 'em, enjoy plenty of good on-the-air time, and may the force of good signals always be with you!

73, Dave, K4TWJ

Looking Ahead in



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

- "A Fuel-Cell Powered Ham Station," by W3IA
- "Cave Radio in Britain," by G3TDZ
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Audio Amplifiers Revisited

Regular readers of this column will recall the discussion concerning class D audio amplifiers we had last year. In brief, a class D amplifier is one where the audio is sampled and then reproduced as a series of pulses the width of which varies with the changes in audio amplitude level. The advantage of this technique is that at any point in time the output power stage is either cut off or in saturation, thereby reducing power dissipation (in the stage) to the absolute minimum.

This feature is most useful for portable applications where the larger continuous current requirements of standard-class AB stages quickly drain a battery. The disadvantage of the class D device, however (as you will recall), was the need for an elaborate filter to smooth out the resulting "pulsed" audio in order to produce a clean, easy-to-listen-to signal. This filter had to be designed not only to filter the pulses, but to handle power as well, since it was typically inserted between the output stage and the load (usually speakers). Well, Texas Instruments now has introduced a filterless class D audio power amplifier that completely does away with the need for the filter!

The TPA2000D2 is touted as a "third generation" 5 volt class D stereo amplifier (two channels). The device uses high-speed MOSFETs, and each output can deliver up to 2 watts of continuous power into a 3 ohm load with less than 1% distortion from 20 Hz to 20 kHz and without filters. Due to the greater than 70% efficiency of the chip, all of this is packaged in a tiny TSSOP 24-pin package. As an example of power savings, at 1 watt of music power into an 8 ohm load a conventional class AB amplifier will require about 185 ma continuously. The same power level from the TPA2000D2 only needs 40 ma on average because of the fact that when not transmitting audio, such as between pauses in speech, power requirements are minimal. Fig. 1 is a typical suggested schematic diagram of an audio amplifier using the chip, and as you can see, not much more than the chip itself is required. For more details, though, I

strongly suggest that you contact Texas Instruments at <http://www.ti.com/sc/tpa2000d2>. There are other options such as forced shut-down and user-programmable gain which are discussed in detail in the data sheets for the device, as well as a more in-depth discussion of the actual operation of the device.

While we're on the subject of audio amplifiers, National Semiconductor has an offering that is described as "the world's smallest, most powerful audio amplifier." The LM4872, as it is called, is indeed tiny. It comes in a micro SMD package which is only 0.05×0.08 inches in diameter. The connections are by means of solder "bumps" on the rear of the package, and the entire assembly is not much more than a minimally packaged chip. The performance from something so tiny, though, is quite impressive.

The LM4872 can deliver 1 watt to an 8 ohm load from a 5 volt supply or $\frac{1}{2}$ watt from a 3.3 volt supply at only 0.2% distortion. No output coupling capacitors are required, and the gain can be controlled by means of external resistors. Frequency response extends beyond 10 kHz, making the device suitable for communications as well as moderate performance music/consumer applications. No, it isn't hi-fi, but it also is a far cry from telephone quality.

Fig. 2 is a schematic of the typical amplifier using the device. As you will note, there is a switch shown connected to pin 5. This switch is used to provide a shut-down mode where quiescent current drops to less than $\frac{1}{4}$ ma, most of this through the 20K resistor. In operation, the chip normally draws 4 ma in addition to the output signal current. The data sheet for the device can be down-

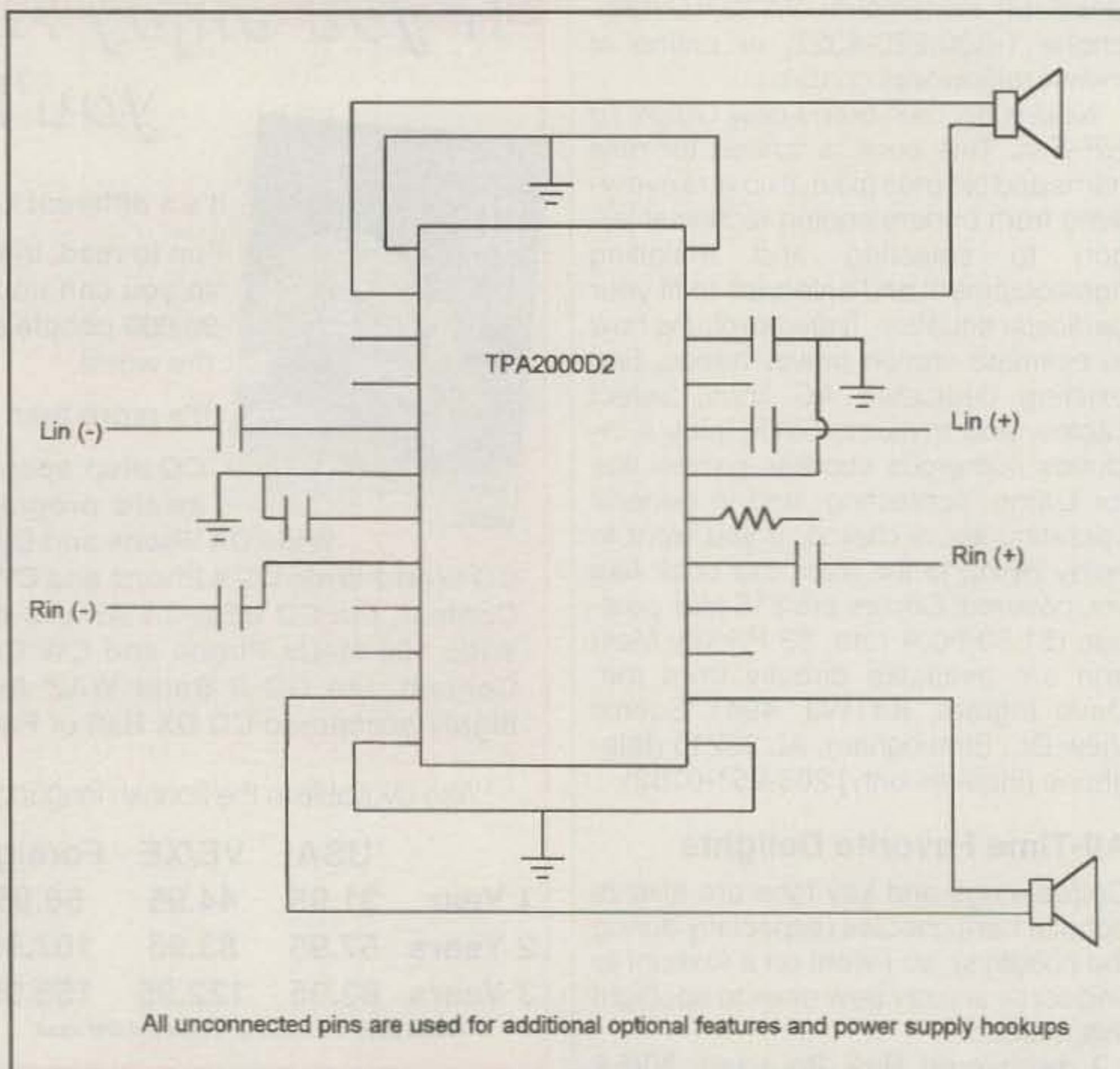


Fig. 1— Simplified schematic of a class D filterless audio amplifier.

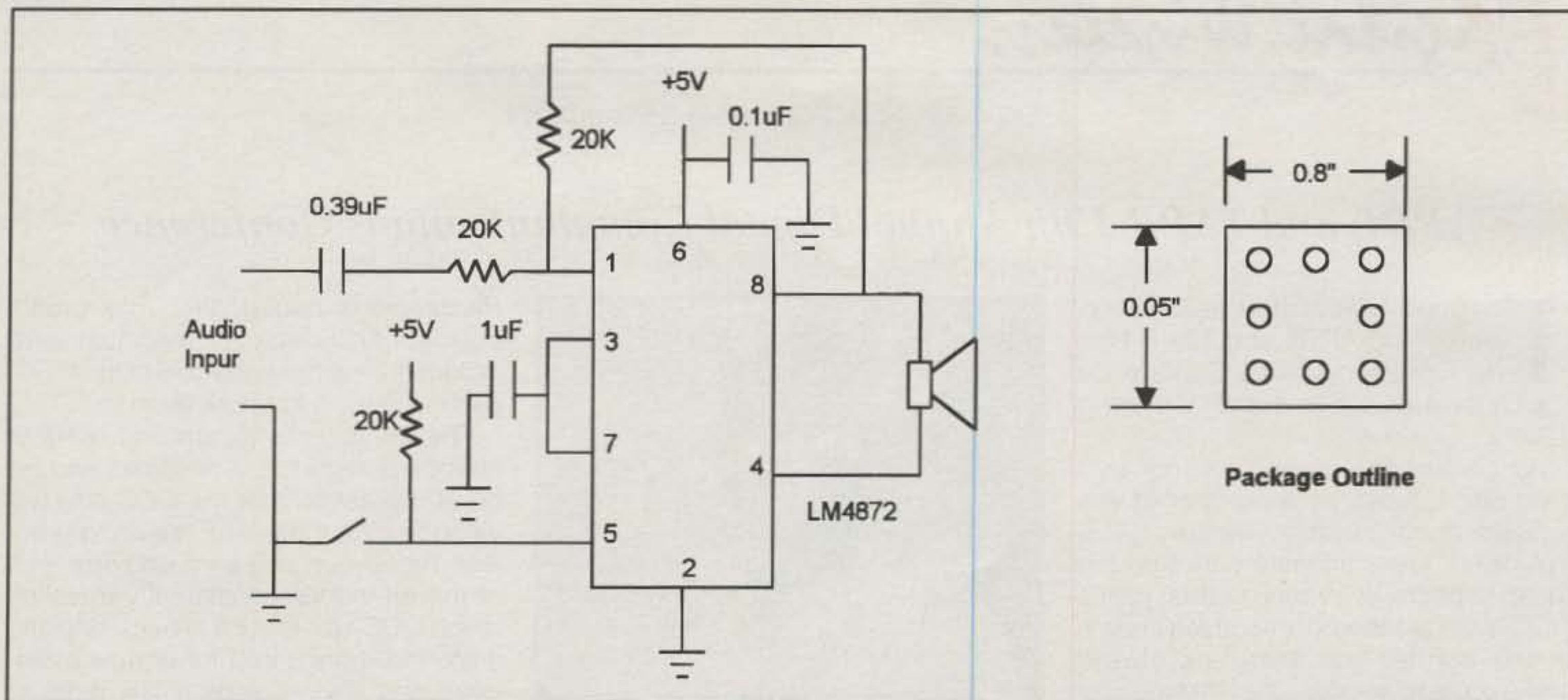


Fig. 2— Schematic of the tiny audio amplifier and package.

loaded from the National Semiconductor web site at <<http://www.national.com>> and contains complete instructions for designing amplifiers for operation from 5 volts, 3.3 volts, or 2.5 volts.

At this time of year I would like to wish all of my readers a very happy and

healthy holiday season. As I have said since the early 1970s (when "Math's Notes" began), "May all of your hopes and wishes come true in this coming year." They say that 2001 is the start of the 21st century, and hopefully it is the start of a new millennium for each of us both psychologically as well as chrono-

logically. I sincerely hope it also will serve to rekindle the experimental curiosity in our midst. Remember, ragchewing is nice, but there is still nothing like the thrill of communicating with someone via equipment you have built, even if it is only a microphone connector or a homebrew antenna.73, Irwin, WA2NDM

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ARRL and TAPR 19th Annual Digital Communications Conference

The good news is that the 2000 version of the ARRL and TAPR Digital Communications Conference (DCC) is over... the bad news is that the 2000 DCC is over.

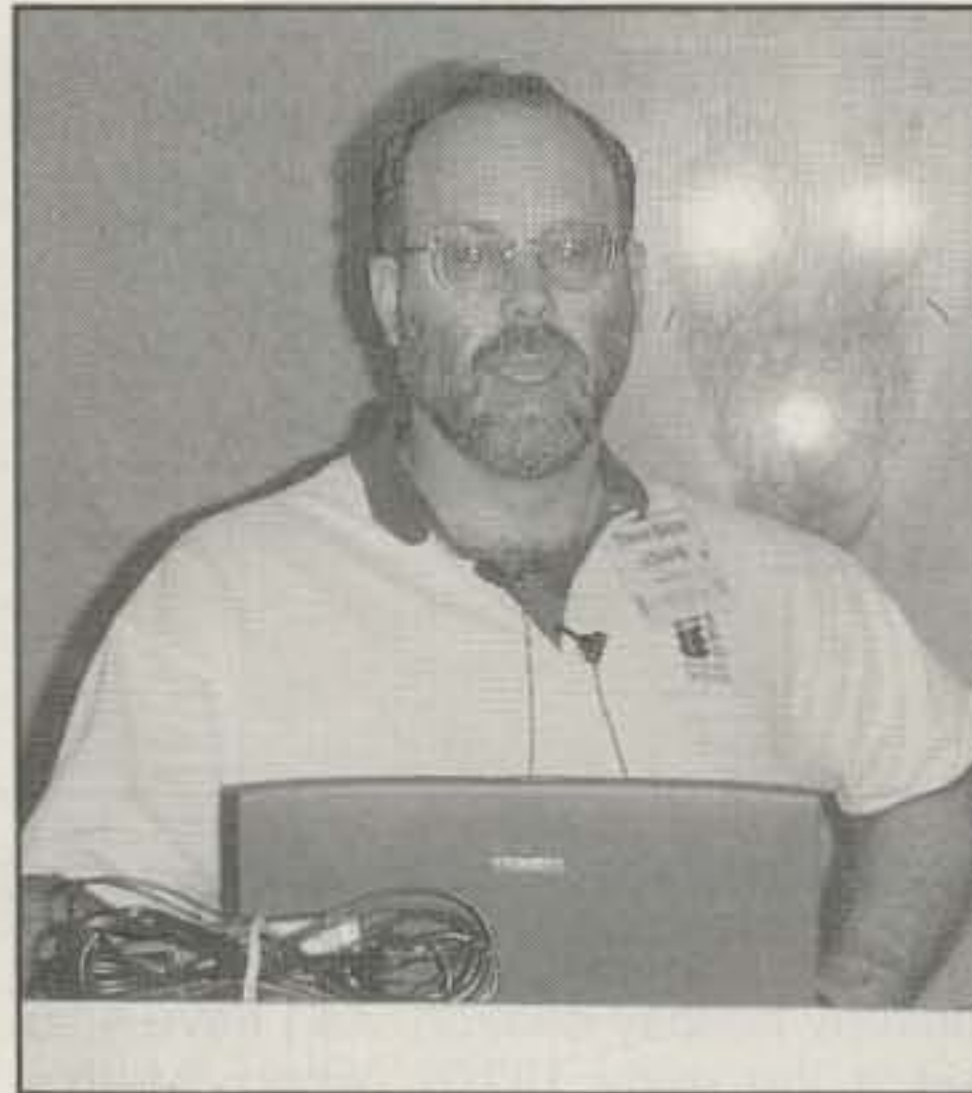
As conference organizers, my wife Tina and I, aided by a number of volunteers (most notably Geoffrey Dick, WA4IKQ), were intimately involved in most aspects of planning this year's DCC. As anyone who is involved in such events can tell you, there are always last-minute mini-crises that threaten (or at least seem to threaten) the success of the event, and yet it (almost always) comes together, and the attendees have a great time and learn a lot. By that standard, the 19th Annual DCC was a roaring success. I'll try to describe some of what happened at the 2000 DCC, along with some "insider" commentary.

On the Agenda

The 19th DCC was held September 22-24, 2000 at the Orlando Airport Marriott Hotel in Orlando, Florida. It helps to understand the "flow" of the DCC to realize that a number of sub-events occur under the umbrella of the DCC:

- TAPR (Tucson Amateur Packet Radio, Inc.) annual Board Meeting on Friday morning
- National APRS Seminar on Friday afternoon
- Packet Radio User's Group of Japan Reception and Presentation on Friday evening
- Main Paper Presentations on Saturday morning and afternoon
- Packet Radio (and associated topics) Introductory Sessions on Saturday morning and afternoon
- TAPR Annual Meeting on Saturday afternoon
- DCC Banquet, dinner speaker, and prize drawing on Saturday evening
- Technical Seminar Sunday morning

One of the main points that I make whenever explaining about the DCC is that it's *not* just "dry," formal paper presentations. Mostly, the DCC is about meeting interesting people who are



Steve Bible, N7HPR, presented his paper on Easy Trak, a PIC Based Rotor/Radio Controller Interface, during the main session of DCC 2000.

actively involved in digital wireless communications and amateur radio. I'm on record as stating that the most important "product" of the DCC is fun and learning—in that order.

Attending the DCC

One of the primary goals of the DCC is to "move it around." Roughly, the DCC follows a three-year cycle in the following "regions" of North America: East, Central, West. Each of these "regions" is very roughly defined, and the final location for each year's DCC is largely dependent on which group offers to host it. For example, DCC in 2001 will be held in Cincinnati, Ohio, and in 2002 the conference will be "West," exactly where yet to be determined.

One of TAPR's goals when it undertook the prime management role for the DCC some years ago was to try to keep the cost of the DCC at a minimum for attendees. That necessitated a bit more advance planning (and some considerable experience at such negotiations) to comparison-shop for hotels near airports (free shuttle service is a prime criterion) with decent room rates. Cost of attendee registration closely tracks the fixed expenses incurred for the DCC—room and equipment rentals, meals,

Proceedings books, etc. Any profits from the DCC are, for the most part, incidental; the financial goal of the DCC, such as it is, is to break even.

The attention to minimizing costs to attendees as much as possible, and the great reputation that the DCC has developed over the years, result in somewhere between one third and one-half of the attendees consistently traveling to the DCC wherever it is held. "Moving it around" brings in a lot of new attendees and always adds a few more to "The Traveling Road Show" contingent, as I've heard them refer to themselves.

TAPR Board Meeting

The main news from the TAPR Board Meeting, which was open to all TAPR members, is that John Ackermann, N8UR, has been elected TAPR president. N8UR had been acting-president since Greg Jones, WD5IVD, stepped down from that role earlier in the year. Steve Bible, N7HPR, was elected vice-president. Retaining their previous roles were Bob Hanson, N2GDE, as secretary and Jim Neely, WA5LHS, as treasurer. TAPR has decided to proceed with the production of the innovative PIC-based EasyTrak rotor controller.

APRS Symposium

For the last several years, the APRS (Automatic Position Reporting System) Symposium has been one of the more dynamic aspects of the DCC, and this year's was no exception. It was so successful, in fact, that next year's DCC almost certainly will feature an all-day APRS Symposium on Friday instead of only in the afternoon. Crammed into this year's APRS Symposium were 15 presentations (in 15-minute slots). Unfortunately, only a few of the APRS Symposium presentations were reflected in formal papers in the DCC *Proceedings*. It is hoped that the authors will post their presentations on the web.

PRUG Seminar

For the last several years, Packet Radio User's Group of Japan (PRUG) <<http://www.prug.or.jp>> has graciously sponsored a reception on Friday evening. PRUG then offers a presentation of

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gave me back my Ham Radio hobby



“As I got older, my high frequency hearing loss was destroying my ham radio for me . . .”

-- Martin F. Jue, K5FLU
President and Founder
MFJ Enterprises, Inc.



I know I'm not the only ham who can't understand all the speech in a QSO caused by high frequency hearing loss. I developed a solution that I want to share with my fellow hams.

I almost gave up my ham radio hobby

I have been a passionate ham radio operator for over 40 years ever since I was a teenager. I loved every minute of it. Still do, but I almost had to give it up.

As I grew older (I'm 56 now) I found myself asking "What did you say?" so often it got downright embarrassing. I can hear pretty good most of the time. I just can't always understand what people are saying and my left ear is weaker than my right ear.

It got to where I was having trouble carrying on QSOs. I could hear, but I just couldn't quite make out all the words.

My hearing problem almost put a stop to my lifelong hobby.

There was no way I was going to give up ham radio . . .

Research showed me what to do

I searched the literature and spoke to hearing and speech experts.

According to their research on the intelligibility of speech in hearing English words:

1. The frequencies important for speech intelligibility are the consonant sounds from 500 to 4000 Hz. They contribute 83% of word intelligibility.

Frequencies from 500 to 1000 Hz contributes 35% of word intelligibility and 35% of sound energy.

Frequencies from 1000 to 4000 Hz contributes 48% of intelligibility but has only 4% of sound energy!

2. In contrast, frequencies from 125

to 500 Hz contributes 55% of sound energy but only 4% to word intelligibility.

In other words, nearly half the speech intelligibility is contained in 1000 to 4000 Hz frequency range with only 4% of the speech sound energy.

On the other hand, the low frequencies 125 to 500 Hz have most of the speech energy but contribute very little to intelligibility.

How I improved my ability to hear and understand QSOs

The research showed me what to do. **First**, drastically increase the speech energy above 500 Hz where 83% of intelligibility is concentrated.

Second, drastically reduce the speech energy below 500 Hz that contributes only 4% of intelligibility.

Amateur radio communications limit audio to about 300 to 2700 Hz.

I split the audio band into four overlapping octave ranges centered at 300, 600, 1200, 2400 Hz.

I could boost or cut each range by nearly 20 db to give me full control. This let me maximize speech intelligibility for most kinds of frequency loss.

My left ear is weaker than my right ear so I split the output audio into left and right channels with separate 2½ watt amplifiers. A balance control lets me equalize the perceived loudness to each ear. *Now both ears help in improving speech intelligibility!*

I couldn't believe my ears!

I built one and hooked it to my rig. I boosted the high frequencies, cut the low frequencies, set the volume and adjusted the balanced control so I could hear each side equally loud.

I couldn't believe my ears! Speech that I could hear but barely understand before was now highly understandable. I got my ham radio back!

With this concept, you'll understand QSOs better and enjoy ragchewing and contesting more, even if you don't have high frequency hearing loss.

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It helped me so much I wanted to share this with my fellow hams

I developed this into an accessory that any ham can use.

I made it immune to RFI, added a front panel phone jack, on/off speaker switch, two selectable transceiver inputs, a bypass switch for in/out comparison and built it into 10Wx2½Hx6D inch aluminum enclosure. Needs 12 VDC.

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what its members have been working on in the previous year. The PRUG presentation is always well attended, and there are always a lot of follow-up questions and conversations.

PRUG was well represented this year with seven or more members attending. They gave an update on their PRUG-96 system, which they had presented at the 17th DCC in 1998. PRUG-96 was a system designed for research on routing protocols and was based on three subsystems—a 2.4 GHz spread-spectrum wireless modem, a Z-80-based controller and NE-2000 compatible Ethernet card, and a UNIX-based PC which housed the development tools and experimental builds of software which were then downloaded into the controller. PRUG-96 was so successful that the Ministry of Posts and Telecommunications (MPT), Japan's equivalent of the FCC, has provided a grant to further develop the PRUG-96 system for use in rural areas to provide low-cost wireless internet access. In addition, Root, Inc. was able to develop the spread-spectrum radio into a commercial product and now offers it for sale commercially. The PRUG-96 system has evolved into the PRUG-99 system, which attempts to bring more stability and robustness, as well as new hardware, into the PRUG-96 system.

At the DCC there was a lot of interest in a project PRUG calls TINI-AMEDES, which is a one-board (the size of a memory SIMM for personal computers) computer based on JAVA. PRUG uses the computer to interface between Ethernet and the Dallas Semiconductor 1-wire bus for experimenting with weather instrumentation, including measurement of unusual parameters such as sunlight intensity and atmospheric pollutants.

There were numerous other PRUG presentations, including some really interesting "firsts" at range and unusual conditions using 2.4 GHz spread-spectrum communications (imagine carrying a 5 foot microwave dish on a commuter train) that I can't do justice to in a column.

One of the most impressive aspects of PRUG's activities, for me, was that they are very focused on making use of spread-spectrum, IP-based technologies, and UNIX—exactly the directions I think amateur radio *ought* to be pursuing. I hope to learn more in depth about PRUG's activities and report on them in future columns. Spending time with the folks from PRUG is one of the better parts of the DCC. Those who attended this year were Hiroshi, JH4CIN; Naoto, 7L4FEP; Masao, JQ1VIE; Hiroshi,



Geoff Dick, WA4IKQ, received a plaque thanking him for his efforts on behalf of the 2000 DCC.

JJ1CEI; Yoichi; Hiroto, JJ1LYU; Shingo, JG8OOM; and Masaaki, JE1WAZ.

