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COMMUNICATIONS & TECHNOLOGY

MARCH 2002

CQ

FCC KO's Expansion of PRB-1

p. 6, 54

In This Issue

On the cover: A dramatization of the impact on many hams of the FCC's decision not to challenge homeowner association "no antenna" rules.

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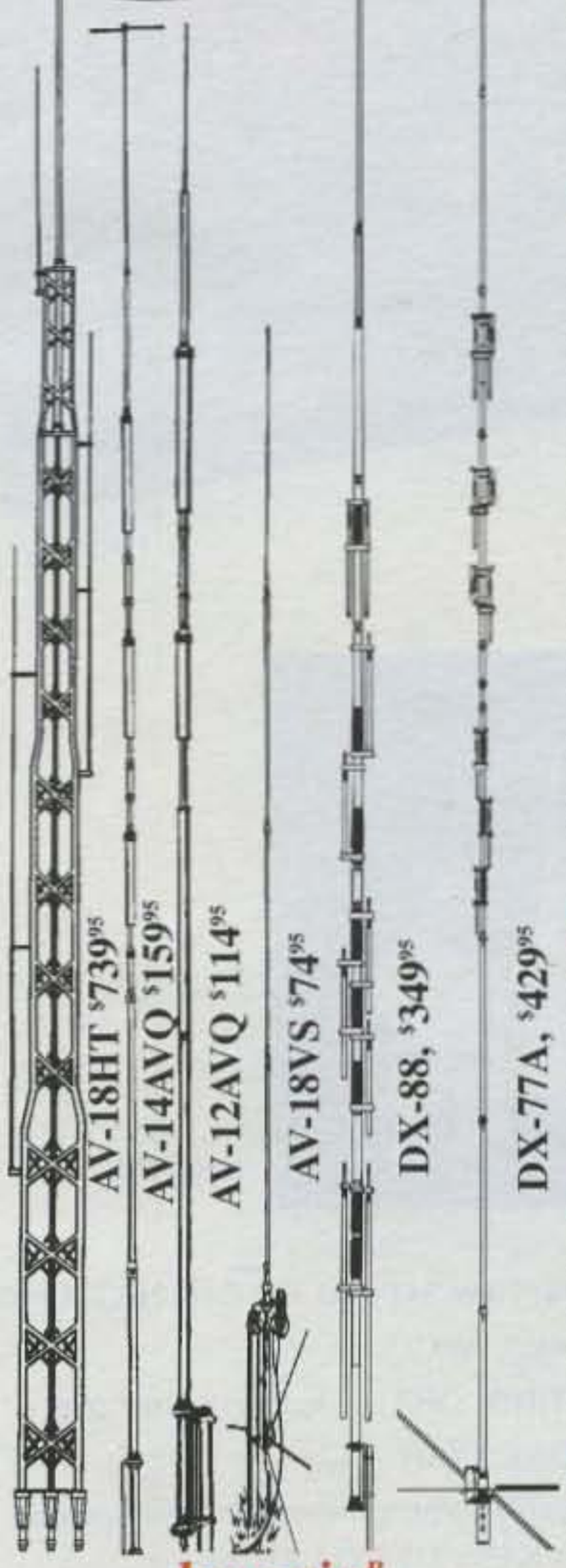

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AV-12AVQ, $114.95. (10, 15, 20 Meters). 13 ft., 9 lbs. The AV-12AVQ also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $79.95.

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DX-88, $349.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs. All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $179.95. Ground Radial System, GRK-88, $81.95. Roof Radial System, RRK-88, $89.95.

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Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$739.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$159.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$114.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$74.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$349.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$429.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

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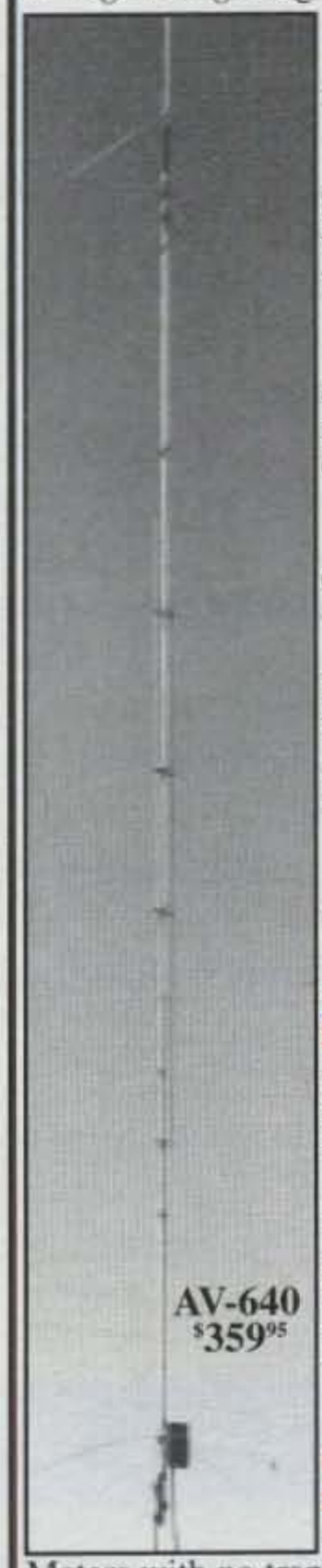

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AV-620, $269.95. (6,10,12,15,17,20 Meters). 22.5 ft., 10.5 lbs. The AV-620 covers all bands 6 through 20 Meters with no traps, no coils, no radials yielding an uncompromised signal across all bands.

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FEATURES

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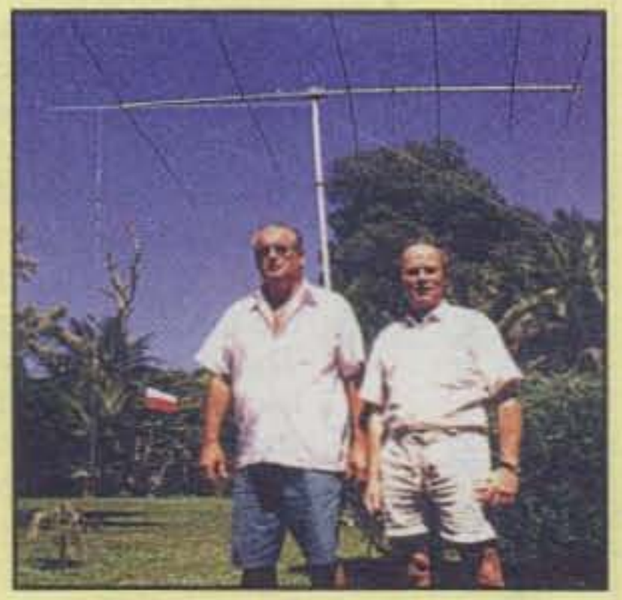

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DEPARTMENTS

On The Cover: Well, it's not quite this bad, but the FCC's refusal to require private housing communities to "reasonably accommodate" amateur operation is having a similar effect on hams afflicted with deed restrictions and "CC&Rs." See "Zero Bias" and "Washington Readout" for details. (Cover photo by Larry Mulvehill, WB2ZPI)

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The Kenwood TS-2000 system offers Amateurs the versatility of operation that has never been achieved. This Multi-band/Multi-mode transceiver offers several different operation methods that provide Amateurs with both high performance not available on competitive models as well as 4 distinct methods to operate. The TS-2000 is available with a full functioning front panel or as a "high tech" self enclosed TS-B2000 model. Both units can also utilize the 1.2 GHz UT-20 module for the widest range of transmit capabilities. Both units can be operated with the ARCP-2000 Radio Control Software or the unique, easy to use RC-2000/TM-D700A remote controller. Older TM-D700A displays can be modified to operate the TS-2000 series also. If that wasn't enough, Kenwood offers the capability to use the popular TH-D7AG handheld to operate HF and 6M via SkyCommand II.* The TS-2000 also has PC Flash-ROM capability, which means in the future your TS-2000 is self-upgradeable, no new versions or models to buy. It's easy to see the TS-2000 all adds up to the transceiver with features designed for the future, available today.

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02ARD-2159 #011502 *Skycommand II is pending FCC rule change.

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Ham Radio News

From The CQ Newsroom

FCC Says No to Further Antenna Pre-emption

The FCC has denied—for the third and final time—an ARRL petition to extend the limited federal pre-emption of local laws relating to amateur antennas and towers to include so-called "CC&Rs" and other deed restrictions in planned communities and condominium developments. The full Commission heard this final appeal and ruled that current protections are sufficient and that hams who cannot operate at home due to these antenna restrictions should operate mobile, at club stations, or at some other location away from home. The Commissioners also said they will not try to overrule private contracts without specific orders from Congress, but essentially urged hams to seek those orders by saying "the Commission would expeditiously act" if the lawmakers told it to. The ARRL is working on plans to bring hams' case to Congress. For more information, see "Washington Readout" and "Zero Bias" in this issue.

Amateurs encountering difficulties in getting permission to erect an antenna in any setting (private home, condominium, apartment) may find some help from a new page on the ARRL website. The "Antenna Restrictions How-To Chart" at <http://www.arrl.org/FandES/field/regulations/ant-how-to-charts.html> isn't so much of a chart as a step-by-step guide to working with local governments, homeowners' associations, and landlords. It provides a good framework for those dealing with authorities who intend to act reasonably. The very first line emphasizes that the guide is not a substitute for professional legal advice and assistance, which is recommended if you begin encountering resistance to just about anything you suggest.

New Ham Antenna Installed on Space Station

The first of four new amateur radio antennas was installed on the outside of the International Space Station during a spacewalk in January. The installation was carried live on NASA-TV and received coverage from worldwide news media, including a front-page mention in *The Wall Street Journal*.

Amateur Radio on the International Space Station (ARISS) Board Chairman Frank Bauer, KA3HDO, told the AMSAT News Service "It was exciting to see the unfurled ISS ham antenna system permanently mounted on the outside edge of the service module." The second of the four antennas was scheduled to be installed during an additional spacewalk in late January.

ARRL Seeks "Refarming" of HF Novice Bands

The ARRL will ask the FCC to eliminate the Novice bands on 80, 40, and 15 meters and to reallocate parts of two bands for voice use. Under the League's proposal an extra 25 kHz of phone subband would be created from each of the 50-kHz-wide Novice bands on 80 and 40 meters; Novices and Technicians with code credit would have access to all General class CW frequencies on 80, 40, 15, and 10 meters, but would continue to be limited to operating CW at 200 watts. For background see "Washington Readout." For additional details and a *CQ* alternative proposal, see "Zero Bias."

CQ VHF to Return

CQ Publisher Richard Ross, K2MGA, announced in January that *CQ VHF* magazine will resume publication as a quarterly in the spring of 2002. The magazine, which had been published monthly for four years from the beginning of 1996 to the end of 1999, is being brought back as a result of continuing reader demand. Longtime *CQ* magazine "VHF-Plus" Editor Joe Lynch, N6CL, will be Editor of the new quarterly.

According to Ross, the new *CQ VHF* will retain the friendly, conversational look and feel of the original, but its technical content will be somewhat higher level. While the original magazine was intended largely to reach newcomers to amateur radio, its primary audience, in fact, turned out to be the experienced and established VHFer. With this in mind, the new version will focus more on meeting the technical needs of experienced VHFers without sacrificing the attention to the newcomer that has always been a hallmark of CQ publications. The first issue is due out in May. For details, see N6CL's "VHF-Plus" column and W2VU's "Zero Bias" editorial in this issue.

AMSAT Plans New HT-Access Satellite

AMSAT North America has decided to begin development of a multi-channel FM microsatellite that would be usable with nothing more than a dual-band handheld.

According to the AMSAT News Service, the new satellite would be launched into low Earth orbit and its multi-channel design would permit several simultaneous contacts. It would also include at least one yet-to-be-determined experimental mode.

The report said the AMSAT-NA board of directors vote was unanimous but that it came after "extensive discussion." AMSAT has been under pressure to develop an easy-access satellite ever since it decided that its first new project after OSCAR-40 would be another SSB/CW satellite that would require a specialized station to operate.

Vanity Processing Resumes

Applications for amateur vanity callsigns are being processed once again after a more than two-month shutdown due to anthrax being discovered in federal government mail facilities. Even electronically-filed applications were placed on hold, due to FCC policy that all applications are handled together, in order of date received. According to the ARRL, the FCC licensing facility in Gettysburg, Pennsylvania, resumed processing vanity applications on January 9, beginning with those received on October 15, 2001. No applications had been processed after October 30. If you submitted a paper application between October 15 and November 1 and have not been contacted by the FCC to resubmit the paperwork, please contact the FCC at 888-225-5322 to see if you need to resubmit anything. However, you should first check the Universal Licensing System database on the FCC website (<http://www.fcc.gov>) to see if your application is already on file.

(Advice from the ARRL: On the ULS home page, under "Search," click "Applications," click "Continue" enter your present call in the "Call Sign" field, and press Enter or click "Search" at the bottom of the page. If an underlined number appears under "File Number," click on it to view your application. If it is there, you don't need to do anything else.)

FCC Requests Comments on Four Petitions

Four amateur-radio-related petitions to the FCC were put on public notice in early January this year, with the Commission seeking comments from the public. According to the ARRL, one petition seeks formal CW and voice subbands on 160 meters (currently there is no regulatory CW subband, as on most other bands). Top-band veterans Jeff Briggs, K1ZM, and Bill Tippett, W4ZV, seek a no phone zone below 1843 kHz.

(Continued on page 110)

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Time marches on and your friends at Kenwood continue to build outstanding products with unparalleled performance and great value. It's not too late to own an "HF Legend," because we are still building them today.

TS-50S Compact Mobile

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Zero Bias

BY RICH MOSESON, W2VU

An Editorial

FCC to Hams: Hit the Road
Plus: Novice Band "Refarming" and the Return of CQ VHF

It's widely believed that one of the key reasons Gerald Ford lost his bid to be elected to a full term as President in 1976 was a single headline in the New York *Daily News* the previous year after Ford refused to bail the city out of a fiscal crisis. It read: "*Ford to City: Drop Dead!*"

Now, the Federal Communications Commission has a similar message to hams living in developments that ban outdoor antennas. In a ruling by the full FCC, the Commissioners refused to extend the protections of their 1985 PRB-1 decision to deed restrictions, homeowners' association rules, etc. The ARRL began in 1996 to try to persuade the FCC to include homeowner association (HOA) rules, architectural control committee (ACC) regulations and "covenants, conditions and restrictions" (CC&Rs) under its then-11-year-old limited preemption policy (see this month's "Washington Readout" column on page 54 for background and details). Instead, the Commissioners said the current rules offer adequate protection and that hams who are not permitted to put up antennas could use "other methods" to transmit. These methods, the FCC says, include "operation ... at a location other than their residence, mobile operation and use of a club station." There are several serious flaws in the FCC's logic.

First of all, what the FCC has done here is create a permanent underclass of "nomad" hams who are not permitted to operate home stations. Thirty years ago, the FCC required a ham to have a permanent station location before it would issue a callsign (the operator and station licenses were considered separate even though they were printed on the same piece of paper, and an operator without a permanent station location would not have been issued a station license, which was the part of the license that carried a callsign). Now, the FCC not only says it's not necessary for hams to have a permanent station location, but that those who are barred from setting up home stations by their homeowner's association or by deed restrictions should hit the road, take a hike, or go visiting.

The FCC also seems to assume that there is a large number of permanent club stations in operation around the country. No doubt, this is due to the large number of club callsigns assigned in recent years. But it is not a valid assumption. Even disregarding the various frauds uncovered by the Enforcement Bureau in which certain individuals amassed dozens of club calls, the actual number of club stations where a member can come get on the air at will is small. This is because the number of clubs with permanent locations at which a station might be set up is small. A very few are lucky enough to have their own clubhouses and stations. Some have good enough relationships with the facilities where they meet (emergency service headquarters, Red Cross chapter houses, etc.) to be given an area where they may set up a station and make it available to club members. But these are the minority. The vast majority of club callsigns in use today fall into one of two categories: 1) repeater station callsigns, or 2) club calls that are activated for special events such as contests and other temporary group operations. These are both valid, legitimate uses of club callsigns, but their existence and use do not necessarily imply that there is a permanent station on the air with that callsign from which club members may operate. For most people living in antenna-restricted communities, the FCC ruling thus leaves two options: operate mobile or "at a location other than their residence," wherever that might be.

Mobile operation is a viable possibility for some amateurs but not for others. For those, the only remaining option is operating "at a location other than their residence." Such as...

Let's see... Perhaps you could impose on a ham friend to let you operate from his or her station. Technically speaking, though, FCC rules require guest operators to sign the call assigned to the *station* from which they are operating, unless their privileges exceed those of the station licensee, in which case they sign <station callsign/operator callsign>. A ham seeking contacts that count toward operating awards, etc., could not legally do so with his own callsign if operating from someone else's station. Same for operating at a club station.

What other options are there? Well, you could theoretically use a dual-band handheld or mobile transceiver to remotely control an HF transceiver at another location. Oh, wait. The FCC says you can't do that if one of the bands is 2 meters ... and try finding a dual band rig that doesn't include 2 meters. Plus, there's the internet. Yes, the internet. Elsewhere in this issue, WB2REM brings us up to date on the latest version of internet-repeater linking (I-LINK), through which you can use the internet to link into repeaters or simplex outputs around the world, on VHF and even on 10 meters. But the FCC has had serious questions about these setups in the past, concerned about making sure that only amateurs have direct access and that third-party rules are observed for any non-amateurs who use the system under the supervision of a licensed control operator. These concerns are legitimate, but the FCC can't have its cake and eat it, too (or for those who prefer that their aphorisms make some sort of sense, can't eat its cake and have it, too).

If the Commissioners are going to require that thousands of amateurs get on the air using methods that don't involve putting up antennas at home, then they must also give a green light to developing and permitting technology for alternatives. Kenwood, whose Sky Command system for remotely controlling HF radios (described above) was declared illegal at the ARRL's behest, now has a petition before the FCC asking that the rules be changed to permit auxiliary operation on 2 meters. This would allow the Sky Command concept to be employed using the most commonly available dual-band FM transceivers. This concept is a perfect example of how one might operate "at a location other than their residence" and ought to be promoted by the FCC, not restricted. The Commission must approve this petition in order to promote its vision of antenna-restricted hams finding alternative means of getting on the air.

Likewise, the rules must be interpreted liberally to permit radio-internet linking. WB2REM argues in his article that third party rules should not apply here, because the purpose of those rules was to prevent the use of amateur radio to circumvent the public telephone system and thus deny revenue to commercial or government phone system operators.

Using the internet to link to remote repeaters does not circumvent the public telephone system, it *uses* that system to connect users and repeaters. The phone or cable companies are getting their money. That leaves the issue of who has access to amateur frequencies. As WB2REM points out, the I-LINK system requires an amateur control operator to enable the link between the internet and a radio station. That operator also has the ability to bar specific users (with just one mouse click) who abuse the rules, an option that many repeater control operators only wish for. The current rules did not anticipate this sort of operation and should not be applied in reverse to limit the innovative use of technology to get people on the air.

The real problem, though, is that the FCC refuses to recognize the reality that so-called "voluntary" deed restrictions and homeowner association regulations are not "voluntary" at all, and generally are not subject to negotiation when a contract to purchase a home is being signed. Actually, the FCC may indeed recognize this, but refuses to go into the political morass of pre-empting "private contracts" without specific orders from Congress to do so. The Commissioners as much as admitted this in their ruling, noting that the pre-emption of restrictions on antennas for "over the air receiving devices" or OTARDs (commonly known as TVs and radio receivers) was done in direct response to a Congressional mandate. In addition, after insisting that the current requirement that state laws and local ordinances "reasonably accommodate" amateur communications provides enough protection to hams and that pre-emption of deed restrictions is unnecessary, the Commissioners say they'll do a quick about-face if Congress is willing to take the political heat from homeowners' associations and developers. "(S)hould Congress see fit to enact a statutory directive mandating the expansion of our reasonable accommodation policy," the ruling concludes, "the Commission would expeditiously act to fulfill its obligation thereunder."

So there we have our political marching orders, direct from the FCC Commissioners—persuade Congress that the rights of amateurs should supersede the rights of homeowners' associations to restrict antennas. This will be a tough sell, but it can and must be done. The only way to do it successfully is from the local level. Former House Speaker Tip O'Neill made the famous statement that "all politics is local," and he was right. Each of us needs to contact our local representatives in Congress, explain how these restrictions hurt not only amateurs but all the residents of their district, and urge them to support a bill ordering the FCC to require that private housing contracts as well as state and local laws "reasonably accommodate amateur operation." But we must do it in a unified, coordinated, way. Next month, I'll offer you tips on how to go about this in an effective manner, and in concert with efforts by the ARRL, which continues to make this issue a top priority.

Whither the Novice Bands?

The ARRL's Board of Directors has approved a modified version of its Novice Spectrum Study Committee's plan to eliminate the current Novice CW subbands and expand the US phone allocations on 80, 40, and 15 meters (*Please note: This updates the specifics of the League plan presented in this month's "Washington Readout," which had a tighter deadline than this column*). The only changes made by the board were to reduce somewhat the size of the proposed phone band expansion on 75 and

(Continued on page 109)

Announcements

DARA Scholarships – The Dayton Amateur Radio Association has announced the availability of scholarships for the 2002–2003 academic year. Applicants must be graduating high school seniors in 2002 and hold an FCC amateur radio license of any class. DARA grants scholarship awards of up tp $2000 toward tuition at an institution of higher education, as outlined in the application. To obtain an application send an SASE to DARA Scholarships, Attn.: DARA Scholarship Chairman, Gary Des Combes, N8EMO, 9873 Lower Valley Pike, Medway, OH 45341, or e-mail to <n8emo1@msn.com>. Completed applications must be postmarked by June 1, 2002.

International Museums Weekend 2002 – IMW 2002 will take place June 15–16, and individual operators as well as amateur radio clubs from around the world are invited to join in by setting up a special event station at their local museum. Registration (required for the event) is free via the website <http://www.imw.f2s.com/> and more info can also be found there. Nearer to the event check the website: <http://www.qsl.net/m1byt/>.

Virginia QSO Party – Sponsored by the Sterling Park ARC to promote activity in the 95 Virginia counties and 42 independent cities; 1800Z Saturday, March 16 through 0200Z Monday, March 18, 2002 on 160 meters and up (no WARC bands) phone and CW. For more information and entry forms, contact VA QSO Party, Call Box 599, Sterling, VA 20167; web: <www.qsl.net/sterling>; or e-mail: <ks4ii@arrl.net>.

Oklahoma QSO Party – Sponsored by the Pklahoma DX Association, stations outside Oklahoma work as many Oklahoma stations in as many Oklahoma counties as possible; stations in Oklahoma work anyone. Begins 2300Z March 22 and ends 2300Z March 24, 2002; all entrants may work 36 of the 48 hours. For details go to: <www.qsl.net/OKDXA>.

Wisconsin QSO Party – Sponsored by the West Allis RAC, 1800Z March 10 to 0100Z March 11, CW and phone on 80, 40, 20, 15, 10, 6, and 2 meters. For details contact WARAC, P.O. Box 1072, Milwaukee, WI 53201; web: <www.warac.org/>.

• The following special events are scheduled for March:

WX2PHI, from Hazardous Weather Awareness Week (in PA), Mount Holly, New Jersey; NWS-Phi SKYWARN Assn.; 1500–2100Z March 17 on 7.273, 14.273, 28.373. Certificate with SASE to John Holmes, WX3W, WX2PHI Special Event, 126A Worman Rd., Bath, PA 18014-9099.

W4BKM, from Cherry Blossom Festival, Macon, Georgia; Macon ARC; 1500–2200Z March 16 on SSB 14.240 and 21.335, CW 7.135 and 14.055. For certificate send QSL and 9×12 SASE to Macon ARC, P.O. Box 4862, Macon, GA 31208.

KL7JFU, from Iditarod® Sled Dog Race, Alaska; Matanuska ARA; from March 2 until the end of the race on 160–6 meters. Special event QSLs sent for verified contacts; certificates for three or more different band QSOs (SASE required for QSL/certificate; *no route given—ed.*)

W9RH, from 85th anniversary of Milwaukee RAC; 0000–2400Z March 16 on 28.470, 14.270, 7.260, 144.200. For certificate send QSL and 9×12 SASE to Tom Schulte, W9RH, 8802 Castle Ct., Franklin, WI 53132. For certificate via e-mail send QSL info to <W9RH@arrl.net>.

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

Mar. 2, **Shasta Cascade ARS Ham Radio Swapmeet,** Downtown Mall, Redding, California. Contact SCARS, P.O. Box 493549, Redding, CA 96049-3549, or Jim, KE6OUA, <ke6oua@arrl.net>.

Mar. 2, **North Jersey Hamfest,** Parsippany PAL Building, Parsippany, New Jersey. Contact Splitrock ARA, P.O. Box 610, Rockaway, NJ 07866 (phone 1-888-511-SARA; e-mail: <hamfest@splitrockara.org>; web: <http://www.splitrockara.org>).

Mar. 2, **Mammoth Cave ARC Hamfest,** Cave City Convention Center, Cave City, Kentucky. Contact Jim Erskine, KD4GNN, P.O. Box 187, Canmer, KY 42722 (e-mail: <mail@chirotoons.com>). (Talk-in 146.94/34; exams 9 AM)

Mar. 3, **Metro DC Winterfest,** Northern Virginia Community College, Annandale, Virginia. See <http://winterfest.home.att.net/> or e-mail: <winterfest@att.net>. (Exams Saturday, Mar. 2, 9 AM)

Mar. 3, **SEWFARS Swapfest,** Waukesha County Expo Center, Waukesha County, Wisconsin. See <www.sewfars.com> or e-mail: <sewfars@hotmail.com>.

Mar. 9, **Englewood ARS/Peace River Repeater Assn. Swapfest,** Charlotte County Fairgrounds, Port Charlotte, Florida. Contact Vic Emmelkamp, KF4VHX, 1181 Manor Rd., Englewood, FL 34223 (941-473-5560; e-mail: <vkamp1@glnet.com>; <www.fcrosby.com/hamfest>). (Talk-in 147.255+; exams)

Mar. 9, **West Fargo Hamfest 2002,** Red River Valley Fairgrounds, West Fargo, North Dakota. See <www.rrra.org>. (Exams)

Mar. 9, **Scottsdale ARC Hamfest,** Scottsdale Community College, Scottsdale, Arizona. Contact Ed Nickerson, WU7S, 902 N. 73rd Place, Scottsdale, AZ 85257 (480-949-5162; e-mail: <Bnickers@qwest.net>). (Talk-in 147.18; exams)

Mar. 9, **North Arkansas ARS Hamfest 2002,** Boone County Fairgrounds, Harrison, Arkansas. Contact Bill Rose, N5VKF, 1007 North Maple, Harrison, AR 72601 (e-mail: <billrose@cox-internet.com>; <http://www.qsl.net/naars/hamfest/index.html>. (Exams)

Mar. 10, **Mount Tom Amateur Repeater Assn. Fleamarket,** Amherst/Pelham Regional Middle School, Amherst, Massachusetts. Contact (tables) Bob, K1YO, 413-569-0320, e-mail: <k1yo@arrl.net>; <www.mtara.org>. (Talk-in 146.940–, 145.130 [+ offset 71.9 PL]; exams 10 AM, amateur radio contact Dave, WA1DC, <wa1dc@pipeline.com>, or commercial Steve, N1SR, 413-593-6554)

Mar. 10, **Western Canada Amateur Radio & Electronics Fleamarket,** Queensborough Community Centre, Ryall Park, New West-

(Continued on page 110)

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Journey to Mongolia

BY KEN CLAERBOUT,* K4ZW

Since the inception of *CQ* magazine's 5-Band Worked All Zones (5B WAZ) program, I've been fascinated by the challenge of working all 40 zones on 80 through 10 meters. It remains one of the most difficult awards to achieve. The addition of the WAZ award for 160 meters added an even greater challenge to the program. One of the zones that makes this a difficult award to complete is zone 23. Zone 23, which is the central zone of Asia, is comprised of the Chinese provinces of Tibet, Sinkiang, Kansu, and Hinghai; the Russian region of Tana Tuva; and the country of Mongolia. Zone 23 has been pretty well represented on the higher HF bands with activity from UAØY stations, increased activity from China, and a number of active stations in Mongolia. Working zone 23 on 80 and 160 meters remains a significant challenge for many operators worldwide.

Several years ago I mentioned to friends that I was interested in making a trip to this region for the purpose of activating zone 23 on the low bands. In 2000 some discussions were held about the possibility of staging such an operation from UAØY. For whatever reason, the idea was never pursued further. Then in the spring of 2001 Karl Renz, K4YT, mentioned that Chadraabal "Chak," JT1CO, would be in the Washington, DC area.

I was invited to meet Chak at Karl's home on a Saturday afternoon. On my way to Karl's house, I stopped at Ham Radio Outlet to pick up a copy of ON4UN's *Low-Band DXing* book and the *ARRL Antenna Handbook* as gifts. During the visit several of us discussed low-band antenna systems with Chak. He was in the process of building a new house 15 miles northwest of Ulaanbaatar, so the timing was right. Later in the week Chak had a chance to visit my QTH and view my 4-square array for 80 meters. I guess he was impressed, because he asked if I could install one at his QTH.

Following that meeting Chak returned to Mongolia, and I began to think seriously about a suitable low-band antenna system for him. It had to be something that would be capable of producing a better than average signal as well as fit within the property lines of his new QTH. In the case of the latter, it wasn't clear just how much room we had to work with. I later learned that Chak would be returning to the U.S.

JT1BG (top) works on JT1CO's new 6 meter beam while JT1KAF (below the TH-11) holds the mast steady. (Photos by the author)

and making a trip to the Dayton Hamvention®. I spoke again with K4YT and made arrangements to meet with Chak at Dayton for a few minutes so that the three of us could talk in detail about our plan and how we would carry it out.

Karl and I felt it would be difficult to obtain material on the local market to build a 4-square array and shipping the material to Mongolia would be too expensive. In addition, we still would need to do something for 160 meters. The amount of available real estate was still a concern. In the end, we would need to find an alternative that would address both bands yet be something we could install without a major undertaking.