Main Session

Twenty-three papers were submitted in time for publication in the 19th ARRL and TAPR Digital Communications Conference *Proceedings*. The papers and presentations touch on a wide variety of digital wireless communications topics (abstracts and a complete list of topics are available online at <<http://www.tapr.org/tapr/html/Fcnc19.html>>). Steve Bible, N7HPR, presented his paper on Easy Trak, a PIC Based Rotor/Radio Controller Interface. Easy Trak is a next-generation automatic rotor controller designed to interface with a wide range of rotor systems. John Hansen, W2FS, presented his "PIC-et Radio II: How to Receive AX.25 UI Frames Using Inexpensive PIC Microcontrollers," which was a follow-on to John's presentation a year ago on how (relatively simple) it was to transmit AX.25 UI frames using a PIC. Rick Muething, KN6KB, presented "Winlink 2000... A Global Ham Message Transfer and Delivery Network," which fascinated me, and I hope to write an entire column on Winlink 2000. There were many presenters and many excellent papers. Even for those who attended, listening to the audio of the presentation is well worth the time.

DCC Audio

Greg Jones, WD5IVD, is one of the unsung heroes of the DCC (for the

moment I'll set aside Greg's very formative role in the life of the DCC in getting TAPR formally involved in its management and hands-on involvement through DCC 18). Greg's least-recognized role at the DCC is that of audio archivist for the DCC presentations. Greg pretty much single-handedly has diligently recorded and converted the audio from all recent DCC presentations and made it available via TAPR's web page. In 2000 the audio presentations will be saved as .MP3 files and made available on CD-ROM. Previous experiments at the DCC have included live and recorded streaming audio formats. Much of the "flavor" of the DCC thus can be recreated by listening to the hours of audio.

A Note About DCC Papers

Upon hearing that the main activity at the DCC is a "Presentation of Papers," the vast majority of hams instantly and incorrectly assume they certainly could never write a paper, and compound that mistake by assuming they're not "technical" enough to understand the content of the DCC papers. Nothing could be further from the truth, as the majority of DCC papers are informal and informational, and not at all "scholarly." Most of the DCC papers are written something like an article for *CQ* or *QST*. The authors use a conversational style to try to explain something they've done or something they're considering doing, or to illuminate a particularly obscure technical aspect of wireless digital communications. As far as I'm aware, no paper has ever been rejected for publication in the DCC *Proceedings* for anything other than missing the submission deadline (and you have to miss the submission deadline by a considerable margin to not be included; Maty Weinberg at ARRL HQ works wonders in assembling the DCC *Proceedings* into a coherent and logical book.).

Papers on nearly any topic in wireless digital communications are welcome. It's preferred, but very definitely not required, that the topic have some relationship to amateur radio, or illustrate a concept of which amateur radio should be aware. I've been assured that the DCC *Proceedings* can grow to any reasonable size to include any number of papers submitted.

I'm as guilty as anyone. A paper I wrote on the Puget Sound Amateur Radio TCP/IP Network was published in a DCC *Proceedings* several years ago and that was a proud moment, but I haven't written anything for the DCC



TAPR held its first-ever "prime time" annual meeting at DCC 2000.

since. I hope to correct that in 2001 and submit at least a couple of papers. I also should note that students benefit tremendously from publication of a paper in the *Proceedings*; such an achievement looks really good on an academic resume.

TAPR Annual Meeting

TAPR held its first-ever "prime time" annual meeting at DCC 2000 since combining the previously separate TAPR annual meeting and the DCC. By most accounts, the change in format appeared to be a success, allowing the membership to question and comment on TAPR's activities face to face with the TAPR board of directors. At previous DCCs, the annual meeting was held after the dinner, at a time when most of the attendees badly craved sleep, resulting in sparse attendance and not very lively discussions. A number of suggestions were well received by the board. One sad note was that former TAPR President Greg Jones, WD5IVD, announced to the membership his intention to resign from the board to be able to devote more time to completion of his doctoral thesis and spend more time with his new wife, Bridget. Greg plans to remain involved with TAPR.

Dinner Speaker and Prizes

After a great dinner attended by most of those who were at the DCC, we settled down for a very informative presentation by Doug Campbell, Vice President of Product Management, Marketing and International Business of Triton Network Systems. Triton makes broadband microwave communications systems, and

is a relatively young company located in Orlando, Florida. Doug related how he knew he should have made his presentation "more technical" when he was going through the dinner line and overheard a conversation on Fast Fourier Transforms, a welcome change from the audiences he's used to.

Doug was asked if he felt that amateur radio experience is relevant to Triton Network Systems, and he replied with a very emphatic yes, stating that one of his key challenges is finding personnel with RF experience and that several key members of Triton's technical staff are hams. More information about Triton Network Systems can be found at <http://www.triton-network.com>.

In 2000 there were a number of prizes donated for DCC attendees. The grand prize was a Kenwood D-700A mobile radio, which was won in a random drawing by Geoffrey Dick, WA4IKQ. Kenwood was also gracious enough to send

a quantity of nice coffee mugs with TAPR's logo on one side and Kenwood's logo on the other, enough for each attendee to receive one. Other notable prizes were a number of high-end PIC development kits and a Palm VII. The ARRL and TAPR donated a number of prizes, and CQ offered several subscriptions to CQ magazine and CQ calendars.

Sunday Technical Seminar

DCC 2000's Technical Seminar was a PIC Design Seminar organized by Steve Bible, N7HPR, with several others offering additional presentations. Attendees received design materials, including booklets and CD-ROMs.

The Fun

I'm not sure if I've gotten across the *fun* that happens at the DCC, mostly as a result of like-minded people getting together to discuss topics that are near and dear to them. Lack of sleep due to long conversations into the wee hours is a definite hazard, though. One of the most striking aspects of the DCC is that the authors very much want to help folks understand their topics. They are just incredibly helpful and understanding.

DCC 2001

DCC 2001 will be held in the Cincinnati, Ohio area, likely on September 21-23. I hope I've piqued your interest for attending next year. Updates will be posted on the TAPR DCC web page: <http://www.tapr.org/dcc>. If you live in the Cincinnati area and would like to get involved in DCC 2001, contact Steve Bible, N7HPR. He and his wife Sheila are the DCC 2001 coordinators. Steve can be reached at n7hpr@tapr.org.

73, Steve, N8GNJ

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Ham Radio's Online Connection

Logging Programs (Not) and Kudos for CORES

There is more out there than we can even imagine. I learned this the hard way, and I'd like to share a bit of that experience with you.

I sat down at the keyboard four weeks ago with every intention of fulfilling my September promise to write a column exploring the various software packages offered for contact logging. Having picked up a half-dozen info sheets at Dayton, I figured I'd download the sample versions, use them a little, and dash off an article. No such luck.

As it turns out, after just a little bit of searching, I was confronted with nearly 50 commercial offerings, and double that in freeware. Most of these are not simple databases, as I had expected, but full-fledged station management systems. Most programs will not only log your contacts, they will also control your rig and rotor, print out QSL labels, alert you if a station is needed or a duplicate, handle DX Cluster spots, let you know where you stand for awards and during a contest, do CW keying and decoding, maps—the list goes on and on.

Note to self: Don't promise something in a field you know nothing about.

It very quickly became obvious even to me that there is no way I could compare features intelligently among all these offerings. I'm not the type to write about something I'm not certain about, so faking it was out immediately. The conclusion I came to was that I'd have to find something else to write about for the last column of the second millennium. If there's anyone out there who was really looking forward to what I promised in September, a comparison of logging software, I apologize, because it isn't going to happen this month.

Just briefly, if you're interested in getting some logging software, do some research into the following programs, which seem to be the most popular ones (in alphabetical order): "CT" by K1EA, "DXBase 2001" from Scientific Solutions, "DX4WIN/32" from Rapidan Data Systems, "Log Windows" from Creative Services Software, "Log EQF" by N3EQF, "LOGic 5" from Personal Database Applications, "Prolog2k" from Da-

tamatrix, "TR-Log" by N6TR, and the "WJ2O Master QSO Logging Program" by WJ2O. You'll find most of these advertised in the pages of *CQ*. Also, have a look at the list at <http://www.ac6v.com/pageplog.html>. Now for something completely different.

At the CORE(S) of the FCC

It was recently announced that only about 18% of all hams have signed up so far for the FCC's much-touted Universal Licensing System (ULS). Although nobody knows for sure, most speculation for the low compliance rate revolves around the need to give the FCC your Taxpayer Identification Number (TIN) which, for most of us, is our Social Security Number (SSN). It seems that people value their privacy, and I tend to agree. When it comes to your SSN, you simply cannot be too careful, as that number is the key to your financial kingdom and should be guarded jealously. Another possibility is much less sinister: It's just that the remaining 82% of us just haven't had to transact any business with the FCC, and therefore did not have any reason to sign up for ULS.

Note that the need to provide the FCC with your TIN has nothing to do with the ability to access your records on-line. Instead, it was mandated by Congress as another means of denying Federal services to those who owe money to the government, and to track down so-called "deadbeat dads" who refuse to pay court-ordered child support. While there are some who point their fingers and shout "Big Brother" about this Orwellian way of doing business, I for one agree with the idea, since I have nothing to hide. I also have resigned myself to accept that the government already has my Social Security Number (after all, who issued it?), and if they really are that interested in me, there's little I can do about it.

Besides the TIN issue, which may or may not be exaggerated, there was also the browser issue: You were required to have Netscape Navigator as your Internet browser in order to use ULS. If you're like me—Microsoft Windows whether you like it or not—there wasn't much sense in signing up. These issues became obvious to even the FCC,

prompting them to replace the "people tracking" parts of ULS with a new system named CORES.

CORES, short for COMmission REGistration System, was developed from the ground up, and this time they did a very good job. The main purpose of CORES is to provide a unique FCC Registration Number (FRN) for each entity doing business with the FCC. Eventually, you will be able to use your FRN to conduct all FCC business, without the vulnerability of divulging your TIN via the Internet. The FRN essentially replaces the TIN as the unique number used to unambiguously identify a person.

CORES is kind of nice and easy to use. At this time, you can only search the CORES database. The FCC is not yet ready for CORES to be used for business, but it will be soon. This doesn't mean that ULS is going away. Far from it. ULS will be responsible for the main task of *license* administration, while CORES is the system that keeps track of the *people* who need to deal with the FCC.

One really nice feature is their respect of my privacy. Of course they don't list my SSN/TIN, but they also have marked both my callsign and home address as Private Information *without my asking*, a touch which I appreciate. Of course, anyone can go to one of the callbook servers and get that info with just my name, but the FCC has the right idea. The FCC's privacy policy is also very clear: They only gather the information you specifically provide to them, and then use it only to perform the business you asked them to do. They also collect statistical data, as do nearly all web sites, so they can monitor system performance. Not very Big Brother-ish at all, really.

Although CORES is envisioned as an on-line system, it is possible to register for it, and update information, via the US Mail. You can download FCC Form 160 (Registration), 161 (Registration Update) and most other FCC forms at <http://www.fcc.gov/formpage.html>. You can also get a copy of the form by telephoning 202-857-3800. Mail these forms to the CORES Administrator, 445 12th St. SW, Room CY-C140, Washington DC 20554.

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

Perhaps you have forgotten your FRN, or are not sure if you have one? Just use the search capabilities of CORES. You can search by name, address, and TIN. If you can't find your FRN, or can't remember your old ULS password (which is now also your CORES password), just call the CORES Administrator toll-free at 877-480-3201. You can also e-mail the CORES customer service team at <CORES@fcc.gov>.

Is it just me, or does this all sound very unlike the Federal Government we have come to expect? Toll-free info and help lines, start-of-the-art web-based registration, a dedicated customer service and support team . . . Can it really be that the FCC is turning into the very best of what we pay our government to do for us? Add in Riley the Enforcer, and it almost seems too good to be true.

CORES is a voluntary system. Amateur radio operators tend to enjoy being on the cutting edge of technology. With that in mind, I encourage everyone reading these words to fire up their PC, get online, and register with CORES and ULS. The FCC is really trying hard to reinvent itself, and I can think of no better way of telling them that they're doing a good job than by supporting their new system.

Cool Web Site

As I wrote last time, the internet's main value to amateur radio is as a resource. Although we can always use a search engine, finding a specific piece of information in the ham world can be easier if you check with one of the many pages devoted to links. One such page, at <<http://www.ham-links.org>>, is maintained by John Woodstock, K1DWU.

There's no screen shot of the site here because frankly, it's fairly plain. What's different about this list is that all of the links are checked weekly, nearly eliminating the time-wasting practice of following outdated links. Some of the links lead to other pages of links. If you can't find it from here, it doesn't exist. Oh, yes: John is one of the 18% who is registered with the FCC's ULS.

Once again, another year comes to a close. This time, we'll be moving into the third millennium since some of us started counting. As I always do this time of year, I want to once again send you and yours all the very best wishes of the season, for happiness, health, and maybe some wealth. We all should work toward keeping that warm fuzzy feeling alive throughout the whole year. Until next millennium . . . 73, Don, N2IRZ



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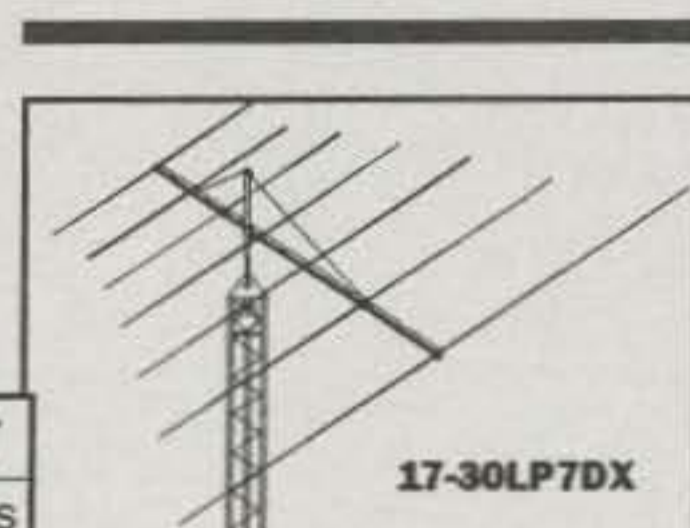
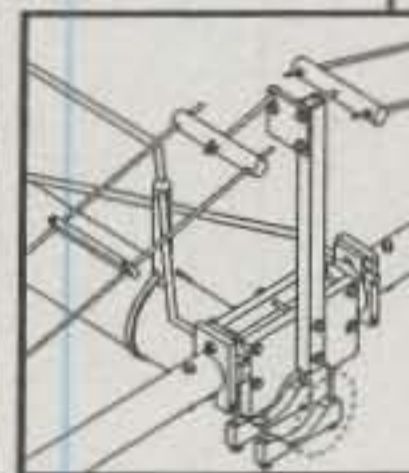
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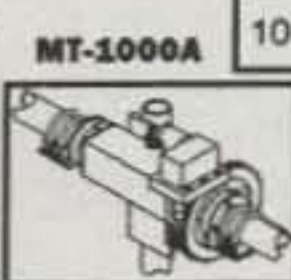
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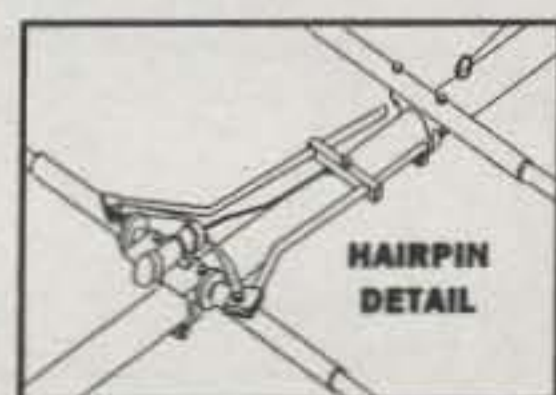
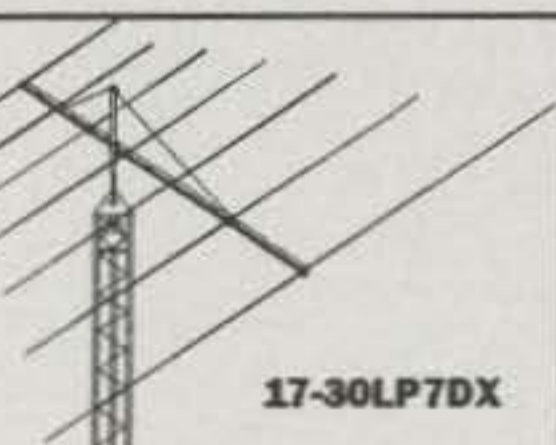


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For the Newcomer to Ham Radio

Nets, Reader Feedback, and More

Ham radio is about having fun while learning and accomplishing. It is about becoming proficient at communicating, while exploring. It is about adventure; it is about fun. It is about making the world a better place to live. And it is about helping out when someone needs assistance. How do you do that?

In any group of hams, you are going to find a few operators who exemplify the tradition of ham radio. Unfortunately, you probably also will find a few "lids" (poor operators). What makes an effective ham? Some would tell you that it involves having a "professional attitude"—calm in times of stress, consistent, an efficient communicator. If that is not you, what do you have to do to bring up your skill level?

One approach is to join one or more nets. Nets (networks) date back to the earliest days of ham radio. They are what put the "Relay" in ARRL, the American Radio *Relay* League. To be perfectly honest, however, nets are an antiquated mode of long-distance communication in the day-to-day world. On the other hand, they provide a wonderful training ground for becoming a good on-the-air operator. Plus, traffic nets and public-service nets prepare us for efficient disaster operation; it is impossible to overestimate the importance of this. Finally, on a social level, nets are fun.

Like any other complicated behavior, net operation is best learned in small, manageable chunks. Start out with something easy and work your way up. Also, spend some time listening and noting procedure before attempting to join in. How much listening? There is no easy answer—maybe a few minutes or maybe two or three sessions.

The easiest nets to participate in are local repeater nets. Once you are comfortable with the procedures on these infor-

mal nets, start looking around for something a little more formal. You may also find some of these on local repeaters, notably ARES or RACES emergency training nets and ARRL local traffic nets. On HF (usually 75 meters), your state or ARRL section probably has a phone (SSB) net. If your taste runs to CW, then look around for a slow-speed CW net. Once you are involved in traffic-handling nets, the ARRL's National Traffic System (NTS) has a whole hierarchy you can work your way through.

There are other paths to take, too. You can join one of the public-service groups and practice in their drills. Or, if you are so inclined, you can join one of the Military Affiliate Radio System (MARS) groups. MARS groups are comparatively rigid with respect to procedures, and they tend to follow an underlying military structure.

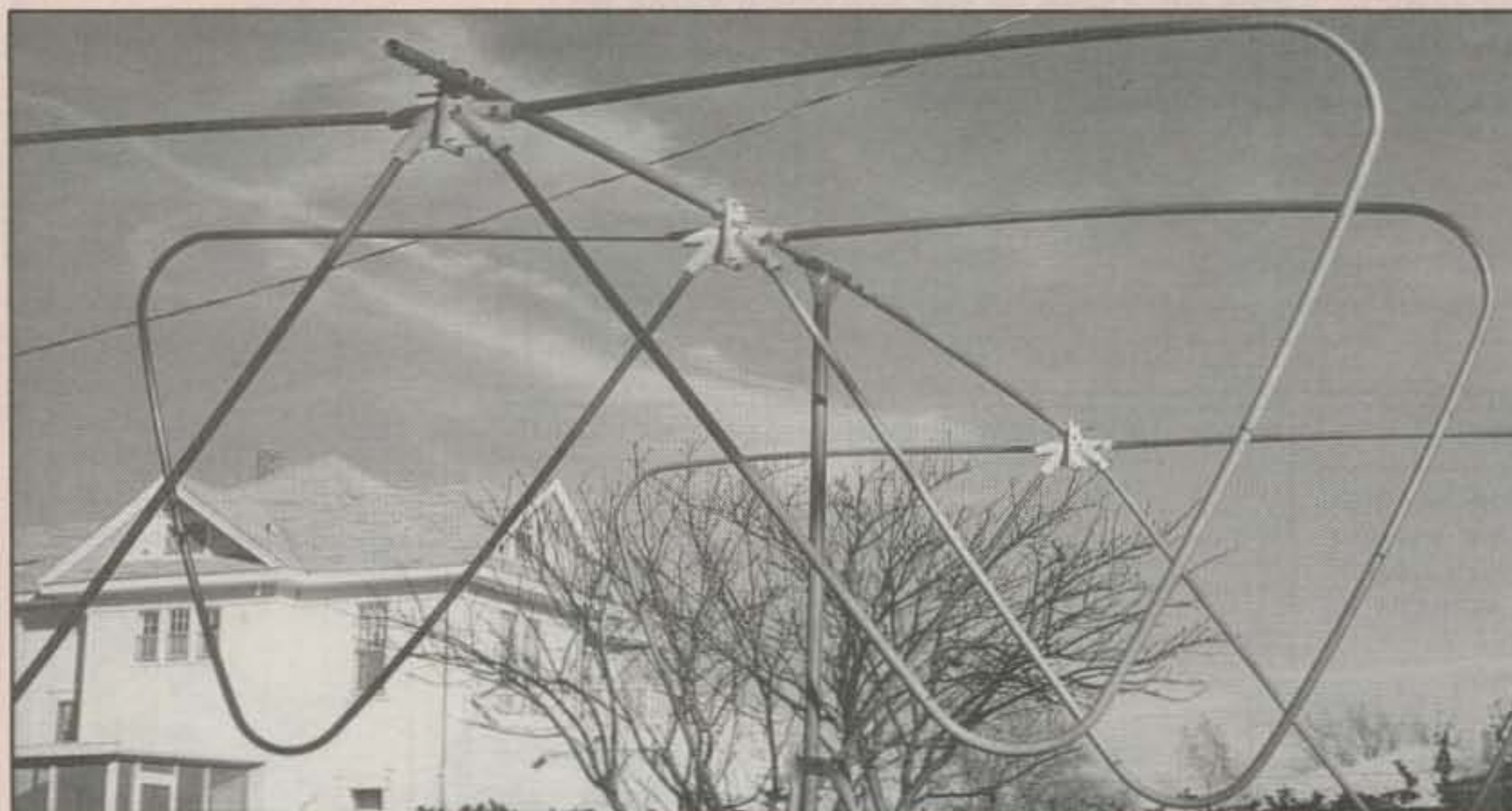
Let's start out with an informal local repeater net. When you participate in a net, you are under the direction of a seasoned guide—the Net Control Station (NCS, or simply "Net Control"). By the way, this is true of all participants, not just the newcomers. Most nets meet at a particular time each day or week on a particular repeater. The NCS will read some sort of net preamble, which tells listeners the name of the net, its purpose, and any particular information that the sponsoring organization deems appropriate. After the preamble, the NCS calls for check-ins. In some cases, check-ins are done in a particular order, but usually any station can check in at anytime the NCS has opened the net for check-ins. If there is some prearranged order for checking in, it will be mentioned in the preamble. Some nets request that check-ins provide certain information, as they check in along with their callsign. Listen closely.

Usually, the NCS allows several stations to check in, and then he acknowledges those he has heard. Want to make sure that the NCS gets your callsign correctly? Simple. Use

standard phonetics. It is a good idea to keep a copy of the standard phonetic alphabet at your operating position. You might also consider writing out the phonetics for your callsign and first name. Early in my ham career, I drew a blank when I checked in and the NCS asked me for my name. Any stage fright will evaporate quickly and rarely lasts beyond the first or second time checking into a net.

Also, during check-in it is quite possible that two or more stations will attempt to check in at the same time. To avoid this, pause and listen during your check-in to make sure that no one else is

*123 NW 13th Street, Suite 313, Boca Raton, FL 33432
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The bow-tie antenna constructed by W5ERY. All materials are available at your local hardware store. For construction plans, check out the Beginner's Forum on the CQ website.

also trying to check in at the same time. In other words, a proper check-in might go like this: After hearing the NCS call for check-ins, I wait for the initial rush to end. When it seems like a "clear spot," I push the PTT button on my microphone and say, "This is..." Then I release the PTT button and listen long enough to determine that no one else is talking at the same time. When I am sure that no other station is attempting to check in (it only takes a fraction of a second), I finish my check-in with "Whiskey Bravo Two Delta." Now all I do is wait for NCS to acknowledge me. If I had heard another station transmitting when I paused, I would just go back to the top and repeat the procedure. This method of checking in eliminates 99% of the doubles. By the way, it will probably work best for you if you use the phonetics for your own callsign. It is less confusing that way.

What happens next varies from net to net. Let's assume that you have started with one of the easier types of nets to work the local club's Monday Night Net on *the* repeater. Bob is running the net tonight because it is his turn. (You remember Bob, don't you? He was the tall, balding guy with the slight pot belly who smiled a lot at the club meeting you attended. Nice, friendly guy.) When the new check-ins become scarce, Bob shifts gears.

First, Bob asks if anyone has any emergency traffic for the net. No one ever does, but NCSs keep asking ... for that one time when someone actually might. Then Bob moves on to more interesting and productive topics. He asks Jane, the club president, for any news pertaining to the club. Jane mentions several topics: the speaker for the next club meeting, the antenna party at Bill's house to erect his new tower and HF antenna, the next fox hunt, and the need for some volunteers to help plan the summer hamfest.

Bob then asks Ed, the head of the repeater committee, to give a report on the repair work recently completed at *the* site. Ed talks for a few minutes using some very strange words. Ed is a nice guy, so everyone pretends to understand what he is talking about. Everyone is happy except Fred, who is a "techie wannabe." He's convinced that he could do a better job than Ed, but everyone who knows him would rather be in another county the minute he picks up a screwdriver. Bob finds some way to quiet down Fred and moves on.

Bob pauses now and asks for any late check-ins. Five or six other stations check in. Bob acknowledges them, and

then he asks if anyone has any business for the net. No one says anything tonight, but sometimes people mention some ongoing club project and the like.

Next, Bob asks for comments from the first station that checked in. George notes that the weather has been much nicer than he expected and that he hopes to finish his antenna work next weekend. Then he says something like "back to net," and Bob starts talking again. This time he is asking for comments from the second station that checked in.

Horrors! There is a pattern here. Net Control is going to ask every station that checked in, including you, for comments! What will you do? How will you do it? What will you say? Gulp.

Fortunately, there are a number of stations ahead of you. You can listen to what they say and how they say it to get an idea of what to do. After listening to a couple of transmissions, you realize that the format is the same. Only the content varies.

First of all, no one transmits until the NCS calls on them by callsign. When called, they wait for the repeater timer to reset (usually there is a courtesy tone to let you know that it is okay to go ahead and transmit). Then they immediately respond, usually with some pleasantries, a quick comment on some recent endeavor, and then "turn it back" to the NCS with words to this effect: "Hope everyone has a nice week. This is WB2D back to net." Notice that there is no need to use phonetics this time. Most stations keep their comments short and sweet.

What should you say when it is your turn? Probably the best thing to do is introduce yourself to the group. It might go something like this, "Good evening, Bob and the rest of the net. The name here is Ralph—roger, alpha, lima, papa, hotel. I live over in the Brentwood section of town. I just got my license a couple of days ago. This is the first net that I have checked into. Hope everyone has a good week. This is KQ8XYZ, back to net." You don't have to use your callsign at the beginning of your transmission, but you should use it at the end.

Bob will welcome you to the net and may ask you a couple of questions. Answer them quickly and to the point. This is not the time to run through your family history, how many dogs you have, your fondness for chicken ala king, and the fact that your mother has pictures of Elvis in every room of her house.

Bob will move on to the next station. Once he has finished with the list of check-ins, he will ask for any final business and then close the net. That's it. It

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is over. You don't have to do anything else. Usually some interesting chit-chat follows the net, so if you have time, hang around and listen. If it seems appropriate, join in.

This is about as laid-back as net operation gets. It is a great way to learn the basics, though.

You might also consider ordering the ARRL's *Net Directory* (\$2), which provides a short tutorial on traffic handling; there is an on-line version of it at the ARRL web site. Once you get the hang of it, it is really quite simple, and it can be lots of fun. We'll cover traffic handling in a future article.

Jump into that local net next session. In no time you will be sounding like an old-timer. Your transmissions will be precise and efficient. Good operating will be a habit with you, and that is a good habit to have. Next time we will look at the next step up the net ladder—HF nets.

Feedback: QSLs, Wallpaper and Antennas

Jerry, WA2AUZ, writes: *I am using QSL Maker by WB8RCR and it is working fine for me, as I only send QSL cards*

out if I receive them. I have been getting quite a few from DX stations, so your article helped me design my card. I have a question that I hope you can answer; can't find it anywhere. How do I fill out a QSL card for an SWL who monitored my two-way QSO with someone else?

I always just use a permanent marker and write something like this "Confirming SWL report from (name or SWL callsign) of hearing my station in contact with" and then the rest of the card is the same. Some countries require operators to collect a specified number of SWL confirmations before a ham license is issued.

Dale Holloway, K4EQ, writes: *After 40 years of hamming (as of today!), I still get a kick out of earning a new certificate, although only a few cherished ones actually get on the wall. The rest go in a file folder for an occasional nostalgic review of my years of fun.*

You hit the nail on the head in discussing the difficulty of achieving the WAZ award. You said, "It is not uncommon for a DXer to approach 200 or more countries worked before nailing the final zone." Boy, I can sure testify to that. I'm hardly a big-time DXer, but I have managed to work 263 countries (257 confirmed). However, I still need that last zone. After all these years, I have never been able to work zone 26. Believe me, when I do work it and get the QSL, the cherished WAZ award will become part of my permanent wallpaper.

On another note, you were incorrect in stating you must have worked every country (entities now) on the DXCC list to qualify for Honor Roll. Actually, the rules state: "To qualify, you must have a total confirmed entity count that places you among the numerical top ten DXCC entities total on the current DXCC List (example: If there are 334 current DXCC entities, you must have at least 325 entities confirmed)." So, you don't need them all, but a LOT more than I have.

Al Watson, W5ERY, writes: *I am constructing a backyard antenna (see photo). We all need a really good antenna. This year's fantastic skip calls for a bow-tie antenna, especially for 10 and 15 meters.*

Nice job, Al. I don't have room to run the construction details here, but I am posting them on the Beginner's Forum of the CQ website, <<http://www.cq-amateur-radio.com>>. If you are interested in a simple, inexpensive antenna that you can construct yourself, check out Al's plans on our website.

Happy Holidays! 73, Pete, WB2D

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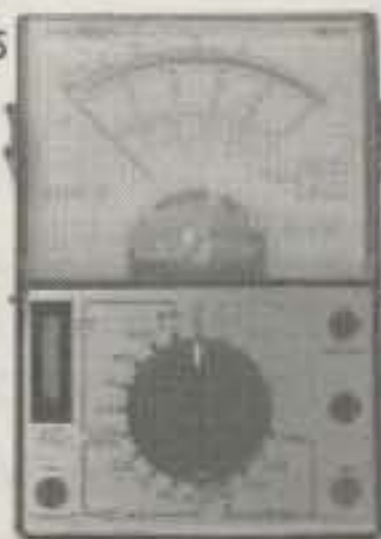


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The Art of Low-Power Hamming

SSB and QRP—A Great Combo!

Happy Holidays, friends! We trust you are enjoying this festive time of the year, QRP'n to the max, and looking forward to expanding your radio horizons even more during the good times straight ahead. In light of that fact, this month's column is written especially for new or renewed HFers and part-time QRPers interested in the voice or single sideband aspect of QRP. You understand most QRP action is on CW—usually around 7.040 and 14.060 MHz—but your mode of preference is SSB and you are curious if it will actually reach out, right? You bet it will! Folks are successfully QRP'n with SSB every day—not just in the U.S., but around the world—and having a ball in the process.

Need more convincing? Try this experiment/test with your own rig in your own shack and judge for yourself. First, tune in an SSB signal that is running S9 on your transceiver's meter. Be patient and accurate; this is a real time test. Listen and try to find a station running 100 watts—a "barefoot" transceiver. Then "QRPize" the station by switching in your rig's 10 dB attenuator and notice the resultant signal strength. Could you hear a difference without looking at your transceiver's S-meter? Was the S-meter's drop less noticeable than you expected? Surprise! As we always say, a little QRP can go a long way!

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

What happened here? Think back to your licensing theory studies, add in some proven-true facts, and you have the answer. A 100 watt signal dropped by 10 dB becomes a 10 watt signal—the "full power" level for SSB QRP (which is also double the 5 watt level for CW QRP). Also, the S-meters on most modern transceivers are calibrated so 4 or 5 dB equals 1 "S" unit. The AGC system in those same modern transceivers also works to favor QRP. It usually equalizes signal level differences of up to 15 dB (or more) to the same volume level. That is why you could not hear a difference and your meter's change was barely noticeable.

Here is another interesting point. Due to compromising antennas and/or lossy cables, a number of stations unknowingly radiate an "almost QRP" signal and still work into all areas of the world. If they can do it with a low-slung, weather-beaten longwire, you can do at least as well with a well-made dipole and QRP! You will like the rigs, the people, and the fun. Really!

The Rigs

You say you are committed to giving SSB QRP'n a good old college try and would like some suggestions on gear? You could start out right now using your existing transceiver with its output dropped back to 10 watts (and realize less telephone or television "RFing" to boot), but that idea works better for in-

home trials than long-term use. Why? The big attractions of QRP gear are its small size, go-anywhere portability and low current requirements for battery operation. Most 100 watt home (or mobile) transceivers use more current (and drain more batteries) just while receiving than two or three dedicated QRP transceivers use on transmit. Further, no one can question if you are really running QRP if you are using a dedicated QRP transceiver. Well, they might if you work DX galore, but honesty among hams is a proud tradition of the highest order (pardon the soapbox sidetrack).

Presently, the three most popular QRP-type transceivers with SSB capabilities are SGC's little all-band SG-2020; MFJ's economical "9400 series" monobanders for 6, 10, 20, 40, or 75 meters; and Elecraft's neat K2 kit rig.

A view of SGC's-2020 is shown in photo 1. The little marvel measures 2.75"H×6"W×7"D, covers 160 through 10 meters, includes full-coverage short-wave reception, and delivers up to 20 watts output. Power can easily be reset to 10 watts for SSB QRP'n, and current demands are genuine QRP—less than .5 amp receive/2 amps transmit (at 10 watts). The transceiver has a good RF speech compressor for hi "talk power," a noise blanker, RIT, XIT, 20 memories, scan capabilities, passband tuning, CW keyer, and a built-in SWR metering (a neat all-in-one box station for portable use!). If you really want to go first class,



Photo 1—The SGC-2020 is a neat little transceiver for multiband SSB QRP'n. It is small, rugged, energy efficient, and loaded with deluxe operating features. (Photo courtesy SGC Corp.)



Photo 2—Budget-conscious QRPers preferring to buy rather than build their rig will find MFJ's 9400 series of monoband SSB transceivers quite attractive. They are performance proven, stouthearted, and dandy for everything from camping to bicycle mobiling. (Photo courtesy MFJ Enterprises)

A Contester's Dream

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Photo 3— If kit building and using a hot new transceiver of the day piques your interest, Elecraft's new K2 with its optional SSB PC board installed is a clever choice. The little gem sports numerous "big rig" features, and is coming up great in the world of QRP. (Photo courtesy Elecraft)

the 2020 can be ordered with optional snap-on/off front and rear covers. The rear cover holds batteries for stand-alone or on-the-spot operations, and a microphone, key, and log can store inside the front cover. The full package is both handy and rugged.

I have only "scratched the surface" of the 2020's many attributes. More details (and rigs!) are available from SGC, P.O. Box 3526, Bellevue, WA 98009 (1-800-259-7331 or <www.sgc-world.com>).

MFJ's 9406/6m, 9410/10m, 9420/20m, 9440/40m, and 9475/75m SSB transceivers are also well known in QRP circles (photo 2). In fact, some folks really put them to the test operating portable and bicycle mobile, and they continue working despite heavy abuse. Each of the transceivers measures 2 1/2"H x 6 1/2"W x 6"D and exhibits low current demands on both receive and transmit. They sport a quite sensitive receive with crystal filtering and S-meter, plus a conservatively rated transmitter with a good speech compressor. The 6 meter version pumps out 10 watts. The 20, 40, and 75 meter versions deliver 12 watts output, and the 10 meter version delivers 20 watts output (easily reset to 10 watts). These little travelers "get around" and

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Band	Frequency
160 meters.....	1.910 MHz
80 meters.....	3.985 MHz
40 meters.....	7.285 MHz
30 meters	CW-only band
20 meters.....	14.285 MHz
17 meters	presently unadopted
15 meters.....	21.385 MHz
12 meters.....	24.950 MHz
10 meters.....	28.885 MHz

Table 1— Popular calling/gathering frequencies of SSB QRP'n. (Discussion in text.)



Photo 4— Is working 100 countries in two weeks with QRP actually possible? Yes, indeed, and Bob Rosier, K4OCE, has the DXCC Millennium Award just to prove it. Jolly good show, Bob!

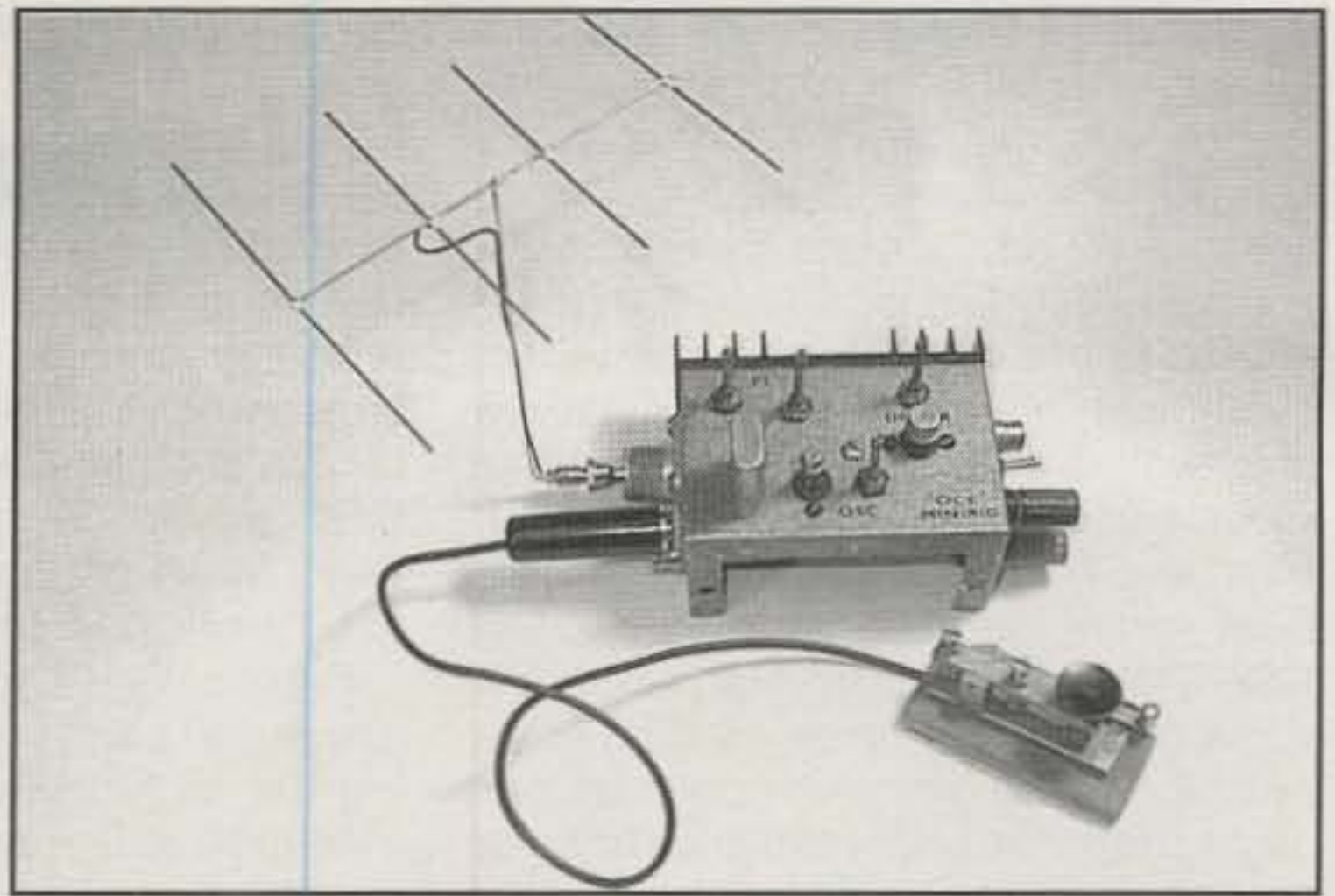


Photo 5— This is the spiffy little DX-grabbing QRP transmitter Bob, K4OCE, homebrewed and used during the 1970s. The two-transistor treat has WAZ to its credit. The antenna used was a mite larger than one shown with rig.

"get out" great. They can also be used on CW with an optional MFJ adapter, or combined with a same-width antenna tuner and AC supply/battery case for stand-alone field use. Again I only "hit the high points." More details (and rigs!) are available from MFJ Enterprises, P.O. Box 494, Mississippi State, MS 39762, (1-800-647-1800 or on the web <www.mfjenterprises.com>).

The Elecraft K2, shown in photo 3, is unique because it is a full-featured, all-band QRP transceiver you build from a kit—similar to those famous Heathkits of past times. Many QRPers are also staunch homebrewers, so it is no surprise the K2 is presently "top banana" among low-power enthusiasts. Yes, and it is flat out exciting to say "I built it myself!" The K2 sports dual-frequency

synthesized VFOs, selectable crystal-filter bandwidths, receive preamp and attenuator, RIT, XIT, noise blanker, built-in keyer, speech compressor, and more. The basic K2 is a CW-only transceiver. An optional PC board adds SSB plus 160 meter operation. An automatic antenna tuner and a 2.9 amp/hour battery are also available as options. When installed internally, the little 3" x



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8" x 8" K2 becomes a fully self-contained rig capable of very good performance. It is also designed for easy assembly. For more information or to order a K2 kit, contact Elecraft LLC, P.O. Box 69, Aptos, CA 95001 (831-662-8345 or <www.elecraft.com>).

Although no longer available as new rigs, two more QRP transceivers warrant favorable mention: Index Labs "QRP Plus" and Ten-Tec's famous "Argonaut." Both units are genuine multiband SSB/CW delights, and both have become classic collectibles. Finding either radio for sale and in good condition (and paying its occasionally stiff price) may be challenging. Are they worth it? That depends on your viewpoint. Compared to cars, I would say, "Would you rather have a '56 Corvette or a 2001 Impala?"

The Bands

We have briefly reviewed today's popular rigs, so I assume you are now asking which bands are good choices for SSB QRP'n. Once again, opinions may differ, so I will share some general pointers and then you can make your own decision.

First of all, the "hot spots" for SSB QRP on any and all HF bands are not as well known and/or as active (with QRP, that

is!) as those for CW QRP. The "getcha going" list in Table I should prove helpful, but feel free to tune, tune, tune, and exercise the old hunt-and-pounce DXing technique. Monitor propagation forecasts from WWV on 10, 15, and 20 MHz at 18 minutes past each hour and hit the bands when conditions are good. Catch DX before pile-ups begin. Work SSB QRP during Sweepstakes and Field Day. Those are the best ways to learn what works best for you.

Personally, I find 20 meters the best all-around band for SSB QRP'n. Dodging the high-power boys can prove a mite difficult (especially on weekends), but DXing is good, and most operators are sharp enough to copy QRP stations without strain. Next in preference are 10, 17, 12, and 40 meters—in that order. When 10 and 12 meters are open to your area, QRP'n is terrific and you can work DX like a pro. Just avoid the pile-ups you cannot "crack" within two or three calls (Once a DX station hits the packet cluster and the pile-up bulges, your odds of success drop like a rock.). Seventeen meters is a good band for mobiling and also for QRP'n, because it is open many hours of the day and night, and U.S. QRM is almost non-existent. Forty meters seems to be

a favored band for CW QRP, but I find it filled with screeches, howls, QRM, QRN, and operators having various types of rig or cockpit problems. It undergoes a face change during contests, however, and exhibits good late-night propagation. Finally, I might describe the HF bands like many folks describe their rigs: They all are terrific! Whatever you use at the moment is the perfect choice—until you discover something better. Enjoy!

The Fun

Finally, we have the most pleasant question of all: Why use QRP? Why chance making or missing a special contact with low power when your odds for success are greater with higher power? Precisely the point, grasshopper! Why drive a small European sports car when you can motor around in a big gas-guzzling SUV? Why choose a plate of spaghetti and lentils when you can wolf down five times the calories and fat grams in a big platter of lasagna? Image is everything. Just tell the local gang you are a lean, mean hammin' machine, then prove it on the air with QRP!

A while back, I was dinking with some adjustments on my QRP plus and a VK6 suddenly came on my tuned-in 20 meter frequency calling CQ. Without realizing the odds were against me, I called him and he replied, saying he was beaming over the long path. Wow—what a QSO! If I pulled off that feat with a 5 watt rig lacking a speech compressor, you can surely do it with one of the fancy new rigs mentioned here in this month's column.

Can you stand another nudge? Look at that newly acquired millennium award Bob Rosier, K4OCE, is holding in photo 4. Bob worked 100 countries during the first two weeks of January 2000—just 14 days. His rig was a Kenwood TS-570 set at 5 watts and a 4-element beam. Many of the QSOs were on CW, true, but that is beside the point. Sunspots are presently peaking, and all the bands are doing great. Try them and you too will be hooked on QRP.

Bob has an interesting QRP background. During the 1970s, he built the little two-transistor transmitter shown in photo 5 and achieved Worked All Zones with it. The circuit is fairly universal/conventional, so Bob's secret for success has to be that neat little miniature key he uses with it. What a gem!

That fills all the room available and is all the views for this time, gang. Keep on QRP'n and may the force of good signals always be with you!

73, Dave, K4TWJ

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February 10-11, 2001

Starts: 0000 GMT Saturday Ends: 2400 GMT Sunday

I. Period of Operation: Single Operator stations may operate only 30 hours of the 48-hour contest period. Off-time periods must be a minimum of 60 minutes in length and must be clearly marked on the Summary Sheet. Multi-Operator stations may operate the entire 48-hour contest period.

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

III. Bands: The 3.5, 7, 14, 21, and 28 MHz bands may be used. No 1.8 MHz or WARC bands.

IV. Terms of Competition (for all categories): All entrants must operate within the limits of their chosen category when performing any activity that could impact their submitted score. Transmitters and receivers must be located within a 500 meter diameter circle or within the property limits of the station licensee, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers used by the entrant. All high power categories must not exceed 1500 watts total output power on any band. Only the entrant's callsign can be used to aid the entrant's score.

Any form of DX alerting assistance is permitted in ALL categories.

V. Categories:

1. Single Operator (Single Band and All Band)

(a) **Single Operator** stations are those at which one person performs all of the operating, logging, and spotting functions. Only one transmitted signal is allowed at any time.

(b) **Low Power:** Same as 1(a) except that output power is 150 watts or less. Stations in this category compete with other low power stations only.

(c) **Rookie:** An entrant in this category shall, at the time of the contest, have been licensed as a radio amateur three years or less. If you are entering this category, please indicate such on your Summary Sheet.

2. Multi-Operator (All Band operation only)

(a) **Single Transmitter:** Only one transmitted signal at any time. Limited to 6 band changes in any clock hour (0 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes. Violation of the 6 band change rule will result in reclassification to the Multi-Multi category.

(b) **Two Transmitter:** A maximum of two transmitted signals is allowed as long as each transmitter is on a different band. Each of the two transmitters is limited to 6 band changes in any clock hour (0 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes. Violation of the 6 band change rule will result in reclassification of the entry to the Multi-Multi category.

(c) **Multi-Transmitter:** No limit to transmitters, but only one signal and running station allowed per band.

3. SWL: SWLs are required to log the callsigns of both the heard and correspondent station. Scores are based only upon the heard station, using the same rules as transmitting stations. Correspondent callsigns may not appear more than three times per band in your log.

VI. Exchange: RS(T) report plus a progressive contact three-digit serial number starting with 001 for the first contact. (Continue to four digits if past 999.)

VII. Serial Numbers and Identification of Transmitters: Single Operator log entries must contain a progressive three (or four) digit serial number sequence starting with 001 for the first contact. Multi-Single log entries must follow the same serial number scheme and are required to identify which transmitter made each QSO in the log. Multi-Two and Multi-Multi entries must provide a separate log and serial number sequence for each transmitter.

VIII. Points:

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

2. Contacts between stations on the same continent but in different countries, and contacts with maritime mobile stations, are worth two (2) points on 28, 21, and 14 MHz and four (4) points on 7 and 3.5 MHz.

3. Contacts between stations in the same country are worth one (1) point on 28, 21, and 14 MHz, and two (2) points on 7 and 3.5 MHz.

IX. Multiplier: The multiplier is the number of "valid" prefixes worked. A prefix is counted only once regardless of the number of times the same prefix is worked.