I finally settled on a single vertical, the V160 HD made by Titanex. The V160 is an 87 foot vertical made of high-strength aluminum titanium alloy. This particular model can be raised or lowered with the provided winch and comes with a tuning box at the base with 12 volt relays that provide switching among 40, 80, and 160 meters. Many DXpeditions have used a portable version over the years with wonderful results. It met our criteria, so I made the suggestion to Chak at Dayton and he quickly agreed. He also asked again if I would like to travel to Mongolia to help him install the system. How could I pass up such an opportunity?

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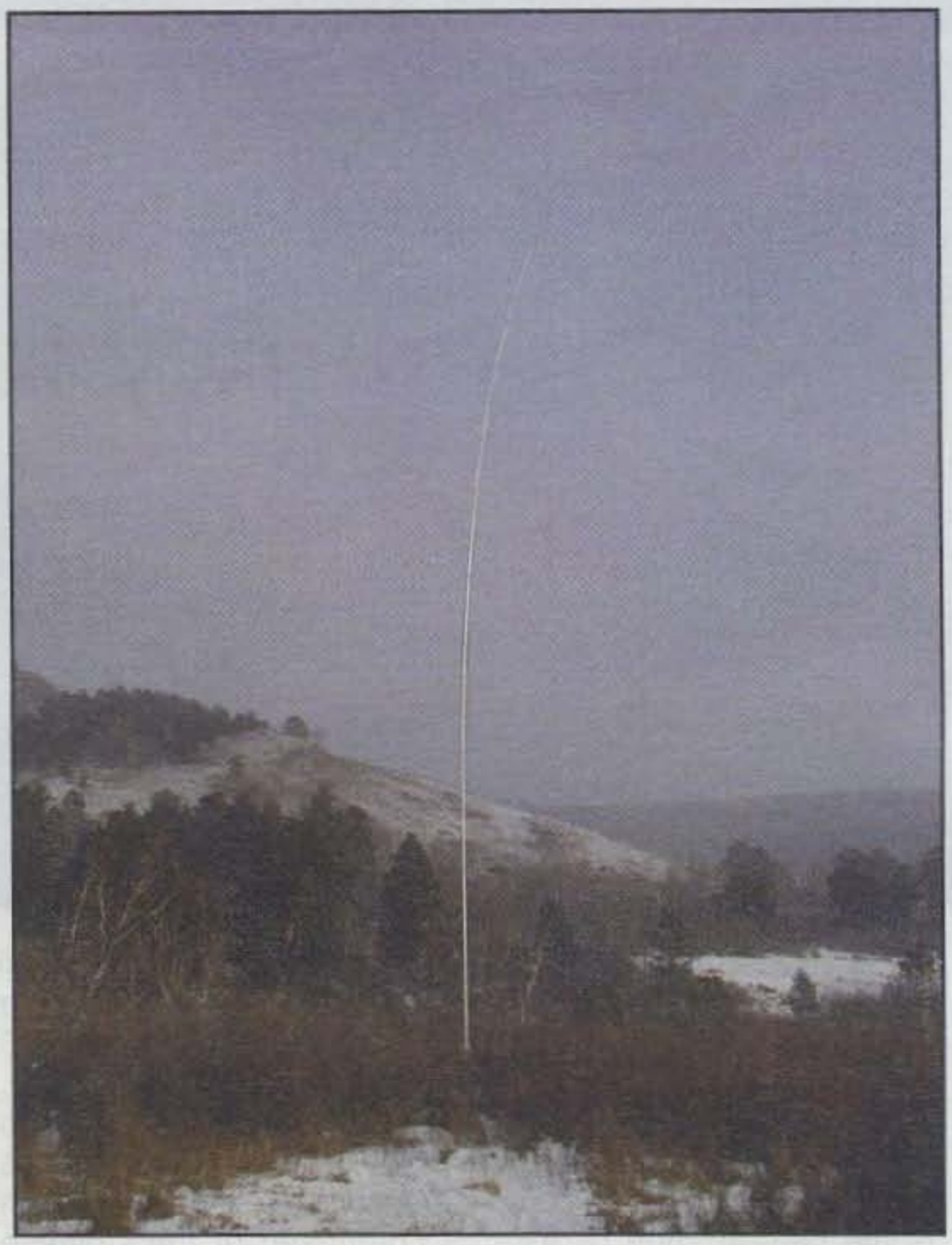
JT1KAF (left) and JT1BG (right) raise an antenna on JT1CO's homebrew crankup tower.

The Titanex vertical we installed at JT1CO for 160, 80, and 40 meters is 87 feet tall! →



K4YT and I began to discuss our schedules in an attempt to find a suitable time to carry out our mission. Our goal would be to get the system operational for Chak so that he would be ready to operate by the time the low-band season rolled around later in the year. The trip was planned as more of a working DXpedition than one in which we actually would spent a lot of time operating. Winters in Mongolia can be brutal, so we wanted to find a time frame that would allow us to complete our outside antenna work without too much trouble. Airline reservations were eventually made for the weekend of September 14th.

Our next challenge was getting the antenna and other material to Mongolia in time for our visit. Things were coming down to the wire with shipment of the antenna from Titanex in Germany. One problem we encountered was that the bottom section of the vertical was close to 20 feet long, so it would not fit in the cargo section of the MIAT Mongolian Airlines A310 Airbus for its flight between Berlin and Ulaanbaatar. Titanex cut the piece in half, added a sleeve to join the two sections, and we were all set. I began to pick up other supplies such as coax, control cable, and anything else we conceivably would need. I was working with the mindset that we would need to bring every last item, as we probably would not be able to procure these things locally. I found out later that this was not necessarily the case.

On the surface, this seemed like a relatively easy trip to put together. However, anyone who has done something similar knows all too well the pitfalls and work that is involved. There were more than a few anxious days when I wondered if everything would eventually come together in time.

September 11th

Finally we were all set to go. I made plans to attend the W9DXCC convention in Chicago, as we had to transit through O'Hare Airport on our way to the Far East. I was counting down the days, and Tuesday, September 11th started off like any other day. What happened several hours later would change the world forever.

I spoke with Karl, who was in Arizona at the time. My initial thought was to continue with our plans. As the week unfolded, however, it was obvious there was no way we were going to be able to fly as scheduled. Furthermore, I couldn't imagine trying to get through Dulles Airport in Washington with a load of radio equipment, especially since American Airlines flight 77, which hit the Pentagon, had originated there. Plans were put on hold indefinitely.

Eventually we were able to make new travel arrangements. Because of K4YT's work schedule, he was unable to make the trip, so I was on my own. Friday, November 16th found me at Dulles Airport at 5:30 AM with over 200 pounds of baggage, bound for Seoul, Korea, where I would overnight before heading up to Ulaanbaatar the following day. Thankfully, everything went extremely well even with the added security measurers.

Upon arrival in Mongolia, I was met at the airport by Chak, JT1CO; Baatar JT1BG; and Chak's family driver. After a 30-minute drive we arrived at the new QTH of JT1CO, where I would spend the next ten days. The evening was spent exchanging stories and spending a little time on 20 meter CW. We eventually went to bed at around 2 AM.

Antenna work began in earnest the next morning. The crew consisted of JT1CO, JT1BG, JT1KAF, myself, and some local laborers. Part of the group started working on the TH-11 beam, which was not loading properly on 15 meters and needed some fine tuning on a couple of other bands. While the crew began lowering the TH-11 on Chak's homemade crank-up tower, I started playing with the Titanex. Chak's homebrew tower is a real piece of engineering work. It's

Baatar, JT1BG (standing), welcomes Chak, JT1CO (seated), and the author (behind the camera), to his ham shack.

square in design, standing 60 feet tall, with a carriage on large rollers that is raised and lowered by a hand crank.

I was thankful that most of the physical work was done prior to my arrival and before the ground froze. After reversing a couple of traps on the TH-11 to correct a problem on 15 meters, I was able to turn my attention back to the Titanex. The radials had to be terminated and the tuning unit set up for each of the bands. I was able to set up the tuner for 160 meters as the sun literally was setting on day one.

An unexpected problem popped up later as I tried to tune the Tokyo Hy-Power amplifier on 1830 kHz. It only produced 600 watts output. As I went higher in the band, the power output increased until I was able to get full legal limit around 1900 kHz. It became apparent that the amplifier circuitry was designed for the upper segment of 160 meters, which is where the Japanese Topband operators were once restricted. As a result, we later would use 1905.5 kHz as our transmit frequency and listen down lower in the band.

The first hours were spent working mostly Japan. Given the lack of substantial activity from Mongolia on 160 meters, even the JAs were anxious to make a QSO. At 20Z the band began to open to Europe. By sunrise I had finished with 79 QSOs on Topband—not a bad start considering we were using reduced power due to the amplifier problem. Day two was spent installing a 6 meter beam above the TH-11, and setting up the Titanex for 40 and 80 meters and retuning it on 160 meters for 1905 kHz. Surprisingly, there was no switch supplied with the vertical to switch the relays in the tuning box. We took a trip into the city, to a local electronics repair shop, where we found a three-position switch and box to mount it in. So much for the notion that Radio Shack or something similar doesn't exist in Mongolia.

That evening I fired up on 80 meters. At 14:28Z I worked my first U.S. station, K6KII. Shortly thereafter the log began to fill up with other W6/W7 stations. As local sunrise approached 9M2AX went into the log along with W8JI on the East Coast. I was starting to get a sense that the antenna was working quite well on 80 meters. It also provided an initial sense of accomplishment knowing that all the work and planning was starting to pay off. The following day I started on 80 meters with good openings to Europe and most parts of the U.S. Later I went back to 160 meters and was rewarded with my first QSOs to the U.S. when AI6L and K7CA went into the log. A total of 11 QSOs were made with the U.S. that day on 160 meters.

Back in the shack of JT1CO two laptop computers were put into use. I used mine to log and run Geoclock. Geoclock is an invaluable tool for anyone operating the low bands. It provides a graphical representation of the world with a real-time display of areas in darkness. In the case of the U.S. the map was customized with major cites throughout the country. I could zoom in on the U.S. and monitor sunrise or sunset as it swept

across the country. The second laptop was connected to the internet via an analog radio, dial-up connection. The connection was a little slow, but hey, we were out in the countryside of Mongolia. We used the internet to connect to DX Summit so we could announce our transmit and receive frequencies. This was especially important on 80 meters, as the band is often inundated with random QRM from the south. What could be a good receive frequency in a split operation one minute could become unusable seconds later. I hesitated to change frequency immediately when this happened since it was random, but there were times when it became necessary.

The rest of the week was spent doing antenna work during the day and operating the low bands at night. Sleep became an afterthought. After all, I was finally in zone 23 with a great low-band antenna. I could sleep when I got home.

On Thursday as I awoke several hours before sunrise, I heard a loud roaring wind outside. I could hear the beam banging around on the tower but was unable to see what condition the vertical was in. Nevertheless, everything loaded up fine, so I went back to 80 and 160 meters. As the sun began to rise, I got my first glimpse of a real snowstorm with winds over 60 Mph. Welcome to the Mongolian winter. The vertical was guyed at two levels and if there was any question about its ability to withstand the local climate, it sure passed its first test with flying colors. It barely budged in spite of the strong winds.

As the day progressed the weather improved and we were able to begin work on a rotatable receive loop. One of the local members of our club, Mike, K4GMH, had an old AR 44 rotator that I completely refurbished including the use of some low-temperature grease. It still was no match for the cold weather, so we were stuck, literally, with a rotator that did not want to turn unless I brought it inside the house. At the end of the day it was apparent that our entire group was beginning to tire from nonstop antenna work. Long days in the cold weather and late nights operating were wearing out all of us. Both JT1CO and JT1BG commented that they were going to take up stamp collecting, as ham radio was too much work. It was, of course, said in jest.

The CQ WW from Zone 23

With the weekend looming ahead, it was time to start preparing for the CQ WW DX CW Contest. I had mixed feelings about giving up the chance to operate from my home station. Still, it would be an interesting experience to operate from a rare DX location in a much-needed zone. The contest began at 8 AM Saturday local time so I would have a chance to get a decent night's sleep and work a bit of the morning low-band opening before the start.

The contest proceeded with little fanfare. It's been said before, and was certainly true in this case: A good DX location does not necessarily make a good contest location. Often the pile-ups would grow too large and occasionally get unruly. It is next to impossible to keep any rate going in that environment. Mongolia is also far removed from a steady diet of 3-point QSOs. It's tough to run up a big score when 40% of the QSOs are with 1-point stations. I did, however, manage to set a new Mongolian and zone 23 record in 36 hours of operating. I would have spent more time in the operating chair, but the long week leading up to the contest left me more tired than I realized.

Following the contest it was time to take in some of the local sights and make a final push on the low bands before heading back home. Baatar, JT1BG, was kind enough to act as tour guide for the day. We drove around the city of Ulaanbaatar so I could take some pictures of daily life in Mongolia. We also visited a Buddhist temple, a traditional Ger (the portable home of the nomads of central Asia for over 2000 years), the City Square, and several shopping centers. Some of the larger department stores are very well equipped with daily commodities as well as large items such as appliances and large-screen TVs. I saw billboards for no less than three different cell-phone providers. Baatar had to stop to renew his cell-phone service. The department was absolutely packed with eager consumers. It was not unusual to see an occasional BMW or other luxury car on the streets of the city.

Another highlight of the trip was an invitation to visit with Baatar and his family at their apartment. We were treated to a wonderful meal and plenty of drink. I was also introduced to Baatar's son Jargal, JT1CT, and his daughter Oyuna, JT1CC.

Mission(s) Accomplished

All too soon it was time to wrap things up and get ready to head back home. Most of the final evening was spent on 160 meters. It was a real balancing act spending time between two of my favorite bands, 80 and 160 meters. I wanted to spend the final evening on 160 meters, hoping that we would get an opening to the eastern half of the U.S. It was one region where I had not been able to make much of an impact. In the end we did not get the opening I had hoped for, but at least I could leave knowing I had given it my best shot.

Final totals, outside of the contest, were 429 QSOs with 48 countries on 160 meters and 565 QSOs with 57 countries on 80 meters. While the numbers might seem rather small, it does represent for many the completion of 5B WAZ or 160 Meter WAZ, a goal which they had been chasing for years. We also accomplished what we set out to do from the beginning, and that was to leave Chak with a good low-band antenna system so that there will be plenty of opportunity to work Mongolia and zone 23 for years to come.

I believe my feelings at the conclusion of my trip were best summed up in a note I sent to the Topband internet reflector. I'd like to share them here:

I wanted to share a couple of thoughts as I conclude my trip to Mongolia today. First and foremost, I owe a big Thank You to Chadraabal, JT1CO, and his family. For the past ten days they have taken me in as a part of their family and allowed me to stay with them at their beautiful new QTH 25 km northwest of Ulaanbaatar. They fed me three times a day and went out of their way to make sure I felt welcomed in their home. They have been most gracious in every imaginable way. I'm sure they will now welcome a little peace and quiet in their life with my departure.

Second, a big thanks to my good friend Baatar, JT1BG. When I began this hobby some years ago as a kid in high school, I can remember chasing Baatar for a new country and hoping some day I might even work him for that coveted zone 23 on 80 meters. He's not quite as active now as he was then, but one of the first calls that comes to my mind when you mention Mongolia is JT1BG. Baatar works with JT1CO and he was also very instrumental in getting this low-band setup going. Never did I imagine years later that I would have the opportunity to meet this gentleman, in his country, and become such good friends. What a great hobby we have!

Thanks to the other members of the JT1JA radio club and in particular JT1KAF, who also spent many hours over here getting things going.

Finally, I need to thank my wife and family for putting up with this unusual hobby. They don't always understand it, but they know enough at this point to go with the flow.

On a final note, I was able to work JT1CO on 80 meters two days after I returned home. That QSO completed my 5B WAZ quest. ■

MFJ *Apartment* Antenna

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

MFJ-1622
$99.95
New!

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

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

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

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

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

MFJ Ground-Coupled Portable Antenna Base

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

MFJ-1904
$99.95
New!

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

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

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

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

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

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

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

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

33 Feet Telescoping fiberglass Mast . . .

Collapses to 3.8 feet, weighs 3.3 lbs.

MFJ-1910
$79.95

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

MFJ Vertical

for Antenna Restricted Areas

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

MFJ-1795
$149.95
New!

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

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

Highly efficient end-loading. Entire length radiates.

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

HF mini-Bugcatcher

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

MFJ-1624
$79.95
New!

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

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

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

MFJ Portable Antenna

MFJ-1621
$89.95

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

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

MFJ Super High-Q Loop

MFJ-1786
$379.95

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

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

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

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

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

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

Free MFJ Catalog

Visit: http://www.mfjenterprises.com or call toll-free 800-647-1800

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We all know the economy's not so hot right now, but WB6NOA says that might make this year the best in a long time for buying a new HF ham rig!

High-Frequency Transceivers

BY GORDON WEST,* WB6NOA

The General class ham ticket is your ticket to worldwide excitement, and it continues to be the most popular license for an upgrade. Although Extra class gives you a little bit more elbow room, General class opens up nearly 3000 kHz of exciting skywave activity in addition to the VHF/UHF privileges of a Technician class operator. The theory test requires no major math skills, and the 5 wpm code exam is a pushover for any Technician class operator willing to work on the dits and dahs for about 30 days.

High-frequency equipment manufacturers have held the line on HF transceiver pricing for the last couple of years, and most amazing during our troubled economy are some price *reductions* on selected equipment that may also include 6 meters, 2 meters, and 440 MHz. New manufacturer strategies to add more value to their HF transceivers with included accessories and base station mics may make this your year to acquire a new HF rig.

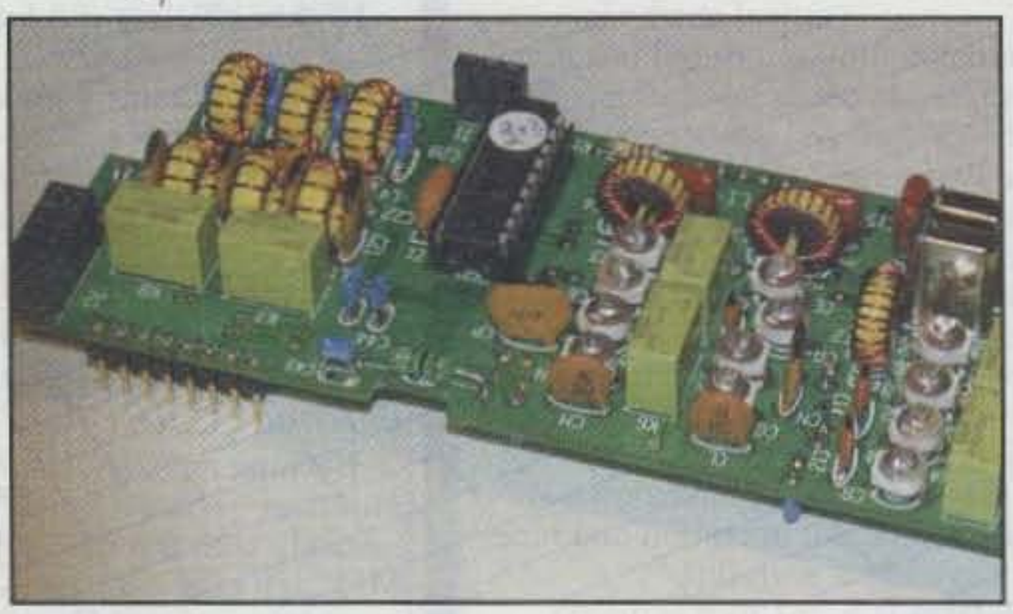
Let's take an inside look at the different manufacturers, listed alphabetically from Alinco to Yaesu, and see what they are doing to plug you in for more value in an HF transceiver.

The Alinco remote-head DX-70TH is a 100 watt mobile rig with the 6 meter band also included, and a receiver featuring razor-sharp selectivity.

Alinco

Alinco has completed its move from California to Covington, Ohio. "Our move will allow us to stock our dealers faster with the merchandise they need, and we have also increased our service department," comments Phil Cota of a family-owned business called ATOC Technologies. Service Manager Rich, W8VK, and Yukio Masuda, JA6MMO, report that the service turn-around time for any Alinco product is excellent, and an extensive on-hand parts inventory of high-frequency and VHF/UHF transceiver parts is readily available.

The Alinco remote-head DX-70TH is a 100 watt mobile rig with the 6 meter band also included, and a receiver featuring razor-sharp selectivity. You must hear one of these Alinco DX-70's to appreciate the great audio. Another option is the DX-77T, a 12 volt DC, HF, base-style transceiver, but without 6 meters. The DX-70TH is by far the firm's most popular low-cost mobile HF rig. The Cota brothers also manufacture the Iron Horse fiberglass and stainless-steel ham whips, which are good lightweight performers when running the Alinco DX-70TH mobile.



Brand new from Elecraft is a four-band module for the K1 QRP CW transceiver, covering 40, 30, 20, and either 15 or 17 meters.

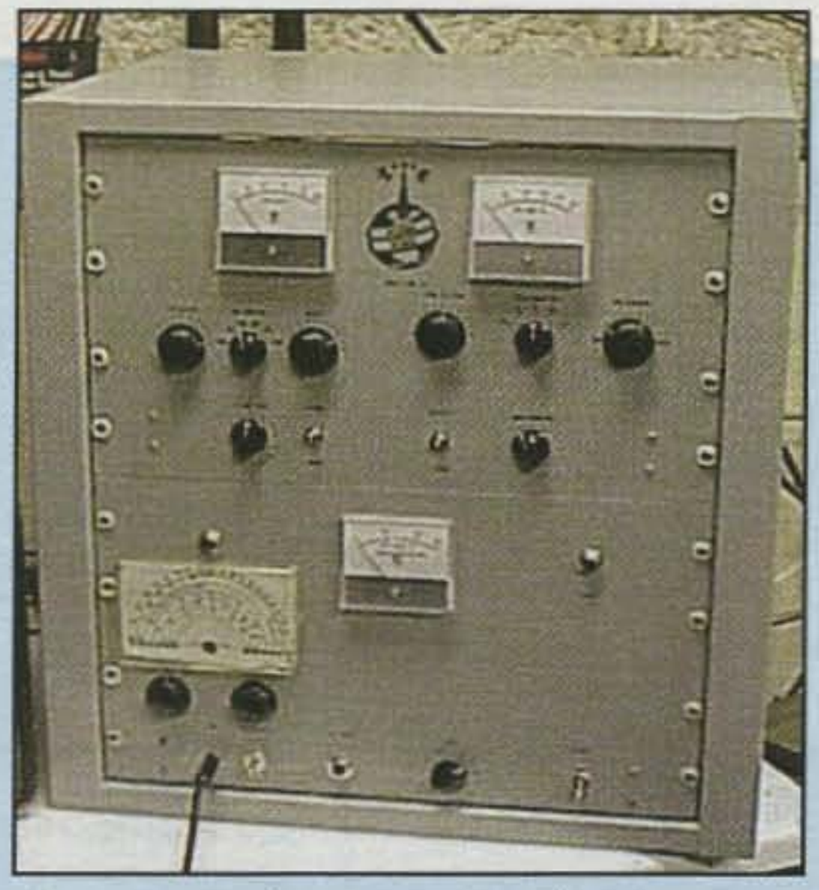
Elecraft

This California company continues to offer kit builders an excellent selection of QRP equipment. New for this year are custom enclosures that are the same size and color as Elecraft's K1 and K2 transceiver kits, allowing the kit builder to match up a companion automatic tuner or AC-to-DC power supply. Also brand new is a four-band module for the Elecraft K1 QRP CW transceiver, covering 40, 30, 20, and either 15 or 17 meters. Elecraft brings back the thrill of putting together your own advanced HF transceiver multi-band kit.

Globe King

Remember the World Radio Labs Globe King AM transmitter? Wow—500 input watts of plate-modulat-

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



Vintage Radios of North East Texas has introduced an updated version of the classic Globe King 500 transmitter, the Globe King 500D. Each handmade unit includes a self-contained power supply, a stable solid-state VFO, and a 4-400 final with 500 watts AM input.

ed AM so you could take part in the high-fidelity contests early in the evenings on HF. Well, what's old is new again! Vintage Radios of North East Texas is offering an updated version of this classic transmitter, the Globe King 500D. Each handmade unit includes a self-contained power supply, a stable solid-state VFO, and a 4-400 final (yes, it still glows in the dark!) with 500 watts AM input. It even comes mounted in its own 19 inch rack! It's a bit pricey, but if you're looking for a 500 watt AM transmitter, price probably isn't your number-one concern.

ICOM America

It looks as if the 32-memory-channel IC-707 has been replaced by the 101-memory-channel IC-718 HF 100 watt, low-cost transceiver. Similar in appearance to the Alinco DX-77, this large base-station-type 12 volt DC transceiver is more at home on a desk than in the mobile. For the mobile, your choice is the ICOM 706 MKIIG recently seen selling *below* $875 *including* a free separation cable kit. This is one of the rigs I have in our communications van, because the remote head is back-lit for nighttime operation and besides HF, it also gives me 6 meters, 2 meters, and 440 MHz, plus unlimited tuning for everything from television to FM music to public-safety agencies that have not yet switched to digital.

ICOM America also upgraded its IC-746 to an IC-746 PRO, adding 32-bit IF-DSP, variable-level noise blanker, SSB/ CW synchronous tuning, selectable digital IF filters, automatic notch filter, and even a built-in RTTY demodulator and decoder. I'll bet ICOM even will come up with a way of decoding PSK and packet soon, but it's not in this latest offering.

The ICOM 756 PRO II is another recent upgrade of the original 756 PRO, enhancing the 5 inch, thin-film transistor display window, improving sensitivity and the third-order intercept point, and improving the filter section, which allows you to adjust the shape of the filter to best suit your operating style or band conditions. Now if ICOM could just add the IC-R3's slow-scan TV option, it would allow that gorgeous screen to show even more excitement. The bandscope, RTTY receive, and huge color screen, though, still make this rig a DXer's dream radio.

The ICOM 781 is no more, and I understand that the ICOM IC-775 DSP is a special-order item.

ICOM America continues to dazzle us with big improvements in big equipment that you would not think could get any better!

ICOM has upgraded the IC-746 to an IC-746 PRO, adding 32-bit IF-DSP, variable-level noise blanker, SSB/CW synchronous tuning, selectable digital IF filters, automatic notch filter, and even a built-in RTTY demodulator and decoder.

The JRC JST-245 is a powerful, almost 200 watt output transceiver that covers HF plus 6 meters and has a triple-conversion receiver and great-sounding transmit audio.

JRC – Japan Radio Corporation

I always like operating JRC equipment because of its functional knob layout, crystal-clear display, and 40-bit digital signal process. This is extraordinary equipment, and the JRC JST-245 is a powerful, almost 200 watt output transceiver that covers HF plus 6 meters and has a triple-conversion receiver and transmit audio such that usually the other station asks what type of exotic transmit equalization I have in the mic circuit. Continue to watch JRC for new announcements at the upcoming Dayton Hamvention™ in May.

Kenwood

The Kenwood TS-2000 HF/VHF/UHF multi-mode base or mobile transceiver can also be special ordered with the 1240–1300 MHz band factory-installed (the TS-2000X). This brand-new rig is receiving praise from DXers around the world, especially because of the DX Cluster® tune and the built-in TNC which defaults to 1200 bps but has capability of 9600 bps. Dial in the sub-band to your local 2 meter packet cluster and go about doing your thing on high frequency. I can set up

The Kenwood TS-2000 HF/VHF/UHF multi-mode base or mobile transceiver can be special ordered with the 1240–1300 MHz band factory-installed (designated the TS-2000X).

the packet-cluster function so that if any incoming packet shows DX—such as 6 meter DX at 50.203, VE1YX double-hop from Nova Scotia—instantly the main band will jump up to 6 meters, my 6 meter beam will be put on antenna port #2, and I'm ready to run some unanticipated DX with the main band all set to go. You can also use the internal terminal node controller for APRS, *attended* Sky Command remote operation, along with a built-in RS-232 for complete computer control. However, no computer is required for the built-in TNC and DX packet-cluster automatic tuning!

The popularity of the new 300-memory Kenwood TS-2000 may have caught Japan by surprise, but Kenwood is managing to keep dealers stocked with the RC-2000 compact mobile controller head, and orders for the equipment without the regular head, for strictly computer control, are also keeping the dealers hopping. I *have* seen the Kenwood 2000 under PC radio control, and the ARCP-2000 option is helping to cement the marriage of HF radio and computers. It's quite a rig, especially with the tiny mobile head and computer control!

Sailors still like the little Kenwood TS-50 because it works quite well with Pactor II for AirMail and fits almost anywhere at the navigation station. The TS-570 DSP with 6 meters included continues to be another popular Kenwood product, but the big Kenwood TS-950 SDX appears to be out of production in favor of the TS-2000. The TS-870 is also disappearing from the marketplace, replaced by the 570.

Will Kenwood come up with a TS-50 size HF/VHF/UHF rig to compete with ICOM and Yaesu? If there is something in the works, the company is keeping it super secret, and only the Dayton Hamvention™ will reveal plans for 2002.

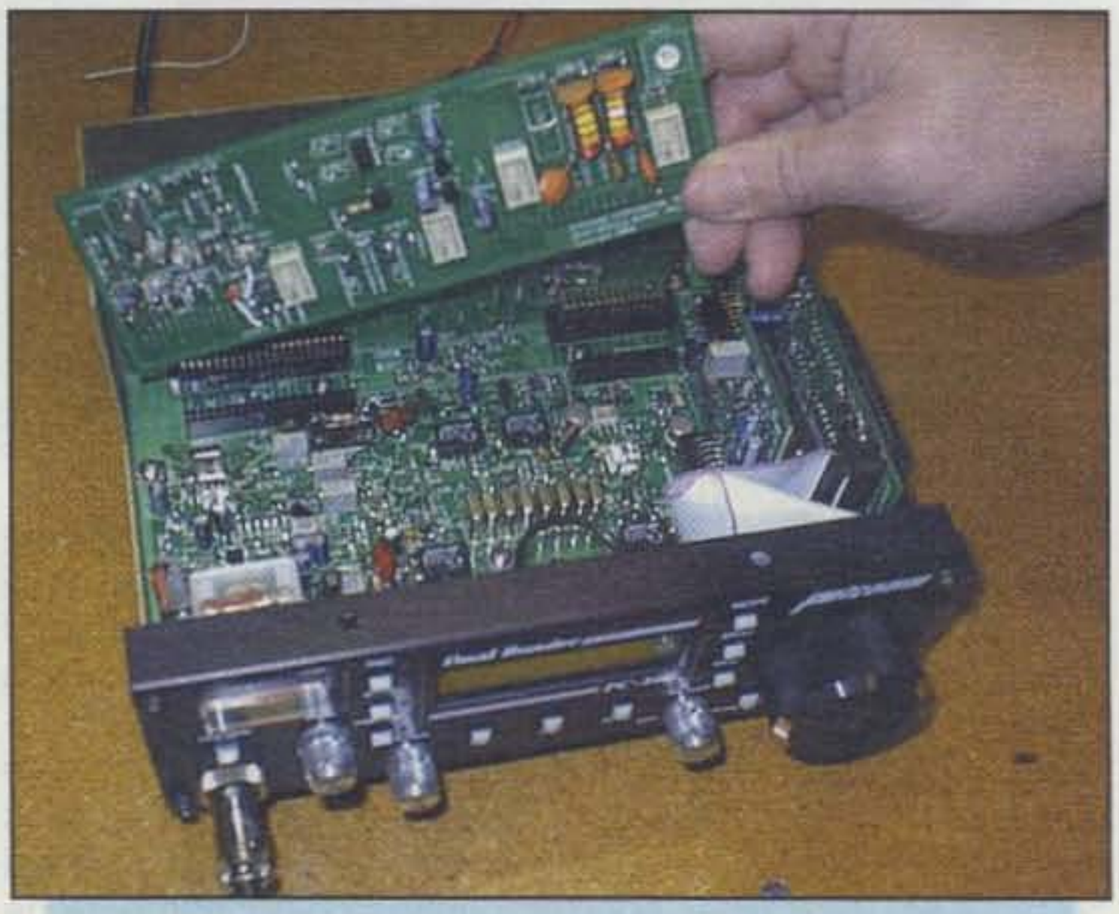
MFJ 9XXX Single-Banders

Martin Jue at MFJ tells me he barely keeps up with demand for his 10 watt QRP transceivers with a hot dual-conversion receiver. These are swell little boxes to take out for a public ham demo, because passersby are amazed at the DX a little box can pull in.

Shown here is the MFJ-9020 10 watt, 20 meter QRP transceiver with dual-conversion receiver. The MFJ single-banders are very popular!

PATCOMM

PATCOMM equipment is made in New York, and the popular PC-16000A still continues to be a favorite among those hams who might want the option of operating the equipment via a keyboard. I recently had an opportunity to work with Ken Neubeck, WB2AMU, with the new PATCOMM PC-500, a two-band transceiver that takes band modules from 160 up to 6 meters. Direct digital synthesis and crystal-mixing techniques offer exceptionally quiet receive with high dynamic range and a very low noise floor. Take off the antenna, and you hear almost nothing!



The PATCOMM PC-500 is a two-band transceiver that takes band modules from 160 up to 6 meters and offers exceptionally quiet receive with high dynamic range and a very low noise floor.

Add any kind of simple antenna and the PC-500 springs to life. You can order additional band modules for less than $40 each, and when Ken and I tried out the PC-500 in the PSK-31 mode, it locked onto signals that were barely above the noise floor. I ran the PC-500 with a brand-new AOR multimedia terminal in the PSK mode, and I was delighted with the performance, with the combined capabilities of both units boosting HF performance under noisy southern California power-line conditions. The AOR equipment works with *any* HF transceiver or receiver.

Ramsey Electronics

Did you get the latest Ramsey catalog yet? Ramsey just took over AVCOM, the service monitor folks, and has also developed quite an impressive line of low-power FM equipment for the new FCC-authorized service. However, I'm told Ramsey will continue to keep its single-band ham equipment in its lineup of kits. If you're looking for a fun radio-related project for you and the kids, look at Ramsey Electronics HF gear.

Ranger

Ranger has expanded into marine VHF. This is a big market and should keep Ranger healthy in the specialized single-band and dual-band HF market. I'm sure we'll continue to

see Ranger radios in the marketplace. The equipment looks much like CB radio high-end gear, but it is custom-tuned to the 12 and 10 meter ham radio bands.

SGC

Pierre at SGC indicates that the firm has improved its popular SG-2020 by including adaptive digital signal processing in the transceiver. The little SG-2020 has been seen all over the hills and valleys, operating with its strap-on battery power pack and working into a myriad of SGC automatic antenna couplers. SGC's latest coupler comes in at an incredibly low $249, and it works nicely with the SG-2020 ADSP transceiver.

SGC has improved its popular SG-2020 by including adaptive digital signal processing in the transceiver, designating the rig the SG-2020 ADSP.

For you boaters, SGC makes an FCC-certified, high-frequency marine transceiver that also doubles as a powerful 150 watt output ham set, data-ready. Also, if you really want a big signal, add the SGC-500 solid-state automatic band-switching amplifier, and roast some hot dogs at 600+ watts output working from 12 volts DC at about 50 amps voice peak. SGC regularly supports ham radio public-service events and is a big supplier of military and airborne HF transceivers.

Ten-Tec

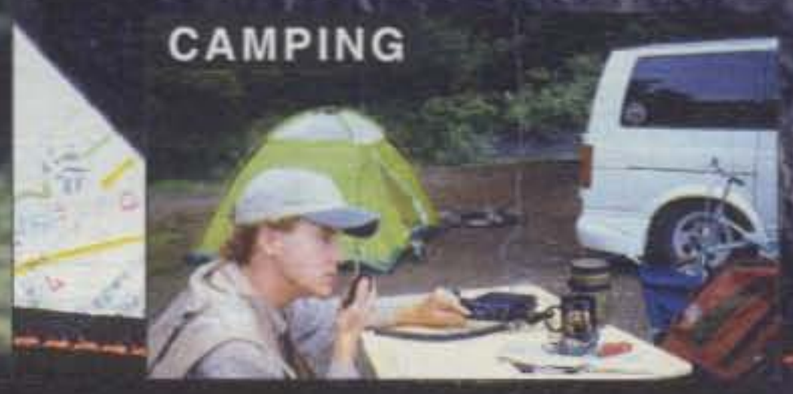
U.S.-made equipment continues to earn high praise from its users, and Ten-Tec sells factory direct. This is the firm's 33rd year in ham radio. Its newest product is the Ten-Tec Jupiter, an IF-DSP HF transceiver with a wonderful LCD display and spectrum scope. If there is something happening up or down the band, you will see it instantly!

The Jupiter offers 34 selections of IF-DSP filtering, and you can also choose 18 selectable transmitter bandwidths to

The Ten-Tec Jupiter is an IF-DSP HF transceiver with a great LCD display and spectrum scope, plus 34 selections of IF-DSP filtering and a choice of 18 selectable transmitter bandwidths to tailor your output.

The Ultimate Backpacker!

Ham Radio in the Great Outdoors: It's the Best with Yaesu's FT-817!



Actual Size

Bring Ham Radio along on your next hiking, camping, or business trip with Yaesu's amazing new FT-817 Multimode HF/VHF/UHF Portable Transceiver!

● **ULTRA COMPACT:** Measuring just 5.3"x 1.5"x 6.5" WHD (135 x 38 x 165 mm) and weighing about 2 1/2 pounds (1.17 kg, including the supplied antenna and alkaline cells), the FT-817 is small and light enough to take along wherever you're going.

● **WIDE FREQUENCY COVERAGE:** 160-10 meters on HF, plus the 50, 144, and 430 MHz Amateur bands. Plus FM Broadcast, AM Aircraft, and Public Safety receiver coverage.

● **MULTIMODE DESIGN:** Ready for action on SSB, CW, AM, FM, FM-Wide (Rx), 1200/9600 bps Packet, and Digital, including dedicated USB and LSB PSK-31 configurations.

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

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

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

● **OPTIONAL COLLINS® MECHANICAL FILTERS:** An optional filter slot is provided, accommodating either the YF-122S (2.3 kHz) 10-pole SSB filter or the YF-122C(500 Hz) 7-pole CW filter. You get "base station" performance even from a mountain top.

● **INCREDIBLE MEMORY RESOURCES:** You get a total of 208 memories, including 200 "regular" memories which may be separated into ten groups of up to 20 channels each. And you can append an Alpha-Numeric "Tag" to each memory to aid in channel identification.

● **A CW OPERATOR'S DREAM MACHINE:** You get a built-in Electronic Keyer with adjustable weighting, adjustable CW Pitch, CW Normal/Reverse frequency tuning, and you can even use the microphone's UP and DOWN keys to send CW via the Keyer.

● **BUILT-IN CTCSS AND DCS:** The built-in CTCSS and DCS Encoder/Decoder systems provide you with the versatility you need for repeater access or selective calling.

● **DUAL - COLOR LIQUID CRYSTAL DISPLAY:** Select from Blue or Amber display illumination, which can also be switched off to conserve battery life. And while you're away, the Spectrum Scope will provide you with a visual record of activity ±5 channels from your current operating frequency.

ALL MODE PORTABLE TRANSCEIVER

FT-817

HF/50/144/430 MHz Multimode Transceiver

YAESU
Choice of the World's top DX'ers™

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Visit us on the Internet: http://www.vxstd.com

See the exciting new FT-817 at your Yaesu Dealer's showroom today!

Simultaneous Reception

V$_{HF}$/V$_{HF}$ U$_{HF}$/U$_{HF}$ V$_{HF}$/U$_{HF}$

A New Dual-Band Engineering Milestone:
Introducing the Dual Band Mobile for the 21st Century's Active Ham!

The Yaesu Engineering Team has done it again! The exciting new FT-7100M Dual Band Mobile brings you the ruggedness and operating ease of our single-band mobiles, and the convenience of remote-head mounting capability (optional YSK-7100 Separation Kit required), in an all-new 144/430 MHz Dual Band design!

Providing 50 Watts of power output on 2 meters, and 35 Watts on 70 cm, the FT-7100M has power to spare when you're in a fringe area. For repeater access or selective simplex calling, you get built-in encoder-decoder circuits providing 50 CTCSS tones and 104 DCS (Digital Code Squelch) codes. And the FT-7100M's huge 262-channel Memory System lets you store up to six Alpha-Numeric characters, for easy channel identification.

Operation of the FT-7100M is simple and straightforward, with separate Volume and Squelch controls for each band during dual-band reception, and eight single-function front panel keys provide the easy feature access you need during mobile operation. What's more, you also get three user-definable keys on the microphone to use for important control functions.

Rugged, reliable, and versatile, the FT-7100M provides the highest cost-performance available among Dual Band FM Mobiles. See your Yaesu Dealer today for a test drive!

144/430 MHz FM Dual Band Mobile Transceiver

FT-7100M

FEATURES

- Frequency Range: TX 144-148, 430-450 MHz RX 108-137 MHz (AM), 137-180 MHz, 320-480 MHz, 810-999.99 MHz (Cellular blocked)
- VHF/UHF, VHF/VHF, and UHF/UHF Dual Receive operation*
- Channel Steps: 5/10/12.5/15/20/25/50 kHz/step
- Power Output: 50 Watts (144 MHz) 35 Watts (430 MHz)
- Power Amplifier Type: 2SK3478 Power MOS FET
- Efficient Cooling System: Direct-flow heat-sink and thermostatically-controlled fan
- 262 Memory Channels: 120 "regular" memories, 5 pairs of band limit memories, and one "HOME" channel on each band
- Alpha-Numeric Memory Labels: 6 Characters on lower display field, 5 Characters on upper
- Smart Search™ Automatic Memory Loading System
- 50 CTCSS Encode/Decode Tones
- 104 DCS Encode/Decode Codes
- CTCSS and DCS Search
- ARTS™ (Auto-Range Transponder System)
- Automatic Repeater Shift (ARS)
- TMF Microphone (U.S. version): Includes 16-memory Auto-dialer, and Direct Frequency Entry
- Band Scanning, Band-Limit Scanning, and Memory Scanning
- Three Priority Channel Modes: VFO, Memory, and Home Channel Priority
- RF Squelch: Opens at user-defined signal level
- Tx Time-Out Timer (TOT)
- Automatic Power-Off (APO)
- 1200/9600 bps Packet Compatible
- Battery Voltage Meter
- Compact Size: 5.8" x 1.9" x 6.9" WHD
- Large (0.9" x 2.3") Liquid Crystal Display
- Cloning Capability: To other FT-7100M Transceivers
- Optional YSK-7100 Separation Kit
- Optional CT-39A Packet Cable

*Simultaneous reception on two different Frequencies, in-band or Cross-Band. Cross-band Repeater Function not available.

Actual Size

For the latest Yaesu news, visit us on the Internet:
http://www.vxstd.com

Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

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US Headquarters
17210 Edwards Road,
Cerritos, CA 90703 (562)404-2700

HF Transceivers

Table 1. Under $800

Make/Model	DC or AC?	RX coverage	TX bands	Power Output (tested)	RX circuitry	Mem. Chs.	Remote Head	DSP?	Built-in Keyer?	Built-in Tuner?	"Street Price"
Alinco DX-70TH	DC	.15-30 MHz + 50 MHz	All HF + 6m	110	Dual conv.	100	Yes	No	No	No	$750
Alinco DX-77T	DC	.15-30 MHz	All HF	120	Dual	100	No	No	No	No	$699
Elecraft K1 (K1-2, K1-4)	DC	Ham band	2 & 4	5	Dual	VFO	n/a	No	Yes	Option	$269
Elecraft K2 Kit	DC or built-in battery	1.8-30 MHz	All HF	10	Dual	10	No	No	Yes	Option	$600
ICOM IC-718	DC	30 kHz-30 MHz	All HF	100	n/a	101	No	Option	No	No	$599
Kenwood TS-50	DC	.15-30 MHz	All HF	110	Dual	100	No	No	No	No	$679
MFJ 9xxx series	DC	Ham band	Single banders for 10, 20, 40, 80m	14	Dual	VFO	No	No	No	No	$250 each
Patcomm PC-500	DC	Any two ham bands ($35 for additional band units)	—	15 (adjustable)	Dual	4	keyboard control	No	Yes	No	$390
Patcomm PC-9000	DC	Ham band	All HF + 6m	40 (HF), 20 (6m)	Single	1 per band	No	No	Yes	No	$600
RadioShack HTX-10	DC	28-29.7 MHz	10m.	31	Dual	5	No	No	No	No	$150
Ramsey QRP-RX	DC	Single banders for 20, 30, 40, 80m	(Rcvr only)	n/a	n/a	—	No	No	No	No	$30/kit/band; $15 case+knobs
Ramsey QRP-TX	DC	(Xmtr only)	Single banders for 20, 30, 40, 80m.	1 CW only	n/a	—	No	No	No	No	$30/kit/band, $15/case+knobs, $10 power supply
Ramsey SX-20	DC	20m.	20m.	10	n/a	n/a	No	No	No	No	$300 kit, $370 wired/tested
Ranger 5054DX	DC	50-54 MHz	6m.	25	Dual	10	No	No	No	No	$300
Ranger RCI-2950DX	DC	24.8-24.9, 28-30 MHz	12 & 10 m.	25	Dual	10	No	No	No	No	$400
Ranger RCI-2970	DC	28-30 MHz	10m.	100	Dual	10	No	No	No	No	$550
RF Limited 357DX	DC	28-29.7 MHz	10m.	150	Dual	5	Yes	No	No	No	$400
SGC 2020 ADSP	DC or battery pack	1.8-30 MHz	All HF	40	Triple	20	No	Yes	No	No	$675
Sierra Kit	DC	1.8-30 MHz	All HF	3	Dual	—	No	No	No	No	$369
Yaesu FT-600	DC	.5-30 MHz	All HF	140	Triple	100 w/alphanumerics	No	No	No	No	$900
Yaesu FT-817	DC or battery pack	.1-1000 MHz (no cellular)	All HF + 6/2m +70cm	5	Dual	208	n/a	No	Yes	External	$659
Yaesu FT-840	DC	.1-30 MHz	All HF	125	Dual	100	No	No	No	No	$569

Table 2. $800–$1500 Range

Make/Model	DC or AC?	RX coverage	TX bands	Power Output (tested)	RX circuitry	Mem. Chs.	Remote Head	DSP?	Built-in Keyer?	Built-in Tuner?	"Street Price"
ICOM IC-706 MkII-G	DC	.2-470 MHz	All HF + 6/2m + 70cm.	135	Dual conv.	100	Yes	Yes	Yes	No	$899
Kenwood TS-570D(G)	DC	.1-30 MHz	All HF	100	Dual	100	No	Yes	Yes	Yes	$1079
Kenwood TS-570S(G)	DC	.1-54 MHz	All HF + 6m	100	Dual	100	No	Yes	Yes	Yes	$1249
Patcomm PC-16000A	DC	.1-30 MHz + data readout	All HF	110	Dual	90	Keyboard	Yes	Yes+reader	No	$1295
Ten-Tec Jupiter	DC	.5-30 MHz	All HF	108	Triple	100 + computer	n/a	Yes	Yes	External	$1189
Ten-Tec Pegasus	DC	.5-30 MHz	All HF	104	Triple	Comp. control	Yes/Comp.	Yes	Yes	No	$900
Yaesu FT-100D	DC	.1-1000 MHz (cellular blocked)	All HF + 6/2m +70cm	118	Dual	200	Yes	Yes	Yes	No	$849
Yaesu FT-920	DC	.1-30 / 48-56 MHz	All HF + 6m	145	Dual	110	No	Yes	Yes+memory	Yes	$1079

Table 3. $1500–$2400 Range

Make/Model	DC or AC?	RX coverage	TX bands	Power Output (tested)	RX circuitry	Mem. Chs.	Remote Head	DSP?	Built-in Keyer?	Built-in Tuner?	"Street Price"
ICOM IC-746 Pro	DC	.3-60 / 108-174 MHz	All HF + 6/2m.	151	Triple conv.	100	No	Yes	Yes	Yes	$1895
JRC JST-245	DC	1.8-30 / 50-54 MHz	All HF+6m	180	Triple	200	No	No	Yes	Yes	$2500
Kenwood TS-870	DC	.1-30 MHz	All HF	135	Quad	100	No	Yes	Yes	Yes	$1999
Kenwood TS-2000*	DC	.1-500 MHz + 1200-1300 MHz	All HF + 6/2m + 70cm and 1.2 GHz option	HF 100	Quad	300 + computer	Yes	Yes	Yes	Yes	$1899
SGC-2000 w/ADSP	DC	1.8-30 MHz	All HF + marine	170	Dual	100	Yes	Yes	No	No	$1850
Yaesu FT-847	DC	.1-30/ 50-54/ 144-148/ 430-450 MHz	All HF + 6/2m + 70cm	119	Dual	100	No	Yes	Yes	No	$1239

Table 4. Top of the Line ($2500+)

Make/Model	DC or AC?	RX coverage	TX bands	Power Output (tested)	RX circuitry	Mem. Chs.	Remote Head	DSP?	Built-in Keyer?	Built-in Tuner?	"Street Price"
ICOM IC-756 Pro II	DC	.1-60 MHz	All HF+6m	172	Triple conv.	101	No	Advanced DSP	Yes	Yes	$2999
Signal One 1030E-DSP	DC	.1-60 MHz	All HF + 6m	200	Triple	100 + computer	Option	Yes	Yes	Yes	$14,500
Signal One 1030CI	AC	.1-30 MHz	All HF	200	Quad	100 + computer	n/a	Yes	Yes	Yes	$10,000
Ten-Tec Orion *(coming soon!)*											
Yaesu FT-1000D	AC	.1-30 MHz	All HF	200	Quad	100	No	Yes	Yes	Yes	$3999
Yaesu 1000MP Mark-V	AC supply	.1-30 MHz	All HF	200	Triple	100	No	Yes	Yes	Yes	$2575

**Also available as a computer black box or mobile with small remote head.*

tailor your output. Another great feature of the Ten-Tec Jupiter is flash ROM telephone upgrades; you can download files from the internet to always keep your rig up to date. It will also work great off your personal computer by downloading free software and connecting a serial-port cable. Soon look for Ten-Tec's Orion.

Yaesu

Yaesu is last in our alphabetical line-up, but certainly not least! The little FT-100D replaces the FT-100, adding a better and bigger speaker system, an included 500 Hz CW filter, an included high-stability reference oscillator, CTCSS decode, and even a hotter receiver up on 800 MHz public-safety frequencies. Best of all, the price of the FT-100D continues to plummet, all the way down to $825, which is slightly below the price of ICOM's 706. The 100D does a nice job of self-controlling the ATAS 100 HF/VHF/UHF motorized antenna system, and the full-featured, back-lit microphone makes operating the equipment a dream mobile.

Yaesu has replaced the FT-100 with the FT-100D, adding a better and bigger speaker system, included 500 Hz CW filter and high-stability reference oscillator, CTCSS decode, and even a hotter receiver up on 800 MHz public-safety frequencies. With all of that, however, the price of the FT-100D continues to plummet—good news for shoppers!

Of course, the Dayton sellout last year was the Yaesu FT-817—the portable, internal-battery QRP transceiver for HF, VHF, and UHF multi-mode that has spawned every conceivable type of portable HF antenna! Everyone is making backpack-portable accessories for this "cult radio." Every ham should have an FT-817, because it doubles as a sophisticated piece of test equipment that you can use regularly around the house and in your hotel room on upcoming trips.

The Yaesu FT-847 is the satellite operator's dream rig, with HF included. Yaesu still continues with the FT-840 and FT-600, which have some great maritime-mobile applications.

The granddaddy of them all is the Yaesu FT-1000D, as well as the 1000MP Mark V. Even though the FT-1000MP Mark V is dramatically less expensive than the FT-1000D, the Mark V with its enhanced digital signal processing is the DXer's delight. Two large VFO knobs allow individual adjustments to the main and sub-bands, even on different modes and bandwidths. The Shuttle-Jog™ tuning allows for quick frequency changes, and direct digital synthesizers provide 13 fine-tuning steps, selectable all the way down to a half hertz per step. If you are into PSK or any of the other digital modes, a half hertz will get you right in the ballpark! Now add Yaesu's Quadra linear amplifier system, and stand by: DX is right around the corner!

Summary

Now is the time to make your best deal for this equipment at a ham radio supplier. Manufacturers are offering their dealers all sorts of incentives to see their stock sell through during tough economic times. Free microphones, free DSP chip sets, free headphones, free mobile extension cables, and other free incentives might be available when you begin to explore which dealer you are going to purchase your equipment from. Shop around and look for all you can get with the ongoing manufacturer promotions down at the dealer level. The competition is so fierce between manufacturers that these promotions start and stop quite regularly, so you might not even know there is a special going on unless you make that phone call or stop by your local dealer.

It's going to be a great year for HF amateur radio equipment at the lowest prices ever!

Manufacturers Contact Info

Most manufacturers say the best way to get up-to-date information is via their websites, and that e-mail is best for getting quick responses to questions. Also included in this list are manufacturers not mentioned in the text of this market survey.

Alinco, distributed in North America by ATOC Amateur Distributing LLC, 23 S. High St, Covington, OH 45318 (telephone 937-473-2840; web: <www.alinco.com>).

Elecraft, P.O. Box 69, Aptos, CA 95001-0069 (telephone 831-662-8345; web: <www.elecraft.com>).

Emtech, 1127 Poindexter Ave. W., Bremerton, WA 98312 (telephone 360-405-6805; e-mail: <emtech@steadynet.com>; web: <http://emtech.steadynet.com>).

ICOM America, Inc., 2380 116th Ave. NE, Bellevue, WA 98009-9029 (telephone 206-454-8155; fax 206-454-1509; on the web: <www.icomamerica.com>).

Japan Radio Company, 1011 Klickkitat Way #B-100, Seattle, WA 98134 (telephone 206-654-5644; fax 206-264-1168; web: <www.jrc.co.jp>).

Kenwood Communications Corp., 3975 Johns Creek Ct., Suwanee, GA 30024 (telephone 310-639-5300; fax 310-537-8235; web: <www.kenwood.net>).

MFJ Enterprises, Inc., Box 494, Mississippi State, MS 39762 (telephone 662-323-5869; fax 662-323-6551; web: <www.mfjenterprises.com>).

Oak Hills Research, 2460 S. Moline Way, Aurora, CO 80014 (telephone 303-752-3382; 24 hr. fax 303-745-6792; orders 800-238-8205; e-mail: <qrp@ohr.com>; web: <http://www.ohr.com>).

Patcomm, 7 Flowerfield M100, St. James, NY 11780 (telephone 516-862-6511; fax 516-862-6529; e-mail: <patcomm1@aol.com; web: <www.qth.com/patcommradio>).

Ramsey Electronics, Inc., 793 Canning Pkwy., Victor, NY 14564 (telephone 716-924-4560; web: <www.ramseyelectronics.com>).

Ranger Communications, 401 W. 35th St., National City, CA 91950 (telephone 877-536-0772; e-mail: <rci@rangerusa.com>; web: <http://www.rangerusa.com>).

Red Hot Radio, 14730 Charmeran Ave., San Jose, CA 95124-3571 (telephone 408-390-6805; fax 800-881-6120 or 831-401-2657; e-mail: <sales@redhotradio.com>; web: <http://www.redhotradio.com>).

SGC, P.O. Box 3526, Bellevue, WA 98009 (telephone 425-746-6310; fax 425-746-6384; e-mail: <sgc@sgcworld.com>; web: <www.sgcworld.com>).

Small Wonder Labs, c/o Dave Benson, NN1G, 80 East Robbins Ave., Newington, CT 06111 (e-mail: <dave@smallwonderlabs.com>; web: <http://www.smallwonderlabs.com>).

Ten-Tec, 1185 Dolly Parton Pkwy., Sevierville, TN 37862 (telephone 865-453-7172; fax 865-428-4483; e-mail: <sales@tentec.com>; web: <www.tentec.com>).

Vintage Radios of North East Texas, 2165 NW Loop 286, Paris, TX 75460 (telephone 903-785-2077; e-mail: <vradioofnetex@1starnet.com>.

Wilderness Radio, P.O. Box 734, Los Altos, CA 94023-0734 (telephone 650-494-3806; e-mail: <qrpbob@datatamers.com>; web: <http://www.fix.net/jparker/wild.html>).

Yaesu (Vertex Standard), 17210 Edwards Road, Cerritos, CA 90703 (telephone 562-404-2700; web: <www.yaesu.com>).

Here is the conclusion of a ground-breaking study of 160-meter propagation conducted by NM7M, based on DX contacts made over a 20-year period by Western Australian "topbanders" VK6HD and VK6VZ.

Equinoctial and Diurnal Path Switching

A New Perspective on Long-Path and Short-Path DXing on the Topband—Part II

BY STEVE IRELAND, VK6VZ,* MIKE BAZLEY, VK6HD, AND BOB BROWN, NM7M

Long-held assumptions about long-path and short-path propagation on 160 meters were examined in Part I of this article and shown to be in need of revision. Specifically, we saw that propagation over certain very long-distance paths switched between long path and short path, based on time of year (equinoctial path switching) and time of day (diurnal path switching). The analysis was based on the logs of VK6HD and VK6VZ in Western Australia, and particularly on the long history of their topband contacts with VE1ZZ in Nova Scotia.

As we saw in Part I, the 1.8 MHz log data from VK6HD and VK6VZ show a pattern when it comes to the contacts with VE1ZZ close to their sunrise. Between the September equinox and the March equinox these contacts can be clearly seen, using azimuthal mapping software such as DXAID and W6ELProp, as being short-path. While the number of contacts that occurred between VK6HD/VK6VZ and VE1ZZ outside of this period were less numerous by about a factor of ten, the difference was quite distinct. Contacts with VE1ZZ prior to sunrise (at the VK6 end) switched from being short path to long path and extended beyond darkness by about 2700 km, instead of being fully contained within the dark region.

Such a distinct change in propagation with season is not found in the HF radio spectrum—particularly the higher parts—where propagation depends on critical frequencies, absorption, and noise. While noise is of a concern on 1.8 MHz, critical frequencies are not, as there is more than enough ionization overhead to support propagation throughout night *and* daytime. That leaves only absorption as a factor when it comes to the control of propagation on 1.8 MHz. The explanation of the seasonal switch from short- to long-path propagation from VK6HD/VK6VZ to VE1ZZ proves to be just as simple, involving changes of absorption in the polar regions due to the systematics and symmetries of darkness.

In that regard, since there are no symmetries found in the azimuthal equidistant projection of the VK6HD/VK6VZ to VE1ZZ path, Mercator projections and the seasonal changes of solar illumination shown in that reference system can be used to illustrate how the short/long-path change practically occurs.

At an equinox, the dark hemisphere extends from pole to pole as the Sun is located over the equator, and beyond that, the dark hemisphere covers 180 degrees of longitude at any time. On a Mercator map this circumstance is shown by a rectangular dark region from 90N to 90S, as well as between lines of longitude separated by 180 degrees and moving east to west at 15 degrees/hour during the course of a day. Those boundaries are at the Earth's surface, and it should be noted that the Earth casts a shadow for several hundred kilometres on the lower ionosphere, where radio propagation takes place. While time at ground level on Earth is convenient as a reference, it should be kept in mind that no part of the ionosphere effective in radio propagation actually reaches that low in altitude. This gives rise to differences between ground time at a terminus, and the altitude and location of the local time when propagation actually begins or ends.

After the March equinox, the Sun moves north of the equator, starting to illuminate the northern polar cap and, by the same token, initiating winter darkness in the southern polar cap. This situation begins to affect radio paths which go across both the polar caps—paths between termini where their longitude difference is close to 180 degrees, such as for Perth in Western Australia and Halifax in Nova Scotia where the difference is 178.4 degrees.

The Perth-Halifax path goes across the polar caps within a degree or so of the poles at ground level and begins to undergo changes in illumination as soon as the Sun goes north of the equator. Thus, absorption from sunlight begins to reduce any propagation across the northern polar cap, and the onset of darkness allows propagation to begin across the other polar cap.

VK6VZ's 1.8 MHz inverted-Vee dipole, with its apex at 90 ft. It is supported on a fiberglass/aluminum extension pole and mounted above a rebuilt Wilson System 3 triband Yagi.