1. A prefix is the letter/numeral combination which forms the first part of the amateur call. Examples: N8, W8, AB8, DL5, DJ2, HG1, WD200, WF96, 3DA0, GB75, ZS66, U3, etc. Any difference in the numbering, lettering, or order of same shall constitute a separate prefix. A station operating from a DXCC country different from that indicated by its callsign is required to sign portable. The portable prefix must be an authorized prefix of the country/call area of operation. In cases of portable operation the portable designator will then become the prefix. Example: AB5KD operating from Wake Island would sign AB5KD/KH9 or AB5KD/NH9. American DX (KL7, KH6, KP2, KH3, etc.) operating within the 48 states must sign with a full designator of their choice. KH6XXX operating from Ohio must use an authorized prefix for the U.S. 8th district (W8, K8, etc.). United States portable stations are not permitted to select a portable prefix designation. For example, WS7I/2 is permitted, but WS7I/WY2 or WS7I/KZ2 is not. Portable designators without numbers will be assigned a zero (0) after the second letter of the portable designator to form a prefix. Example: N8BJQ/PA would become PA0. All calls without numbers will be assigned a zero (0) after the first two letters to form the prefix. Example: XEFTJW would count as XE0. Maritime mobile, mobile, /A, /E, /J, /P, or interim license class identifiers do not count as prefixes.

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

X. Scoring:

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

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

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

XI. Awards: First-place certificates will be awarded in each category listed under Section V in every participating country and in each call area of the United States, Canada, Australia, and Japan. All scores will be published. To be eligible for an award a Single Operator station must show a minimum of 12 hours of operation. Multi-operator stations must operate a minimum of 24 hours. A single-band log is eligible for a single-band award only. (Single band entrants who also operate on other bands are encouraged to submit their logs to aid in the log-checking process. Note: If a log contains more than one band it will be judged as an all-band entry unless specified otherwise.) In countries or sections where returns justify, 2nd and 3rd place awards will be made. All certificates and plaques will be issued to the licensee of the station used.

XII. Trophies and Plaques (Donors)

Single Operator, All Band

- * World Jules Freundlich, W2JGR
- * USA Arnold Sias, K7VS – W6FFC Memorial
- * N.A. Steven Franzen, N9CK
- * S.A. Jacob Oduder, P43P
- * Oceania Jay Dyer, W8JAY
- * Africa CQ Magazine
- * Europe Bill Hellman, NA2M
- * Asia Dick Stevens, N1RCT
- * Canada Raj Singh, VE6RAJ
- * Japan John Lockhart, W0DC

Single Band

- * World 28 MHz Gary Stout, W9OX
- * World 21 MHz TARA-Troy Amateur Radio Assn. – N2TY
- * World 14 MHz Francis Fallon, N2FF
- * World 7 MHz Bill Heinzinger, W9OL
- * World 3.5 MHz CQ Magazine

Low Power, All Band

- * World CQ Magazine
- * USA Wayne Matlock, K7WM
- * N.A. Ron Hall, KP2N
- * S.A. Bob Wruble, W7GG
- * Oceania CQ Magazine
- * Africa Charles Anderson, KK5OQ
- * Europe Eddie Schneider, G0AZT
- * Asia CQ Magazine
- * Canada Victor Kindjerski, VE6PC

Multi-Single

- * World Hal Communications Corp.
- * USA RTTY by WF1B
- * N.A. CQ Magazine
- * Oceania Bob Wruble, W7GG
- * S.A. CQ Magazine
- * Europe Peter Schultz, TY1PS
- * Asia CQ Magazine
- * Canada Malcolm McLeod, VE6CKG

Multi-Two

- * World Amateur Radio Trader
- * USA CQ Magazine
- * N.A. John Lockhart, W0DC
- * Oceania CQ Magazine
- * S.A. Julien and Susan Baldwin, N7VGO/KC7AVS
- * Europe Maurizio Soci, I4MKN &
Giovanni Olivari, I4FTU – I4AYP Memorial
- * Asia Bob Wruble, W7GG

Multi-Multi

- * World Amateur Radio Trader
- * Europe Tony De Prato, WA4JQS

Special Award

- * Rookie of the Year Award CQ Magazine

XIII. Instructions for Preparation of Logs:

1. Logs must be postmarked no later than 30 days after the contest.

2. We want an electronic log in the Cabrillo format. We require an electronic log for any possible high score. All logs that contain more than 200 QSOs and that were generated using a computer program must be submitted via e-mail or on a 3.5-inch floppy disk. In the Subject: line of your e-mail message please include your callsign and the category you are entering—e.g., SOABL, M2, MS, etc. (If you submit a floppy disk, please be sure to use a proper disk mailer to protect your log.) If the Cabrillo format is unavailable then logs must be prepared in accordance with paragraph 4. below and submitted via e-mail or on a 3.5-inch floppy disk containing files in plain ASCII text. Submit and name your files as follows:

Summary Sheet: *yourcall.sum*
 Chronological log: *yourcall.log*
 Dupesheet: *yourcall.dup*
 Prefix list: *yourcall.wpx*

A Zip file containing the four files listed above is acceptable and must be named *yourcall.zip*.

3. Logs submitted via e-mail should be sent to <wpxrtty@kkn.net>. In the Subject: line of your e-mail message include your callsign and the category you are entering, e.g., SOABL, M2, MS, etc. Receipt of all e-mailed logs will be confirmed via return e-mail.

4. If paper logs are submitted, your log must contain the date, time in GMT, band, callsign of the station worked, sent and received exchanges, multiplier claimed, and points claimed for each contest QSO. Prefix multipliers should be logged only the FIRST TIME they are worked. All duplicate contacts must be shown and indicate zero points claimed.

(a) Single Operator entries must be submitted in chronological order and show clearly marked off-times in the log and on the Summary Sheet. Off-times must be at least one hour in length. Your off-time begins one minute of clock time after you log your last QSO and ends as soon as you log another QSO.

(b) Entries from Multi-Single and Multi-Two stations must be merged into a single, chronological log that clearly indicates which transmitter made each QSO. Multi-Multi logs must be submitted chronologically by band.

(c) An alphanumeric checklist of all callsigns worked (dupe sheet) and a list of claimed prefix multipliers must be submitted with your log.

(d) Each entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, entrant's e-mail address, and the entrant's name and mailing address in BLOCK LETTERS. Also submit a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

(e) If you do submit a paper log, please submit the originals. All logs go to: CQ WPX RTTY Contest, 25 Newbridge Road, Hicksville, NY 11801 USA.

Questions pertaining to the WPX RTTY Contest may be sent to the WPX RTTY Contest Director, Glenn Vinson, W6OTC, 488 Locust Street #401, San Francisco, CA 94118 USA; e-mail: <w6otc@garlic.com>.

5. Official log forms and summary sheets are available for an SASE with sufficient postage from: Wayne Matlock, K7WM, Rt. 2, Box 102, Cibola, AZ 85328 USA; e-mail: <k7wm@i10net.com>.

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

XV. Deadline: All entries must be postmarked NO LATER than **March 13, 2001**. E-mail logs are subject to the same deadline. Logs postmarked after the deadline may be listed in the results, but will be ineligible for any awards.



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This month we profile Marilyn Kay Yohe, N9QPQ, who holds USA-CA All Counties #1005.

"I was first licensed in Oklahoma in 1980 as a Novice with the call KA5HZS. I learned Morse code by listening to my husband, Frank, AA9JJ, practice. For many years I remained a Novice, but I did operate CW on HF.

"When my husband retired in 1991, we moved to southern Illinois. Frank wanted me to get my Tech license so that we could communicate on 2 meters when one of us was mobile. When I took the Technician written exam, two of the VEs—Mac, WK9W, and Jim, WT9K—talked me into taking the 13 wpm code test. I passed that, and then they convinced me that I should go ahead and get my General Class license. I studied for a couple of months and got my General license, but didn't do much with it for several years.

"My husband got interested in county hunting and eventually started putting out counties as a mobile. He asked me to log for him, which I was glad to do. At that time I had no interest in collecting counties myself.

"At the 1996 MARAC National Convention in Phoenix, Jan, NV6L, asked me if I would answer if she called me, and I said that I would. County hunters have been calling me ever since then.

"After participating as a logger and contact, I finally decided that I might as well get involved in county hunting myself. Now I am 'hooked.' Of course, a lot of the contacts that I made for other people came in real handy when I started collecting counties myself. I have many mobile county hunters and net control stations to thank for helping me to complete USA-CA.

"We have come to enjoy the conventions very much. It is nice to add a face to the names and calls that we have been talking to on the radio. We have found a group of very nice friends."

—Marilyn, N9QPQ

Possible New County

A brief posting on the K3IMC Internet Forum indicates that Governor Jesse Ventura has approved a referendum for Pine County, Minnesota to divide. The referendum will be on the November ballot. If and when this or any other

65 Glebe Road, Spofford, NH 03462-4411
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

James W. Bogue, KN6ZB
USA-CA All Counties #1007
August 27, 2000

Jerry F. Pierce, KI7SN
USA-CA All Counties #1008
September 23, 2000

Donald L. Kimble, AE3Z
USA-CA All Counties #1009
September 25, 2000

county split occurs, any application for the top level of the USA-CA Award will require the new entity.

Free Homepage On the Internet

Most Internet Service Providers (ISPs) will give customers a small amount of space and host their website. If your provider does not do this, or you want to mirror an existing site, or you want your site to be hosted by an amateur special interest web server, you need to go to <<http://www.qsl.net/>> for a great offer. There's no charge for the account, free e-mail address is provided, and the site has full FTP capabilities. You also will be in the company of literally hundreds of amateurs and clubs from all over the world.

Awards

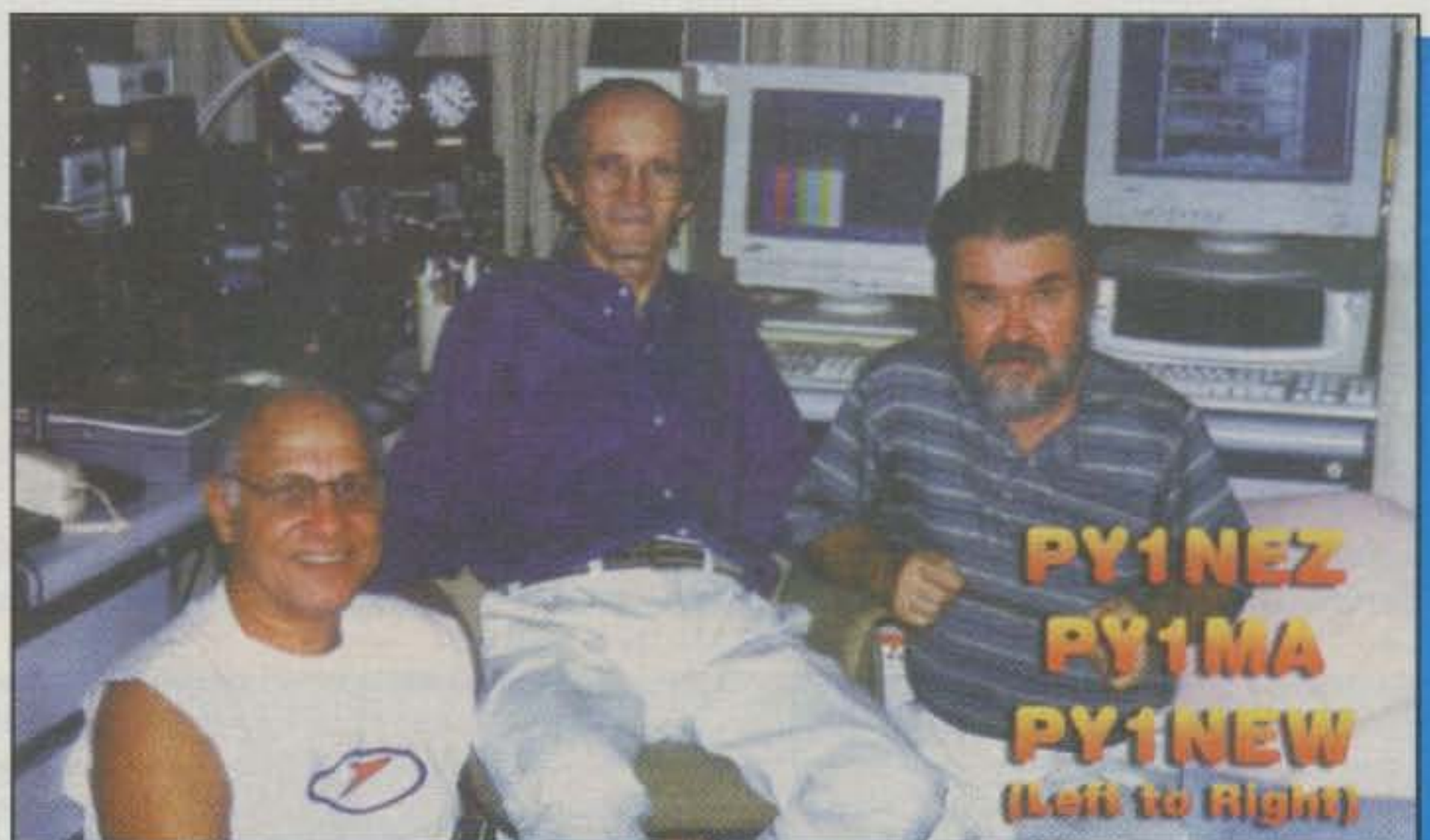
The Discovery of Brazil Award. During 2000 Brazil celebrates the 500th

USA-CA Honor Roll

500		2000	
G3UAS.....	3127	KI7SN.....	1196
OH6NIO.....	3128	AE3Z.....	1197
AE3Z.....	3129		
1000		2500	
G3UAS.....	1556	OK2JS.....	1120
OH6NIO.....	1557	KI7SN.....	1121
AE3Z.....	1558	AE3Z.....	1122
1500		3000	
G3UAS.....	1296	KI7SN.....	1027
AE3Z.....	1297	AE3Z.....	1028

The total number of counties for credit for the United States of America Counties Award is 3076. 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.

anniversary of its discovery by Portuguese navigators. Look through your logs for Brazilian calls with 500 in the call area. Three of them are shown in the accompanying photograph: Doc, PY1MA (ZV500A); Pete, PY1NEW (PR500W); and Lima, PY1NEZ (PT500Z) have been active this year. Here are the details of the special award for contacting Brazilians during their 500th anniversary year.



The Discovery of Brazil Award celebrates the 500th anniversary of the discovery of Brazil by Portuguese navigators.



The Shire of Laidley Award is issued for contacting specific Australian hams.



The Regional Nature Park Awards are sponsored by the Club Amateur Radio Blancois, France.



Sponsored by the Kuzbass DX Group, the W-18-Z Award is issued for making contacts with different Russian stations in CQ zone 18.



The Crimea Award is issued by the Crimean Branch of the Ukrainian Amateur Radio League.

The award is available for contacts made from January 1 to December 31, 2000. Brazilian amateurs need 200 QSOs made with Brazilian stations plus 10 with continental Portuguese stations (CT). Asia and Oceania amateurs need

20 QSOs with Brazilians plus 10 CT contacts. All others need 50 QSOs with Brazilians plus 10 CT QSOs.

The same station may be contacted one additional time but on a different band, with a minimum of 24 hours between the QSOs.

For DX (not Brazilian) stations, a certified log entry will be accepted instead of cards. Send the list of stations contacted with a signed certification by an official of your radio club or two other licensed stations that the QSOs are registered in your logs. You must also sign the following declaration: "I declare, for my honor, that the contacts for obtaining the Discovery of Brazil Award, with the related stations in GCR log, were indeed accomplished." (date, signature, callsign)

Fees: Brazilians R\$5.00; all others \$US5.00. Apply to the custodian: Ronaldo Bastos Reis, PS7AB, P.O. Box 2021, 59094-970 Natal, RN, Brazil (e-mail: <ps7ab@qsl.net>).

Australia's Shire of Laidley Award. This is a full-color award, starting at the top as a rich "sunset orange" and gradually changing to pale yellow, encompasses all the colors of a typical Laidley sunset. Work any three amateur operators who are residents of Laidley Shire, or any one member of the Lockyer Valley Radio and Electronics Club, or any one of the instant qualifier stations, VK4CEJ and VK4DZ. Send GCR list and fee of \$US5 (VK's fee \$AUS5.00) to: Solar Award, P.O. Box 80, Laidley, Qld 4341, Australia.

Regional Nature Park Awards from France. These awards are sponsored by Club Amateur Radio Blancois, B.P. 54, F-36300 Le Blanc, France. Portable stations count if their precise location is shown on the QSL card. No use of relays/repeaters. SWL okay.

Brenne Regional Nature Park Award. Present QSL cards, or photocopies, of three stations operating within the Brenne Regional Nature Park. The following stations are located within the limits of the park: F5KED, F5SSN, F5NDA, F6ALV, F5AOV, F1SSO, FA1BGX, and F-13106. Fee is 60FF, \$US10, 12 IRCs, or 10Euros.

The French Regional Nature Parks Award is available in three levels:

Bronze Award—contact 10 Regional Nature Parks.

Silver Award—contact 20 Regional Nature Parks.

Gold Award—contact all 38 Regional Nature Parks.

Fee for the award is 80FF, \$US12, 15 IRCs, or 12 Euros.

Russia's W-18-Z Award. Sponsored

by the Kuzbass DX Group, this award is for making contacts with different Russian stations from CQ zone 18. The following prefix guide may be used for determining stations within zone 18: UA9H; UA9O, P; UA9U, V; UA9Y; UA9Z; UA0A; UA0B; UA0H; UA0O; UA0S, T; UA0U; UA0W; UA8T; UA8V.

SWL okay. SWL cards from zone 18 are equally valid. No time, band, or mode limitations. The award is available in three classes:

1. 18 QSOs, stations in all 14 oblasts are needed.

2. 18 QSOs, stations in 7 oblasts are needed.

3. 10 QSOs with any stations in zone 18.

Send GCR list and fee of \$US5 or 10 IRCs to: Oleg Maljavskij, Box 1, Topki, Kemerovskaja obl., 652320 Russia.

The Crimea Award. This award was established by the Crimean Branch of the Ukrainian Amateur Radio League. A beautiful photograph of the "Swallows Nest Castle," a well-known symbol of the Crimea, is the central theme of the certificate. Contacts must be on or after 1 January 1994. All bands and modes are okay.

Europeans need 20 QSOs with different stations from the Crimean Republic. All others need 10.

Valid prefixes for the award include: UU, UT#J, EM#J, EN#J, EO#J. Cards from Crimean SWLs are equally valid. The award manager is UU2JQ. He requests that applications be verified by two other amateurs and sent to: Dainius Savicius, LY1DS, P.O. Box 1274, Vilnius-56, Lithuania.

URL of the Month

Dom Domina, K4DOM, has established a Quick Start Page for New County Hunters. The page offers one location for all of the questions frequently asked by both county hunters and mobile stations who are interested in joining in the fun of putting out counties. It provides links for getting lists of all the counties, suggested software, the award rules, how to act as a net control or assistant net control, and how to join MARAC, the county hunters' very active organization. The URL is: <<http://marac.org/marac/new/>>.

Wanted: Samples of award certificates and rules for applying are requested. Please send them to me at the address at the beginning of this column. We'll help you get the word out to hams all over the world!

73, Ted, K1BV

News Of Communication Around The World

How and Where To Find the DX

Fall conditions are finally making for some good DXing, although we continue to have sunspot disruptions from time to time. It makes DXing rather like Christmas packages: You never know what you are going to get in the package, and you never know what is going to be workable on any given day. That makes it more interesting, though, whether you are getting your information by computer-internet, or the old-fashioned way—by listening.

Speaking of listening, a few months ago I commented on a book by Bob Locher, W9KNI, called *The Complete DX'er*. I got a number of requests for information on where the book could be purchased. One of the main points in the book is "listen, listen, listen." Anyway, I spent a good bit of time trying to locate copies of this book and discovered that it is now out of print. The good news is that I found a number of copies still available and was able to help put the book in the hands of the interested parties. As it has turned out, I still have two copies here if anyone else might like to have one. Contact me for details.

The fact that there were some DXers interested in this book was encouraging. One said he had not been on CW for several years. He said he really wanted to get back into CW DXing, but felt he was so "rusty" he needed a little coaching and thought this book might help. There are a number of tips in the book for CW DXing that are certainly applicable even in this day of so many electronic gadgets. Gadgets can only do so much, and it still takes the human touch—thinking process—to get the job done and put those contacts in your log.

You still must listen and determine where that elusive DX station is listening, and that takes the human touch. Over the years I have seen CW copying devices, but they are only so good. There is *no* substitute for the human ear when it comes to copying CW. Contesting with computers for logging and computing scores and all is great, but the human touch is necessary here, too. You must hear the signal, copy those dits and dahs, convert it into information that can be entered on the keyboard,

P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

Where To Find DX Info

QRZ.com	< http://www.QRZ.com >
QSL.net	< http://www.QSL.net >
DX Notebook	< http://www.dxer.org >
Daily DX	< http://www.dailydx.com >
425 DX Report	< http://www.425dxn.org >
ARRL	< http://www.ARRL.org >
North Jersey DX Association	< http://www.njdx.org >
Propagation Info	< http://www.wm7d.net/hamradio/solar >
QRZ DX / The DX Magazine	< http://www.dxpub.com >
DX Summit (on line cluster)	< http://oh2aq.kolumbus.com >

Weekly DX Bulletins:

59(9) DX Report, P.O. Box 73 Dept. W, Spring Brook, NY 14140 USA
e-mail: <the599rpt@aol.com>

QRZ DX, P.O. Box DX, Leicester, NC 28748-0249 USA
e-mail: <qrzdx@dxpub.com>

List courtesy Paul Blumhardt, K5RT.

etc., etc. You all know the process. My point is, you must have the human thought process at work.

I find a large number of DXers out there are "one mode" operators. Personally, I prefer CW, but even I work SSB from time to time. There have been a number of DXpeditions that, for whatever reason, work only one mode, whether it is CW or SSB or RTTY. These DXpeditioners are the ones footing the bill, taking the risks to go to these countries/islands. If they choose to operate only one or two modes, well, it is *their* ball game. However, it would be nice if they would consider the thousands of DXers around the world who are working for awards recognizing *mode*. Not everyone is adept at RTTY or SSTV, and that is understandable. The "normal" modes (CW and SSB) should not be that difficult for anyone, and I encourage DXpeditions to consider their audience and at least try to provide some activity on these "normal" modes when they are on the air. It will be greatly appreciated by a lot of your fellow DXers.

I am pleased to bring you the following from Paul Blumhardt, K5RT, to assist new DXers in their quest for the DX we all seek.

Communication is defined as the successful transmission of information among multiple parties. In the case of the DXer, this may be the successful copy of call signs and signal reports. For a contester, it is accurately copying an entire exchange, as in the ARRL's November Sweepstakes.



Robin, DU9RG, visited Lenny, K5OVC, in Arkansas. Left to right: Dave, K5DV; Robin, DU9RG; Lenny, K5OVC; and Ollie, W5GO. (Photo courtesy K5OVC)

For our purposes here, though, let's discuss the communication of information relevant to DX chasing. To begin, to be an efficient DXer (read that as high confirmed countries totals), you need to be informed. Informed means being aware of upcoming DXpeditions, activity from rare countries, and how to get their QSLs. This topic may seem old hat, but trust me: It cannot be covered too many times.

Where can you find DX info? In lots of places! (Also see the accompanying box "Where to Find DX Info"—ed.)

In today's world, the internet is an ideal source of DX information. There are subscription (free or paid) services, such as The 59(9) Report, The Daily DX, the 425 DX News, the OPDX (Ohio-Penn) DX Bulletin, and QRZ DX "E."

The WPX Program

SSB

2764WA8BIJ 2768JR6QJR
 2765KE6FQC 2769JA6RZW
 2766WB2QKX 2770KU4UC
 2767IZ1ANU

Mixed

1862KA5AGM 1865N3RC
 1863WA8BIJ 1866VE1JS
 1864VE6ZT

CW

3045WA8BIJM 3046JA0ADY

CW: 350 WA8BIJ, JA0ADY, 400 WA8BIJ, 450 WA8BIJ, 650 K1NU, 700 K1NU, 750 K1NU, 900 K6UXO, 1100 F5YJ, 1150 F5YJ, 1450 VE6BF, 1500 VE6BF, 1550 VE6BF, 1800 K9UKN, 1850 K9UQN.

SSB: 350 IZ1ANU, 400 K6IRA, 450 K6IRA, 500 K6IRA, 700 K1NU, 750 K1NU, 800 K1NU, 850 K1NU, 900 K1NU, 950 K1NU, 1000 K1NU, 1150 AA1KS, 1200 AA1KS, 1250 AA1KS, 1300 AA1KS, 1350 AA1KS, 1400 AA1KS.