**Please contact the authors c/o VK6VZ, P.O. Box 55, Glen Forrest, Western Australia 6071, Australia*

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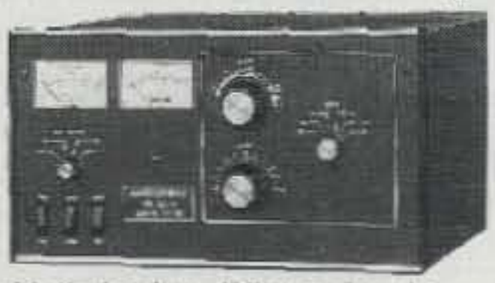

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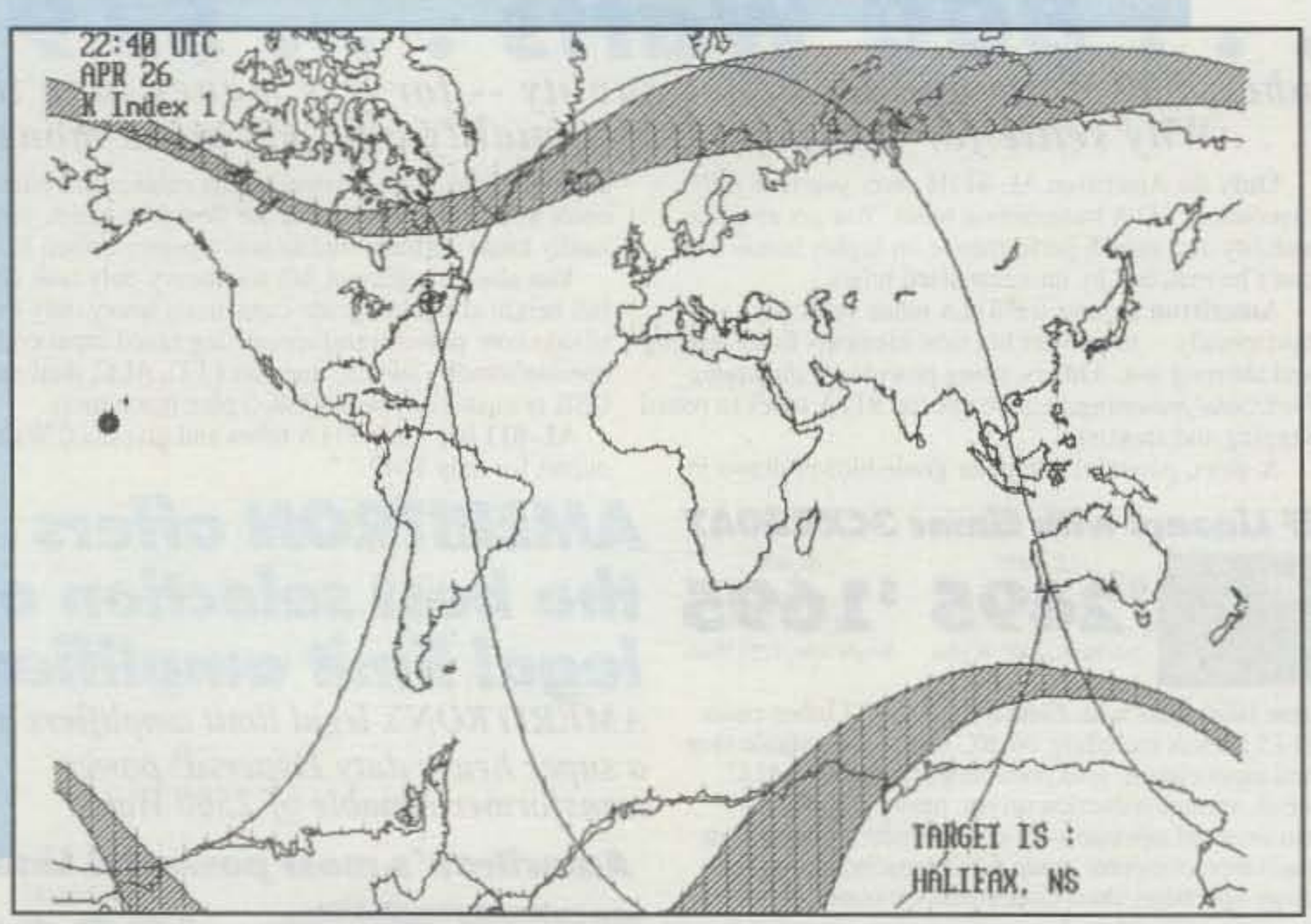


Fig. 5– Mercator Map for VK6VZ's long-path contact with VE1ZZ on April 26, 1999.

The time and extent to which propagation can proceed depends on the position of the dark region relative to the path. Fig. 5 shows the position of the dark hemisphere, in the Mercator projection, at the time of a VK6VZ to VE1ZZ contact at 2251 UTC on April 26, 1999. It can be seen that the short opening for a long-path contact between Perth and Halifax could continue as long as Perth was close to darkness and the part of the path reaching Halifax was not in too much sunlight. A similar contact was made with VE1ZZ by VK6HD (from a location near Albany) at 2240 UTC on the same day.

These two contacts with VE1ZZ are the latest in date after the March equinox in both the VK6VZ and VK6HD logs. As a result, there is the question as to just how much longer after an equinox in calendar terms that long-path propagation on these paths could practically be supported.

In any event, as the days advance past the equinox, the terminator would move from right to left in fig. 5. Thus, signal absorption in the Halifax (VE1ZZ) area would decrease, while just the opposite would occur in the vicinity of Albany and Perth.

In the final analysis, the VE1ZZ to VK6 path would close when the total absorption in sunlight over both ends of the path brings the signal below the threshold for reception and signal recognition.

As shown in fig. 5, the limiting factor would seem to be the level of absorption in the leg of the path to Halifax, which is in stronger illumination from the nearby Sun than a similar leg that would occur later in time and near Perth/Albany. In that regard, fig. 6 shows the path situation two months later, at the June solstice.

It would appear a comparable VE1 to VK6 opening would be possible from the absorption standpoint, and the lack of any such contact in the VK6HD/VK6VZ logs may be more sociological than physical in origin. The levels of QRN in the northern hemisphere summer, the occurrence of sunset very late in the evening in that part of the world, coupled with the fact that the VE1 and VK6 operators are not expecting a contact of this kind to happen, are probably the main reasons one has not occurred so far.

This also raises the question whether contacts between VE1 (Halifax) and VK6 (Western Australia) could be made on a year-round basis. After all, the contacts reported here were during the southern hemisphere summer, so why not expect to be able to make similar contacts during the northern hemisphere summer? Rest assured, VK6VZ and VK6HD will be in touch with VE1ZZ in time for the 2002 northern hemisphere summer to see if skeds can be set up to test out this theory.

Other Factors

While contacts were made between Western Australia and northeastern North America, the stations in the two regions were not identical. Indeed, they differed in many respects, such as in their individual choices of antennas and equipment. However, the stations at each end of the path also differed in other respects where choice was not involved—in geophysical features. Specifically, their geomagnetic latitudes differed considerably—about

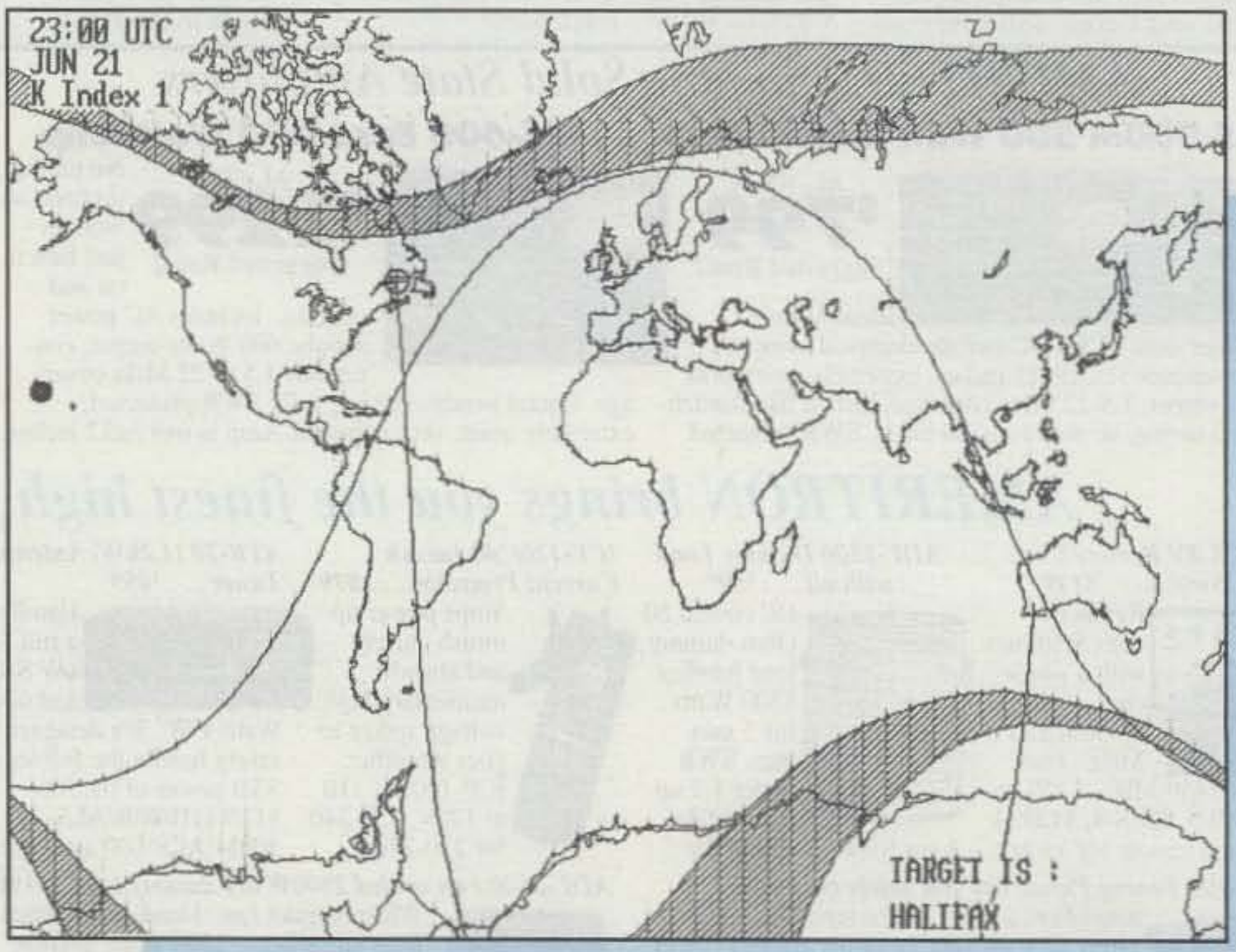
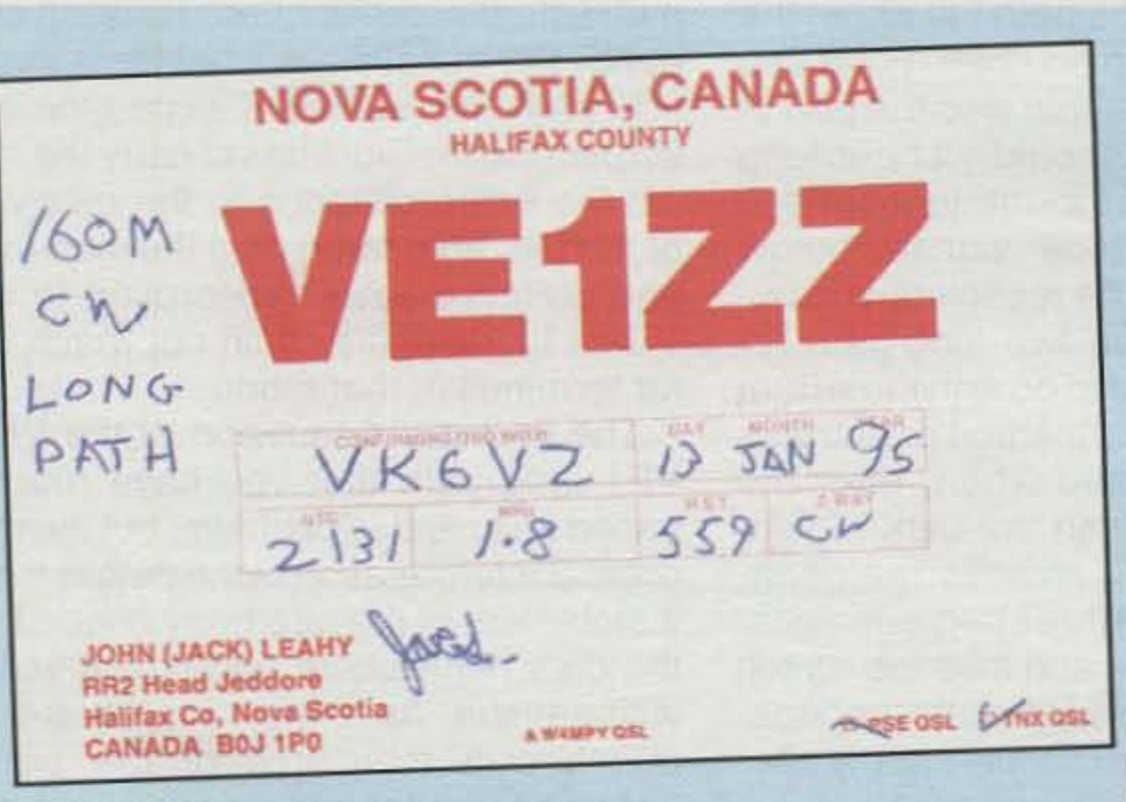
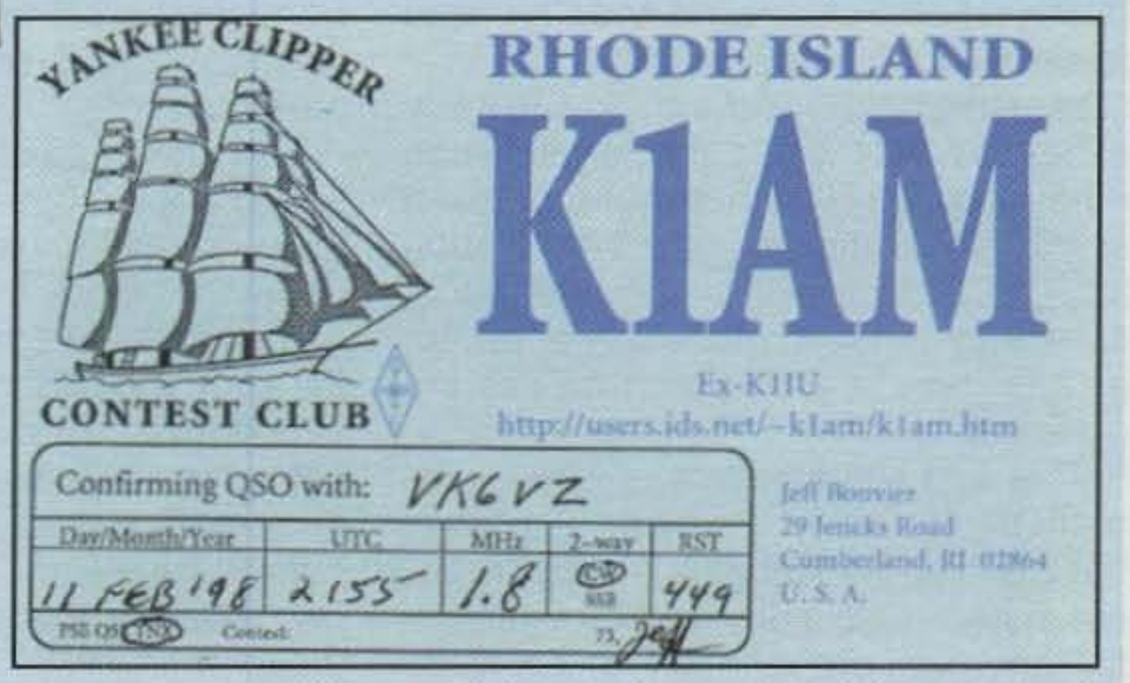


Fig. 6– Mercator Map for a possible long-path contact between Perth (VK6VZ) and Halifax (VE1ZZ) at the summer solstice.


NOVA SCOTIA, CANADA
HALIFAX COUNTY
160M
CW
LONG
PATH
VE1ZZ
VK6VZ 13 JAN 95
2131 1.8 559 CW
JOHN (JACK) LEAHY
RR2 Head Jeddore
Halifax Co, Nova Scotia
CANADA B0J 1P0
A WIMPY QSL
PSE QSL TNX QSL

This card is for VK6VZ's first-ever QSO with VE1ZZ on 13 January 1995, taking place about eight minutes after sunrise at the former's location. At the time both parties assumed the QSO was "long path" in nature, as you can see by the card. Modeling by NM7M has subsequently revealed a contact between VK6VZ and VE1ZZ at this time of day/year is much more likely to be short-path.


YANKEE CLIPPER
CONTEST CLUB
RHODE ISLAND
K1AM
Ex-K1IU
http://users.ids.net/~k1am/k1am.htm
Confirming QSO with: VK6VZ
Day/Month/Year | UTC | MHz | 2-way | RST
11 FEB 98 | 2155 | 1.8 | CW SSB | 449
PSE QSL TNX Contest 73, Jeff
Jeff Bouvier
29 Jenicks Road
Cumberland, RI 02864
U.S.A.

The long-path QSO between VK6VZ and Jeff, K1AM, in Cumberland, Rhode Island took place on 11 February 1998, about six minutes after sunrise at the VK6VZ end. K1AM has a very poor take-off on the short path to Western Australia and long path was the preference for a schedule for 1.8 MHz Worked All States purposes. The QSO took several weeks of trying and was made under excellent conditions, through the skirts of a huge pile-up for 9M0C (Spratly).

42S magnetic latitude for the stations in Western Australia and 55N magnetic latitude for those in northeastern North America.

While the difference in the magnetic latitudes is quite significant, the stations in the two areas are quite comparable when it comes to the local inclination of field lines with respect to the Earth's surface. The International Geomagnetic Reference Field[6] shows how field lines emerge from and re-enter the Earth's surface, pointing northward and up at an angle of 67 degrees with respect to ground level in Western Australia, and going back down into the Earth's surface, northward and down at an angle of 69 degrees, in northeastern North America. These features affect the degree of coupling[7] of 1.8 MHz signals with the lower ionosphere, as given by the theory of magneto-ionic propagation in the Earth's magnetic field. As field lines enter and exit the ionosphere, it is found that the actual transfer of power depends on the antenna polarization and the local magnetic field direction.

This matter was developed about 35 years ago by two BBC engineers[8], and their methods show how insertion loss for signals varies with polarization and field direction at the base of the ionosphere, favoring vertical polarization at mid and high latitudes. Those methods were used to obtain the insertion loss for polarization for the locations in this study. While vertical polarization was the more important of the two polarizations for the antennas in use—a large 4-square vertical array with considerable gain was mainly used at VE1ZZ—the closeness of the dip angles in the two hemispheres resulted in no advantage of one location over the other.

Although the major part of DXing on 1.8 MHz is done at low angles with vertically polarized antennas (Horizontal polarization is generally a poor choice for DX work on 160.), there is one occasion/situation when this norm can be reversed—at sunrise when signals are refracted from the *F*-region at high angles due to tilting of the *F*-region at that time of day.

Although the antennas (inverted-Vee dipoles at 90 ft., inverted-U dipole at 50 ft.) mainly used at VK6HD and VK6VZ have a useful vertical "low angle" component, they are sited under a quarter of a wavelength above ground and thus are predominantly horizontally polarized high-angle radiators. The vast majority of their contacts with VE1ZZ took place very close to VK6 sunrise, when tilting of the *F*-region takes place, and thus in conditions potentially favoring the use of a high-angle antenna at the VK6 end of the path.

Therefore, for contacts from VE1 to VK6 at the latter's sunrise, the combination of a high gain vertical antenna at VE1 and antennas with both vertical and horizontal components at VK6 was a good one—perhaps even ideal.

The difference in geomagnetic latitudes is another matter and quite important, although this is not readily expressed in a quantitative way— i.e., as a loss or gain in signal strength. This is the case, as "test-launching"[9] of 1.8 MHz signals with the PropLab Pro propagation program carried out by Carrie Oler[10] shows signal ducting is *three times* more likely for west-to-east signal paths from a low latitude (as in Western Australia) than east-to-west signals from higher latitudes (as in northeastern North America).

This situation was found to be the case for radiation angles from 10 to 25 degrees, but at lower angles, very lossy *E*-hops resulted. For radiation angles above about 25 degrees, signals went over to *F*-hops without ducting.

Thus, considering the high efficiency of ducted signals, when this phenomenon took place over the path in question, VK6HD and VK6VZ in Western Australia would have had a significant advantage over those stations in northeastern North America due to being much closer in distance to the lower lat-

itudes. This advantage may have made up in some ways for the higher gain antenna used in particular at VE1ZZ.

Summing Up

The equinoctial path switching that takes place around the equinoxes on 1.8 MHz is not unique to the VK6 and VE1 pair of locations considered here. As was described in the first part of this article, it also notably occurs between ZL (New Zealand) and G (the United Kingdom). Other pairs of locations can be found which are also good candidates: ZL7 (Chatham Island) to LA (Norway), ZL9 (Auckland and Campbell Island) to OY (Faroe Islands), and VK7 (Tasmania) to TF (Iceland), to cite a few examples. All these pairs certainly can meet the short-path requirement—a spatial separation of less than 20,000 km—so as to fit within the dark hemisphere at one time of the day or another and have a path going across the polar cap which is in darkness.

This last requirement is more geometrical in nature than anything else, having to do with longitude differences, but there is also a physical requirement for long-path propagation on 1.8 MHz. In particular, a "long path" on 1.8 MHz not only needs to meet the geometrical requirement that the path fall within the dark portions of the southern polar cap as seasons change, but also the part of the path in daylight should not be so long that it suffers sufficient ionospheric absorption to reduce signals below detection level of the receivers in use.

The first of those two long-path requirements still has to do with the extent to which the path concerned penetrates the polar region and when, after the equinox, it falls within the dark region. The VK6-VE1 path crosses the northern polar cap about three degrees equator-ward of the pole and thus the switch from short-path to long-path propagation (at VK6 sunrise) occurs shortly after the equinox.

The other pairs of locations mentioned above that are good candidates for equinoctial-type switching have paths that cross the polar cap at 10 to 12 degrees from the poles. As a result, the short path does not close down until sunlight has reached that part of the polar cap, days after the equinox. When short path has come to an end, long-path contact starts at soon as darkness has reached the path in the southern polar cap.

Beyond that, the point about ionospheric absorption bears on how the long path actually is structured. Thus, on one hand, the question is whether a multi-hop path has sufficient night-time absorption so that light has to carry the signal the entire distance to the receiver, or, on the other hand, that the multi-hop part suffers heavier absorption to the extent that signals could not reach the far terminus in that mode.

The in-depth discussion of the VK6-VE1 long path that you have read is based on actual experiment, but the theoretical interpretation of the path is more a statement of the geometry needed for the dark hemisphere and how it varies with season. As a result, there are no quantitative measures of the signal strengths and absorption given here, nor a full understanding as to why or how the strengths of the 1.8 MHz signals survived the over 21,000 km distance necessary for a long-path contact.

The why and the how are a complex matter of ionospheric physics which goes well beyond the scope of this article and is giving NM7M and fellow physicist Carl Luetzelschwab, K9LA, plenty to think about, lots of excitement, and a few headaches.

We hope the investigation in this article of the where and when of short/long-path propagation on 1.8 MHz will pro-

vide those interested in topband DXing with a deeper insight into propagation on this fascinating band than has previously been available.

On a final note, azimuthal mapping software such as DXAID and W6ELProp is readily available and provides an essential "navigational aid" for the 21st century low-bander, offering the chance of far greater insight into where and when DX paths will occur than is available through sunrise/sunset tables and the like.

Acknowledgements

The authors would like to thank Peter Oldfield, the author of the DXAID program, for providing NM7M with an early version of DXAID 5.0. The LoProp mapping utility was invaluable for use in this analysis.

References

1, 4. Atkinson, Brian, G3GSI, and Robertson, Jim, ZL2JR, "To New Zealand on Topband Phone," *Radio Communication,* September 1994; see also fig. 1 (in Part I of this article).

2. DXAID has been developed by Peter Oldfield, a retired professional radio and aerospace engineer with a long-time interest in radio propagation. Version 5.0, including the LoProp mapping utility used by NM7M for analysis in this article, is now available. Lo Prop allows the user to follow the advance of darkness over global DX paths and to vary upgrades of the screen view both forward and backward in units of DX time (1, 15, and 60 minute steps) by using the arrow keys and to vary user time-steps for screen upgrades (5, 30, and 60 second steps) to suit user needs and convenience. The utility is intended to allow the user to see when low-band paths open and close, as well as the directions from which QRM can be anticipated. DXAID 5.0 can be purchased from Peter Oldfield, 251 Chemin Beaulne, Piedmont (Quebec), J0R 1KL0, Canada for $25 US, $30 Canadian, or £15 UK post-paid (for a 1.44Mb floppy or e-mail delivery).

A mini-review of DXAID 5.0 by NM7M appears in this month's DX column. A full review was in the November/December 2001 issue of *The DX Magazine.*

3. W6ELProp, developed by Sheldon Shallon, W6EL, is a computer program for predicting ionospheric (sky-wave) propagation between any two locations on the Earth on frequencies between 3 and 30 MHz. It is the Windows® version of the earlier MINIPROP and MINIPROP PLUS propagation programs which ran under the MS-DOS operating system. Although not designed to work as low as 1.8 MHz, W6ELProp can be used as a guide for calculating path lengths and looking at the possibilities of short- and long-path propagation on this band. Licenses for its use for non-commercial purposes are granted free of charge; copies can be downloaded from: <http://www.qsl.net/w6elprop/>.

5. Ireland, Steve, VK6VZ, "Go Surf the Grey and Dark Lines," *CQ,* February/March 2001.

6. IGRF, International Geomagnetic Reference Field, Utility Programs for Geomagnetic Fields, National Geophysical Data Center, Boulder, CO; 1995.

7. Brown, Bob, NM7M, "Demography, DXpeditions and Magneto-Ionic Theory," *The DX Magazine,* March/ April 1998, p. 44.

8. Phillips, G.J. and Knight, P., "Effects of Polarisation on Medium Frequency Sky-wave Service," Proc. I.E.E., Vol. 112, January 1965.

9. Brown, Bob, NM7M, "Signal Ducting on the 160 Meter Band," *Communications Quarterly,* Spring 1998, p. 65.

10. Oler, Carrie, "PropLab Pro—A High Frequency Radio Propagation Laboratory," *Solar Terrestrial Dispatch,* Canada, 1994. ■

Advanced computer telephony combined with amateur radio provides an excellent medium for worldwide communications.

I-LINK
A Marriage Between Radio and the Internet

BY JIM MILLNER,* WB2REM

I-LINK is a computer telephony software program designed specifically for amateur radio by Graeme Barnes, MØCSH. It allows for crystal-clear, real-time communications with repeaters, simplex stations, and other amateurs around the world. I-LINK differs from other amateur-based internet telephony systems such as IRLP in that it runs in a Windows® (Win 95,98, 2000 & XP) based environment. This makes it available for use by most amateur radio operators who have a 486 or better computer and an internet connection.

The USER program is easily downloaded in a zipped format and can be obtained free of charge from <http://www.aac-net.net>. The program is only 300 KB in size and can be extracted in seconds. Don't let the small size of this program fool you, though. It is an extremely powerful program which uses four dedicated servers around the world to provide 24-hour uninterrupted operation.

To date there have been over 4000 copies of the program downloaded, although the number of actual users is much smaller. Even so, the popularity of this mode of operation is growing exponentially. There are currently over 200 repeater-simplex link stations from all over the world actively using the I-LINK system with five to ten additional link stations coming on each day. This is not bad given the program has just come out of beta testing!

Fig. 1– Screen shot of the welcoming screen when you log onto I-LINK.

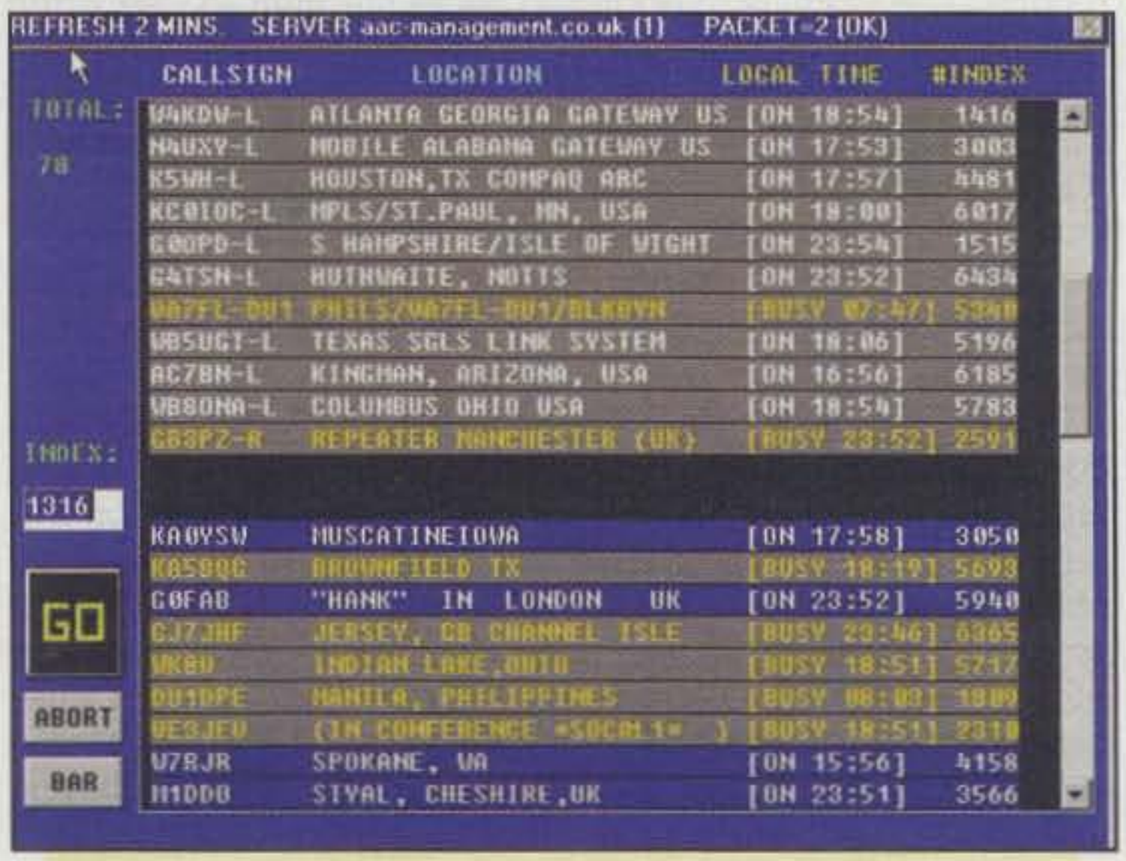


Fig. 2– Typical screen showing what links are available and active. (See text for details.)

Using I-LINK

To use I-LINK all that is needed is a good-quality microphone attached to the sound card and an internet connection. Before downloading the program, make sure your computer's microphone is set up properly. This can be done by going to the volume control, clicking properties, and checking the recording button. Once in the recording section, check the microphone box. You may need to return to this setting later on to fine tune your microphone gain. To eliminate audio feedback you can either wear a headset microphone or go to the volume control (not in the recording section) and check the mute box under the mic.

After I-LINK has been unzipped, run the program. It will ask you for your callsign and location. The program will open and look like fig. 1. Push BEGIN to see the list of stations and repeaters available for QSO (see fig. 2). If you are running a LAN (local area network), you may need to open ports 5198–5201 for the program to run. In addition, firewall protection needs to be minimized for I-LINK to work properly. To contact another station highlight the callsign with your cursor and push OK. You will see the call of the connected station appear at the top of the box. The BEGIN screen lists the stations in order of repeater links (listed with a gray background), base stations (listed with a blue background), and conference rooms (listed with a red background). (See fig. 1.) All stations except conference rooms turn yellow when busy. Wave patterns, similar to an oscilloscope, show if you or the other station is over- or under- modulated. The space bar is used, by tapping it once, to put the program in transmit and tapped once to go back to receive. That is it!

There are many other features in the program. It has a text box with details about you or your station which is viewed by

*7 Winnipeg Lane, Lawrenceville, NJ 08648
e-mail: <wb2rem@amsat.org>

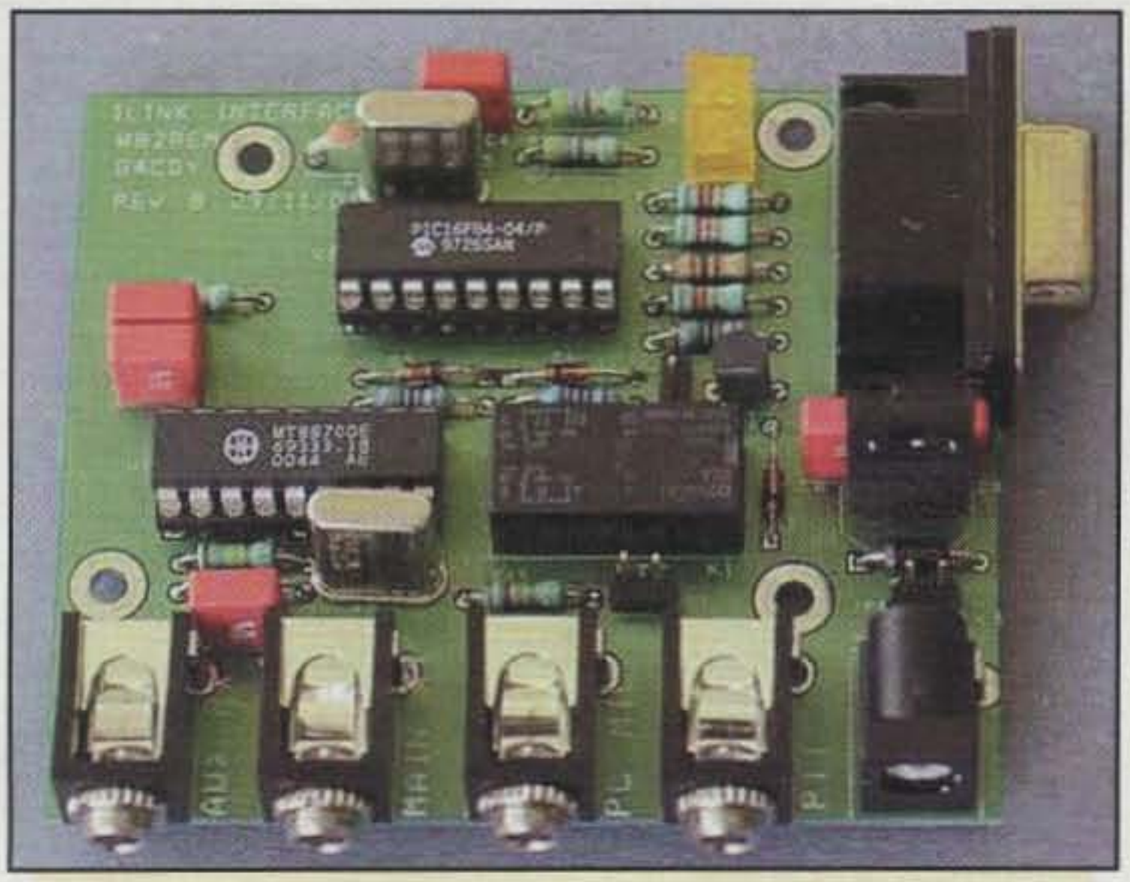


Fig. 3– I-LINK Interface Board, needed to connect a repeater to the I-LINK system on the internet.

others when they are connected to you, the capability of text chat, and a call-waiting indicator that is included in the program.

Connecting to Repeaters

Repeater operators reading this article may ask, "How can I put this on my repeater?" There is a SYSOP version of the software, which used in conjunction with the *I-LINK interface board* <http://www.ilinkboards.com> shown in fig. 3 can be remotely connected to your repeater to allow for repeater-to-repeater or repeater-to-base operator connections. Through Touchtone® commands, repeaters around the world can be accessed. This is accomplished through an on-board Touchtone decoder. Each station and repeater that runs the I-LINK is assigned a unique four-digit number. This number can be accessed remotely through a repeater or simplex station simply by entering the Touchtone associated with the station. A voice response from the SYSOP software acknowledges the request by repeating back the digits. After the link has been connected, a welcome message is played identifying the repeater.

A partial listing of repeater stations around the world is in Table I. A larger directory of repeater stations can be found at <http://www.qsl.net/vk2jtp> as well as in the user section of the WB2REM-G4CDY I-LINK Interface Board's website <http://www. ilinkboards.com/user.html>. There are also simplex stations that are not listed here. Most of the repeater stations use UHF/VHF. Many of the worldwide links utilize simplex frequencies. There are a few 10 meter FM links, including my station on 28.500 MHz and EA8EE on 29.900 MHz.

Security and Legal Issues

Maintaining the integrity and security of the amateur frequencies is a concern to all of us. Graeme, MØCSH, I-LINK's creator, and the users of the I-LINK constantly suggest ways of improving the functioning of the program and level of security. All I-LINK link stations must be authorized by a SYSOP before the program is enabled. Once authorized, the link station enters a password which activates the program. Since link stations are responsible for what is transmitted on their link, the I-LINK users are closely scrutinized. If a non-amateur appears on the list or an amateur acts inappropriately, he can

CALLSIGN	QTH	I-LINK Index #	Freq.	Mode
GB3BN-L	BRACKNELL, BERKSHIRE, UK	2481	434.600	Repeater
G4CGB-L	DUDLEY, SW BIRMINGHAM, UK	1246	145.2875	Simplex
GØAMO-L	ANDOVER, HAMPSHIRE, UK	1451	145.2875	Simplex
GØOPD-L	HAMPSHIRE STH. and ISLE OF WIGHT	1515	145.3375	Simplex
G4TSN-L	HUTHWAITE, NOTTINGHAM, UK	6434	—	—
MØCSH-L	BLUEBELL HILL, KENT, UK	1010	434.4750	Simplex
GØWZL-L	BURNLEY, LANCASHIRE, UK	1061	144.3375	Simplex
GB3PZ-R	MANCHESTER, UK	2591	430.900	Repeater
G4VYX-L	ASHINGTON, NORTHUMBERLAND, UK	2085	145.2875	Simplex
G4CDY-L	PURLEY, SURRY, UK	3073	145.2875	Simplex
G7VBX-L	BLOCKWITCH, WEST MIDLANDS, UK	1042	145.2875	Simplex
2E1SAF-L	NORLEY HALL, WIGAN, UK	1644	431.1500	Simplex
G4OBF-L	SHEFFIELD, YORKSHIRE, UK	2282	431.2000	Simplex
VK2RMB-L	TERREY HILLS, SYDNEY, AUSTRALIA	1316	146.8750	Repeater
I1HJP-L	ASTI, ITALY	3440	145.2250	Simplex
IKØHKA-L	CASSINO, ITALY	3620	435.3750	Repeater
IT9VOT-L	MESSINA, SICILY, ITALY	5928	—	Simplex
EA8EE-L	LAS PALMAS, CANARY ISLANDS	3160	28.900	FM Simplex
DD6VD-L	BERLIN, GERMANY	5778	439.9250	Simplex
VE6DBD-L	EDMONTON, AB, CANADA	5972	—	—
VE7VDU-L (VE7ZMK-R)	PORT COQUITLAM, BC, CANADA	5320	443.5500	Repeater
VE7WAZ-L (VE7ZIT-R)	VANCOUVER, BC, CANADA	4843	442.5750	Repeater
VE3KES-L	BARRIE, ONTARIO, CANADA	6358	—	Simplex
VE3FGK-L (VE3PRC-R)	BRAMALEA, ONTARIO, CANADA	1939	146.88	Repeater
VE3CIJ-L	MOOSONEE, ONTARIO, CANADA	4930	446.1000	Simplex
VE3OC-L	TORONTO, ONTARIO, CANADA	5304	—	Linked SSPB
VE7VDU-L (VE7ZMK-R)	PORT COQUITLAM, BC, CANADA	5350	443.550	Repeater
K4KR-L	JASPER, ALABAMA, USA	5132	—	Simplex
N4UXY-L	MOBILE, ALABAMA, USA	3003	145.66	Simplex
AC7BN-L	KINGMAN, ARIZONA, USA	6185	—	Simplex
KLØNE-L (KL1BR-R)	FT. RICHARDSON, ALASKA, USA	4613	147.78	Repeater
K6IRF-L (K6IRF-R)	CLAREMONT, CALIFORNIA, USA	3369	448.26	Repeater
WB6DJI-R	LOS ANGELES, CALIFORNIA, USA	5203	—	Repeater
W1CDM-L (WA6SYN-R)	SAN DIEGO, CALIFORNIA, USA	1314	449.98	Repeater
KD4EFM-L	LAKELAND, FLORIDA, USA	3363	147.195	—
AX4XQ-L (N4GDV-R)	MIAMI, FLORIDA, USA	5394	442.55	Repeater
KE4TTE-L (N4ZIQ-R)	ST.CLOUD, FLORIDA, USA	2332	145.350	Repeater
VE3ECZ-L	SPRINGHILL, FLORIDA, USA	4114	146.575	Simplex
W4KDW-L	ATLANTA, GEORGIA, USA	1416	145.600	Simplex
AH6HI-L (AH6HI-R)	HONOLULU, HAWAII, USA	4678	—	Repeater
KB9KRI-L	VALPARAISO, INDIANA, USA	5762	—	Simplex
KG4FVR-L	HOLYOKE, MASSACHUSETTS, USA	3361	—	Simplex
KCØIOC-L	ST. PAUL, MINNESOTA, USA	6017	146.550	Simplex
WB2REM-L	LAWRENCEVILLE, NEW JERSEY, USA	1471	28.500	FM Simplex
N2LEN-L (N2LEN-R)	BROOKLYN, NEW YORK, USA	6269	445.050	Repeater
WB8ONA-L (WB8ONA-R)	COLUMBUS, OHIO, USA	5783	442.225	Repeater
WO8Z-L	RAY, OHIO, USA	5760	433.1125	Simplex
W9JCM-L	SILVER SPRINGS, NEVADA, USA	4107	146.58	Simplex
N3OYQ-L	(N3OYQ-R) CLEVELAND, OHIO, USA	3486	442.125	Repeater
N3QZR-L	LEHIGH VALLEY, PENNSYLVANIA, USA	2128	145.700	Simplex
K5WH-L (K5WH-R)	HOUSTON, TEXAS, USA	4481	444.50	Repeater
WB5UGT-L	HOUSTON, TEXAS, USA	5196		Linked UHF/VHF
KB5MBK-L (KB5MBK-R)	MIDLAND, TEXAS, USA	5225	147.28	Repeater
N5YBG-L	SAN ANTANIO, TEXAS, USA	5565	—	Simplex
W5MET-L	WOODLANDS, TEXAS, USA	5790	144.92	Simplex
W5FBQ-L	WHITE DEER, TEXAS, USA	6247	—	Simplex
KB9LFF-L (N9QWH-R)	SOLON SPRINGS, WI, USA	3613	145.49	Repeater
N7WGR-L (N7WGR-R)	TACOMA, WA, USA	3304	433.825	Repeater
SOCAL1	> CONFERENCE SERVER < USA	2146	—	—
VK2JTP	> CONFERENCE SERVER < AUS	2166	—	—
E.COAST	> CONFERENCE SERVER < USA	2239	—	—

Table I– Partial listing of repeaters connected to the I-LINK network and through which you may make contacts when online.

quickly be barred from using the system simply by pushing the BAR button on the screen, which sends a message to the server. This is more than you can do on the air if someone is acting improperly or operating illegally with a transmitter. Future security improvements will be made to the program as the need arises. However, in the year that this program has been in use, there have been few, if any, breaches of security.

There are a number of legal issues which need to be addressed. I-linking is such a new concept that it is difficult to assign a traditional legal interpretation to its use. A person on the I-LINK system should be considered the same as having a visitor talking on your radio in your shack. The station is coming to you through the internet, which is through cable or telephone lines. Therefore, you are not bypassing the telephone lines to

communicate; you are using them. Thus, the third-party phone patch agreement issue does not apply.[1] Likewise, when another repeater is accessed, you are a guest operator in that shack. At either end of the connection a control operator needs to be present to shut down the system if necessary. This can be done by entering a termination code via 440 MHz or above using a telephone remote shutdown or by terminating the program in person. The WB2REM I-LINK Interface has an auxiliary audio input which can shut down the system even when an internet station is using it.

QSLs?

For all of you DXers out there, the question has arisen, "Can I QSL my contact?" The answer is yes, but only to the station that is transmitting the link. For example, Yeshey, A51AA, has operated my link in the past. Even though you may have talked to him in Bhutan on my link, you only can verify a contact with me, WB2REM, in New Jersey. Sorry!

I know that many of you are skeptical of this type of operation. I have heard it all, from people who feel that "this will ruin ham radio" to "UHF/VHF wasn't meant for long-distance communication" (*don't tell that to the people working worldwide DX on 6 meters in recent months—ed.*). These are also the kind of people who complained about the emergence of SSB during the AM days. We are communicators. Does it really matter what type of medium we use to communicate with one another? This will open a whole new world to hams in retirement communities as well as those who live in apartments or areas with antenna restrictions. It will allow them to become active again and enjoy our hobby. It could also attract new hams to your repeaters and clubs. Let's not complain about what harm this can do to our hobby, but instead celebrate the new technology, experiment, and communicate with one another through I-LINK! ■

[1] *This is the author's interpretation, with which I disagree. While the point about using the public telephone network as opposed to bypassing it is well taken, if indeed a user of this system is "a visitor in your shack," then I believe it is essential to adhere to third-party rules, specifically those dealing with international communications. Remember, though, that the FCC effectively says another ham is not a third party for the purposes of these rules. —W2VU*

Let's go "back to the days of yesteryear" with W6BNB for a look into the very earliest days of radio, or should we say, wireless...

The Heyday of CW at Sea—Part I

BY ROBERT SHRADER,* W6BNB

Today when older generations of radio amateurs and the general public think back to the "old days of radio," it is usually to the broadcast radio stations they first heard. Actually, when radio first came into practical use it was called *wireless,* and it was used to send messages mostly from ship to ship, or between ships and shore stations, then point to point between stations using radiotelegraph only. That was during the first decade of the 1900s, and of course there are not too many of those people around anymore. Radio broadcasting was not really on the general-public scene until after WW I, and television was only a dream for a few people.

The beginning of commercial shipboard radio involved sending messages and distress signals over distances of only a few hundred miles because of the limitations of reception due to the poor sensitivity of the receiver detectors and the lack of AF amplifiers at that time. As might be expected, all of the early-day radio equipment was quite rudimentary. Early amateur and commercial transmitters all used some form of spark gap to generate the radio frequency (RF) AC that produced the radio waves radiated from an antenna, or *aerial.* The AC voltage used at sea to make a spark jump the transmitter's gap came from some kind of 110 volt DC generator driving an *alternator* (AC generator) having a frequency of perhaps 400 Hz AC. The lower voltage AC had to be stepped up to thousands of volts by a transformer to produce a voltage high enough to make a spark jump across a sizeable air gap. A two-electrode, metal spark gap was connected somewhere in a high-voltage coil with a capacitor shunting it in series with the primary of an RF transformer, with its secondary coupled to a wire antenna with loading coils (see fig. 1).

When the voltage of each half cycle of the alternator's AC voltage reached a high enough value, a spark would jump across the spark gap and hold until the 400 Hz AC voltage dropped to the extinguishing point. The start of the spark current flowing in the primary of the antenna transformer induced an RF current flow back and forth in this coil and the antenna wire. The frequency of the RF AC generated depended basically on the effective quarter wavelength of the antenna (frequency in MHz = 234/length in feet). The RF AC only oscillated a relatively short time after the spark stopped on each power AC half-cycle. This resulted in RF AC cycles that started at high values and then died down to form what were called *wave trains.*

If the antenna wire and its loading coils, plus the antenna to ground capacitance to ground (C_A) formed a resonant circuit at some frequency—say, 500 kHz (known then as 500 kilocycles, or kc)—the RF AC oscillating back and forth in the antenna wire would be at a frequency of 500 kHz regardless of the power-line AC frequency. Since frequency in Hz = 300,000,000/wavelength in meters, or wavelength = 300,000,000/Hz, the "frequency of 500 kHz" is also a "wavelength of 600 meters." Because the RF AC cycles were constantly starting and then decreasing

*e-mail: <w6bnb@aol.com>

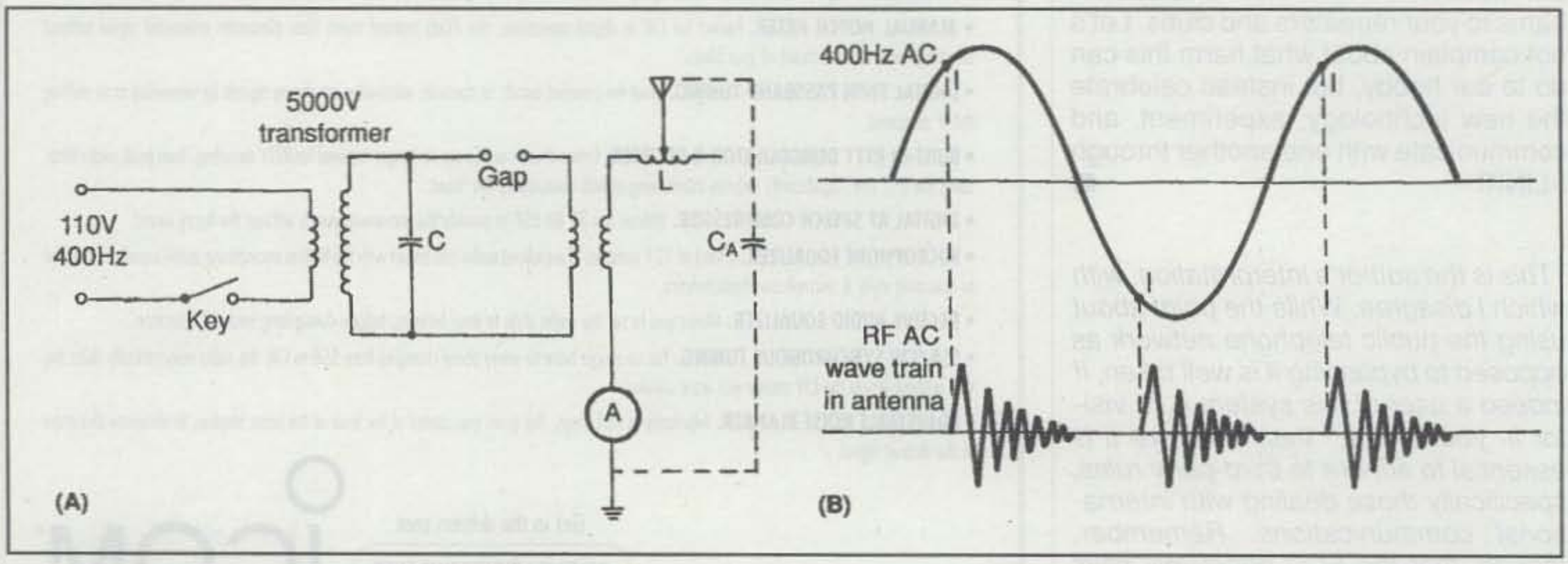


Fig. 1– (A) Basic spark transmitter circuit. (B) Power-line AC waveform and RF AC wave trains developed in antenna.

as the alternator's AC cycle voltage values decreased, the radiated RF waveforms were not sinusoidal (perfectly shaped), resulting in many RF AC sideband frequencies being developed, and thus a wide bandwidth signal.

Spark-transmitter emissions were very broad, particularly if the antenna was closely coupled to the spark circuit. This caused problems, especially after broadcast stations started sharing the airwaves with the ship stations. When ships sailed into a port such as San Francisco or New York and opened up with a couple of kilowatts of highly distorted 500 kHz, spark-type RF AC, all of the broadcast receivers in the area (which normally were tuned to something between about 550 and 1500 kHz) would hear some of the spark signals coming in over the broadcast-station signals to which they were tuned. The listeners took a very dim view of such emissions, of course, and so did the broadcasters! It wasn't long before ships using spark transmitters were required to do all of their entering-port and leaving-port transmissions either at very low power or more likely when the ship was out in the open sea.

There were many different types of radio signal *detectors* developed in the early days that could make the spark's RF AC audible in earphones. All of them were quite insensitive and none could amplify the received signals. One requirement for radio operators in those early days was a pair of good ears!

It was found that by carefully touching a thin-wire *cat-whisker* onto a piece of galena or other crystal at a "sensitive" spot, a rectifying diode was formed that detected signals fairly well. Such a simple receiver is shown in fig. 2. It was called a *crystal detector* then rather than a rectifying diode. With such a detector in a receiving circuit, a spark's wave-train, RF AC signals varying in amplitude (strength) 400 times on the positive half cycles of the power AC and 400 times on the negative half cycles could be rectified to varying amplitude RF DC pulses of 800 wave trains per second. This varying amplitude current moving the earphone diaphragms in and out 800 times a second resulted in 800 Hz audible-frequency air waves from the earphone diaphragm vibrations. Capacitor C_3 smoothed the raw pulses of DC into a smoother varying DC for the earphones. The tuned circuit L_2C_2 determined the frequency being received, and the series antenna circuit if tuned to the same frequency by L_1C_1 would increase signal strength and receiver selectivity.

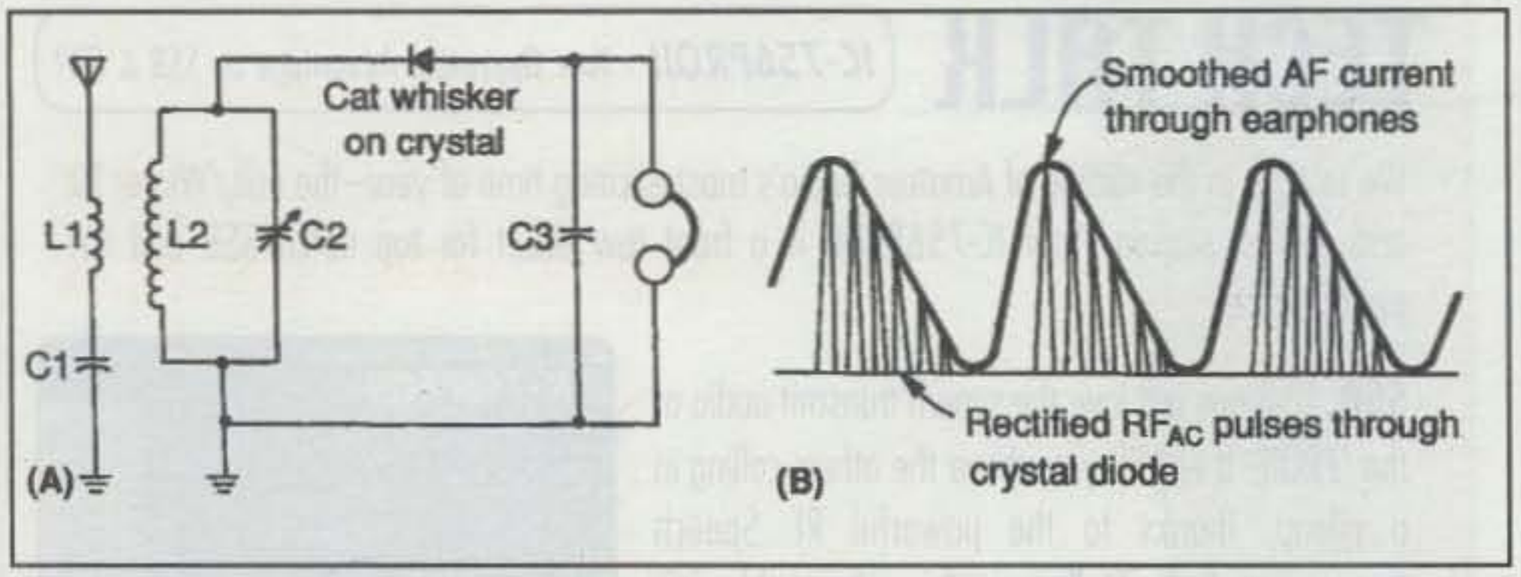


Fig. 2– (A) Basic crystal set receiver. (B) Current through the crystal and earphones.

Enter the Vacuum Tube

Late in the first decade of the 20th century two-element *diode* and then three-element *triode* vacuum tubes (VT) were developed. With VT diodes, finding a sensitive spot on a crystal was no longer necessary, and rough seas or other jarring of the receiver did not bounce the cat-whisker off the hot spot on the crystal surface. Triodes could not only work as rectifiers, they also could amplify signals, making weak signals much stronger. *Oscillator* circuits using triode tubes were developed which generated RF AC that did not vary in amplitude as spark wave-trains did. Broad sideband signals were not produced by such triode oscillators. They *generated Continuous-amplitude Wave* (CW) RF AC. Because at first only Morse code was used with VT transmitters, the term *CW* has come down through the decades to mean transmissions of Morse-code-type signals of a non-varying amplitude (*unmodulated*) type. (*Now you know why Morse code is known as CW—ed.*)

CW emissions cannot be detected by a simple diode circuit. Receiving CW requires an oscillator (RF AC generator).

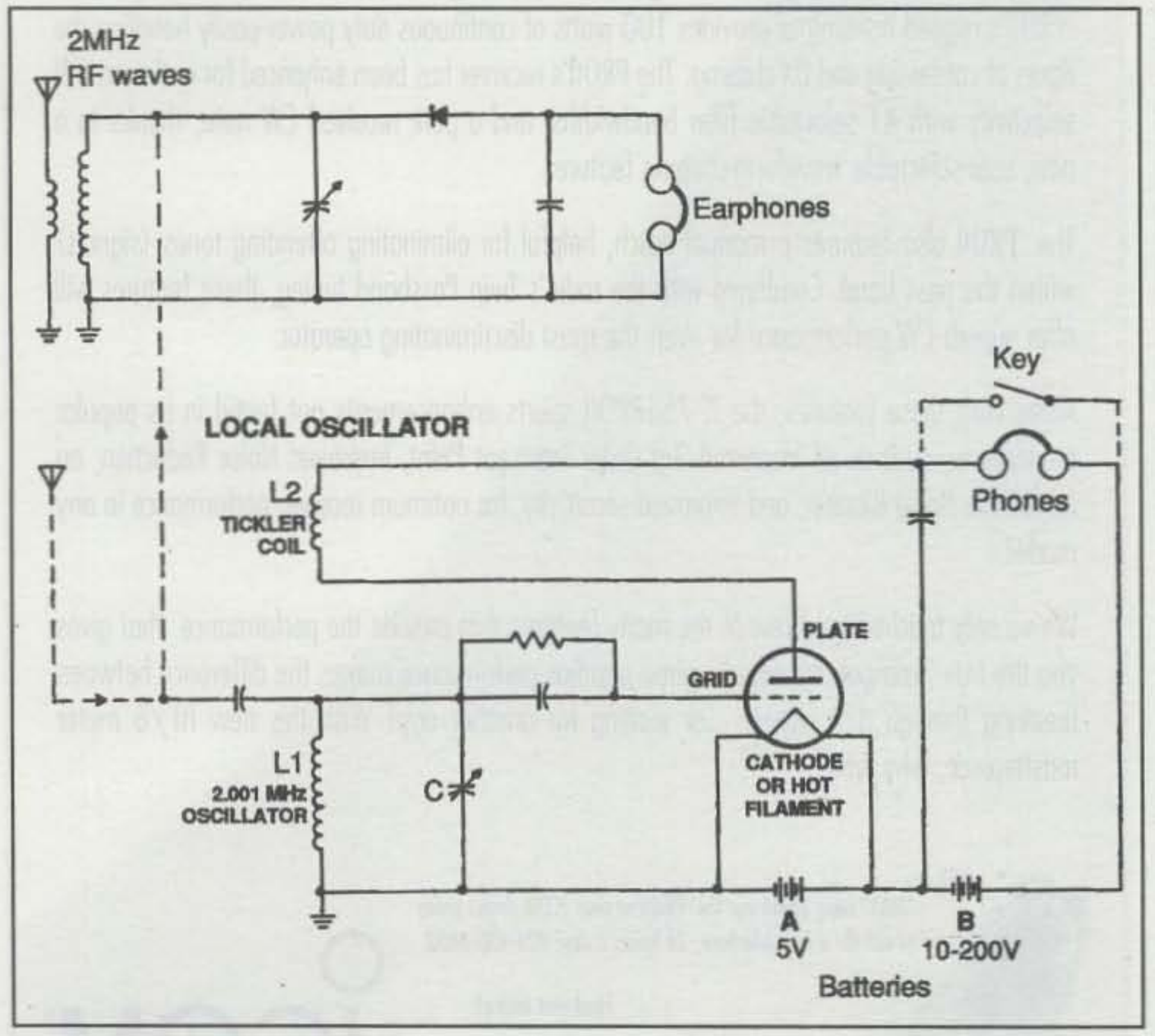


Fig. 3– (Top) Rectifying detector using a crystal, although a diode tube would work equally well. (Bottom) DeForest tickler-coil oscillator.