MIXED: 450 KA5AGM, WA8BIJ, N3RC, VE6ZT, VE1JS, IK2RPK, 500 KA5AGM, WA8BIJ, N3RC, VE6ZT, VE1JS, IK2RPK, 550 KA5AGM, WA8BIJ, VE6ZT, N3RC, VE1JS, IK2RPK, 600 WA8BIJ, VE6ZT, N3RC, VE1JS, IK2RPK, 650 WA8BIJ, VE6ZT, N3RC, VE1JS, 700 WA8BIJ, VE6ZT, N3RC, VE1JS, 750 WA8BIJ, VE6ZT, N3RC, VE1JS, 800 WA8BIJ, VE6ZT, N3RC, VE1JS, 850 WA8BIJ, VE6ZT, N3RC, VE1JS, 900 WA8BIJ, VE6ZT, N3RC, VE1JS, 950 K6UXO, N3RC, VE1JS, 1000 N3RC, VE1JS, 1050 N3RC, VE1JS, WA3FWA, 1100 N3RC, VE1JS, WA3FWA, 1150 N3RC, VE1JS, 1200 N3RC, VE1JS, N1NU, 1250 N3RC, VE1JS, N1NU, WM2V, 1300 VE1JS, N1NU, WM2V, 1400 OE1-P140, 1500 VE6BF, 1550 VE6BF, 160 VE6BF, 1650 VE6BF, 2150 K9UQN, WB3DNA, 2200 K9UQN, 2250 K9UQN, 4500 F2YT, 4550 F2YT.

10 meters: JQ1CJF, UA3AP

15 meters: UA3AP

20 meters: UA3AP

40 meters: UA3AP

80 meters: UA3AP, IK6JYY

160 meters: N3RC, UA3AP

Asia: K6UXO, JL6IPK, UA3AP, VE9FX

Africa: KX1A, UA3AP

N. America: VE9FX

S. America: DF7HX, UA3AP

Europe: UA3AP, VE9FX
 Oceania: DF7HX, UA3AP

Award of Excellence Holders: K6JG, N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, W4BQY, W4BQY, I0JX, WA1JMP, K0JN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SM0AJU, N5TV, W6OUL, WB8ZRL, WA8YM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DE0DXM, DK4SY, UR2QD, AB0P, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, H18LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KB0G, NB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1PO, K9LNJ, YB0TK, K9QFR, 9A2NA, W4UW, NX0I, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DE0DAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, I0RIZ, I2MQP, F6HMJ, HB9DDZ, W0ULU, K9XR, JA0SU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, KZ1R, CT4UW, K0IFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, I7PXX, S57J, EA8BM, DL1EY, K0DEQ, KU0A, DJ1YH, OE6CLD, VR2UW, 9A9R, UA0FZ, DJ3JSW, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RA0FU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE.

Award of Excellence with 160 meter Endorsement: K6JG, N4MM, W4CR2, N5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SM0DJZ, DK3AD, W3ARK, LA7JO, SM0AJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DE0DXM, UR1QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, H18LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N8JV, ONL-4003, W5AWT, KB0G, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YB0TK, K9QFR, W4UW, NX0I, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, WB0DD, I0RIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JA0SU, I5ZJK, I2EOW, KS4S, KA5CLV, K0IFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, K0DE1, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U, RA0FU, UA0FZ, CT4NH, W1CU, EA7TV, LY3BA, RW9SG, K1NU, W1TE.

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.

The WAZ Program

Single Band WAZ

10 Meter SSB

510HB9BGV

12 Meter SSB

22N4MM

15 Meter SSB

543JA9PQ

17 Meter SSB

21W4DR 22VE3XO

20 Meter SSB

1067W8AEF 1068JG1OWV

40 Meter SSB

95HB9BGV

10 Meter CW

157HB9BGV

12 Meter CW

22W4DR

30 Meter CW

38W4DR

20 Meter RTTY

47VK3EBP 48HK3WGO

160 Meters

147S59Z (40 zones)

All Band WAZ

All CW

200AC4IK 201WA2VQV

SSB

4590S57MVD 45944Z5GV
 4591SM7UZZ 4595G4URW
 4592W6NRQ 4596JR0PJR
 4593LU1YU 4597F5AMH

Mixed

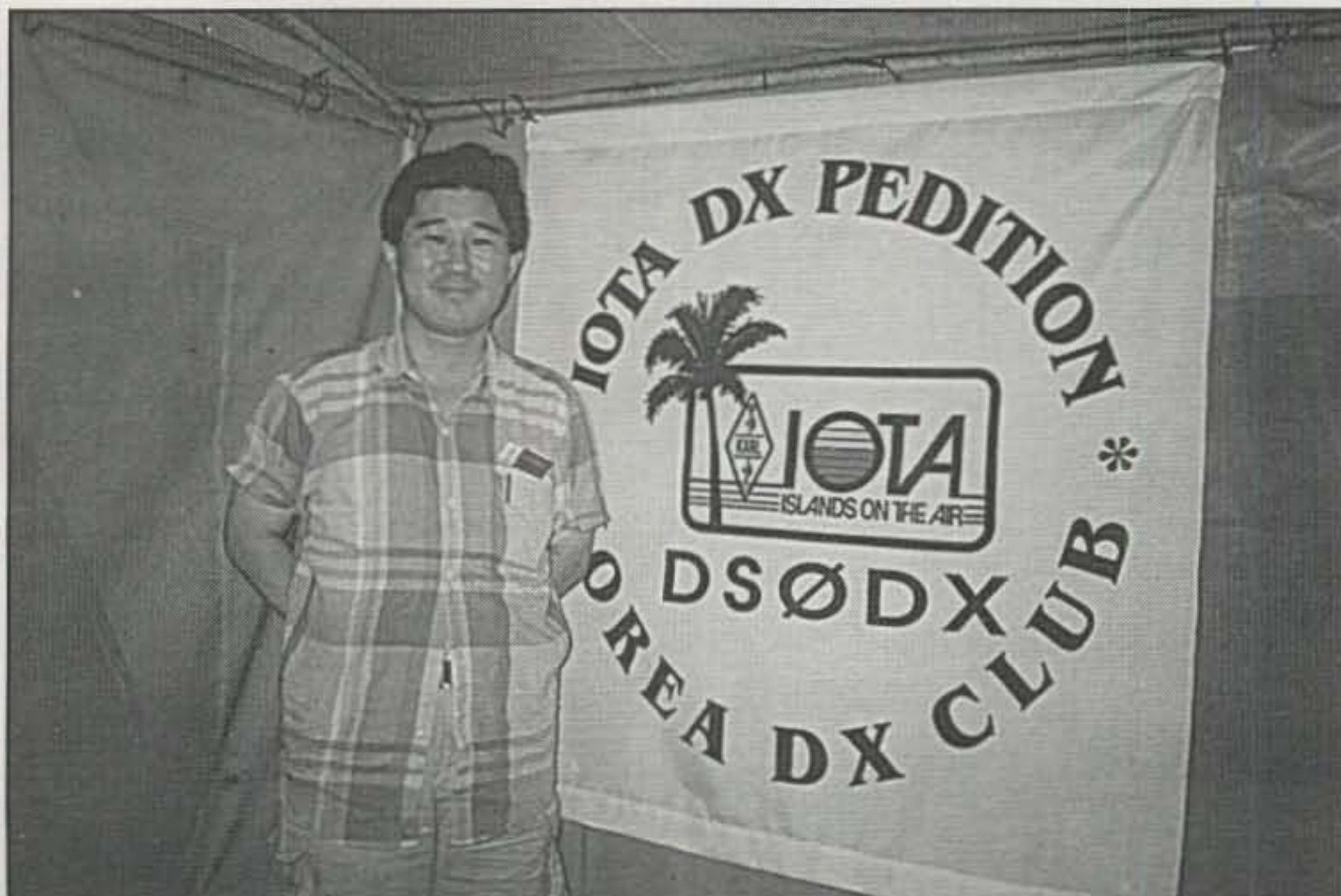
7978HL1LKF 79819A4SS
 7979W8OX 7982WA8BIJ
 7980W6NRQ

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>.

There are also several excellent DX-oriented internet web sites, such as "The DX Summit," "The DX Notebook," and web sites sponsored by many of the DX clubs around the world. There are several callsign database servers, such as <QRZ.com> and <QSL.net>. So get on the web and search out the information.

DX PacketClusters are also good places to gather DX knowledge. Not in an area where you can access a cluster via 2 meters or 440? Check out the OH2BUA web cluster. Some DX PacketCluster networks even allow access from the internet directly (connected like you are an on the air user).

One last web thought: Many of the major DXpeditions these days have on-line logs available. This makes it very easy to be sure that you are in the log, before you send your



Lee, DS2BGV, is one of the members of the Korea DX Club, which is very active in the IOTA program. His DXCC total stnads at 308 worked with 277 confirmed. He says he works all bands/modes but likes CW. (Photo courtesy KD0JL)

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.

4966.....9A2AA	3629.....VE3XN	3101...WA8YTM	2835.....W2WC	2381.....S58MU	2256.....KS4S	1852.....I2EAY	1396.....NH6T	1089...OK1DWC
4224.....W2FXA	3563.....N4MM	3043.....K9BG	2814.....JH8BOE	2367.....W9IL	2242.....YU7JDE	1706.....AA1KS	1389.....VE6BF	1020.....KU6J
3949.....F2YT	3472.....SM3EVR	3042.....YU7SF	2799.....I2EOW	2342.....K2XF	2171.....W4UW	1687.....KC6X	1380.....N1KC	1006.....VE9FX
3904.....K6JG	3448.....9A2NA	3033.....YU7BCD	2753.....HA0IT	2289.....9A4W	2104.....W7OM	1656.....I1-21171	1295.....W2EZ	1003...EA2BNU
3901.....EA2IA	3426.....I2PJA	2974.....I2MQP	2721.....IK2ILH	2280.....W6OUL	1946...PY2DBU	1618.....YU1ZD	1264.....VE6FR	995.....F5RRS
3884.....W1CU	3324.....YU1AB	2947...WB2YQH	2709.....K0DEQ	2272.....N6JM	1921.....DJ1YH	1611.....Z35M	1263...VE6BMX	870.....K6UXO
3772.....UA3FT	3333.....N5JR	2903.....KF2O	2636.....S53EO	2268...W8UMR	1919.....N3XX	1589.....W7CB	1251...KW5USA	601.....JH2IEE
3748.....N4NO	3269...IT9QDS	2894.....W9HA	2597.....HA5NK	2267...WA1JMP	1882...OZ1ACB	1441.....A16Z	1209.....W2CF	
3677.....N6JV	3101...PA0SNG	2852.....4N7ZZ	2477...YU7GMN	2259.....K5UR	1872.....JN3SAC	1430.....WT3W	1146...JR3TOE	

MIXED

4235.....I0ZV	2992...EA8AKN	2504.....4X6DK	2162.....K5RPC	1668.....KS4S	1549...K8MDU	1314.....KC6X	1015...DL8AAV	734.....VE6BMX
3831.....ZL3NS	2919.....N4NO	2492.....I8KCI	2056...IN3QCI	1651.....W9IL	1522...I3ZSX	1185...KI7AO	1001...EA6CD	719.....F5RRS
3642.....K6JG	2909...I4CSP	2473...UA3FT	2048...HA0IT	1651...LU5DV	1518...W2ME	1175...LU3HBO	982...EA3EQT	707.....KU6J
3513...F6DZU	2784.....N5JR	2440...KF2O	1969...W4UW	1634...HA5NK	1495...IK2AEQ	1156...IK0JMS	972...A16Z	683...OK1DWC
3416...I2PJA	2755...I2MQP	2422...WA8YTM	1923...K5UR	1628...W7OM	1479...SV3AQR	1155...K4CN	937...LU4DA	642...BD4DW
3149...CT4NH	2708...PA0SNG	2401...PY4OY	1813...N6FX	1609...W6OUL	1432...N3XX	1121...WT3W	896...JR3TOE	641...F5LIW
3124...N4MM	2696...9A2NA	2358...KF7RU	1774...K2XF	1606...DK5WQ	1419...DF7HX	1104...EA5DCL	892...AG4W	635...F5UTE
3027...OZ5EV	2600...I2EOW	2278...CX6BZ	1752...YU7SF	1599...K3IXD	1411...T30JH	1073...I2EAY	878...JN3SAC	608...KE4SCY
3019...F2VX	2579...CT1AHU	2230...EA1JG	1712...I8LEL	1592...IT9SVJ	1386...I3UBL	1066...NH6T	862...VE9FX	
3017...EA2IA	2515...LU8ESU	2183...YU7BCD	1704...EA7TV	1572...CT1BWW	1357...W2FKF	1046...N1KC	790...N3DRO	

SSB

3983...WA2HZR	2535.....W2ME	2243...JA9CWJ	1920...OZ5UR	1670.....N3XX	1549...W7OM	1265...EA2CIN	1058...9A3UF	799.....WT3W
3670.....N6JV	2527...LZ1XL	2173...HA0IT	1905...G4SSH	1668...9A2HF	1509...EA5YU	1245...I2MQP	995...YU1TR	736.....AI9L
3399...VE6CBE	2522...N4MM	2147...HA5NK	1853...I7PXV	1658...DJ1YH	1509...W9IL	1240...AC5K	994...K2LUQ	706...WA2VQV
3165...N4NO	2490...N5JR	2135...KA7T	1842...LU2YA	1639...KS4S	1487...9A3SM	1174...KC6X	967...EA2BNU	691...N1KC
3162...K6JG	2450...YU7BCD	2102...EA7AZA	1823...K2XF	1625...JN3SAC	1482...K5TSS	1161...I2EOW	965...NH6T	670...KU6J
3050...YU7LS	2445...G4UOL	2083...S58MU	1822...K5UR	1577...EA6BD	1467...EA6AA	1159...A16Z	930...PY4WS	623...KX1A
2998...K9QVB	2410...9A2NA	2057...KF2O	1782...IT9VDQ	1564...JA1GTF	1348...LU3DSI	1157...DF6SW	904...JK1AJX	614...F5RRS
2961...EA2IA	2399...WA8YTM	2026...G3VQO	1744...W6OUL	1558...I2EAY	1335...VE6BF	1155...LU7EAR	888...VE6BMX	610...EA5DCL
2593...VE7DP	2302...W2WC	1982...N6FX	1678...IK3GER	1553...EA7AAW	1270...4X6DK	1063...W4UW	850...K6UXO	

CW

QSL request. On-line logs are not limited to major DXpeditions. A great many stations have now put their logs on the web for easy viewing.

For those not "online," weekly bulletins such as "QRZ DX" (by our own N4AA) and the "59(9) DX Bulletin" are terrific sources, although both are now offered as Adobe

PDF files, in addition to their regular mail version. There are even DX bulletins transmitted by W1AW (SSB/CW/RTTY—see QST for schedules) and W6TI each Monday at 0200Z on 14002 kHz and 7016 kHz.

Propagation information is also readily available via the web (from the ARRL web site) or from W1AW bulletins. There are also

web sites that deal with propagation and sunspots.

Numerous DX reflectors, such as the one sponsored by the North Jersey DX Association are terrific sources of information, too.

Join a DX club in your area, or socialize with local amateurs of a DX mindset.

Finally, there is the old tried-and-true



Wis, YB0AZ, was licensed at age 14 in 1984. As he upgraded his license, he held the calls YD0FTD (Novice) and YC0FTD (General). In June 1998 he changed his suffix to "AZ" and became YC0AZ. After passing the Advanced Class exam in September 1998, his call was changed and he became YB0AZ on January 1, 1999. Wis is very active on 20 and 15 meters, mostly SSB. (Photo courtesy John, KD0JL)

CQ DX Awards Program

SSB

2316.....W4JFR

CW

1013.....K7ZYV

SSB Endorsements

320.....VE2WY/330 320.....ZL1BOQ/324
 320.....VE4ROY/328 275.....YV5NWG/287
 320.....WA4WTG/328 200.....CE3HA/203

CW Endorsements

320.....KA7T/327 310.....OZ5UR/315
 310.....K1FK/315

The basic award fee for subscribers to CQ is \$6. For non-subscribers, it is \$12. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00 each plus SASE. Updates not involving the issuance of a sticker are free. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 331 active countries. Please make all checks payable to the award manager.

5 Band WAZ

As of August 30, 2000, 536 stations have attained the 200 zone level and 1157 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:
W2UP NN4T

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)	N3UN, 199 (18)
W4LI, 199 (26)	K4IQJ, 199 (23)
K7UR, 199 (34)	K3NW, 199 (23)
W0PGL, 199 (26)	UA3AP, 199 (6)
W2YY, 199 (26)	OH2VZ, 199 (31)
VE7AHA, 199 (34)	K2UU, 199 (26)
IK8BQE, 199 (31)	W1FZ, 199 (26)
JA2IVK, 199 (34 on 40m)	K9GX, 199 (26)
AB0P, 199 (23)	NT5C, 199 (18)
KL7Y, 199 (34)	UT4UZ, 199 (6)
NN7X, 199 (34)	EA5BCX, 198 (27,39)
OE6MKG, 199 (31)	G3KDB, 198 (1,12)
IK1AOD, 199 (1)	KG9N, 198 (18,22)
DF3CB, 199 (1)	K0SR, 198 (22,23)
F6CPO, 199 (1)	UA4PO, 198 (1,2)
W3UR, 199 (23)	JA1DM, 198 (2,40)
KC7V, 199 (34)	9A5I, 198 (1,16)
GM3YOR, 199 (31)	K4ZW, 198 (18,23)
VO1FB, 199 (19)	LA7FD, 198 (3,4)
KZ4V, 199 (26)	K5PC, 198 (18,23)
W6DN, 199 (17)	VE3XO, 198 (23,23 on40)
W6SR, 199 (37)	K4CN, 198 (23,26)
W3NO, 199 (26)	KF2O, 198 (24,26)
K4UTE, 199 (18)	W6BCQ, 198 (37,34on40)
K4PI, 199 (23)	G3KMQ, 198 (1, 27)
HB9DDZ, 199 (31)	DL3JJ, 198 (19&31 on 10)
HB9BGV, 199 (31)	W5BOS, 198 (18,23)

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

RX9TX (189 zones) EW2AA (190 zones)

Endorsements:
HB9BGV (199 zones) W1WLW (191 zones)
WO2N (180 zones) RW9SG (194 zones)
UA4SKW (181 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 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 at e-mail: <k5rt@cq-amateur-radio.com>.

method of just plain listening on the bands. Cultivating on-the-air friendships with well-known DXers can also be another valuable source of information. Seek out these folks!

There is no excuse for being an uninformed DXer. You just need to communicate (via internet, packet, snail mail, or whatever means are at your disposal) and the information is there for the taking. As The Man once said, "Seek and ye shall find."

Summary

I hope I at least heard you, perhaps worked you, in one of the CQ WW DX Contests (SSB the end of October; CW the end of November). If not, hopefully we can work one another in one of the others contests yet to come this year or in the 2001 season. Enjoy the good propagation and the holidays!

73, Carl, N4AA

QSL Information

3B8ST to DL1BDF
3D2RK to W7TSQ
3D2SQ to W7TSQ
3DA0/ZS6 to WPX - ZS6KTT
3DA0WPX to ZS6WPX
3V8BC to F5LAJ
3W7CW to SP5AUC
3W7TK to OK1HWH
3Z60W to SP2BNJ
4B1AC to XE1BEF
4L26MAY to 4L1DA
4S7UB to KJ6UB
4S7YSG to JA2BDR
4W6SP to 9A2AA
5C8A to EA5XX
5R8DS to PA3BXC
5V7MD to K7PT
5V7MN to DF8AN
5X1Z to SM6CAS
6V6U to K3IPK
6W1QV to F6FNU
6Y5MM to W4YCZ
6Y8A to WA4WTG
7O1II to DJ3XD
7S2A to SM2LWU
7S2E to SM2DMU
8M2000 to JARL
8P9JL to OH6RX
8P9V to OH6RX
8Q7LA to OM3LA
8R1AK to 8R1AK
8S7A to W3HNK
8S7IPA to OZ5AAH
9E1C to IV3OWC
9G5MD to G3OCA
9G5ZW to OM3LZ
9J2FR to IK2RZQ
9K2SS to KB2MS
9M2TO to JA0DMV
9M2XA to JF4WPQ
9M6CT to G4JMB
9N1VJ to JA9VJ
9N7EK to JR8FEK
9N7IP to JG5CIP
9N7RN to IK4ZGY
9N7SZ to JA9LSZ
9N7VJ to JA9VJ
9N7VN to K3VN
9N7WU to JA8MWU

9N7YT to JJ2NYT
9V1XE to DL4DBR
A45ZN to G0DBX
A51GJ to W0GJ
A52A to W0GJ
A52JS to VK9NS
AH6PW/KH0 to N1HOW
AJ2U/VP9 to KQ3F
AN6IB to EA6IB
AP2MY to OM2SA
AP2WAP to IK4ZGY
AY0N/X to LU2NI
BI4L to BY4RSA
BT0QGL to KQ6PS
BV9G to BV8BC
3F1BYS to Elbio Salinas, Box 10745, Panama 4, Panama
3F3A to Louis N. Anciaux, PSC 2 Box R3197, FPO AA 34002 USA
3F3XUG to Louis N. Anciaux, PSC 2 Box R3197, FPO AA 34002 USA
4S7WN to Dr. Nihal G. Wijesooriya, 44-1/1 Ward Place, Columbo 7, Sri Lanka (Use over-size return envelope, big card)
4W6MM to Thorvaldur Stefansson, POB 3699, Darwin, NT 0801, Australia
5B4AGX to Mike Potter, Box 60195, CY-8128 Paphos, Cyprus
5N0WUFU to Box 1509, Wiesbaden, Germany
6K5SSR to Lee Jong-Min, Box 65, Taegu Susung 706-600, South Korea
7O1YGF SSB and RTTY to Hans Hannappel, Eschenbruchstr. 1, D-51069 Koeln, Germany
7P8/ZS5CDF to P.O. Box 401219, Redhill 4071, South Africa
7P8/ZS5LF to P.O. Box 401219, Redhill 4071, South Africa
8J1RL Feb. 2000 to JG3PLH, Takumi Kondoh, 1-23 Shinkecho, Sakai City, Osaka 599-8232, Japan
8P6GH to Kelvin Went, Box

150E, St. Michael, Barbados
9M6XXT N-A only to K4ST, Kiyoshi Endo, 8 Amlajack Blvd Suite 362, Newnan, GA 30265 USA
9N1AA JA's to JM1HBO; all others via N4AA
A41LK to Fahad, P.O. Box 509, Sohar 311, Oman
A41MD to Jeifar Abdullah al-Habsy, Box 1823, Seeb 111, Oman
A43IB to The Royal Omani Amateur Radio Society, Box 981, Muscat 113, Oman
A51TY to T. Yonten, Headquarters Royal Bhutan Wireless, Post Office, Thimphu, Bhutan
AP2ARS to Pakistan AR Society, POB 1450, Islamabad 44000, Pakistan
AP2ARS May 13-14, 2000 to ON5NT, Ghislain Penny, Lindestraat 46, B-9880 Aalter, OV, Belgium
AP2N to KU9C, Steve Wheatley, POB 5953, Parsippany, NJ 07054 USA
BD4AGN to Room 403, No. 35, Village 14 of Tianlin, Xuhui, Shanghai 200233, China
BD6QH to Ruan, Box 60003, Wuhan 430060, China
BD7KU to Yi Quan, 131 Xian Lie Dong Road, Guangzhou 510500, China
BD7YC to Dick Hisan, Box 59, 16 Datung Avenue, 570102 Haukou, Hainan, China
(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>.)

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FLORIDA STATE CONVENTION



The Art and Sport of Running

December's Contest Tip of the Month

Having lots of antennas on every band is just for the big stations, right? The answer is a definite NO! While you may not be able to put up stacked Yagis on all bands sprinkled every 20 degrees around the globe, erecting a small beam to the south or a second dipole that is broadside to your main 80 meter antenna is a sure-fire way to make your score increase. The keys are to think of ways to improve your signal in directions that are currently not performing effectively. Also, any time you can eliminate the use of that darn rotator is a good day in contesting. Don't settle for mediocrity in the scope of antennas for your station. You'll be surprised at how much a small bit of creativity can impact on your future contest results in this department!

Don't despair. You haven't picked up the wrong magazine this month. Ironically, though, running in the athletic sense has many similarities to running in contest operating. Let's take a detailed look at this aspect of contest operating.

So What is Running, Anyway?

At the risk of being overly presumptuous for some of you, the concept of running is a tactic in contest operating where one focuses on "calling CQ" and working one station after another by having the stations call you for a QSO. It is an operating method that is in sharp contrast to the alternate approach, which is called "search and pounce," where you tune the bands looking for new QSOs and multipliers.

More About Running

The act of running in contests, while seemingly simple on the surface, is actually quite a skill in and of itself. In fact, it's much more than simply calling CQ and answering the stations that call, although that is the ultimate end game of the strategy. Running stations in contests requires you to consider several factors, including:

- Understanding the strengths and limitations of the station you're using.