A local oscillator's RF AC was combined with, or "heterodyned against," an incoming CW signal to produce an audible difference-frequency tone that could be heard in earphones (see fig. 3). The lower circuit is the DeForest tickler coil oscillator. Any small variation in the grid circuit is amplified in the plate circuit, producing an alternating magnetic field from the tickler coil into the L_1C circuit, which keeps the latter oscillating. If oscillations at 2001 kHz were fed to a diode-type detector that was receiving a 2000 kHz signal, the 1 kHz difference frequency between the two signals would be developed in the earphones as a 1000 Hz tone. Actually, the regenerative detector alone could be used as a detector for CW signals if earphones were connected at point X. Such regenerative detectors were used at sea and by amateurs until the early 1940s, although some amateurs may still use them today. If a key were inserted instead of earphones, the oscillator could operate as a low-power CW transmitter.

After WW II it was discovered that by touching two cat-whiskers to two adjacent sensitive spots on a germanium or silicon crystal, a "transistor" resulted. Transistors could be used not only as rectifying diodes but also in amplifiers, and many thousands of circuits and devices evolved out of that discovery!

At the beginning of the second decade of the 1900s high-power *arc converter* (converters of DC to RF AC) transmitters were being used. These transmitters utilized the *negative resistance* (ability to cancel resistance in a circuit) of an electric *arc*, which is a continuous DC spark between two electrodes in a gas-filled chamber. The constant electrical arc required a DC generator to supply power instead of the AC of spark sets. It was only necessary to add a DC arc in series with an antenna with its loading coil and its antenna-to-ground capacitance to generate RF AC. The DC arc was ignited by pushing a carbon electrode against a copper electrode for an instant and then separating the electrodes somewhat by spring action. Once started, the arc produced a negative resistance that canceled any resistance in the antenna circuit, allowing RF AC oscillations to be maintained in the antenna-arc-ground circuit (fig. 4).

Arc frequencies ranged from about 18 to 500 kHz. The field of a strong electro-magnet looped the arc outward, lengthening it and producing more efficient operation. Since DC does not vary in amplitude, the RF AC developed by arc sets had no amplitude variations

and therefore no sidebands, so arc converters produced CW emissions which required oscillator-type detectors.

On and off keying of arc sets was not too successful. It was easier to frequency-shift key the emission by changing the antenna length. This could be done easily by shorting a few turns on the antenna coil, indicated by the key across coil turns in the diagram. Key-up transmits on one frequency; key-down transmits on a higher frequency. If tuned to the wrong frequency, receivers received unreadable, inverted Morse code signals. Another keying method was the "back-shunt" (dummy antenna) system. With key-up the arc developed its RF AC into the shielded back-shunt circuit, which did not radiate. With key-down a relay arm disconnected the arc circuit from the back-shunt, connecting the antenna to the arc circuit, allowing RF AC wave energy to be radiated. It was also possible to key frequency-modulated signals by keying a rotary-toothed contacting wheel across a turn of the antenna loading coil, which made arc signals detectable by any type of detector.

Actually, arc sets only oscillated cleanly up to about 500 kHz because of the continual variations in the looped-out arc's length. This frequency was used by ships, but after WW I amateurs had to operate above 1500 kHz and could not then use arc converters. By this time vacuum tubes were being developed that operated nicely up into tens of millions of cycles per second. Since radio circuits were constantly being developed for higher frequency operations, arc equipment was only used up through the WW II era. Aboard ships, if enough oxygen leaked into the alcohol-vapor- filled arc chamber, when the arc was struck its vapors could explode and the top cover of the arc chamber would be driven up and back on its hinges, blowing out soot and depositing a black band around the room and across the operator's chest. This did not make arc operators too happy, particularly if they were wearing white uniforms!

Before Going to Sea

My personal radio experience started in 1922 when I was given a little crystal detector receiver, a 100 ft. piece of stranded copper wire for an antenna, and a pair of earphones. By connecting the antenna wire to the antenna binding post, making a ground connection from a water pipe to the ground binding post, and connecting earphones to the other two binding posts on the receiver, local radio stations could be heard! That may not seem like much today, but it was an incredible thing for the general public at that time.

It was not long before I was experimenting with my homebrew crystal sets, finding that even the bed springs beneath my mattress would work as an antenna provided a good ground connection was made to a water pipe. Now that was really a good method of hiding an antenna system! I haven't seen that idea suggested for hams who are living in restricted antenna areas! It was not too efficient, of course, bringing in only the strongest local broadcast signals. (Don't try this when transmitting with more than a couple of watts of power, and keep an eye out for any smoke from the mattress!)

I first learned Morse code in Boy Scouts, then later in high school as a function of the physics department's radio club. What a happy day in 1931 when the 10 wpm sending and receiving code test was passed, diagrams of a complete CW receiver and a transmitter were drawn, and a bunch of theory questions were passed, all for my Class B Amateur License. It took three months before they got around to issuing my operating license and the call-sign for my station license (two separate licenses in those days).

In the 1920s and '30s commercially made amateur receivers, transmitters, and antennas were few and far between. It wasn't until the late '40s that I bought a small VT (vacuum tube) broadcast/HF amateur receiver "for my wife" (W6ECU). In the early days most of my amateur radio parts were purchased at Woolworth's 5&10 cent store. Everything I used was homebrew—regenerative detector receiver; a type 210 tube Hartley oscillator transmitter with tube, coils, capacitors, and resistors mounted on a "bread-board"; a Zepp antenna with wax-soaked dowels for spreaders; an antenna tuner; transformers hand rewound for proper filament and plate voltages; a power supply; and slop-jar rectifiers. What a thrill when a station answered me on 40 meters! That was something I will never forget. It anchored me permanently into ham radio and CW. Of course, there were years of experimenting with loop, plate, grid, screen-grid, suppressor-grid, and cathode-modulation systems on the 160, 80, 40, 20, 10, 5, and 2.5 meter bands, and then later came SSB circuits. It is too bad more amateurs today can't go this route from the ground floor up.

Graduating from high school in December 1931 dumped me into the job

market in the depths of the Great Depression. What about going to sea as a radio operator? Now that was a great idea. After a month or so of boning up at the Central Trade School radio class in Oakland, a theory test and the 20 wpm code test gave me a Radio-telegraph 2nd Class License. Great, but there were no radio operator jobs to be found. I continued in school to improve code copy on a "mill" (typewriter) and also spent the greater part of a year, every Friday, traveling to San Francisco by ferry boat, then by street car, bus, and finally on foot, to the Globe Wireless station at Mussel Rock, many miles south of San Francisco. There I copied high-speed, point-to-point code for several hours at a time as practice for a job with the Dollar Steamship Line.

In September 1933 the long-awaited job opening came—2nd radio operator on the 502 ft. passenger/freighter *SS President Harrison* . . . around the world in 110 days! What a thrill for a 19-year-old ham!

At 4 PM the next Thursday the *President Harrison* pulled away from the dock with Globe Wireless's newest and greenest radio operator standing watch. My first transmission was to notify the local shore stations that KDMW was outward bound from SanFrancisco (one word costs half as much as two by radio) to Honolulu. Unfortunately, being given that information at 5:15 PM, I promptly switched the transmitter on and called shore station KPH on 500 kHz at 5:16 ÂM—right in the middle of one of the two international 3-minute silence periods, 15–18 and 45–48 minutes after each hour—when only distress traffic is allowed! I was summarily told "QRX SP." Not a very impressive start for a life in radio, but in later years the same QRX SP was heard from many shore stations to other ships, so I could feel for those operators.

Some Ship Radio Information

The early and mid thirties were the heyday of shipboard radio operating. It was the most pleasurable time for operators. The equipment in use had become reasonably modernized, and a lot of communicating was done at fairly high code speeds.

The radio station was on the top deck just aft of the smoke stack, or funnel. The main antenna ran from the feed-through insulator on top of the radio shack up to the top of the 70 ft. mainmast, then formed an "L" to the foremast about 300 feet away. It was used on all medium frequencies (MF) from below 400 kHz to 500 kHz and on high-frequency (HF) bands from 3 to 24 MHz. The low-frequency (LF) ship bands were no longer in general use by the 1930s. Some ships also had one or more HF dipole antennas.

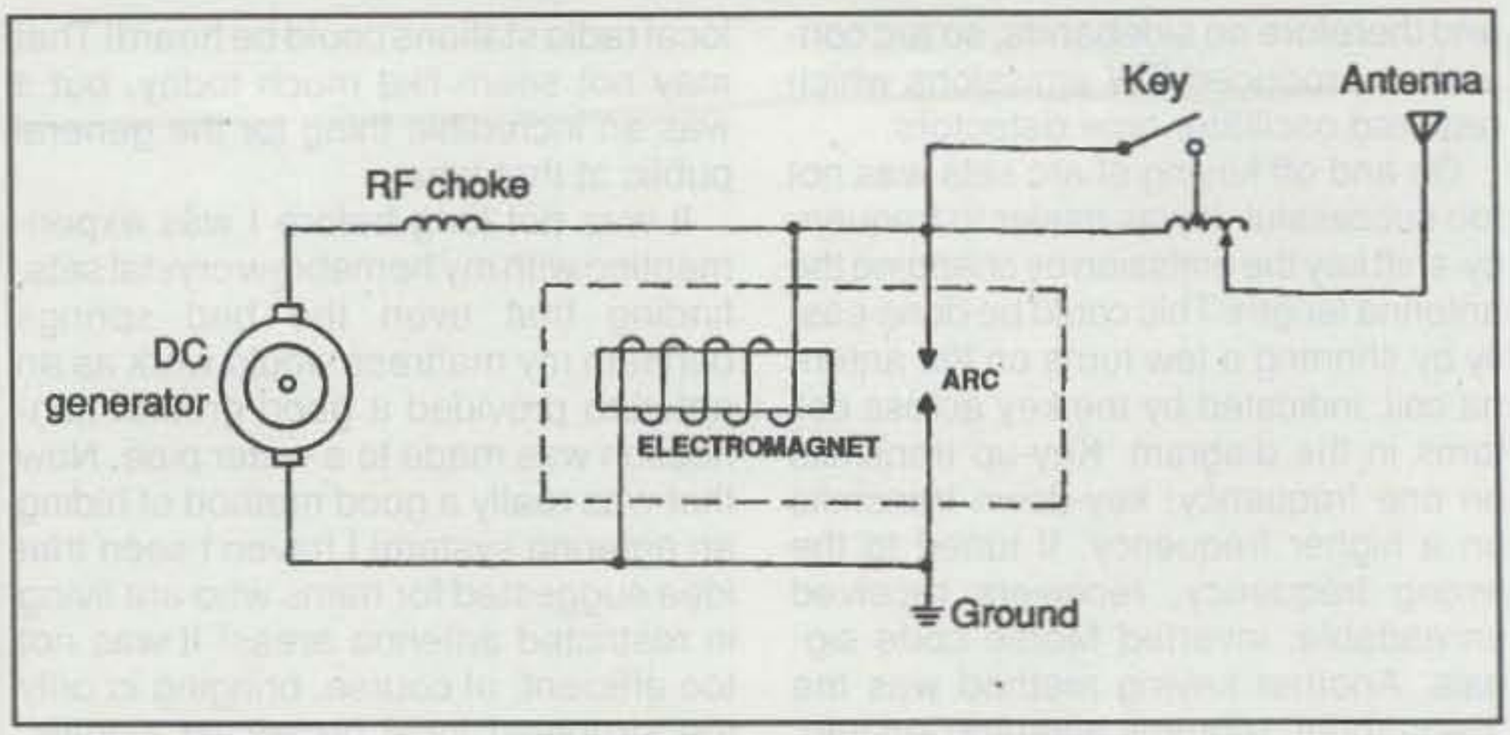


Fig. 4– Simplified frequency-shift-keyed arc circuit.

Inside the radio room of the *PresHarrison* (again, one word in messages) were two transmitters; two receivers; a typewriter; a 7-day, 24-hour clock on GMT; another clock on ship's time; an antenna change-over switch; two 6 V filament batteries kept charged through a dropping resistor from the ship's 120 VDC line; several 45 V dry-cell B-batteries; a long operating table athwart-ship (*perpendicular to the length of the ship, for you landlubbers—ed.*); and a couple of chairs. There were two portholes, a door to the deck, and another door to the radio operator's two-bunk cabin with its little wash sink. The head was forward, in the bridge officers area, a very wet walk on stormy days!

The spark transmitter was a standard 2 kW "quenched-gap" (low noise) type mounted next to the operating position on a long operating table. Fifteen metal gap holders were mounted on the front of the spark transmitter a few inches above the tabletop. The more gaps switched in, the more power output. Once one of the mates was sitting on the table in front of the gaps with his feet on the steel deck, shooting the bull with us, when he made the mistake of leaning back while the operator on watch was sending with the spark transmitter. Since the spark's operating voltage was about 5 kV, he never went near that part of the tabletop again! (OSHA did not exist in those days.)

The other transmitter was a 6 ft. tall, 1 kW, push-pull Gammatron triode tube oscillator—that's right, a single-stage, self-excited, push-pull Colpitts-like oscillator transmitter. Both spark and VT transmitters were fed by a 500 Hz alternator rotated by a DC motor running off the ship's 110 volt DC power lines. (Few ships used AC power before WW II.) If the ship's power went off, there was a gasoline engine outside the shack that drove our emergency 110 volt DC generator to take the place of the ship's power. The VT transmitter used AC on filaments and plates, so the output signal was modulated with 500 Hz AC, a very distinguishable, broad (now illegal) tone-modulated output. It was fortunate that the signal was broad, because both receivers and transmitters in those days drifted considerably, especially on the higher frequency bands. If you were lucky, both your receiver and the other station's transmitter drifted the same way. If not, it was necessary to keep one hand near your receiver dial.

The monitor receiver used for the distress frequency (500 kHz) was an early 1920s IP-501A regenerative detector with a two-stage AF amplifier connected to either a pair of earphones or a loudspeaker. Loudspeakers were used so operators were not required to wear earphones for 12 hours a day! The receiver was B-battery operated with a 6 V automobile battery for the filaments of its three 5 V tubes. A rheostat controlled the filament currents of the amplifier tubes, which also acted as the receiver volume control. There was an emergency crystal detector mounted on the front panel. The earphones could be plugged into it if the receiver's batteries went dead. To assure proper operation when out at sea with no signals, a small 1.5 V battery operated a buzzer on the front panel. When its on-off button was pushed, it produced a weak spark-type RF signal. With this the operator could

tell when the cat-whisker was on a sensitive spot.

This receiver had an MF tuning range of about 1000–300 kHz, plus a LF range of about 300–20 kHz. It was only tuned off 500 kHz for traffic handling in the MF range and was immediately tuned back to resume the watch again for any possible 500 kHz calls or distress traffic. It was always used with the detector in oscillation to assure hearing CW, spark, or tone-modulated CW (MCW) signals. Because receivers might be zero-beat with CW signals, all SOS traffic had to be sent using MCW or spark transmissions. We qualified with both our spark and our MCW VT transmitter.

The main HF traffic-handling receiver was a "TRF" type, meaning a tuned radio frequency amplifier ahead of its regenerative detector, with audio amplifiers feeding earphones. While 500 kHz might be monitored by loudspeaker, earphones were used when copying traffic. It wasn't until WW II that superheterodynes were in general use at sea.

The RF AC generated by a regenerative detector in oscillation radiated a weak signal when connected to an antenna. Unfortunately, this signal could be homed in on by submarines, allowing them to sink any ships monitoring 500 kHz with a regenerative detector! Just for the heck of it, on one trip, when advising the operator at Colombo, Ceylon that we were docking at his port, I keyed the IP-501A regenerative detector while it was in oscillation and sent him our arrival message: "KDMW QTP Colombo." He copied me, but the signal was so weak he didn't believe we were entering his port. I then keyed the 2 kW spark rig and he believed me!

The TRF receiver, by switching coils, covered all CW frequencies from about 350 kHz to 27 MHz. Signals were tuned in and then peaked by tuning the RF amplifier input circuit for maximum signal strength. Our main HF operating frequency was the 36 meter ship's CW band. Ships operated in allocated bands, the same as amateurs do. Shore stations worked on assigned frequencies above or below ship bands. Shore station transmitters usually operated with outputs of several kilowatts and could be heard quite well through the noise produced by the hundreds of DC electric fans in operation aboard all ships, particularly in the tropics. Message traffic was handled with those shore stations at some time of day, on some frequency, almost every day, all around the world. (DX has had no great appeal for me after five years of contin-

ual around-the-world DXing on almost every watch.) The antenna was coupled to both receivers by break-in relays, providing QSK operating at speeds up to about 35 wpm.

The all-capitals telegraph typewriters had to have their four feet set into ?-inch deep holes, or placed in special lower-than-table-level cut-out areas in the operating table to prevent them from sliding around or falling onto the deck during rough seas. On some ships mills rested on special little raised-border shelves mounted next to the operating position. Even so, when our ship was hit broadside by an exceptionally large and unexpected wave in mid-ocean one day, my mill wound up on the deck!

The seven-day, wind-up GMT clock on the bulkhead in front of us showed the two 3 minute silence periods from 15–18 and 45–48 minutes as thin, pie-shaped red markings. There were also 12 Auto-Alarm (AA) 4-sec. red markings separated by 1 second blanks all around the minute markings on the clock's face. When an SOS was to be transmitted, the operator was supposed to hold his MCW 500 kHz transmitter's key down while the second hand was over all of those twelve 4-sec. red markings. Three of these 4-sec. long dashes would set off AA receiver alarm bells on all nearby single-operator ships having no one standing watch at that time. These bells rang in the radio room, in the radio operator's cabin, and on the bridge.

I sent my only SOS when the ship was being bombed by aircraft while we were at anchor in the Yangtze River, waiting to move up to Shanghai. I used a bug, not at the specified 18 wpm for an SOS, but at about 25 wpm, and I didn't mess around with those twelve 4-sec AA dashes either! The local Shanghai XSG operators QSLed my message and made the arrangements that prevented any more bombing. Japanese and British battle ships nearby responded and circled around us but were advised that only medical help was needed, which the British ship supplied.

Years later when I was on a single-operator ship, I had to use an AA receiver when I was off watch. It is remarkable how many times static noise, especially in the tropics, can turn out to produce the three 3.5- to 4.5-sec dashes (steady static noise), separated by a 0.5-sec to 1.5-sec noiseless periods that would set off the AA. Many a time I had to rush into the radio room to turn off the bells only to find out it was another false alarm. One of the bridge officers had to rush back to the radio room to determine where the ship in distress was. After listening for several minutes, but hearing no repeat of any SOS message or any distress traffic being handled, the incident was logged off.

Operators learned to turn down the RF gain on the AA receiver so that only nearby, strong radio signals would activate it! This was adequate in our case, because at 8 knots full speed ahead our ship was so slow it could not have gotten to a ship in distress to do any good if it was more than a hundred or so miles away! At less than 100 miles any signals would have been strong enough to actuate the AA.

The antenna change-over switch, hanging down from the overhead in many radio rooms, had a moveable brass arm about a foot long connected to the long main antenna. It had at least three switch positions, selected by pulling the arm up or down to different fixed contacts by a rope and pulley. These positions were:

1. Antenna to the transmit/receive relays for communicating,

2. Antenna to the 500 kHz receiver, as when the radio direction finder was calibrated, because a retuned antenna above a radio-direction-finder loop antenna can shift the direction taken by radio waves approaching the loop.

3. Antenna to the ship's steel hull (ground) when in port or in an electrical storm.

Once when cruising up the coast of Italy, the ship passed under a cloud, producing a very strong electrical disturbance. Playing around with the change-over switch, it was found that a continuous 1 inch arc could be drawn from the antenna arm to the ground contact by the DC static electricity picked up by our ±350 ft. main antenna! Of course, it is impossible to hear anything on receivers when running in either such "rain static" or "snow static." This is why all ship receivers have small spark gaps across their antenna input circuits. Amateurs sometimes experience this problem when a highly charged cloud passes over their antennas.

Next: The Life of a Radio Operator

Now that you have an idea of the physical setup of a ship's radio station (or at least, *my* ship's radio station), stay tuned for Part II, in which we'll explore a radio operator's life at sea, including a visit to the pyramids and getting bombed in China! ■

Reader Survey
March 2002

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

Each time we run one of these surveys, we'll ask a few different questions and ask you to indicate your answers by circling numbers on the Reader Service Card and returning it to us. 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 your views on "refarming" the HF Novice bands (see "Washington Readout" and "Zero Bias" for details).

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

1. ...how you feel about the ARRL's proposal to add 25 kHz each to the 80- and 40-meter phone bands by reallocating ("refarming") the Novice segments on those bands...

Taking too much away from CW subbands 1
A good plan 2
Not enough additional phone space 3
No opinion 4

2. ...how you feel about the ARRL's proposal to give current Novices and Technicians with code credit CW operating privileges on all General Class CW frequencies in the 80, 40, 15 and 10-meter bands, with a 200-watt power output limit...

Too many additional privileges without upgrading 5
A good plan 6
Agree with frequency privileges but not power limits 7
Agree with power limits but not frequency privileges 8
Not enough additional privileges 9
No opinion 10

3. ...how you feel about *CQ*'s proposal to give current Novices and Technicians with code credit CW and digital operating privileges on all General Class CW frequencies on all HF amateur bands...

Too many additional privileges without upgrading 11
A good plan 12
Agree with frequency privileges but not adding digital privileges 13
Agree with adding digital privileges but not frequency privileges 14
Not enough additional frequency or mode privileges 15
No opinion 16

4. ...what your preferred approach is to the HF Novice bands:

Keep as they are 17
Keep as CW-only 18
Smaller phone subbands than proposed 19
Larger phone subbands than proposed 20
No opinion 21

5. ...what your preferred approach is to HF operating privileges for Novices and Techs-with-Code (circle all that apply):

Modes
CW only 22
Add digital 23
Add more phone 24
Frequencies
Keep as they are 25
Add more 26
Take some away 27
Power
Keep 200-watt limit 28
Increase, but not to full power 29
Increase to full amateur power 30

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

What You've Told Us...

Our January Reader Survey asked about your personal readiness to respond in case of an emergency or disaster, and the results were quite impressive. A whopping 70% of the readers who responded describe themselves as either "well-prepared" (47%) or "very well-prepared" (23%) to provide communications in an emergency, and only 3% said they are not prepared to respond.

We are also well-equipped. Ninety percent (90%) of the respondents have one or more VHF/UHF handhelds available to bring to an emergency; 77% can bring a VHF/UHF mobile rig and power supply, 55% have an HF mobile rig and power supply and 54% have an HF fixed radio and power supply they could bring to set up a makeshift station. The only low number was HF portables, at 13%. You'll also need an antenna and feedline, and 81% of you can bring a VHF/UHF antenna to where it's needed, 56% can bring an HF antenna, and 67% can provide feedline and power cables. Sixty-four percent can even provide a backup radio!

On the question of how much experience and/or training you have in operating emergency, public service or traffic nets, 37% reported "considerable," and 36% responded "some," while 15% said "a little" and 11% said "none." *(A word of advice from first-hand experience: practice and training pay off. Try to find an event you can help with.—ed.)*

Finally we asked how quickly you could pack up required radio and personal gear and be ready to respond if needed, and this provided the most impressive response of all: 57% said within an hour, and another 29% said within 3–4 hours, for a total of 86% of you able to respond to an emergency, with necessary gear, in four hours or less.

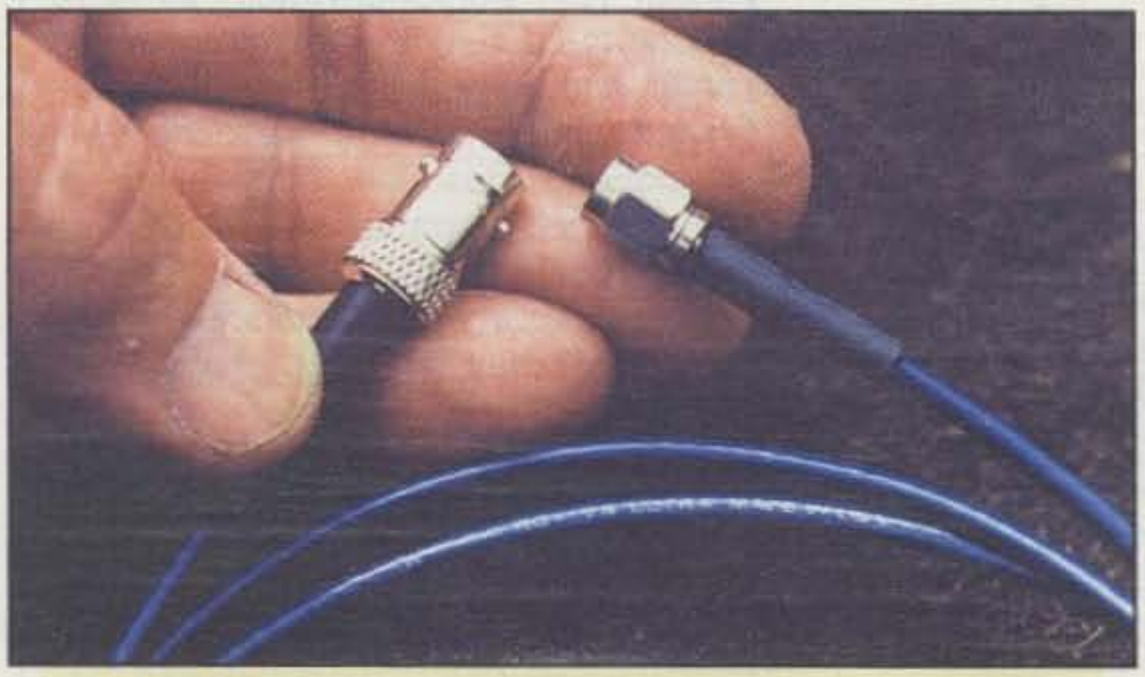
As always, thank you to all who responded to our survey. This month's winner of a free one-year subscription to *CQ* is Bill Bishop, KØBL, of Ottumwa, Iowa.

If you received one (or more) of these last holiday season, you indeed have a gift that will make ham radio more fun...

Tuned, Tested, and Great!

BY GORDON WEST,* WB6NOA

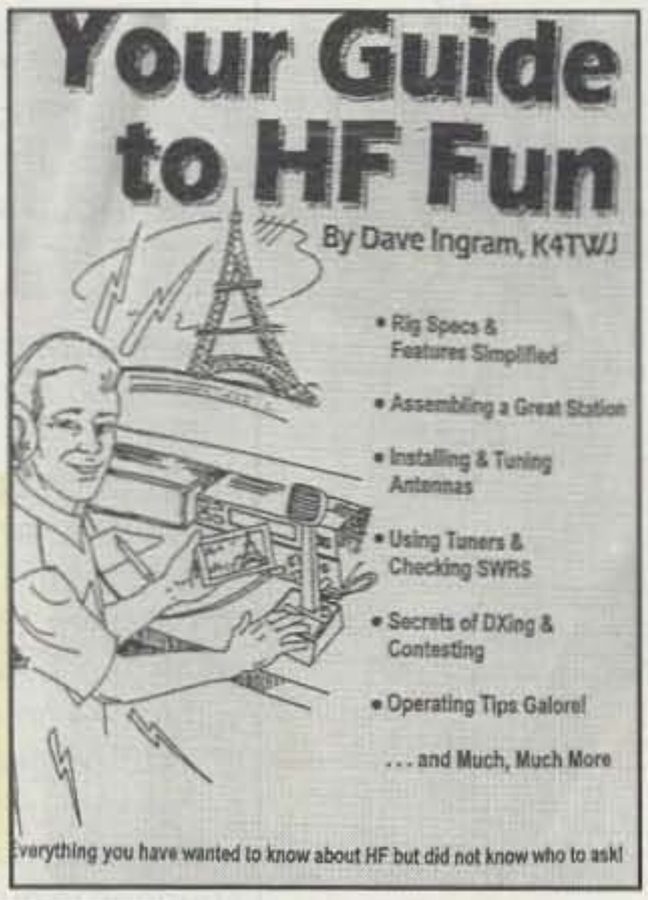
Good hams love *stuff.* Sometimes a relatively inexpensive accessory may supercharge your excitement for our hobby or get you on the air more easily. I get my hands on plenty of *stuff* to test and review each year, and here are some very hot items worthy of your consideration.



Antenna World has over 20 patch cables to take the strain off of any handheld operated from a mobile big-coax cable. Shown here is a BNC to SMA cable.

Antenna Patch Cables

If you own one of those new handhelds with an SMA antenna connection, you stand to break that rather fragile connection on the inside of the HT if you hang on a bunch of heavy adapters to match the SMA to your mobile antenna cable with a PL-259. Right-angle SMA male to an SO-239 one-foot cable is available from Cable Xperts for under $20. Antenna World also has over 20 patch cables to take the strain off any handheld operated from a mobile big-coax cable.



Your Guide to HF Fun, *by Dave Ingram, K4TWJ, gives the new General operator a fun look at setting up HF in a vehicle and getting on the air.*

Good Read'n

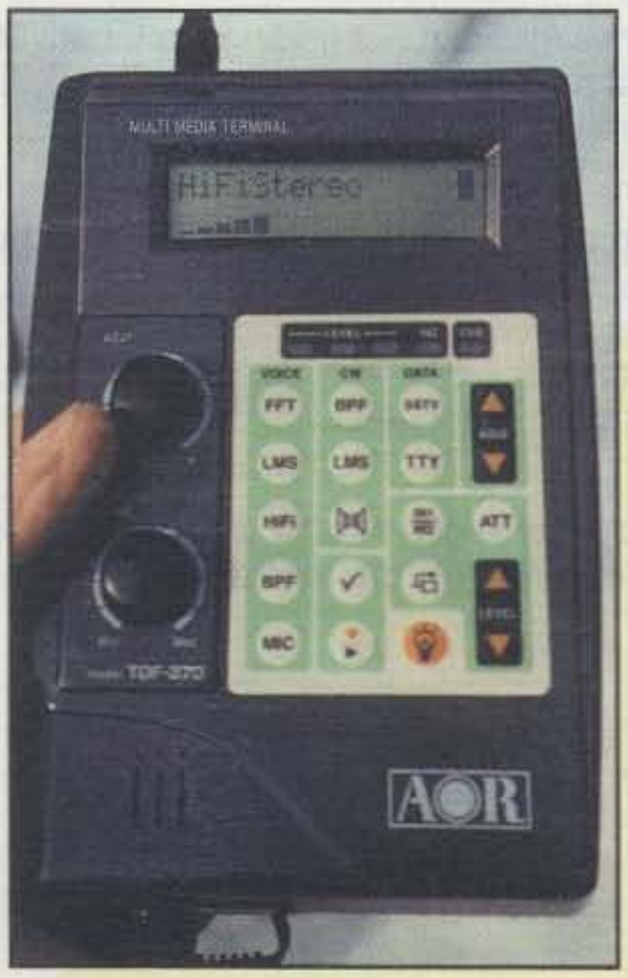
CQ colleague Dave Ingram, K4TWJ, has a new book out called *Your Guide to HF Fun.* It gives the new General operator a fun look at setting up HF in a vehicle and getting on the air. Ingram's style of writing makes the book entertaining and gets you so excited about going mobile that you'll be on the air when you read his last chapter!

What Did You Say?

Operating HF mobile is no time to be fiddling with a myriad of buttons and knobs for DSP noise cancelling. The AMCOM ClearSpeech speaker is either on or off, and it offers 95 percent background noise reduction. This is an active ADSP circuit inside a regular-looking speaker, and wait until you hear what it can do while you're mobile. It can make a big difference as your base-station speaker, too.

Stereo and PSK 31

AOR has introduced a multi-media terminal using powerful DSP noise reduction, dramatically enhancing the reception of SSB and CW signals—even in derived stereo! Best of all, it decodes and displays PSK 31 or RTTY on the LCD panel with no external computer required. It also offers transmit microphone equalization and signal playback up to 102 seconds. It's portable, comes with its own nifty headphones, and adds a whole new dimension when operating HF portable or base. See last month's *CQ* for a full review.



AOR's multi-media terminal with powerful DSP noise reduction dramatically enhances the reception of SSB and CW signals even in derived stereo! It also decodes and displays PSK 31 or RTTY on the LCD panel with no external computer required.

CW Helper

If you're trying to learn CW, back up proven audio cassettes and computer programs with the MFJ Morse Code reader. I tried it, and it really works! Just hold the portable

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

Just hold MFJ's portable Morse Code reader up to any speaker tuned into CW, and about two seconds later the reader begins to spell out everything that's coming out of the speaker. It's a great way to help you learn code.

reader up to any speaker tuned into CW, and about 2 seconds later the reader begins to spell out everything that is coming out of the speaker. It works best tuning in computer-generated CW such as W1AW broadcasts. It sort of works when someone is sending with a rather sloppy fist. However, it *does* work! It's a great way to help you learn the code.

Dead Battery Eliminator

Maha, the battery people, offers an inexpensive smart charger and conditioner for AA or AAA batteries, auto-

The MasterCharger Ia from W&W Manufacturing is a rapid charger that will charge a nickel-cadmium or nickel-metal-hydride battery in 1/2 to 2 3/4 hours and will automatically go into a trickle charge state. Interchangeable adapter cups are available for most ham radio batteries.

Oops...

Well, we managed to hide our mistakes pretty well for a couple of months, but they're finally starting to catch up with us. First of all, W2VU's repeated references to 2002 as an "anagram year" were repeatedly wrong ("Zero Bias," January issue). An anagram is a word whose letters can be rearranged into other words. A word that reads the same backwards and forwards is a *palindrome.* (Tnx W4STX)

Next, we had a typo in December's QRP column (p. 84) in the phone number for W6MMA/Super Antennas. The correct number is 530-622-6668.

matically fast-charging to peak performance in less than an hour, and then automatically trickle charging. Push a button, and it gives the batteries a conditioning cycle. It works great on nickel cadmium chemistry as well as nickel metal hydride.

Maha also makes an almost twice as powerful replacement battery pack for the popular Yaesu FT-817, along with a battery-pack charger and conditioner called the MH-C777 Plus. Drop the pack on the rig and watch the LCD readout. Maha is a great source for your battery needs. (*See this month's "How it Works" column for more on batteries in general and on Maha's chargers as well.—ed.*)

When it comes to a completely new battery pack for that older HT, W & W Manufacturing Company and Batteries America (E.H. Yost & Co.) offer a wide selection of replacement battery packs.

Junior Whip

Speaking of the Yaesu FT-817 backpack radio, I tried the new Junior Outbacker antenna, dubbed the *Joey* after a baby kangaroo, and it works pretty well from 80 meters through 2 meters, including 30, 17, and 12 meters. The antenna is about 50 inches long and comes complete with a 12 foot copper-braid counterpoise along with an available lightweight miniature tripod. The little Junior Outbacker looks like a big Outbacker, but smaller, and it works relatively well! This comment is not meant to be negative. There will always be compromises in shortened HF antennas. This is a really shortened HF antenna, and with that in mind, it works relatively well!

Attic Master

I just returned from Hawaii, where I put together a hidden antenna installation in a condo attic. The problem was it wouldn't work worth a hoot inside the attic, but a convenient unused vent pipe gave me access to the wild blue yonder. I wrapped wire around the MFJ 33 foot telescopic fiberglass mast, and up through the vent pipe it went, standing tall and dramatically improving my signal. Simply twist to lock each section in place, and up goes the MFJ telescopic mast. I tried different automatic antenna tuners with the long wire, and the LDG AT-11MP did the trick nicely on all bands from 10 meters down to 75 meters. For mobile I ran with several SGC automatic antenna couplers, and they, too, are outstanding performers as long as you give them lots of wire and a big ground plane.

Stuck on You

I think I have found the ultimate magnetic mount for major-size mobile antennas. It's made by Metal & Cable Corporation, and the mount features eight individual full magnets that hold on so tightly that it was nearly impossible to coax it off my rental-car roof. If you run a smaller HF whip, they have a four-magnet mount, too.

Your Call?

If you're looking for custom embroidering to put your callsign on any type of apparel, Creative Promotions out of Seattle has all the machinery to embroider your callsign, or handle a large club order for a specific embroidered design. Best of all, the company is run by Chuck Northcutt, W7SRZ, a well-known Seattle ham and past sales manager for ICOM America. Whatever you need embroidered, he has all of the ham logos ready for three giant embroidery computers to do the job.

Got Kids?

I am reviewing several crystal radio kits from Vectronics, and we hope to have enlarged versions of these kits for kids to put together at the upcoming Dayton Hamvention™ in May. Richard Stubbs at MFJ/Vectronics promises some of the very best kits for a variety of applications, and he can't wait to see how much fun everyone is going to have putting together these entertaining and instructional projects.

What's Your Feedpoint?

Do you have one of those big, new motorized HF antennas and just can't seem to get the SWR down on 40 and 75 meters? The problem may not be resonance, but rather feedpoint impedance. MFJ offers two impedance-matching selector switches; you switch in shunt-sent capacity that will magically raise the feedpoint impedance to near 50 ohms. Your transceiver will be much happier, and it is one of the easiest ways to get back to 50 ohms without a handful of coils or caps.

A Little Privacy, Please

Are you looking to stay in touch with your better half on 2 meters, but not have everyone on simplex hear exactly what you are saying? Codes and ciphers are not legal ion ham radio, nor are scramblers. However, what *is* legal is the new Alinco DJ-596 dual-band HT with the optional digital voice encoder and decoder. While other operators with decode capability for ITU-TV.32 digital voice protocol may eavesdrop, chances are on simplex you won't be overheard by too many people. On an analog HT the digital signal is just noise. I don't suggest that you talk digital over a repeater, because the control op won't know what is being said, and if the repeater is tone-controlled your digital signal won't get through. On simplex, though, two licensed hams using the digital format can stay in touch without too many other folks listening in. I've tried it and it works, but be sure to ID in normal FM before going over to the digital talk mode. (*We'll be reviewing the DJ-596 in an upcoming issue.—ed.*)

All in all 2001 was a very good year for *stuff*, and since the accessory market is particularly encouraging of entrepreneurs starting out with just one or two products, I'm sure we can look forward to a lot more new—and good—stuff in 2002! ■

Resource Directory

Alinco: <http://www.alinco.com>
Alpha Delta: <http://www.alphadeltacom.com>
Amcom: <http://www.amcominc.com>
Antenna World: e-mail <tom@antennaworld.com>
AOR: <http://www.aorusa.com>
Batteries America: <http://www.batteriesamerica.com>
Cable Experts: <http://www.cablexperts.com>
Creative Promotions Embroidery: phone 206-243-7070
Dave Ingram, K4TWJ: phone 205-951-0162
LDG: <http://www.ldgelectronics.com>
Maha: <http://www.mahaenergy.com>
Metal Cable: e-mail <david@metalcable.com>
MFJ: <http://www.mfjenterprises.com>
SGC: <http://www.sgcworld.com>
W&W Manufacturing: <http://www.ww-manufacturing.com>

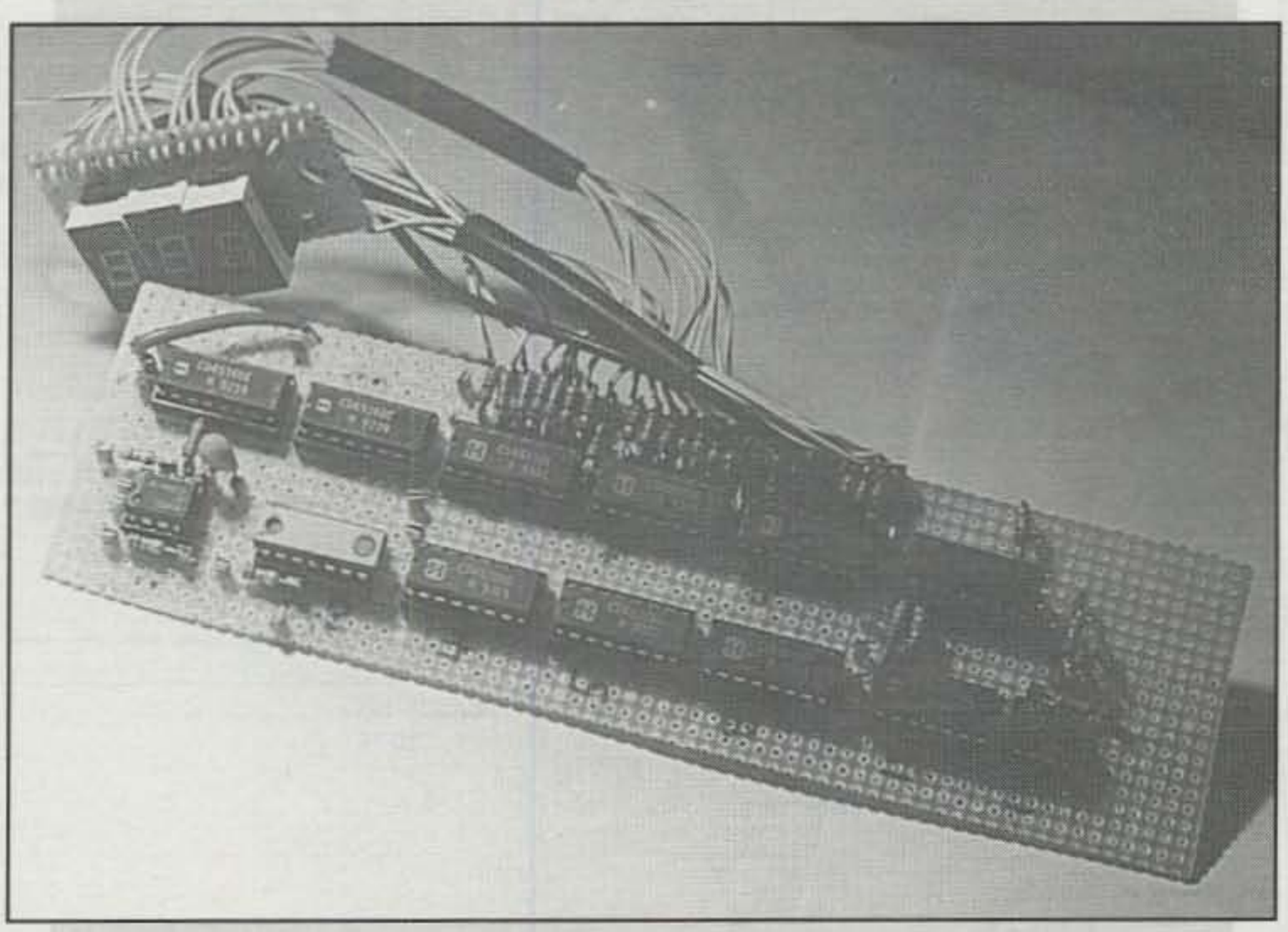
(If you've converted an old CB rig for use on the ham bands (assuming, of course, that you have a ham license with privileges on 10 or 12 meters), here's a neat circuit to add a convenient feature to your newly modified radio.

Add Scanning to Converted CB Rigs

BY KLAUS SPIES,* WB9YBM

With the best propagation of the current sunspot cycle on the 10 and 12 meter bands, it's once again time to dust off the radios and enjoy the DX. For those of you who either don't have a radio yet for those bands or do but want something smaller that you can use in a mobile environment, converting a citizens' band (CB) radio may prove to be the easiest and least expensive approach. All it takes is a different reference crystal in the oscillator and a re-tuning of the RF stages. This article, however, is not a guide to converting a CB rig for ham use (see box for articles on this topic). It's a project for adding a convenient feature that many of these radios are missing.

This concept of converting a CB rig, while effective, efficient, and inexpensive, still lacks a few of the options of fancier radios. Don't despair! Many modifications are much easier than you might think. Checking out where in the squelch circuit the audio amplifier (or audio) gets switched on and off can provide a convenient signal for controlling links, repeaters, autopatches, and other interesting add-ons (we'll even be using that in this circuit).



The author's scanning/LED readout circuit before installation.

Add a Scanning Circuit

Let's take a look at scanning. It's much simpler than you might imagine: All that's needed is a digital (square-wave) oscillator (U1 in the schematic) and a counter (U2 and U3). The counter takes the place of the mechanical switch (which, in effect, was nothing more than a mechanical binary counter—on or off). The oscillator provides the driving force behind the counter. The remainder of the circuitry is both to make the circuit a bit more "user friendly" by adding things such as a digital channel readout (U4–U9), and automatic power-up reset, which also makes sure that the counters for the channel display and the counters for the PLL (phase locked loop) start at the same place (U10C, U12C, U14, and U15), as well as adding a few "bells and whistles."

Manual or automatic scanning is selected by U12A, S1A, and S1B. Manual channel advance is provided by S2. Depending on the type of switch that you use, you might have to put a capacitor in parallel to it to avoid noise or "switch bounce." S3 and U13A select between the scanner stopping at an unused or busy frequency. This will al-

Converting CB Rigs for Ham Use

There have been dozens of articles published over the years in ham magazines for converting CB rigs to amateur use. The following are just a few, courtesy of the FBTO (From Beverage Through OSCAR) indexing program by Di-Dah Publishing:

- 10 Meter Conversion of CB Transceivers," *QST,* 2/67, p. 20
- Simple CB Conversion," *QST,* 5/67, p. 49
- Another Simple CB Conversion," *QST,* 8/67, p. 40
- Sears SSB CB Rigs: CB to 10 Meters," *CQ,* 11/80, p. 59
- CB to 10 Meter Conversion Article List," *73,* 3/88, p. 39 and 4/88, p. 52

You may also find plans on various websites. Use your favorite search engine to look for them.

* *815 Woodland Heights Blvd., Streamwood, IL 60107*

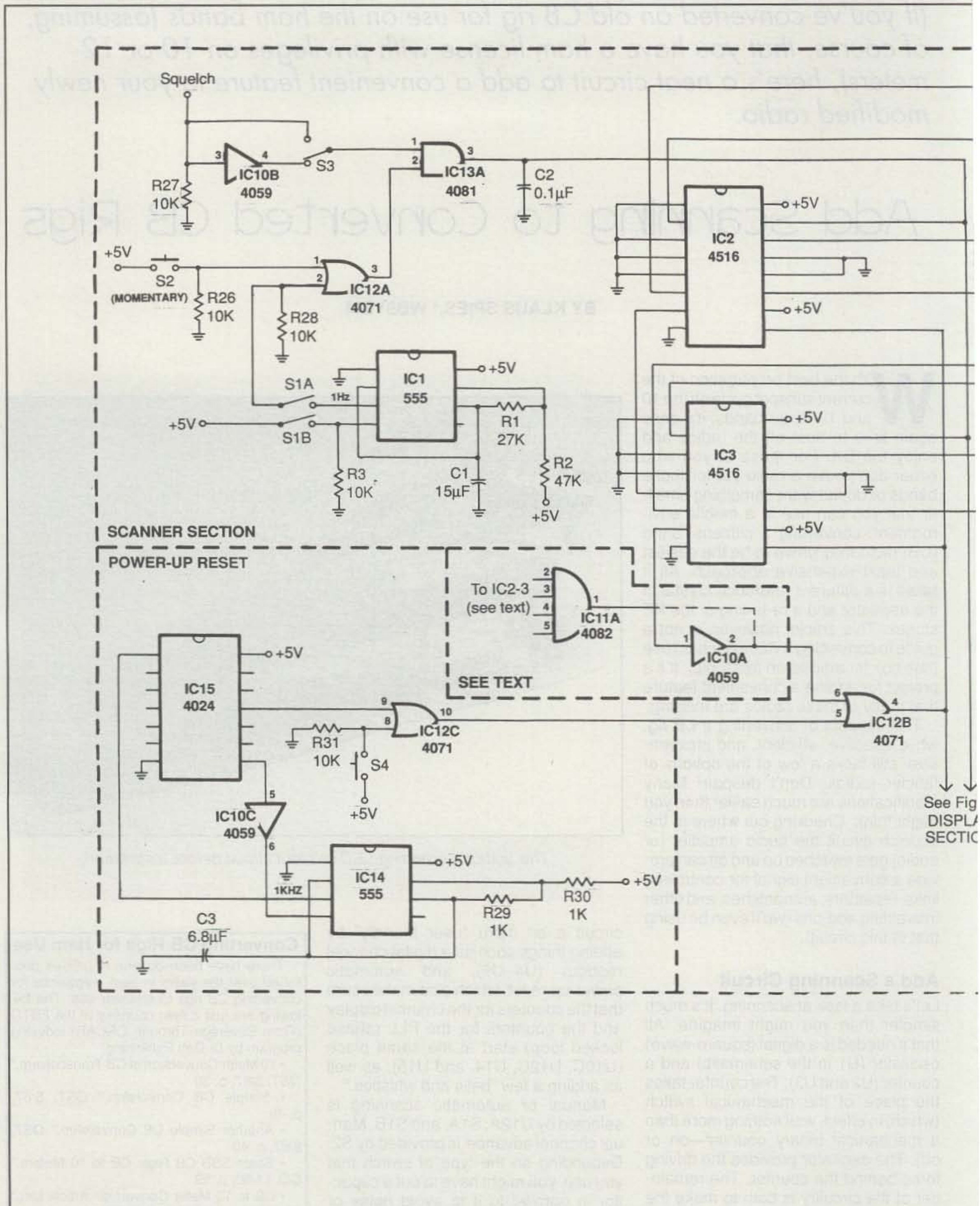
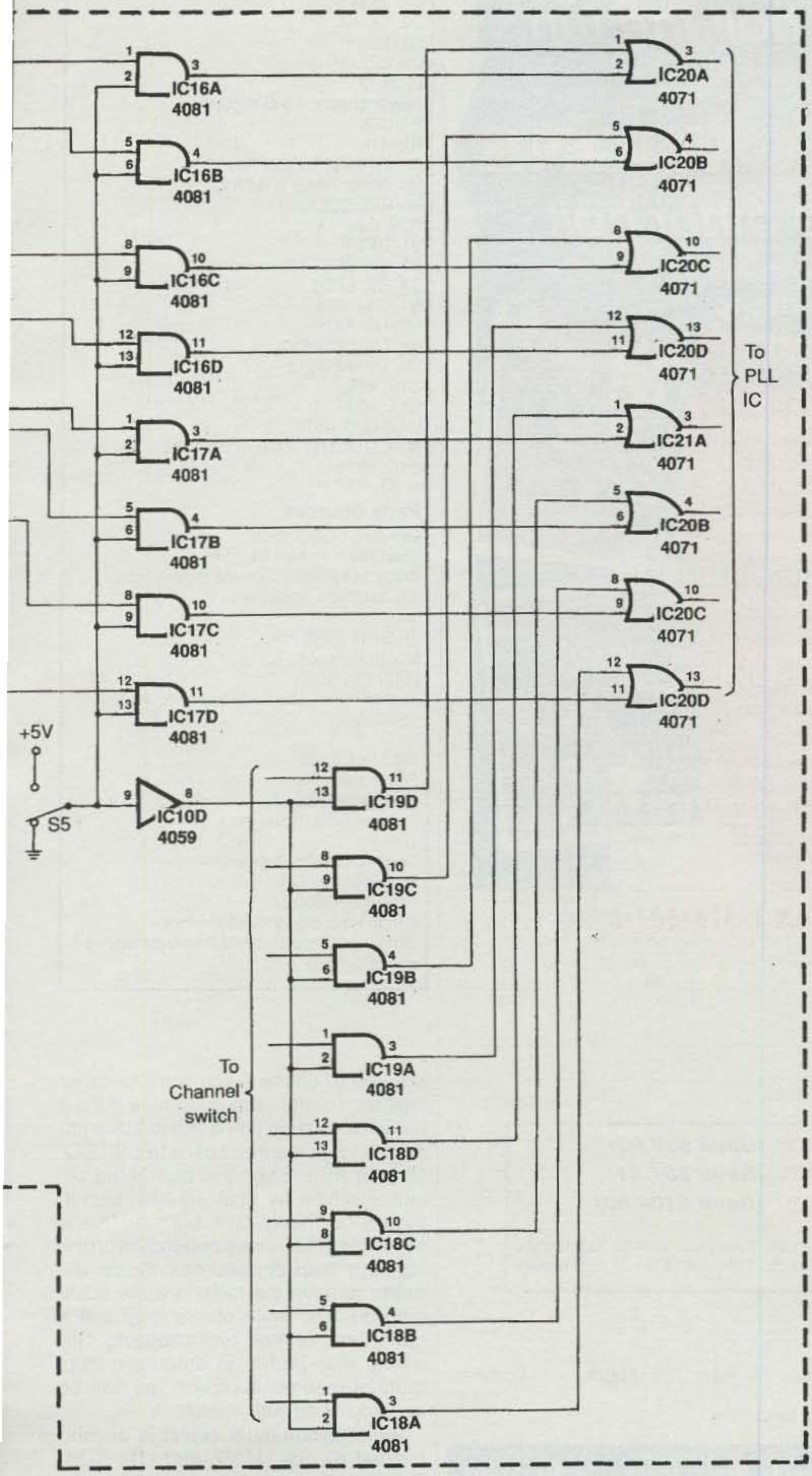
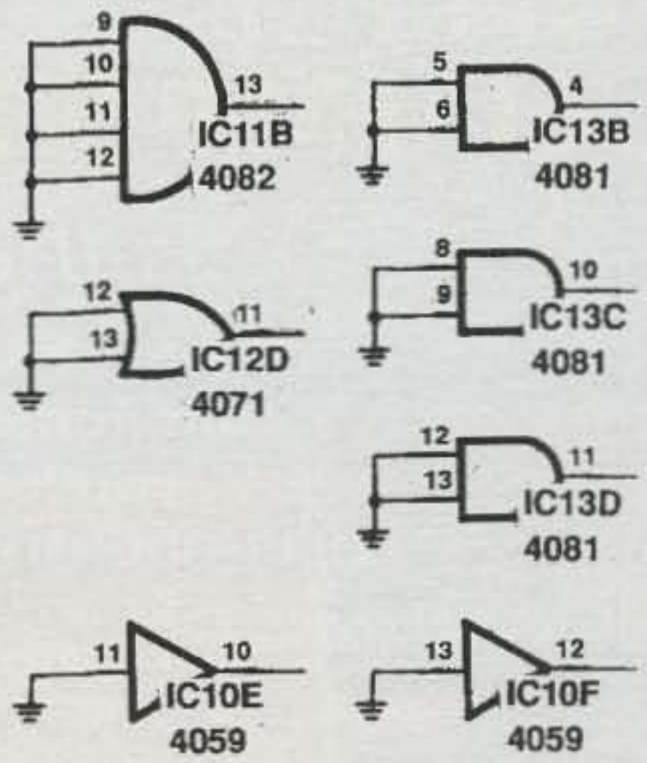
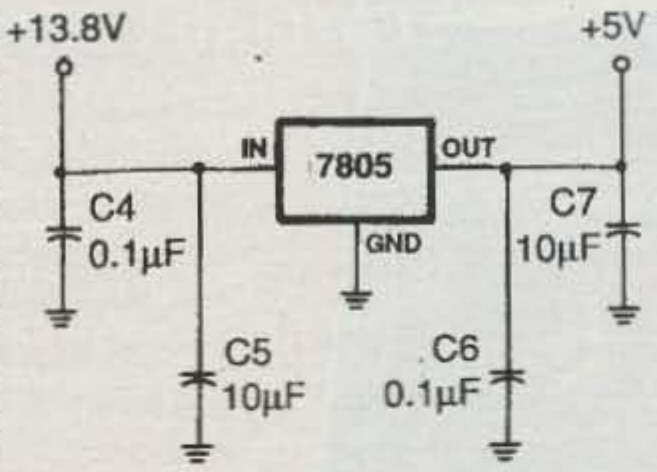


Fig. 1– Partial schematic of the scanning/LED circuit. Display section is in fig. 2. Note that there is no R4.





UNSED GATES



SUPPLY

ADDITIONAL POWER SUPPLY CONNECTIONS

IC	+5V	GND
4016	Pin 14	Pin 7
4071	Pin 14	Pin 7
4081	Pin 14	Pin 7
4082	Pin 14	Pin 7

Parts List

C1: 15 µF
C2, C4, C6: 0.1 µF
C3: 6.8 µF
C5, C7: : 10 µF
LEDs (3)
Power supply: 7805 regulator
R1: 27k
R2: 47k
R3, R26, R27, R28, R31: 10k
R4: *Note: There is no R4*
R5-R25: 200 ohm
R29, R30: 1k
S1: DPST
S2, S4: SPST Momentary
S3, S5: SPDT
U1, U14: 555
U2, U3: 4516
U4, U5, U6: 4510
U7, U8,U9: 4511
U10: 4059
U11: 4082
U12, U20: 4071
U13, U16, U17, U18, U19: 4081
U15: 4024

Parts Sources

Digi-Key Corporation
Thief River Falls, MN
(800) 344-4539 or <www.digikey.com>
(components, tools, etc.)

Tri-State Electronic
Mount Prospect, IL
(847) 255-0600
(components, tools, etc.; showroom & mail-order)

DC Electronics
Scottsdale, AZ
(602) 945-7736
(components, tools, etc.)

Communication Concepts
Beavercreek, OH
(937) 426-8600 or
e-mail: <cci.dayton@pobox.com>
(amplifiers & parts; AN762 recommended by the author)

low you to chose if you want to either look for activity (and determine if it's a particular station you'd like to talk with) or look for some free space to call "CQ" on your own. Since this part of the circuit is driven by your squelch circuit, there's no "hang" time built in. This is something that is very dependent on the builders' own preferences: Some will prefer to have the radio resume scanning quickly, while others may add a hang timer of their own choosing. Still others may prefer an automatic stop/manual resume approach, as can be accomplished with a latch.

Automatic/manual select is accomplished by S5, U10D, and U16–U21. This will allow both a "manual override" mode, as well as a single-channel mem-

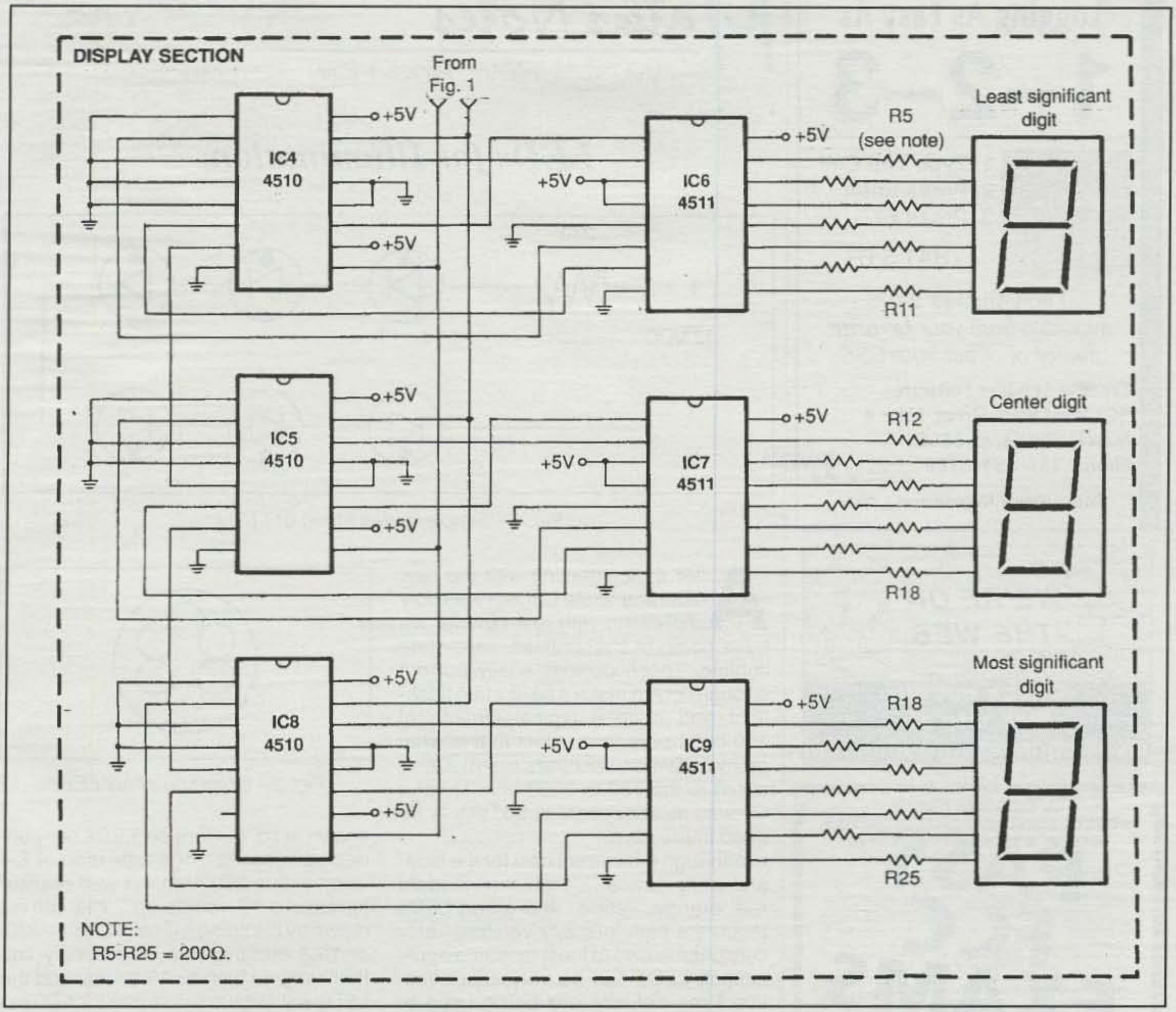


Fig. 2– Display section of circuit. Note connection points to main circuit.

ory, or "priority channel" option for your radio (If you'd like to rely totally on the automatic scanning of the radio, the mechanical channel selector switch may be removed.).