2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

Calendar of Events

Nov. 18-20	ARRL SSB Sweepstakes
Nov. 25-26	CQ WW CW Contest
Dec. 1-3	ARRL 160M Contest
Dec. 2-3	TARA RTTY Contest
Dec. 9-10	ARRL 10M Contest
Dec. 16	OK DX RTTY Contest
Dec. 16-17	Croatian CW Contest
Dec. 30-31	Stew Perry Topband Distance Challenge
Dec. 31	RAC Winter Contest
Jan. 1	ARRL Straight Key Night
Jan. 6	Kid's Day Operating Event
Jan. 6-7	ARRL RTTY Roundup
Jan. 6-7	North American CW QSO Party
Jan. 13-14	North American SSB QSO Party
Jan. 20	LZ Open Contest
Jan. 20-22	ARRL Jan. VHF Sweepstakes
Jan. 21	HA DX Contest
Jan. 26-28	CQ WW 160M CW Contest
Jan. 27-28	REF CW Contest
Jan. 27-28	UBA SSB Contest
Feb. 17-18	ARRL CW DX Contest
Feb. 24-25	CQ WW 160M SSB Contest
Mar. 3-4	ARRL SSB DX Contest

- Assessing whether or not the timing is right to run vs. search and pounce; knowing when to keep trying vs. doing something else.

- Evaluating the proper place in the band to initiate your run.

- Always being aware of how fast you are working stations and whether or not your actions are truly maximizing your score.

Before we delve into the considerations above, let's talk about contest running from a mechanical perspective. When operating in a normal, mid-week fashion, most operating styles tend to be casual and laid back. There's nothing like a good old-fashioned 30-second CQ to bring us back to our roots in ham radio operating. In the contest realm, however, everything changes. There's nothing casual about serious contest operating. Rather, it's a sport that demands operating efficiency. For that reason, you are tasked while running to say or send the least amount of information possible to secure a QSO. What that means in practical terms is the following:

- Call short, brief CQs.
- Use your callsign often; that's the information that someone tuning by simply doesn't know.

- There's no cookbook method to call CQ. Many operators rarely say the word "CQ" and tend to simply send their call-sign over and over with an occasional CQ thrown in to indicate their operating intention.

- Be aware of the potential QRM around you. It's perfectly acceptable to move your VFO around a "run frequency" with the idea of maintaining a clear frequency to either hear better on your end or to be heard on the other. Remember, crystal-based frequency control left us decades ago.

- Running requires an extended level of aggressiveness in operating style. This means that you have to be very focused on holding on to a frequency that you've staked out. Most people who are told a frequency is in use will move if told within the first few seconds of an encounter. This is key to maintaining a quality run.

What's Next?

There are several factors to consider before deciding to throw your hat into the running operator ring. I've outlined them above. Having defined them, let's get into a little more detail with each:

Strengths and weaknesses of your station. The fact is not all stations are capable of supporting the running of stations, no matter how good band conditions are. In contrast, no station, no matter how big, can support the ability to run stations at *all* times. What this means is that you need to know where and when your station plays to assess when the best times to run may be. For example, if you have a tribander at 45 feet, you're probably not going to open 20 meters as one of the first stations to run guys. However, a tribander can certainly support the running of stations when the band opens up and the angle of DX you're trying to work elevates through the opening. In any event, always be aware of how fast you are working stations when you try to run, and evaluate how well you could be doing if you simply were running around the bands calling guys instead. Remember that searching and pouncing is not a statement about our manhood; it is simply a very effective operating tactic.

Is it time to run now? Ah, one of the biggest debates in operating strategy:

When to run? Well, as you might expect, there's no set answer. The key is flexibility. For example, I've had runs that only lasted 5 minutes. There have been other times where I've spent 5 minutes calling CQ, barely working anyone, to have the frequency magically open up and have a run begin in earnest. What plays here more than anything are experience, gut feel, and some common sense. If you have 100 watts and a dipole, you probably won't run many DX stations on the low bands. However, if you look at the low-power scores in most contests, the results can be impressive, so clearly running is part of the game for all stations, big and small. The most important consideration is to be practical in your operating approach and never be afraid to be aggressive. If you don't try to run stations, it's certain that you won't, right?

Am I in the right part of the band? Well, just listen to those big stations running guys like mad on the low end of 15 meters. I guess that's the only place someone can do that, right? Wrong! Most of the major contests have such impressive activity that the key is to find a clear frequency, not necessarily one in any particular part of the band. A good rule of thumb may be that the more modest your station is, the higher in the band you should consider operating. Sure, operating on a band edge is a desirable spot to use, but it's not the "keys to the kingdom" when it comes to being able to run stations effectively.

Am I maximizing my scores? This question is ultimately the gate for deciding whether you should be running or not in any contest. Most popular logging programs will let you know about QSO rates (i.e., the number contacts you are averaging per hour) or even how much a QSO is worth in contrast to working a multiplier. Put another way, while you don't need a math degree to operate contests, it's always a good idea to know whether or not your operating approach is, in fact, maximizing the opportunity in front of you. Remember, too, that just because you've possibly decided to search and pounce doesn't mean that you've exclusively relegated your operating to looking for multipliers. You can have quite a fine QSO rate simply by calling stations one by one as you tune up the band.

What's a Good Rate?

What should you consider a good rate to be when running? The trite answer to this question is that a good rate is one which maximizes your station's capabilities. If

you look at leading contest scores, SSB rates from overseas can exceed 400 QSOs/hour; CW totals can approach 250-300! In the US, top QSO rates have been very high in recent years, especially compared to many DX entries. For example, here are my high rates over the past few CQ WW contests (including some multi-op efforts), presented only because the data is handy:

Year - CW	High QSO Rate
1999	192
1998	228*
1997	193
1996	205*
1995	198*

Year - SSB	High QSO Rate
1999	195
1998	177
1997	N/A
1996	N/A
1995	180

*Multi-operator effort

For your situation, 60 QSOs in one hour may be perfectly acceptable and something to be proud of when compared to others. You can see how you're doing by comparing your results to those of like stations and geographies. Tracking results from one year to the next is another way to check improvements in skill and experience.

Speaking of Skill...

This is always one of those difficult areas to cover. Is contest operating in general and running skill something that can be taught or is it an inherent talent? Well, opinions vary on this, but I think it's really both. Experience only improves contest scores and the ability to be more savvy in your operating decisions and style.

Having said that, some people are simply blessed with the ability to "process" more information than others. I'm sure you can relate to telephone experiences in this context. How many times have you placed a telephone order for a product and left the call saying, "That person would be a great contest operator!" Why is that? In part it's because they exhibit a natural ability to rapidly process information. For example, when they collect your telephone number, they don't read it back to you one group at a time as you say it. They just "copy the callsign" and move on. From my perspective, then, there's hope for anyone to improve. We have to be realistic too in that not everyone has the

innate ability to work guys at 450 QSOs/hour, even when operating from the best stations in the world.

Final Comments

Running QSOs in contests is one of the basics. It's like turkey at Thanksgiving or fire crackers on the 4th of July. If you want a sure-fire way to improve your scores, getting a handle on this basic operating skill is a great place to start without touching an antenna or buying a new piece of gear. Hopefully, you've picked up a nugget or two of useful information here to start you down that road.

Well, it's always hard to believe, but the holiday season is already upon us. My family (Barbara, Timothy, Katelyn, and Kendra) and I wish you a safe and joyous time with friends and family. And, of course, see you next year!

73 John, K1AR

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The Science Of Predicting Radio Conditions

2000 in Review; Sunspot Cycle 23 Peaks

While there is not yet full agreement among the world's experts, in all likelihood 2000 will go into the history books as the year in which sunspot Cycle 23 reached its peak intensity.

The National Geophysical Data Center (NGDC) in Boulder, Colorado predicts the peak to have occurred during the summer, most probably during June or July, with a smoothed sunspot count of approximately 119. This is based upon a statistical prediction method—developed in the mid-1950s by two American scientists, McNish and Lincoln—and utilizes monthly mean sunspot numbers observed through July 2000.

Dr. Pierre Cugnon of the Royal Observatory of Belgium believes that the peak occurred during June, but with a count on the order of 132. He bases his prediction on a long-time statistical method developed by the Swiss solar scientist Waldmeier.

A new method, developed by Dr. Cugnon and his associate Denkmayr, predicts the peak of Cycle 23 will occur as late as March or April 2001 with a smoothed sunspot count of approximately 130.

Since both the McNish-Lincoln and Waldmeier methods, which have withstood the test of time, agree very closely, it is likely that Cycle 23 peaked this past summer. Adding confidence to this is the prediction of an August peak of 183 in the 10.7 cm solar flux level by the Dominion Radio Astrophysical Observatory at Penticton, B.C.

Since the smoothed sunspot numbers lag the monthly mean numbers by six months, it will not be possible to confirm these predictions until early in the new year.

Sunspot Cycle 23 rose slowly during 2000. The year started with a smoothed sunspot count of 113, likely reached a peak count between approximately 119 and 132 in either June or July, and began to decline slowly to an approximate count of 115 by the year's end.

11307 Clara Street, Silver Spring, MD 20902
e-mail: <george@gjainc.com>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for December 2000

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 7, 12, 22, 26	A	A	B	C
High Normal: 6, 8, 13-14, 21, 23, 25	A	B	C	C-D
Low Normal: 1, 4-5, 9-11, 15-18, 27-28, 31	B	C-B	C-D	D-E
Below Normal: 2, 19, 24, 29	C	C-D	D-E	E
Disturbed: 3, 20, 30	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 fair-to-good (C-B) on Dec. 1st, fair-to-poor (C-D) on the 2nd, poor (D) on the 3rd, fair-to-good (C-B) on the 4th and 5th, good (B) on the 6th, etc.

The 10.7 cm solar flux level rose correspondingly from a smoothed value of 178 in January, peaking to an estimated 183 in August, and declining to approximately 182 by the end of the year.

The peak solar activity during 2000 resulted in a very noticeable improvement in HF propagation conditions. Six meter F2-layer DX again became possible; the 10 meter band was very much alive, and openings on all other bands lengthened and increased considerably.

With a predicted peak between 119 and 132, Cycle 23 will fall short of the peaks of Cycles 22 and 21. Cycle 22 peaked in July 1989 with a count of 159; Cycle 21 climbed to a peak of 165 in December 1979. While 2000 was a good year for HF propagation, the best year in nearly a decade, it did not match the great years of 1979 and 1989, nor the once-in-a-lifetime conditions of 1958,

CQ WW DX CW Contest Bulletin

This issue of CQ should reach most readers in time for the CW weekend of the CQ World-Wide DX Contest; November 25 and 26. Here is an updated day-to-day propagation forecast for the weekend made at press time.

The recurrence tendency for geomagnetic conditions continues to indicate the possibility of radio storminess during the CW weekend. Quiet to unsettled conditions are expected on November 25th, with generally Low Normal HF propagation to most areas of the world, with the possibility of High Normal periods to low and middle latitudes. Propagation is likely to drop to Below Normal for paths passing through the higher latitudes and the auroral zones. Storminess may increase on the 26th, with geomagnetic conditions varying between unsettled and moderately stormy. HF propagation is likely to be mostly Low to Below Normal for openings to middle latitudes; mainly Low Normal with periods of High Normal to low latitudes; with the possibility of Below Normal to Disturbed propagation for paths passing through the high latitudes and auroral zones. The near peak sunspot numbers expected during the CW contest weekend may soften the effects of the expected radio storminess.

Be sure to check this editor's website at <<http://www.gjainc.com>> for links to more than a dozen sources of up-to-date and often real-time solar, geomagnetic, and ionospheric data during the contest weekend.

when Cycle 19 peaked at a record-breaking count of 201.

The Royal Observatory of Belgium reports a mean sunspot number of 131 for August 2000, with daily values ranging from a high of 204 on the 14th and a low of 67 on both the 22nd and 23rd.

The mean level for August results in a 12-month smoothed sunspot number of 117 centered on February 2000. A smoothed sunspot number on the order of 115 is forecast for December 2000, as sunspot Cycle 23 is expected to begin its slow decline.

A corresponding 10.7 cm mean solar flux level of 167 was reported for August

Year	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1996	10	10	10	9	8*	9	8	8	8	9**	10	10
1997	11	11	14	17	18	20	23	25	29	32	35	39
1998	44	49	53	57	59	62	65	68	70	71	73	78
1999	83	85	84	86	91	93	94	98	102	108	111	111
2000	113	117	118	118	118	119	118	118	118	117	116	115
2001	115	115	115	114	114	113	112	111	110	109	108	107

Predicted values appear in italics.
 *May 1996 marks Cycle 23's mathematical beginning.
 **October 1996 marks the beginning of Cycle 23 according to a consensus of scientists, which NGDC is now using.

Table I—Smoothed sunspot numbers observed for Cycle 23 from its beginning through February 2000, plus predictions through 2001 made by the National Geophysical Data Center.

2000 by the Dominion Radio Astrophysical Observatory at Penticton, B.C. This results in a smoothed solar flux value of 177 centered on February 2000. A smoothed 10.7 cm flux level of approximately 182 is forecast for December 2000.

2001 and Sunspot Cycle 23 Another Good Year

Table I is a listing of smoothed sunspot numbers observed for Cycle 23 from its beginning through February 2000, as well as predictions made by National Geophysical Data Center, Boulder, Colorado through 2001.

A typical sunspot cycle declines much slower than it rises. Using a peak date of July 2000, Cycle 23 rose to its estimated peak in 3.75 years. It probably will take approximately seven years for it to decline.

The year 2001 is expected to begin with a smoothed sunspot number of approximately 115, declining to about the 107 level by the end of the year. This is a very high range of smoothed sunspot numbers, with an associated strong, intense ionosphere. Expect conditions on the HF bands to be about the same as they were during 2000. This means 2001 is expected to be another good year for HF propagation.

Propagation Article Review

Proving again that CQ is leader in bringing useful propagation information and knowledge to its readers, if you have not already done so, check out the October 2000 issue. While not advertised as a "Propagation Special," this issue contains four outstanding articles dealing with radio propagation, both HF and VHF, plus this monthly column.

"Measuring Geomagnetic Weather" by Ken Neubeck, WB2AMU, is an up-to-date guide on the meaning of the most common geomagnetic indices and their likely effects on HF and VHF propagation. A further discussion of the meaning of the government's geomagnetic indices and space weather tracking scales is contained in "NOAA's New Space Weather Scales," by Dr. Theodore J. Cohen, N4XX. Joe Lynch, N6CL, discusses the very rare concurrent occurrence in August of the peak of the *Perseids* meteor shower and a widespread aurora in "VHF Plus: The *Perseids* and Aurora—Together." In the "DX" column, Carl Smith, N4AA, explores an interesting relationship between DX contests and sunspots.

Be sure to also read the excellent, most informative two-part article "Uncle Sol's Wind and Earth's Magnificent Magnetosphere," by Karl T. Thurber, Jr, W6FX, which appeared in the August and September 2000 issues of CQ. In these articles Karl gives a very comprehensive and easy-to-understand explanation of the complex relationship among the sun, Earth, and ionosphere. It is a great primer on HF propagation.

December Band Openings

A high level of solar activity is expected to take place this month. This, coupled with seasonally peak levels of ionization in the northern hemisphere during the winter months, should result in generally excellent propagation conditions on all HF bands, and on the 6 meter VHF band as well, during December.

Excellent daytime DX openings to all areas of the world should be possible on the 10, 12, 15, 17, and 20 meter bands. Also expect exceptional condi-

tions on the 6 meter band, with peak conditions likely towards Europe, Africa, and in a generally easterly direction an hour or two before noon; towards Central and South America and the Caribbean area from an hour or two before to about an hour after noon; and towards the Pacific, Australasia, and the Far East during the late afternoon and into the sunset period. The best days to look for DX openings on 6 meters are those expected to be high or Above Normal.

From sundown to midnight look for DX openings towards the south and west on 15, 17, 20, and 30 meters, and to most other areas of the world on 40 and 80 meters. Fairly good DX openings on the 160 meter band should be possible from the eastern half of the country towards the north, east, and south.

From midnight to sunrise the best DX bands should be 30, 40, and 80 meters, with openings also possible to many areas of the world on 20 and 160 meters.

DX propagation conditions on the 160 meter band are usually at their seasonal peak during December. The band should open towards Europe and in an easterly direction beginning about 8 PM in all time zones and continuing until 3 AM in the EST zone; 1 AM in CST; midnight in MST; and 11 PM in PST. These openings favor locations in the eastern half of the USA. Openings towards the south, particularly to Central America, the Caribbean area, and the northern countries of South America, should be possible from about 10 PM to 3 AM in all time zones. Openings towards the Pacific, Australasia, and the Far East will favor states in the western half of the country, but it may be worth the time to check for these openings in other areas as well between 4 AM and local sunrise.

Caribbean, Central America & Northern Countries of South America	07-08 (1) 08-09 (3) 09-11 (4) 11-13 (3) 13-16 (4) 16-17 (3) 17-18 (2) 18-19 (1) 09-11 (1)**	06-07 (1) 07-08 (3) 08-11 (4) 11-13 (3) 13-18 (4) 18-19 (3) 19-21 (2) 21-22 (1) 22-01 (3)**	06-07 (3) 07-09 (4) 09-11 (3) 11-14 (2) 14-16 (3) 16-23 (4) 23-02 (3) 02-06 (2) 02-04 (1)*	17-18 (1) 18-19 (2) 19-21 (3) 21-04 (4) 04-05 (2) 05-07 (1) 19-20 (1)* 20-22 (2)* 22-01 (3)* 01-02 (2)* 02-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	06-07 (1) 07-08 (2) 08-10 (4) 10-13 (3) 11-13 (2) 13-14 (3) 14-17 (4) 17-18 (3) 18-19 (2) 19-20 (1) 09-11 (1)**	06-07 (1) 07-08 (3) 08-10 (4) 10-13 (3) 11-13 (2) 13-15 (3) 15-20 (4) 20-21 (3) 21-22 (2) 22-23 (1) 09-11 (1)**	02-06 (2) 06-07 (3) 07-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-00 (4) 00-02 (3) 04-06 (1) 08-09 (1) 23-05 (1)	19-21 (1) 21-04 (2) 04-06 (1) 21-05 (1)* 21-05 (1)* 18-00 (4) 00-02 (3) 04-06 (1) 06-08 (2) 08-09 (1) 23-00 (1)
McMurdo Sound, Antarctica	08-10 (1) 08-09 (2) 09-10 (1) 19-20 (1) 20-21 (2) 21-22 (1) 22-01 (2) 01-02 (2)	06-08 (1) 08-10 (2) 10-12 (1) 15-17 (1) 17-18 (2) 18-22 (3) 22-23 (2) 23-00 (1)	16-18 (1) 18-20 (2) 20-02 (3) 02-04 (2) 04-06 (1) 06-08 (2) 08-09 (1) 23-05 (1)	23-05 (1) 18-20 (1) 21-00 (2) 00-01 (1) 19-23 (1)* 12-14 (4) 14-15 (3) 15-17 (2) 17-19 (1) 22-01 (2)

**Time Zone: PST (24-Hour Time)
WESTERN USA TO:**

	10/6 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern	06-07 (1)	06-07 (1)	05-06 (1)	18-20 (1)
Europe & North	08-10 (3)	08-09 (3)	09-12 (3)	00-01 (1)
Africa	11-12 (1)	11-12 (2)	12-14 (4)	19-23 (1)*
		12-13 (1)	15-17 (2)	
			17-19 (1)	
			22-01 (2)	
Central & Northern	07-08 (1)	06-07 (1)	05-06 (1)	18-20 (1)
Europe & European CIS	08-10 (2)	07-08 (2)	06-07 (2)	20-23 (2)
	10-11 (1)	08-10 (3)	07-09 (3)	23-00 (1)
		10-11 (2)	09-11 (2)	19-22 (1)*
		11-12 (1)	11-14 (1)	
			14-16 (3)	
			16-18 (2)	
			18-21 (1)	
			21-00 (2)	
Eastern & Mediterranean & Middle East	07-08 (1)	06-07 (1)	06-07 (1)	07-09 (1)
	08-10 (2)	07-08 (2)	07-10 (2)	18-22 (1)
	10-11 (1)	08-10 (3)	10-14 (1)	
		10-11 (2)	14-16 (3)	
		11-12 (1)	16-17 (2)	
			17-20 (1)	
			20-23 (2)	
Western Africa	07-08 (1)	06-07 (1)	05-12 (1)	18-19 (1)
	08-09 (2)	07-08 (2)	12-14 (2)	18-21 (2)
	09-11 (3)	08-13 (3)	14-16 (3)	21-22 (1)
	11-13 (4)	13-16 (4)	16-19 (4)	19-21 (1)*
	13-15 (3)	16-17 (3)	19-22 (3)	
	15-16 (2)	17-18 (2)	22-00 (2)	
	16-17 (1)	18-19 (1)	00-02 (1)	
	09-11 (1)**			
Eastern & Central Africa	07-08 (1)	06-08 (1)	06-07 (1)	18-22 (1)
	08-10 (2)	08-12 (2)	07-09 (2)	07-09 (1)
	10-13 (3)	12-15 (3)	09-14 (1)	
	13-14 (2)	15-17 (2)	14-16 (2)	
	14-15 (1)	17-18 (1)	16-21 (3)	
	09-11 (1)**		21-23 (2)	
			23-00 (1)	
Southern Africa	07-08 (1)	07-09 (1)	06-07 (1)	18-19 (1)
	08-10 (3)	09-12 (2)	07-09 (2)	19-20 (2)
	10-12 (4)	12-13 (3)	09-12 (1)	20-21 (1)
	12-13 (3)	13-15 (4)	12-14 (2)	18-19 (1)*
	13-14 (2)	15-17 (2)	14-16 (3)	
	14-15 (1)	17-18 (1)	16-18 (4)	
	08-10 (1)**		18-20 (3)	
			20-00 (2)	
			00-02 (1)	
Central & South Asia	06-09 (1)	06-09 (1)	06-07 (1)	04-09 (1)
	17-18 (1)	15-17 (1)	07-09 (2)	17-19 (1)
	18-19 (3)	17-19 (3)	09-11 (1)	
	19-20 (1)	19-20 (2)	16-17 (1)	
		20-21 (1)	17-18 (2)	
			18-19 (3)	
			19-21 (2)	
			21-23 (1)	
Southeast Asia	08-09 (1)	07-08 (1)	06-07 (1)	02-04 (1)
	09-11 (2)	08-10 (3)	07-08 (2)	04-07 (2)

Far East	11-12 (1) 14-15 (1) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1) 15-17 (1)**	10-11 (2) 11-14 (1) 14-15 (2) 15-18 (3) 18-20 (2) 20-21 (3) 21-22 (1)	08-10 (3) 10-11 (2) 11-12 (1) 15-17 (1) 18-20 (1) 20-22 (2) 22-00 (1)	07-08 (1) 04-06 (1)*
South Pacific & Zealand	09-10 (1) 10-11 (2) 11-13 (4) 13-16 (3) 16-19 (4) 19-20 (2) 20-21 (1) 15-18 (1)**	07-08 (1) 08-09 (2) 09-11 (4) 11-15 (2) 15-17 (3) 17-22 (4) 22-23 (3) 23-00 (2) 00-01 (1)	04-07 (1) 07-09 (4) 09-10 (3) 10-11 (2) 11-18 (1) 18-19 (2) 19-20 (3) 20-00 (4) 00-02 (3) 02-04 (2)	21-22 (1) 22-00 (2) 00-07 (3) 07-08 (2) 08-09 (1) 22-00 (1)* 00-06 (2)* 06-07 (1)*
Australasia	10-13 (1) 13-15 (2) 15-16 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1) 17-19 (1)**	08-09 (1) 09-11 (3) 11-12 (2) 12-14 (3) 14-15 (2) 15-17 (1) 17-19 (2) 19-21 (4) 21-22 (2) 22-23 (1)	06-07 (3) 07-09 (4) 09-10 (3) 10-12 (2) 12-14 (1) 18-20 (1) 20-21 (2) 21-23 (3) 23-01 (4) 01-03 (3) 03-04 (2) 04-06 (1)	01-03 (1) 03-04 (2) 04-07 (3) 07-08 (1) 03-04 (1)* 04-06 (2)* 06-07 (1)*
Caribbean, Central	07-08 (1) 08-09 (3) 09-10 (4)	06-07 (1) 07-08 (3) 08-10 (4)	06-08 (4) 08-10 (3) 10-13 (2)	17-18 (1) 18-19 (2) 19-20 (3)

America & Northern Countries of South America	10-12 (3) 12-15 (4) 15-16 (3) 16-17 (2) 17-08 (1) 08-10 (1)**	10-13 (3) 13-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	13-15 (3) 15-22 (4) 22-00 (3) 00-06 (2) 16-18 (3) 15-19 (4) 19-20 (3) 20-21 (2) 21-22 (1) 08-11 (1)**	20-04 (4) 04-05 (2) 05-06 (1) 19-20 (1)* 20-22 (2)* 22-00 (3)* 00-03 (2)* 03-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	06-07 (1) 07-08 (2) 08-09 (4) 09-10 (3) 10-12 (2) 12-13 (3) 13-16 (4) 16-17 (3) 17-18 (2) 18-19 (1) 08-11 (1)**	06-07 (1) 07-08 (3) 08-09 (4) 09-11 (3) 11-13 (2) 13-15 (3) 15-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	05-06 (2) 06-07 (3) 07-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-00 (4) 00-01 (3) 01-03 (2) 03-05 (1)	19-20 (1) 20-22 (2) 22-00 (1) 00-04 (2) 04-05 (1) 20-03 (1)*
McMurdo Sound, Antarctica	07-08 (1) 08-09 (2) 09-10 (1) 19-20 (1) 20-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-20 (2) 20-22 (3) 22-01 (2) 01-02 (2)	16-18 (1) 18-20 (2) 20-03 (3) 03-04 (2) 04-05 (1) 06-07 (1) 07-08 (2) 08-10 (1)	00-05 (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.
 **Indicates best times to listen for F-2 layer openings on 6 meters.
 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.

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Remember the rule that applies to 160 meter DX openings, and to 40 and 80 meters as well: Optimum conditions occur about the time that the sun begins to rise at the easternmost terminal of the path.

For short-skip openings during December, try the 80 and 40 meter bands during the day for paths less than 250 miles, and 80 and 160 meters at night over these distances. For openings between 250 and 750 miles, 40 meters should be best during the day and both 80 and 160 meters at night. Between 750 and 1300 miles, try 20 and 30 during the day, 40 and 80 meters from sunset to midnight, and 80 meters later in the evening and until sunrise. Try 30 and 40 meters again for about an hour or so after sunrise. For openings between 1300 and 2300 miles, it should be a toss-up among 20, 17, and 15 meters during the day, with 10 and 12 meters running close behind. Try 20, 30, and 40 meters from sundown to midnight, then check 40 and 80 meters until sunrise. Try 40 meters again for an hour or so after sunrise.

This month's column contains DX Propagation Charts valid through mid-February. Short-Skip Propagation Charts for December appeared in last month's column.

Check the Last-Minute Forecast on the first page of this column for day-to-day conditions expected in December.

VHF Ionospheric Openings

6 meters. The best times to check for worldwide 6 meter openings on this band were given earlier in this column. They are also indicated by ** in the DX Propagation Charts. The combination of high solar activity and seasonally high ionization in the F2 layer may produce some good DX openings on 6 meters this month. A secondary seasonal peak in sporadic-E ionization should also result in some short-skip openings on this band between distances of approximately 800 and 1300 miles.

There is considerably less likelihood for 6 meter trans-equatorial (TE) openings during December, but some should be possible between the southern tier states and countries deep in South America. The best time to check for trans-equatorial openings is during the evening hours between 8 and 11 PM.


Meteors. Quite a bit of meteor shower activity is expected this month, and this should result in improved conditions for meteor-scatter-type openings on the VHF bands for distances up to approxi-

mately 1000 miles. The *Geminids*, a major meteor shower, should begin on December 4th and last for about two weeks. Maximum intensity is expected at about 04 UT on December 14th, with an estimated meteor rate of about two a minute. The *Ursids*, a considerably less intense shower, is expected to take place on December 21st and 22nd. It should peak at approximately 2 AM EST on December 22nd with a meteor rate of approximately 15 an hour.

Auroras. There is good possibility for some unusual short-skip openings on both 6 and 2 meters during periods of auroral activity, which are likely to occur during December when HF conditions are Disturbed or Below Normal. Check the Last-Minute Forecast at the beginning of this column for those days during December that are expected to be in these categories.

Holiday Greetings. Be it Christmas, Hanukkah, or Kwanzaa, I would like to take this opportunity to extend to everyone my warmest wishes for this holiday season and for a happy, healthy, rewarding, and peaceful 2001. May the new year continue to bring high sunspot counts and good propagation conditions for readers of this column!

73, George, W3ASK



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Our Readers Say

What is a "Country"?

Editor, CQ:

Please clarify something for me. In your August 2000 issue, in the column highlighting the amateur radio activities of Martti Laine, OH2BH, I wish to comment on the following sentence: "He has helped introduce amateur radio into previously closed countries such as Albania, Myanmar, and Palestine."

Palestine? With the exception of a UN-created entity which was called "Palestine" from 1917-1948, there is not now, nor has there ever been, any country called "Palestine" that Mr. Laine would have had anything to do with. The column states that he received his license in 1961 at the age of 15. In 1948, he would have been only three years old, hardly old enough to have "introduced amateur radio into... Palestine." Since Yasser Arafat has yet to make good on his "official" declaration of the State of Palestine, until he does, how can you state that Mr. Laine has operated there?

The "disputed" territories of the "West Bank" and Gaza are still part of the State of Israel, and should be referred to as such. Even though certain parts may be under the control of the "Palestinian Authority," with Yasser Arafat its "President," there is still no UN-recognized state or country of "Palestine."

Unless CQ magazine is making a political statement by referring to parts of Israel as "Palestine," I would like to see a correction of the above-mentioned portion of the article. Thank you.
Mark Lassman, KB6KGX
via e-mail

Mark: Neither CQ nor the ARRL, which runs the DXCC program, is in the business of international politics and the inclusion of "Palestine" on the ARRL's DXCC List is not a political statement. You are correct that Palestine is not a "country" by international standards, but then neither are Hawaii, Puerto Rico, or the US Naval Base at Guantanamo Bay, Cuba. Yet all qualify for DXCC "country credit."

The DXCC rules—in an effort to distance themselves from claims of playing politics—no longer refer to "countries," but "entities." One of the criteria for including a "political entity" on the DXCC list is as follows: "The entity has been assigned a callsign prefix bloc by

the ITU..." On February 1, 1999, the International Telecommunications Union (an arm of the United Nations) assigned the E4 callsign bloc to the Palestinian Authority, and the ARRL added it to the DXCC list as an accredited "entity." (It was the ITU that made the political decision, not the ARRL and not CQ). Most of us prefer to use regular English when discussing amateur radio, even if the terminology is not 100% accurate, so we tend to refer to DXCC "entities" as countries. I hope this clarifies the matter for you.

A Department of APRS?

Editor, CQ:

As an older citizen just getting into ham radio, I quickly spotted that APRS (Automatic Position Reporting System) is hot and is going to get hotter. My suggestion is to add a section (a.k.a. department) for APRS. Yes, it is digital; yes, it is VHF; yes, it is computers and internet; yes, it is "What's New"; yes, it is public service-related. It is all of these put together and more. Hopefully it could contain a primer and glossary as well as the latest APRS news and procedures.

Now you can finish that cup of coffee! Thank you for your time. I look forward to getting my copy of CQ each month. Keep up the good work.

Tommy Alewine, K5TMA
Brandon, Mississippi

Tommy: First of all, welcome to ham radio. I'm glad APRS has caught your interest. We'd love to be able to devote a department each month to every interest in ham radio, but (a) we don't have enough pages, and (b) people would spend their whole month reading and not operating! As you point out, APRS fits into several of the areas to which we already devote regular columns, and I'm sure that each of those columnists will cover the topic from time to time. An APRS primer as a feature article would be welcome. Any volunteers?

Reciprocal Licensing

Editor, CQ:

W5YI is not entirely correct in stating that one may operate in the U.S. if he or she holds an amateur radio license from another country which has a reciprocal operating agreement with the U.S.



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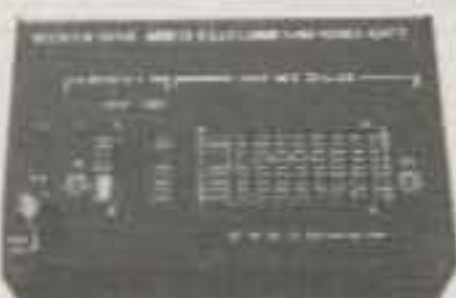
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("Washington Readout," October CQ). That is true only of non-U.S. citizens. A U.S. citizen who has a license from another country may *not* operate reciprocally in the U.S. A U.S. license must be obtained first.

Dale Holloway, K4EQ
Piney Flats, Tennessee

Dale: You are correct and that is an important distinction. Thank you for bringing it to our attention.

Unlocking the Secrets?

Editor, CQ:

Your editorial for October ("Zero Bias: Looking at 'Gain' Through Cesium Glasses") was very interesting and informative...worth the price of a year's subscription! As an engineer and a ham, I'm always eager to learn something new. I suspect that the three scientists referenced have discovered something of great significance...perhaps unlocking the secrets to interstellar travel.

Dick le Massena, W6KH
Los Gatos, California

Letters to Authors

The following letter was addressed to VHF Editor Joe Lynch, N6CL:

Hi, Joe!

Boy, what a surprise to find my name in CQ ("VHF Plus," August issue). I didn't realize you were going to print my article, which was very well received here in Toronto. I work at the largest radio store in Canada, and found this out from one of my customers... I can't thank you for all the years of reading your articles as well as those of Karl Thurber. Since I was a teenager and before, I've followed the issues of CQ. I'm sorry that I didn't get my license sooner. My e-mail address (below) is corrected from what was published. Keep up the excellent work.

73, Ken Pritchard, VE3OQC
<kenpritchard@sympatico.ca>

The following letters were sent to "Digital Wireless" Editor Steve Stroh, N8GNJ, after the appearance of his first column in the September issue of CQ:

Hello, Steve,

I live in the Salem Oregon area and my love has always been digital communications. Packet in the area used to be going strong, but ever since e mail came into existence, packet has been

getting a lot less use. I do use HF digital communications for sending and receiving e-mail while on the road and it works quite well.

I do hope you try and make your articles more toward the operating and procedures of digital communications. I have a heck of a time trying to find out information about digital communications; it took me over a month and many many e-mails to figure out how to make the Winlink 2000 system work for me and I am still having problems. What digital folks need is a place to find information when they have a problem with something. Even though I have operated packet in my area for almost 10 years, I still am confused about why something doesn't work the way I think it should.

I guess what I am trying to tell you, Steve, is please don't make your articles so technical that most of the hams won't understand them, but try and write your column more toward operations, hints, meetings to attend to get information, web sites for help, equipment available for digital communications, etc.

Gary Stark, KB7SCC
via e-mail

Dear Steve,

I carried a clipping from *Time* magazine around for a long time. Sure enough, when I wanted it I can't find it. It quoted a *Time* editor as saying that some article generated the largest "letters to the editor" flood that they had ever seen. It was some 60 letters. The article went on to say that the normal run would be about 10 or 20 for a big deal.

What I mean by all this is that if you get silence, don't think that no one is listening. I haven't anything productive to say (compared to your remarks), but I rate your field very high in my personal interest area.

I think that small spread-spectrum handhelds could be fantastic tools and I would love to try and build one. The idea of using software to "manipulate" the system is very appealing. Putting both together, driven by a Palm Pilot, is borderline exciting.

Thanks for writing "Digital Wireless."

Mike Houston, KE6ERD
via e-mail

N8GNJ responds:

Mike, thanks for your very, very kind note. It was very much on target. I've gotten a smattering of response, which by the standard you cite, means the column is a roaring success! Thanks!

The following letter was directed to author Bill Pasternak, WA6ITF:

Dear Bill,

Congratulations on your article on the digital future of ham radio in the October issue of CQ. You did a fine job of bringing a highly technical subject down to the layman's level. It will be interesting to see how true your predictions are in the years to come. My only concern is that it appears to me that the technical level of amateur radio is dropping. I wonder if future hams will have the technical competence and understanding to deal with it.

Dick Fenner, W5AVI
Houston, Texas

WA6ITF responds:

Dick,

Thank you very much for your note concerning the article. Being in the broadcast industry, I was aware of the "digital revolution" a bit earlier than most in ham radio, mainly because my employer decided to enter it five years ago when we built a new station facility

which is all digital and interfaces to the analog world (cameras, VCRs, monitors, audio amps, etc.) via A-to-D and D-to-A converters. With the advent of the Kachina and Ten-Tec "radio in a computer box" systems, the first rudimentary steps have been taken. These are software-controlled radios. The next step will be full SDR (software defined radios), and at that point terms such as "bands" and "modes" will begin to be redefined. The SDR version of a "Dick Tracy Wrist Radio" is not all that far away.—73

The following was addressed to Contributing Editor Dave Ingram, K4TWJ:

Dear Dave:

I am writing because I was so impressed by your "A Closer Look at AF and RF Amplifiers" article in the September issue of CQ. I passed all my amateur radio tests, but I never did develop a really good understanding of the various classifications of amplifiers. The explanations were never very clear. They all seemed to be written by engi-

neers. You may be an engineer, I don't know, but you do not write like one. You write like an excellent teacher. Your article was easy to follow and a joy to read.

I am interested in the technical aspects of our hobby, but unfortunately, very few people take the time to digress from the jargon and actually explain things. You took the time and succeeded. I was so impressed that I passed out a few copies (hope you don't mind) of the article at our last ham club meeting. If future CQs have similar articles by you, I will purchase the magazine just to read them.

I enjoy collecting and restoring old radios, broadcast and amateur. These are tube rigs. My greatest difficulty is learning how to repair them. There just are not many people to get help from. Courses are nonexistent. I am slowly learning. If you can ever weave any of the older technology into your articles, that would be great. In any event, I will be reading.

Ken Carr, KB1AWV
Coventry, Rhode Island

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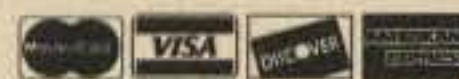
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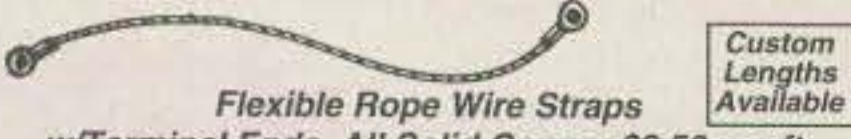
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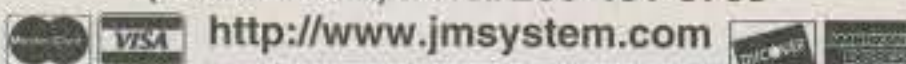
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Ham Radio News (from page 4)

Special Counsel Riley Hollingsworth, K4ZDH, says band plans exist "to enhance the required cooperation and sharing of frequencies in the Amateur Service" and to minimize the need for FCC involvement in amateur operations. "When such plans are not followed, and harmful interference results," Hollingsworth wrote, "we expect very substantial justification to be provided and we expect that justification to be consistent with Section 97.101 (of the FCC rules)."

FCC: Let's Make a Deal!

The FCC has worked out a settlement with Robert Meyers, N5WLY, of Houston, Texas, to significantly reduce his \$8000 fine for causing interference on local amateur repeaters. Meyers consistently denied the FCC charges against him and had argued that the fine would impose an overwhelming hardship on him. In a "consent decree" issued in October, Meyers did not admit wrongdoing, but did agree to make a \$1000 "voluntary contribution to the United States Treasury," to hand in his ham license for cancellation, and not to reapply for an amateur license for at least five years. The "voluntary contribution" was to be made payable to the FCC and sent to its Forfeiture Collection Section.

In a separate action, the FCC has agreed to let a California family of five hams keep 27 of the 36 club callsigns they received in November 1996, even though requests for specific information on the supposed clubs was never provided to the FCC's satisfaction. In a letter to the attorney for the Tucker family of La Mirada, California, FCC Special Counsel Riley Hollingsworth, K4ZDH, wrote that the Commission was imposing its original "consolidation" plan because of unclear or missing responses from various family members. Lesson: if it's *really* important to you to have a couple of dozen club callsigns be sure you can afford a high-powered Washington lawyer.

ARRL on Ultra Wideband: Don't Be Hasty

The ARRL has told the FCC that its proposal for blanket authorization of unlicensed "ultra wideband" devices is premature, and ought to be put on hold until more studies are done to determine its potential for interference to licensed services. According to the *ARRL Letter*, the League says it has no objections "as a general principle" to authorizing these devices, which would supposedly operate without causing interference on frequencies already used by other services. The League questioned the timing of the pro-

posed rulemaking, which was issued before interference tests were conducted and analyzed, and suggested that UWB had to potential to create wideband noise across several amateur bands simultaneously. It suggested going slowly until more is known about actual interference potential, not only to amateur stations but also to other services, such as the Global Positioning System.

VK Hams Lose 420-430 Permanently

Hams in Australia, who "temporarily" lost the use of 420-430 MHz to provide spectrum for media use during the Sydney Olympics, have been informed by the Australian Communications Authority that the reallocation is permanent. According to the ARRL, its counterpart "down under" was told that commercialization of this spectrum was going forward permanently. For a look at the implications of this move in other parts of the world, see this month's "Op-Ed," entitled "The Spectrum Grab Express" (p. 65).

PRB-1 Clone Vetoed in California

California Governor Gray Davis has vetoed a bill passed by that state's legislature to codify in state law the minimal protections offered by the FCC against onerous antenna regulations. According to "Newsline," the bill, which echoed the FCC's "PRB-1" decision, was vetoed by Davis for two reasons: (1) because its cost of implementation was not included in the state budget; and (2) because he felt it was a local rather than a state issue. This second point makes it unlikely that he would sign a future version, even if it was figured into the state budget.

FCC Issues RF Safety Book

The FCC has published a book for local government officials, homeowners' groups, etc., on the topic of RF safety. The objective, according to the Commission, is to help local government, businesses, homeowners' groups, and individual citizens better understand the origins and application of its safety rules. For more information on the book, entitled "A Local Government Official's Guide to RF Emission Antenna Safety," see the FCC's RF safety web page at <<http://www.fcc.gov/oet/rfsafety>>.

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.

160 Results (from page 17)

Number groups after calls denote score, total QSOs, W/VE multiplier, countries worked. Total multiplier is the addition of the W/VE and countries. Multi-op scores follow single-op listings. An asterisk (*) denotes low power. State, province, and country certificate winners are listed in bold.

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NORTH AMERICA
UNITED STATES

CONNECTICUT				
K1VW	310,576	929	54	40
N4XR	53,724	205	46	28
K11M	43,249	239	45	16
*N1RL	20,163	169	40	7
*W1TS	10,257	116	36	3
NT1M/QRP	4,400	76	25	0
NM1K/QRP	2,070	42	23	0
MASSACHUSETTS				
K5ZD	141,331	432	50	29
K5MA	79,310	409	47	23
*W01N	66,176	355	44	20
K2LP	18,172	138	30	14
*K1HT	12,210	95	26	11
*W1WFFH	9,982	149	31	0
*K1TS	5,512	100	26	0
*K1QM	4,389	94	21	0
K1AE	256	8	6	2
MAINE				
K1FK	123,224	451	45	28
N1CGP	24,200	184	41	9
*W1CEK	24	2	1	1
NEW HAMPSHIRE				
KR1G	253,890	768	53	40
*W1USA	208,636	804	56	30
W1ECT	144,378	612	49	29
RHODE ISLAND				
KS1J	70,395	333	43	22
*AB1BX	8,784	171	24	0
VERMONT				
K1IK	59,356	239	46	25
*AA1SU	20,672	220	34	4
*KK1L	9,065	95	28	7
NEW JERSEY				
N2ED	179,654	743	55	31
N2MM	90,072	430	51	21
*K1NK	68,672	519	49	9
N2WM	54,812	244	47	24
*W2LE	10,675	135	34	1
*W2CVW	9,657	126	34	3
W2JEK/QRP	2,176	58	17	0
NEW YORK				
N2BA	312,543	965	55	44
K8FC	174,300	671	51	33
N1EU	126,362	433	48	34
K2FU	108,604	529	50	26
K2AXX	106,096	438	50	26
WD5T	100,800	351	48	30
AA2FB	96,810	469	50	22
N2WK	93,586	442	47	26
W2XL	71,232	510	43	13
*N2CU	53,692	344	47	15
NA2M	47,926	253	43	19
*K2UG	35,040	231	45	15
*W2TZ	33,271	264	39	10
*W2KHQ	22,320	173	40	8
*W2NTX	19,950	211	39	3
K2ONP	16,808	122	34	10
*K2CS	13,224	155	37	1
*W2SEX	6,228	74	34	2
*W2KTF	5,928	106	25	1
KG2NO/QRP	3,912	71	24	0
*N2CK	1,826	40	22	0
DISTRICT OF COLUMBIA				
*W3DQ	14,720	166	40	0
DELAWARE				
AA1K	331,200	1024	56	44
*W3PP	94,010	533	50	20
*N8NA	25,897	237	41	6
*NY3C	8,320	124	32	0
MARYLAND				
N30C	111,528	609	49	23
WK3I/QRP	84,318	496	55	14
W3HVQ	75,024	365	47	25
W3GN	39,160	287	43	12
*W2GG	36,234	225	46	15
N3AM	35,298	266	42	11
*W3CP	25,056	221	41	7
*W3EKT	22,236	183	42	9
*N1WR	21,949	211	42	5
K3SI	12,474	119	38	4
*W3UL	7,228	132	28	0

*N3UN	7,168	106	32	0
W3AO	4,575	84	25	0
*W3FA	1,513	43	17	0
PENNSYLVANIA				
W3BGN	252,434	798	50	41
W3TS	204,102	807	56	31
W9XR	151,567	536	53	36
W3GH	151,284	673	57	27
W3TDF	103,850	579	48	19
K3NW	92,175	391	50	25
*WW3S	50,344	370	47	11
K3SV	40,140	220	41	19
*WF3M	38,305	363	41	6
K3PP	32,010	176	40	15
*NA3V	30,456	284	42	5
N3RJ	28,000	231	41	9
NN3Q	24,150	160	31	15
*K3SWZ	22,080	204	43	5
*W3UHP	19,200	221	39	1
N3FA	16,195	168	37	4
*AA3LX	14,079	167	39	0
W3BBO/QRP	10,836	140	36	0
KB3TS/QRP	8,340	130	30	0
*W3AG	7,656	104	33	0
*K3IPK	6,812	125	26	0
ALABAMA				
*K4IQJ	32,012	259	44	9
KS4YT	22,410	170	49	5
*K4WI	13,803	150	41	2
W4DEC/QRP	10,640	143	34	1
KC3QU	6,848	99	31	1
*K4HCH	2,958	48	29	0
FLORIDA				
N4PN	207,290	763	54	41
N4BP	83,436	411	45	23
W4FDA	50,330	199	43	27
W7QF	33,264	192	40	16
*W4ROM	22,412	204	46	6
*KN4Y	18,102	204	38	4
GEORGIA				
W4WA	135,622	469	49	34
*AA4Z	80,850	331	46	29
K4BAI	58,072	413	49	12
W4DMB	22,184	216	43	4
*K4OGG	7,770	102	33	2
KENTUCKY				
WB4ZDU	20,196	222	44	0
*N0MH	9,612	124	36	0
*KG4BIG	5,888	89	32	0
NORTH CAROLINA				
*WJ9B	67,048	522	51	7
*K4MA	43,064	323	43	13
W4TMR/QRP	30,200	297	46	4
*KS4S	20,710	256	37	1
N2NFG	14,835	152	41	2
SOUTH CAROLINA				
WY2000	145,875	798	54	21
*W8PC	45,080	353	45	11
WA9FWO/QRP	7,446	105	34	0
TENNESSEE				
K0EJ	127,604	716	56	17
*K4WX	112,770	823	54	9
K4LTA	100,368	662	56	12
K4LTA	70,943	513	49	12
*W04O	37,100	315	45	8
*N4POV	19,264	165	40	3
NN4T	19,140	207	40	4
W9WI	18,720	166	41	7
*K4BEV	13,806	168	0	39
*KE4OAR	10,108	123	37	1
*N4KN	9,999	147	33	0
K4AMC	7,040	104	32	0
*AC4ZD	6,112	91	0	32
W4TDB/QRP	4,004	70	28	0
VIRGINIA				
W4MYA	254,790	945	53	37
*K7SV	108,188	586	53	21
K40AQ	93,376	621	49	15
K4SO	83,090	407	50	20
N3JB	60,888	425	44	15
N4MM	56,700	243	47	23
*W4YE	45,201	283	45	12
K4VV	36,423	249	45	12
*AD4TJ	32,844	317	41	5
K4BAM	32,589	274	43	8
*W0YR/4	29,400	236	40	10
K4IX	27,352	240	46	6
N4ROA/QRP	24,180	296	39	0
ARKANSAS				
WD5R	96,287	569	56	17
KJ5WX	23,618	225	47	2
*N5SAN	8,968	112	38	0
LOUISIANA				
WA5JWU	22,785	212	44	5
*AA5AU	12,255	132	41	2

AC5E	11,466	141	39	0
MISSISSIPPI				
N7DF	75,020	493	53	9
N6ZZ	63,512	390	54	14
N5UL	61,880	411	52	13
K5AM	15,839	157	44	3
*W5JRP	10,920	129	39	1
OKLAHOMA				
*K5HP	30,702	277	50	1
TEXAS				
K5NA	237,408	921	56	40
K5RX	201,318	834	56	33
K5ZO	93,860	653	55	10
N1LN	63,700	431	53	12
W9YYG	53,448	287	50	18
K5XR	36,558	305	49	5
K5IUA	30,632	218	43	13
K5NZ	25,653	215	43	8
*W5FO	23,052	191	46	5
*W5CWQ	20,492	192	41	6
*KT5Q	11,924	127	42	2
*N5RA	9,360	108	37	3
K5KB	6,228	79	36	0
*K5SS	5,907	88	33	0
*KE5C	5,363	82	31	0
CALIFORNIA				
N6RO	157,360	642	52	18
K6DB	43,719	302	49	8
K6AM	40,480	305	47	8
N6HC	37,047	259	45	8
K6XT	32,136	243	43	9
*W6JTI	31,349	253	41	6
KH6DX/M6	29,469	179	42	15
W6RKC	26,300	201	43	7
K1GT	24,450	169	42	8
*N6NF	19,935	185	40	5
*K6MO	18,819	156	37	4
W6YRA	18,540	168	41	4
K6BIM	16,430	230	28	3
W7CB	13,984	122	41	5
K6NY	13,079	141	38	3
*N6ZFO	11,844	146	34	2
W6VNR	11,680	130	36	4
*W6VN	11,395	125	38	5
*K6OY	7,820	48	41	5
K6XX	7,488	92	29	3
K6XV	5,264	60	23	5
W6ISO	4,680	60	18	6
*WA6FGV	4,199	116	15	2
*AA6EE	3,427	70	22	1
K86FPW/QRP	3,042	83	17	1
*KE6QR	2,826	73	18	0
*K6EP	2,584	69	15	2
*N6GL	2,490	76	13	2
W6ZH/QRP	1,572	60	10	2
*W6ISO	912	38	12	0
K6MI/QRP	605	19	9	2
*WA6BOB	490	23	9	1
K6III/QRP	477	26	9	0
KU6T/QRP	440	20	11	0
ARIZONA				
N6SS	113,112	554	55	17
W7YS	32,022	253	49	5
KG7V	27,610	186	44	11
N7IR/QRP	20,941	216	40	3
*W7MC	1,035	29	13	2
IDAHO				
*W07Y	27,186	266	44	2
MONTANA				
KS7T	9,984	108	36	3
*K7ABV	6,335	75	31	4
NEVADA				
KU7Y/QRP	26,085	236	43	4
OREGON				
W7GG	148,575	739	55	20
K4XU	46,905	299	50	9
WASHINGTON				
W7RM	97,485	533	52	15
N6HR	35,554	235	48	10
W7LGG	21,944	138	41	11
*K7QBO	16,027	151	39	8
*AB7RW	8,060	140	25	1
*N7LOX	6,058	100	25	1
W7JR1NKN/QRP	20	5	2	0
MICHIGAN				
N8EA	169,078	579	54	37
*W8RU	62,820	449	47	13
ND5S	60,324	359	48	18
K8VT	31,569	278	46	5
*K8SIA	24,420	253	42	2
*W8EB	9,040	104	39	1
K8CV/QRP	7,099	107	31	0
*WB8T	2,120	50	20	0
W8ROS	1,863	39	23	0

K8ND	124,915	552	54	29
W8CAR	101,499	562	48	21
*N8BJQ	60,417	388	46	17
N8AA	46,062	370	47	7
ND8DX	30,855	230	44	11
*KV8Q	28,842	294	46	0
*W8IQ	20,167	218	43	0
*K8AB	18,400	215	40	0
*W8IDM	18,316	223	38	0
*WA8RCN	13,464	175	35	1
*W8PN	9,856	145	32	0
K9DTB/QRP	8,160	95	32	0
*W8FDN	7,440	124	30	0
*AF8C				

*HA0IT	52,630	274	0	38
*HA2A	10,400	85	0	25
IRELAND				
*EI7GL	7,848	65	0	24
ITALY				
I4JMY	264,303	583	24	57
I0SNY	47,424	273	0	38
*I0KHP	10,912	71	0	31
*I2OKW	10,557	83	0	27
*IK4QIB	9,854	78	0	26
*I4CSP	8,430	59	0	30
*IK5WVK	1,995	29	0	15
*IK8UND	765	20	0	9
LATVIA				
*YL1ZC	13,410	89	0	30
LITHUANIA				
LY5A	278,915	796	11	54
LY3BS	64,492	266	0	46
LY1DR	22,750	128	0	35
*LY3BA	15,810	108	0	30
*LY1DM	7,350	63	0	25
MOLDAVIA				
*ER5DX	26,172	136	0	36
ER2GR	18,875	136	0	25
*ER1LW	7,707	71	0	21
NETHERLANDS				
*PA2SWL	33,760	168	1	39
PA0IJM	15,807	95	0	33
NORWAY				
LA5QFA	60,844	293	0	41
LA6EIA	24,444	133	0	36
POLAND				
SP7VC	153,352	495	2	56
*SP9BQJ	12,704	81	0	32
ROMANIA				
*YO5CYG	39,109	207	0	37
*YO2BEH	10,696	77	0	28
RUSSIA				
RA4PPB	117,162	531	0	46
RW3RQ	36,593	190	0	37
*RA3ANI	33,228	170	0	39
*RN3OG	26,670	145	0	35
RV1CC	22,576	134	0	34
*RA3UAG	13,079	86	0	29
RA6LBS	3,485	40	0	17
*RA3DNC	2,808	32	0	18
RA0CCV/QRP	335	17	0	5
RA1ABU	36	3	0	3
SLOVAKIA				
OM0WR	158,238	507	2	57
*OM4DN	25,636	155	0	34
*OM7AG	19,958	120	0	34
*OM8DD	13,282	94	0	29
*OM4ADR	7,820	71	0	23
*OM4ADK	6,660	69	0	20
SLOVENIA				
S50S	158,236	426	14	54
S57M	125,272	427	5	51
S57DX	88,350	358	3	47
*S57NMQ	48,636	232	3	39
S55A	24,990	147	1	34
*S56A	14,240	93	0	32
*S53Z	8,200	70	0	25
*S57U	3,096	38	0	18
*S57IIO	846	23	0	9
SPAIN				
EA2TV	76,038	242	10	48
*EA1DVY	13,370	73	3	32
EA3FF	11,032	81	0	28
EA1AUT	7,425	60	1	24
EA5YB	4,510	44	0	22
EA3ATM/QRP	399	12	0	7
SWEDEN				
SM6R	10,788	74	0	29
*SM4HEJ	2,466	28	0	18
*SM3ARR	225	9	0	5
UKRAINE				
UT0D	110,782	762	1	40
*UW5C	38,766	206	0	39
*UT8IM	29,489	157	0	37
*US7MQ	16,620	129	0	30
US3IZ	15,515	110	0	29
UU4JO/QRP	11,078	82	0	29
UR5YDZ/QRP	10,556	80	0	29
UR5YEZ/QRP	5,764	55	0	22
*UR5FCM	1,000	23	0	10
YUGOSLAVIA				
YU1AB	21,070	117	1	34
*YU1RA	9,831	67	0	29
*YU1UA	550	10	0	10

OCEANIA				
AUSTRALIA				
VK3IO	855	14	6	3
HAWAII				
KH6CC	48,090	139	30	5
SOUTH AMERICA				
ARUBA				
P40V	251,394	334	47	31
BRAZIL				
PY4BK	75	7	0	3
COLOMBIA				
*HK6ISX	52,320	113	28	20
*HK6HKT	4,290	22	5	17
JUAN FERNANDEZ				
CE0ZY	10	1	0	1
MARITIME MOBILE				
*EM1KY/MM	17,460	97	0	36
SSB				
MULTI-OPERATOR				
NORTH AMERICA				
UNITED STATES				
MASSACHUSETTS				
KK1DX	23,868	164	37	15
WO1N	16,568	180	32	6
W1TO	8,120	82	28	7
NEW JERSEY				
K2TOP	242,345	946	56	39
K5KG	102,060	587	48	22
N2WM	78,608	472	51	17
NO2R	41,610	247	33	24
AB2DE	28,512	284	40	4
N2VW	13,176	151	28	8
K2FL	7,424	100	27	5
W1GD	6,304	78	27	5
DELAWARE				
NY3C	1,615	46	17	0
MARYLAND				
N3COB	18,506	210	32	6
K3DI	16,212	169	38	4
K3IXD	10,395	118	30	5
W3UL	2,838	60	22	0
PENNSYLVANIA				
WY3T	125,560	726	56	17
K3WW	119,070	685	49	21
NE3F	91,080	551	51	18
KU3X	27,885	320	37	2
W8FJ	26,000	206	38	12
NORTH CAROLINA				
K3KO	18,032	160	37	9
SOUTH CAROLINA				
AA4V	141,840	738	55	25
TENNESSEE				
KF4ZR	92,598	681	51	10
VIRGINIA				
N4RV	62,940	434	43	17
WA4RS	9,630	141	28	2
NEW MEXICO				
N7DF	31,104	253	47	4
OKLAHOMA				
NA5B	43,660	323	51	8
ARIZONA				
N7KQ	66,734	490	54	7
OHIO				
N8TR	162,948	951	56	18
MICHIGAN				
K8KS	165,088	916	57	20
WEST VIRGINIA				
K8OQL	20,636	209	37	7
ILLINOIS				
K9NR	133,052	784	57	17
INDIANA				
WN90	54,918	467	47	7
CANADA				
QUEBEC				
VE2UMS	70,034	385	37	1
ONTARIO				
VE3DC	188,295	598	54	11



Regular contestant DJ2YE and his station.

MEXICO				
XE1RCS	257,295	576	51	34
ASIA				
ASIATIC RUSSIA				
RZ9WVK	21,476	96	0	26
EUROPE				
ENGLAND				
G3UEG	43,695	190	2	43
FINLAND				
OG4AB	71,668	347	0	41
GERMANY				
DL2DBH	100,011	436	2	49
DL5RMH	86,050	358	5	45
HUNGARY				
HG1S	162,604	514	6	53
ITALY				
IV3OWC	181,500	515	10	56
IV3TDM	72,286	317	2	45
LITHUANIA				
LY7A	158,850	688	0	45
LY2WJ	12,609	97	0	27
NETHERLANDS				
PA3GCV	123,984	440	5	49
PORTUGAL				
CS1A	27,183	134	5	34
SICILY				
IT9CHU	92,226	280	12	45
SLOVAKIA				
OM3KZA	24,854	149	0	34
SLOVENIA				
S51TA	154,755	527	6	51
S50Q	76,551	489	3	48
SPAIN				
EA3BCP	13,949	93	1	28
SWITZERLAND				
HB2CXZ	133,494	440	8	49
UU7J	354,672	1227	11	61
SOUTH AMERICA				
PERU				
OA40	2,737	24	8	9

SSB Check Logs

Thanks to the following stations for their valuable SSB check logs.
CT3HK, DL6RO, EA5GCT/P, ES4RC, K3SWZ, K4JRB, LZ3AB, NX5M, OK1VHV, OK2PCN, PA0RBO, SP2-09001, SP4CGJ, UX2HX, UN6T, VE3BR, W7LR



The antenna at KH6DX mobile 6.

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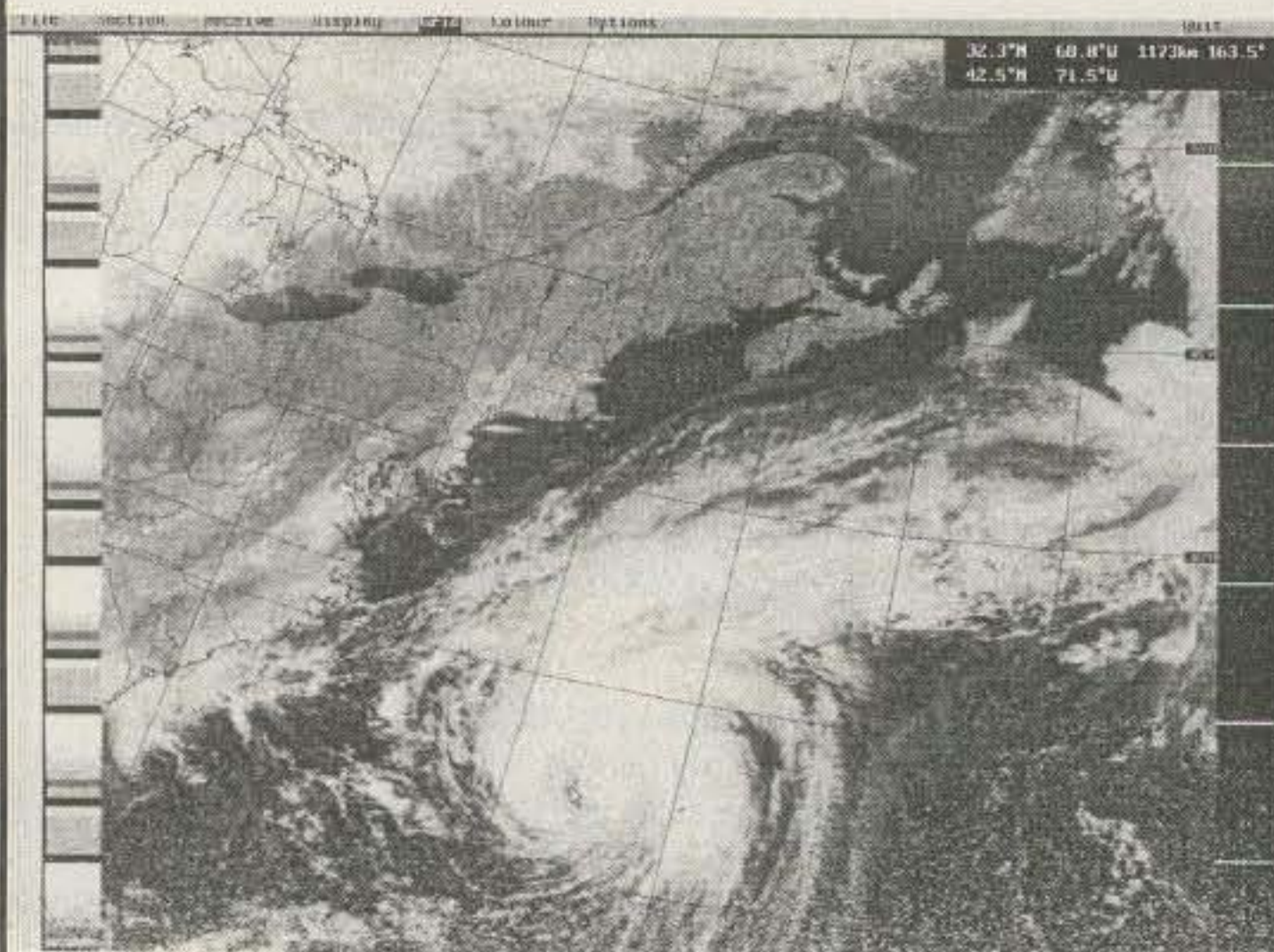
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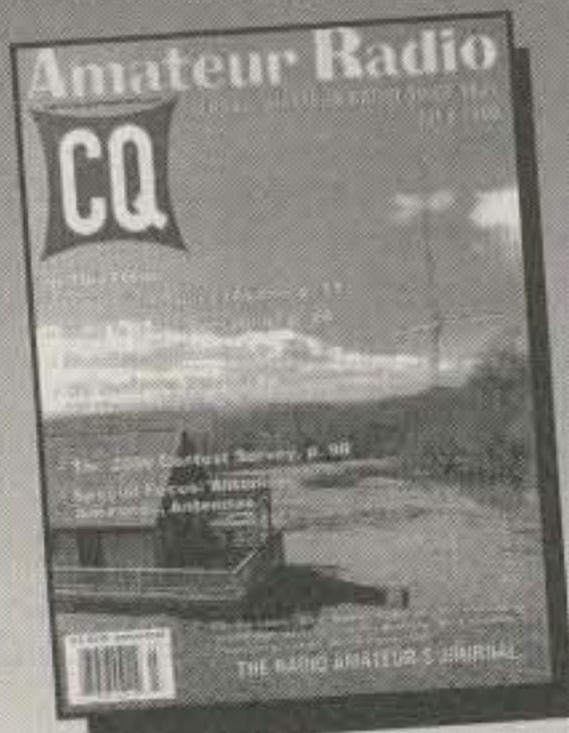


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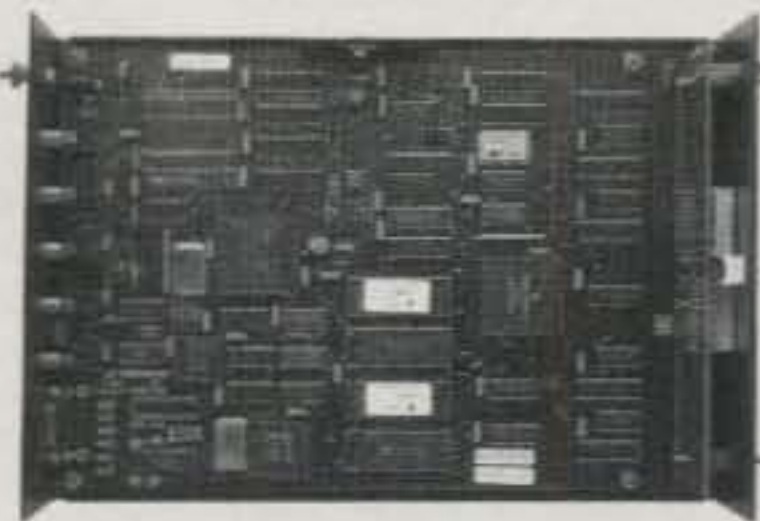
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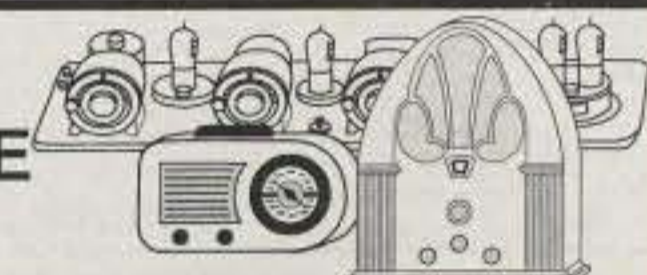
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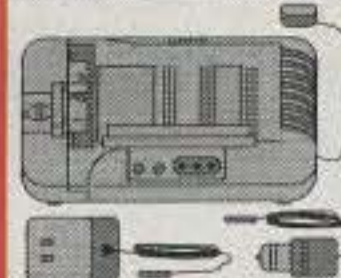
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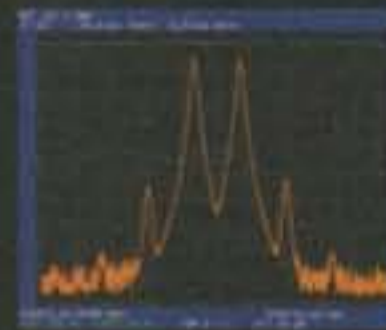
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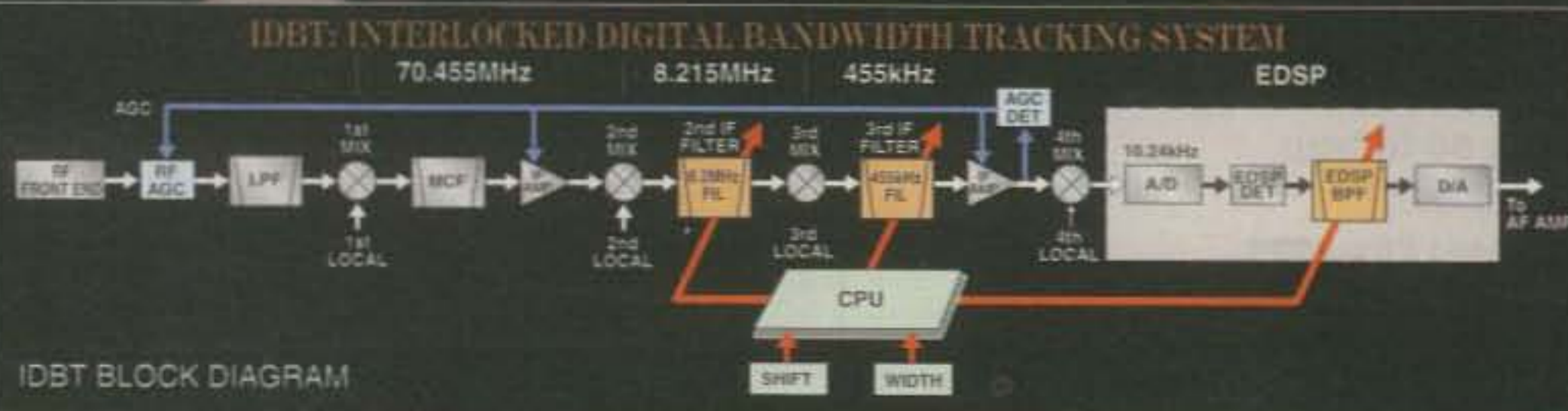


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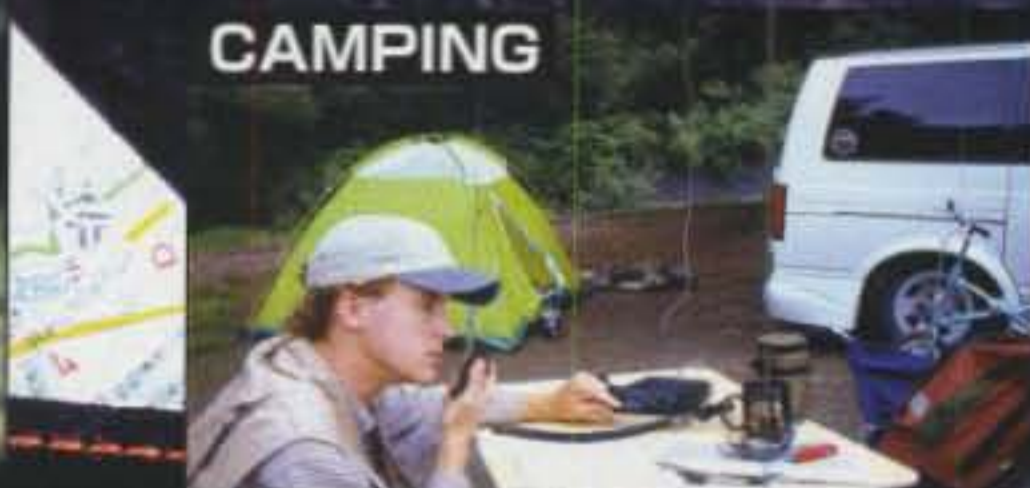
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One of Clipperton Islands' main inhabitants



One of the DX stations set up on Clipperton



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"All seven of the '756PROs worked flawlessly. We ran RTTY perhaps more than 50% duty cycle, and the radios never even got warm at maximum output. The digital filter controls were so easy to adjust and switch...a contester's dream! We had seven radios, most of the time with three modes at once on any given band. There was NO interstation interference. All of our antennas (except for the 160M & 80M verticals) were within a 75 meter circle."

- A52A member Glenn Johnson, WØGJ

"I was particularly impressed with the '756PRO's front end resistance to overloading. I never heard intermod noises or de-sensing even with the huge pileups we generated. Several times I listened carefully for such problems but they simply weren't there. On CW, once I had picked out a station, I could run the selectivity down to 50Hz and hear ONLY the station I wanted. I have worked pileups from several DX'peditions and have never encountered a radio that held up so well."

- FO0AAA member Mike Goode, N9NS.



CLIPPERTON ISLAND
FO0AAA
OVER 75,000 QSO'S



The IC-756PRO's 5" TFT color display makes the information you need available at a glance. Select from four different colors & seven different fonts.

- HF/6M • 100W • All Mode • Triple Conversion Rx • Dual Watch • 32 Bit IF-DSP • Front Panel Adjustable Noise Reduction • Audio Peak Filter • Auto & Manual Notch Filter • Twin Passband Tuning • 5" TFT Color Display Shows Operating Conditions and Spectrum Scope • CW Memory Keyer • VOX • Auto Antenna Tuner • PC Controllable with Optional ICOM Software

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