U11A may be substituted for U10A if you'd like to limit the number of channels the radio scans through; just hook up the inputs of U11A to the proper binary output of U2 and U3 (plus one), and it'll reset when the scanner reaches the proper number.

Closing Thoughts

This circuit has been designed with the mechanical rotary channel selectors in mind, typical of the CBs converted to 10 meter use. There are only minor variations needed to interface this circuit with the push-button channel selector CBs. The scan rate of this circuit is about 1 Hz (or one channel per second). If you plan on changing it, don't forget that a PLL needs time to lock onto a frequency, even if this is the fraction-of-a-second range.

Since most, if not all, PLL ICs in radios operate from 5 volts, this circuit has been standardized to the same voltage to make interconnections easier. Since the CB set's internal 5 volt regulator may not be able to handle all of these additional components (especially when considering the current consumption of the display), I added my own 1 ampere, 5 volt regulator; I also made sure to heat-sink it to the metal enclosure in which I mounted the circuit.

For a bit of "bullet proofing" against whatever stray RF is in the shack, I mounted the whole circuit in a metal box, grounded the box, and added bypass and feed-through capacitors and ferrite beads to all of my incoming and outgoing leads. I also kept holes to a minimum. Some of this might be too cautious if you're just running QRP (low power), but a bit of advance planning might help if you ever plan to add an amplifier. Several parts sources also carry very stylish boxes, so the finished scanner can look like part of the radio.

Now it's time to start having fun ... fun converting the CB rig, fun building and connecting the scanner circuit, and most of all, fun on the air making contacts! ■

Math's Notes

BY IRWIN MATH, WA2NDM

What's New And How To Use It

LEDs for Illumination

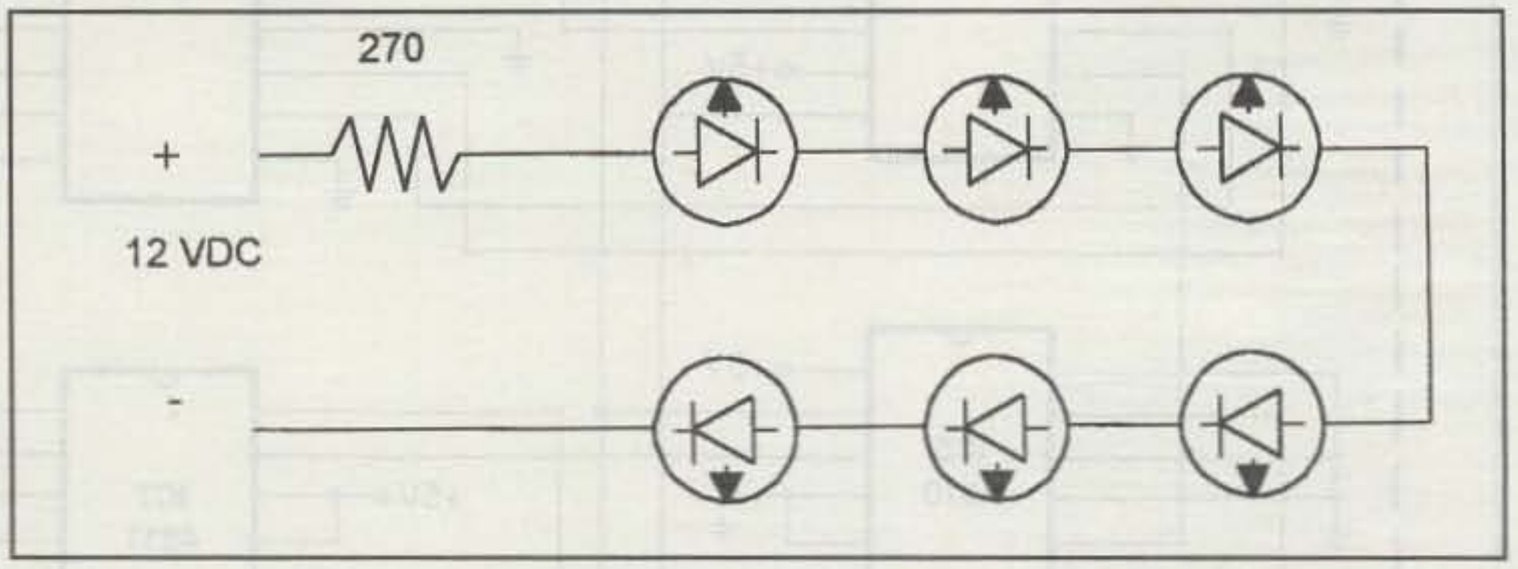


Fig. 1– Simple series string of LEDs.

After experimenting with the new blue-and-white LEDs, I was duly impressed with just how far we have come in filamentless, solid-state lighting. These devices easily put out enough light to make a solid-state flashlight and have a typical lifetime of 100,000 hours (or at least that is what many LED manufacturers claim). Compared to the 750 to 1000 hour life of a 60 watt incandescent lamp, this is indeed impressive.

Although the current cost for the blue-and-white devices is high, the standard red, orange, yellow, and green LEDs (even the high-intensity versions) only cost pennies, so at least for some applications LEDs can be very cost effective.They actually are being used to replace traffic-light lamps. Perhaps you have even seen them in your area. They are easily recognizable as a series of tightly clustered red, yellow, or green LEDs in the actual traffic-light housing.

As experimenters, we can try to fabricate our own incandescent lamp replacements, and this month we will look at several ways to do this. To begin with, I would obtain a bunch of the most inexpensive LEDs I could find. Many of the surplus houses have assortments you can purchase, but even brand-new devices can be obtained for a few cents per LED. For the moment don't worry about the color.

Since the typical operating current for an LED is 10 to 20 milliamperes and the typical voltage drop is about 1.4 volts, we can come up with the series circuit

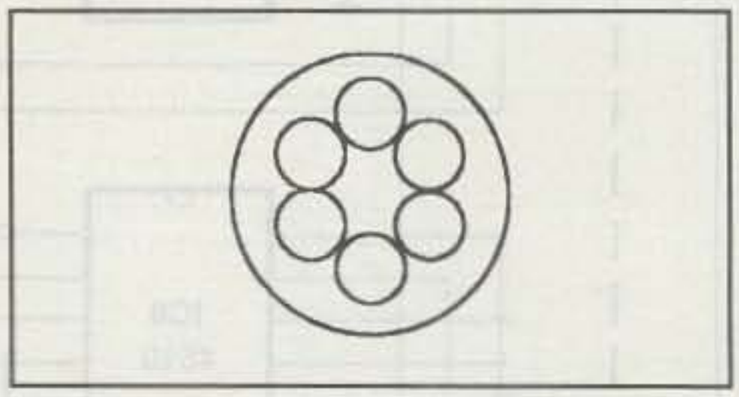


Fig. 2– Grouping of six LEDs.

shown in fig. 1. Here six LEDs are connected in series (for a total drop of 8.4 volts) with a 270 ohm, 1/4 watt resistor to make a 12 volt "lamp." The current drawn by the string will be (12–8.4)/270, or 13.3 milliamperes. The supply can then vary as high as 13.8 volts and the LEDs will still have no more than 20 ma flowing through them. Such a lamp can be used for automobile applications and probably will work well. For best results you could group the LEDs as shown in fig. 2. Depending on how bright the LEDs you use are, these might even make a reasonable tail light (for a motorcycle perhaps) that would almost never need replacement.

One problem with this arrangement is if the voltage across the string varies too much, the current through the LEDs can become excessive, with resulting damage. Reducing the current by raising the resistor can help solve this problem, but then the brightness may suffer. A regulator can be added to the circuit to help, but then the cost increases. All of these factors need to be considered when attempting to come up with a good lamp equivalent.

For use with other voltages, the same scheme can be used with more or fewer

c/o CQ magazine

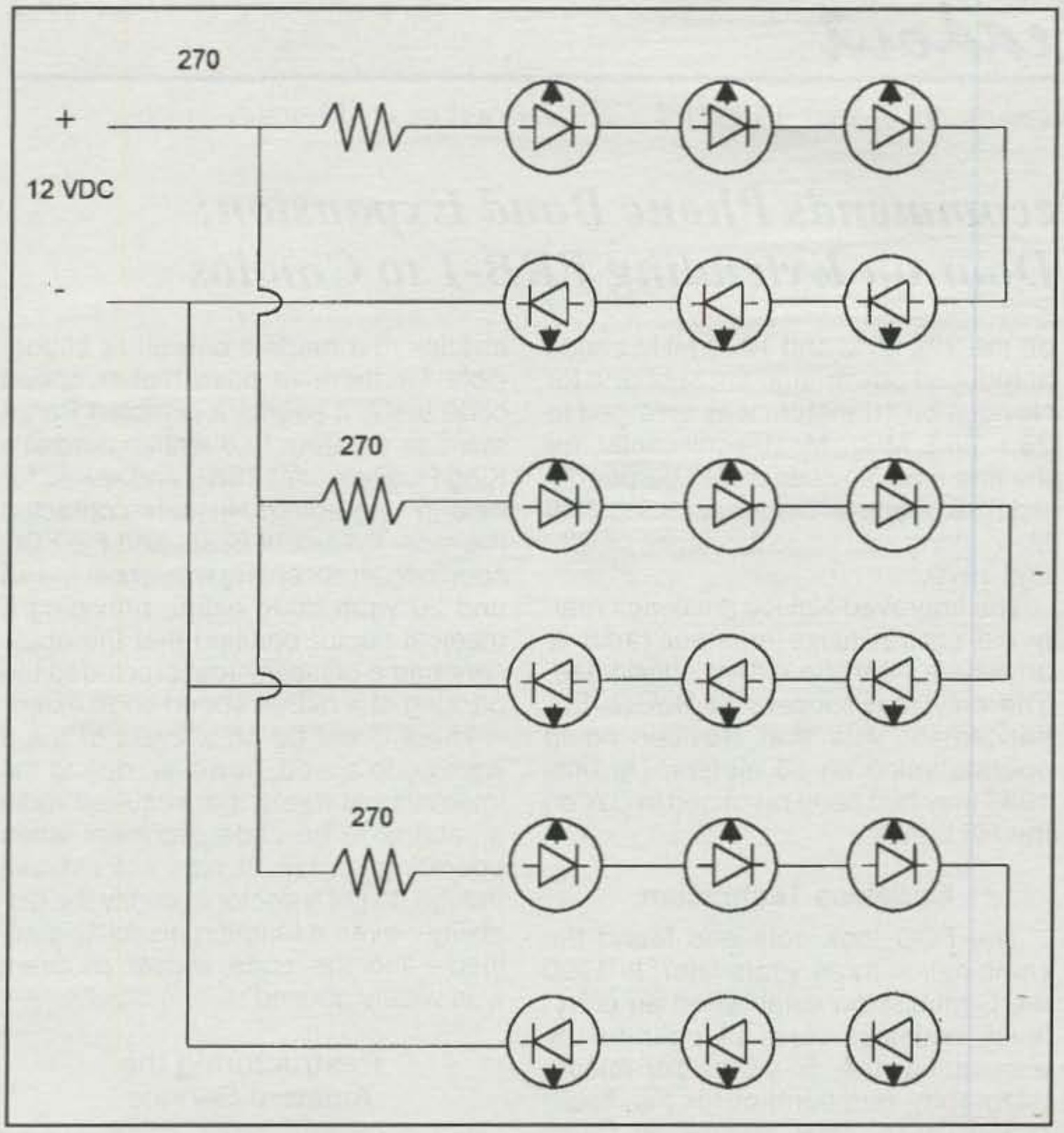


Fig. 3– Parallel string of LEDs.

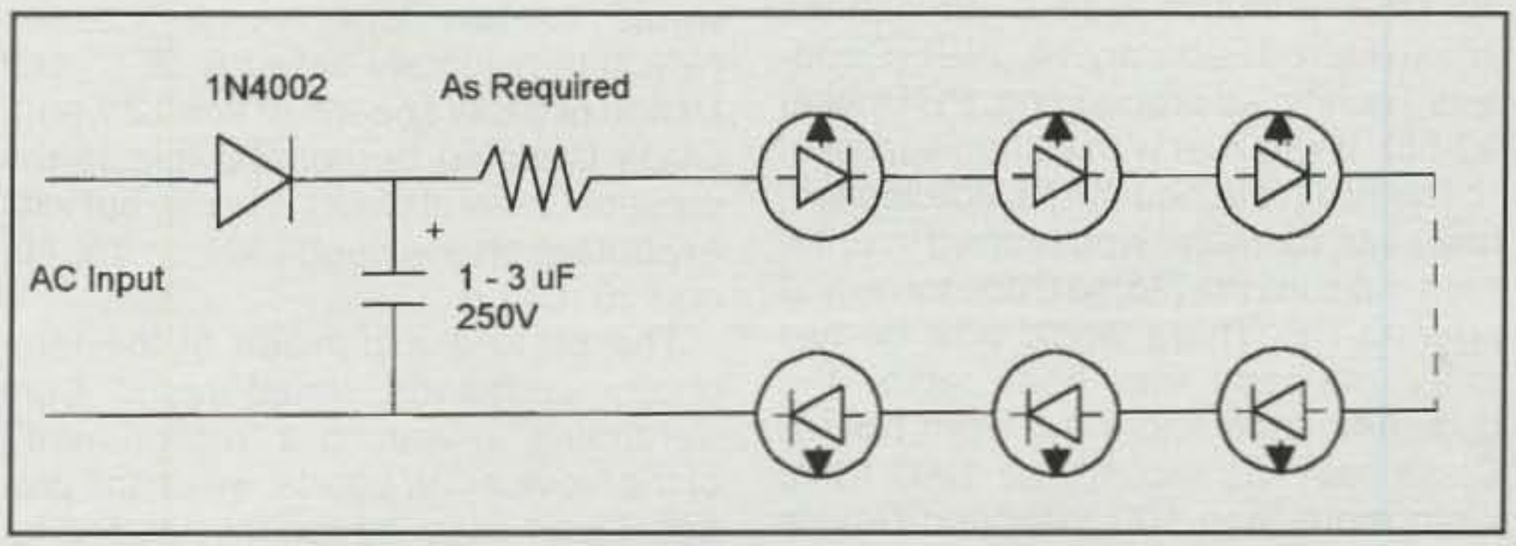


Fig. 4– AC operation of a series string of LEDs.

LEDs in the string. A potential problem with any string, however, is the fact that if one LED opens, the entire string goes out. If one LED shorts, the current through the string then increases. This brings us to fig. 3. Here several strings of LEDs are employed so that if any one goes out, the remaining ones will still operate and provide light. All of the considerations of the single string still apply, however.

The preceding is fine for single colors, but what if you want white, or near-white, light? You can experiment with white LEDs, but they are still fairly expensive. A partial solution would be to use red, green, and blue LEDs to provide white in the same way that a color CRT produces white. To do this you would provide separate series strings of red LEDs, green LEDs, and blue LEDs and "trim" the series resistor of each string to "balance" the brightness to get close to white. Although the blue LEDs are expensive, the red and green ones are not, and the overall combination is less expensive than if you used white LEDs alone.

Finally, we come to replacements for 115 VAC incandescent lamps. Here the problem is not only to utilize the higher voltages, it is to convert AC to DC as well. You just need to use common power-supply techniques. Fig. 4 shows one way to accomplish this easily. A simple 1N4002 diode and inexpensive electrolytic are all that is necessary. Since the total current is only in the milliampere range, just a few microfarads (250 V breakdown) are needed. Such capacitors usually cost much less than a dollar even when brand new. You will have to experiment with the values of dropping resistors, varying line voltage (remember that it can reach 127 volts in some locations) and resistor wattages, but it can be done. The result will be that replacing a lamp in a tough spot, such as at the top of your tower, may be a job you do only once for the lifetime of the tower.

If any of this has sparked your interest, please be sure to share your accomplishments with us.

73, Irwin, WA2NDM

Washington Readout

Regulatory News In The World Of Amateur Radio

BY FREDERICK O. MAIA, W5YI

ARRL Panel Recommends Phone Band Expansion; FCC Shuts the Door on Extending PRB-1 to Condos

We have two significant developments to report on this month, one of which may affect every ham who operates HF, the other any ham who lives in a condominium or other private "community" subject to deed restrictions. (*For commentary on these issues, see this month's "Zero Bias."—ed.*). We'll start with the proposal by an ARRL committee to expand HF voice allocations by "refarming" current Novice subbands.

Possible Phone Band Expansion

The Novice Class was established a half century ago (in 1951), at a time when telegraphy (code) was still commonly used in commercial, military, and marine services, as well as the Amateur Radio Service. At that time, the international rules required that all ham operators be Morse Code proficient.

In 1979, however, the international Amateur Service regulations were amended to permit administrations to waive the manual Morse proficiency requirement for " . . . stations making use exclusively of frequencies above 30 MHz" (WARC-1979, Geneva). That prompted several members of the U.S. amateur community to petition the FCC for a license class with no Morse requirement. In 1983 the FCC responded by proposing a codeless VHF/UHF amateur license. However, it was fiercely opposed by the older, CW-proficient radio amateurs and the American Radio Relay League. The idea was shelved, at least for the moment.

Novice Enhancement

Twenty years ago, 20% of all ham operators were Novices, but their numbers were declining. In an effort to stimulate interest in the Amateur Radio Service, in 1987 the FCC amended the Amateur Rules to expand the privileges available to Novice Class hams. The so-called *Novice Enhancement* proceeding permitted Novices for the first time on the 222 MHz and 1270 MHz bands at reduced power, and the subband for Novices on 10 meters was enlarged to 28.1–28.5 MHz. Most significantly, for the first time Novices would be permitted SSB phone privileges at 28.3 to 28.5 MHz, along with voice privileges on 222 and 1270.

The improved Novice privileges really did not revitalize amateur radio to anywhere near the extent anticipated. The only real success of Novice Enhancement was that Novices could operate voice on 10 meters. Up until 1987 they had been restricted to CW on the HF bands.

Codeless Technician

The FCC took note and found the combination three years later! In 1990 the Commission established an entry-level, codeless class of operator by eliminating the 5 words-per-minute telegraphy requirement for the Technician Class. New Technician Class holders would now be permitted to operate on all amateur spectrum above 30 MHz effective with examinations administered February 14, 1991 (Codeless Technician proceeding, PR Docket 90-55). It was met with instant success!

The FCC retained the Novice license, however, for those who wished to enter ham radio via the Morse Code route and operate HF. There would now be two entry methods into ham radio—the codeless Tech and the 5 wpm Novice Class path. As recently as 1993 there were more than 100 thousand Novice operators. However, given a choice, extremely few new hams opted for the Novice route, and it wasn't long before the no-code Technician Class operator license replaced the Novice Class operator license as the entry-level license class of choice.

Today about 40,000 Novice licensees remain in the current FCC database, and that number is dropping by some 6000 each year through attrition and upgrading.

Morse Code Waivers

Also, in 1991 the FCC was more or less forced into creating a program that would accommodate those with disabilities that made it difficult or impossible for them to pass higher speed code tests. It seems a disabled Pennsylvania amateur had written Jordan's King Hussein, JY1 (SK), and asked for help in upgrading. Hussein contacted the elder President Bush, and the FCC soon began accepting waivers of the 13 and 20 wpm code exam, providing a medical doctor certified that the applicant had a disability that precluded the passing of a higher speed code exam.

There could be no waivers of the 5 wpm code speed, however, due to the international treaty that required radio amateurs to be code proficient when operating on HF. It was not difficult, though, to get a doctor to certify the disability—even a learning disability qualified—and the code waiver program was widely abused

Restructuring the Amateur Service

In July 1998 the ARRL directors voted (9 to 6) to suggest restructuring of the Amateur Radio Service. Their version would contain four license classes (which they initially called A, B, C, and D) and two CW speeds (5 and 12 wpm). Class C would be comparable to the present General Class license, but with expanded phone subbands on 75, 40, and 15 meters.

The 50 kHz expansion of the telephony subbands would result from "refarming" (meaning a "realignment") of the Novice CW bands, which the proposal said were no longer needed for their original purpose. According to the ARRL proposal, all amateurs then licensed as General, Technician Plus, or Novice would automatically become Class C.

The FCC issued a Notice of Proposed Rulemaking a month later (WT Docket No. 98-143, August 10, 1998) essentially proposing the ARRL plan, but making no specific proposals regarding code speed or the status of the HF Novice bands. Instead, the Commission requested input from the amateur community on those questions.

The Commission received and considered over 2200 comments from the amateur community. On the last busi-

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ness day of 1999, the FCC released its Order that restructured the Amateur Service, streamlining licensing to include just three license classes: Technician, General, and Extra Class. Novices and Advanced Class licensees were "grandfathered"—that is, they retained their current privileges and could renew or modify their existing licenses, but no new ones would be issued after April 15, 2000.

No amateur license class received additional frequency privileges (with one exception) and no one lost privileges. The exception was that Technician Class radio amateurs licensed before March 21, 1987 could become General Class licensees on or after April 15, 2000 without further examination, since they had already passed the equivalent of the General Class written exam, plus the new General Class (as well as Extra) code speed exam of 5 wpm. The new top CW exam speed of 5 wpm would also eliminate the widespread code waiver abuse. The FCC's restructuring decision made no changes in the Novice subbands.

Refarming of the Novice Bands

At the January 2001 ARRL Board meeting, the Directors voted to appoint a committee to solicit membership input and updating of the ARRL position on refarming the HF Novice bands in light of restructuring. The Novice Spectrum Study Committee was directed to submit its final report to the Board at the January 2002 Annual Board Meeting.

About mid-year a survey was posted to the ARRL website (in the members-only section) and printed in the September 2001 issue of *QST*. The Novice Spectrum Committee said it wanted to encourage greater utilization of the current Novice spectrum without decreasing the privileges of any licensee. It also said one of the reasons for Novice refarming was to restore full power privileges to higher class operators using the 80, 40, and 15 meter Novice bands. (Current rules limit all operators in the Novice segments to a maximum of 200 watts, regardless of license class.)

Nearly 500 radio amateurs expressed their opinions on possible ways to optimize use of the present Novice allocations on 80, 40, 15, and 10 meters now that the FCC no longer issues new Novice licenses. Nearly 61% of those responding were Extra Class licensees, and most were ARRL members. Nonmembers could also express their opinions by e-mailing their comments and suggestions, but only a very few took advantage of that method. The ARRL said the survey results might form the basis of an ARRL petition for rulemaking before the FCC.

Results of the Survey

On December 21st the League's study panel released the results of the survey. The ARRL Novice Spectrum Study Committee recommended that the ARRL petition the FCC to eliminate the Novice CW subbands and allow Novices and Technicians with code credit to operate CW on the 80, 40, 15, and 10 meter General Class CW allocations at up to 200 watts output. The panel also suggested that certain segments of those bands be set aside for "slow CW operation" to help new Morse Code operators improve their skills. The committee recommended expanding the phone allocations on 80, 40, and 15 meters for the General, Advanced, and Extra Classes. Specifically:

- On 80 meters, extend the U.S. phone allocation to 3700 kHz (from its current 3750 kHz), with Extra Class, Advanced, and Generals all gaining 50 kHz of phone spectrum.
- On 40 meters, extend the U.S. phone allocation to 7125 kHz (from its current 7150 kHz), with Extra and Advanced licensees allowed on the entire segment and Generals from 7175 kHz and up. Thus, Advanced and Extras would gain 25 kHz; Generals 50 kHz. The committee's report suggested no changes to the special allocations for amateurs on certain Pacific or Caribbean islands and in Alaska.
- On 15 meters, extend the U.S. phone allocation to 21.175 MHz (currently 21.200 MHz), with Advanced and Extra Class hams gaining 25 kHz; Generals 50 kHz.
- On 10 meters—where Novice and Tech Plus licensees already may operate CW, RTTY, and data from 28.100 to 28.300 MHz—retain the U.S. phone allocation from 28.300 to 29.700 MHz and extend CW access for Novice/Tech Plus operators to 28.000 MHz , an additional 100 kHz. Neither the current Novice/Tech Plus 28.300 to 28.500 MHz phone band nor the 200 watt CW/SSB power limitation would change.

The committee said in its report that if the ARRL Board adopts the plan, any request for FCC action necessary to implement the changes should be included in an omnibus filing by the League with the FCC encompassing other issues, rather than as a separate petition. Changes to the ARRL Band Plan would be considered following ultimate adoption of any recommendations by the FCC.

The committee's complete report was presented to the ARRL Board of Directors for consideration during its mid-January 2002 annual meeting held in Dallas, Texas.

FCC Declines to Include CC&Rs in PRB-1 Ruling

In an Order released December 26, 2001, the FCC again denied the ARRL's request that " . . . the Commission expand the limited preemption policy for antennas and antenna support structures used in the Amateur Radio Service to include covenants, conditions, and restrictions." CC&Rs are the various landowner agreements contained in deeds, bylaws of homeowner associations (HOA), or regulations of an architectural control committee (ACC). This time the ruling came from the full Federal Communications Commission rather than a bureau official.

A year ago the full Commission was asked by the American Radio Relay League to review a November 15, 2000 decision by one of its bureaus concerning antennas and their support structures. Upon review, the FCC said it found " . . . no basis to reverse the Wireless Telecommunications Bureau's decision."

Background

On September 16, 1985 the FCC partially preempted state and local regulations governing amateur station facilities, including antennas and their support structures. This limited federal preemption is commonly referred to by its FCC document number, PRB-1, even though it subsequently has been written into the Part 97 rules [§97.15(b)]. The ruling requires state and local governments to "reasonably accommodate" amateur operation through "the minimum practicable regulation" and overrides laws that "preclude amateur service communication."

However, in PRB-1 the FCC specifically decided *not* to extend its limited preemption policy to CC&Rs because " . . . such agreements are voluntarily entered into by the buyer or tenant when the agreement is executed and do not usually concern the Commission." The key word is "usually."

On February 7, 1996 the League filed a Petition for Rulemaking seeking a review of the FCC's limited preemption PRB-1 policy and an expansion to include CC&Rs. Nearly four years later the Wireless Telecommunications Bureau denied the petition on the grounds that specific rule provisions bringing pri-

vate restrictive covenants within the scope of PRB-1 were " . . . neither necessary nor appropriate."

A month later, on December 20, 1999, the ARRL filed a Petition for Reconsideration of the bureau's denial, arguing that the FCC's policy in PRB-1 is discriminatory because it does not encompass private covenants, and that the FCC had jurisdiction to preempt CC&Rs, based on its actions with respect to over the air reception devices (OTARDs).

What is OTARD?

The Over-the-Air Reception Devices (OTARD) rule preempted restrictions on the placement of antennas for receiving consumer video programming signals, including Direct Broadcast Satellite (DBS dishes must be less than one meter in size), multi-channel multi-point distribution service (MMDS is wireless cable), and television broadcast (TVBS) antennas (Masts higher than 12 feet above the roof line may be subject to local safety requirements.).

It is important to note that the preemption was directed by Congress as part of the Telecommunications Act of 1996. The objective of OTARD was to promote the development of new video distribution techniques, some of which were hampered by deed, homeowner, or rental property agreement restrictions.

The wide-encompassing rule prohibits restrictions that hinder a person's ability to install, maintain, or use an antenna covered by the rule. The rule applies to state or local laws or regulations, including zoning, land-use or building regulations; private covenants; homeowners' association rules; townhome, condominium, or cooperative association restrictions; lease restrictions; or similar restrictions on property within the exclusive use or control of the antenna user where the user has an ownership or leasehold interest or is a renter of the property.

A restriction "impairs" if it: (1) unreasonably delays or prevents use of; (2) unreasonably increases the cost of; or (3) precludes a person from receiving or transmitting an acceptable quality video signal from an antenna covered under OTARD. The rule specifically does not apply to antennas used for AM/FM radio, amateur radio, CB, or Digital Audio Radio Services.

However, since both receive-only (one-way) and transmit (two-way) video transmissions and antennas are covered by OTARD, it was the League's view that the preemption should be expanded to include amateur radio antennas. The Wireless Telecommunications Bureau again rejected the League's petition, and the ARRL appealed the matter to the Commissioners themselves.

In its December ruling affirming the previous denials, the FCC said it recognized that amateur radio "plays an important role in providing emergency communications" and that "we agree with ARRL that there is a strong federal interest in promoting amateur radio communications."

"However," the Commission continued, "we believe that PRB-1 adequately protects that predominant federal interest from regulations that would frustrate the important purposes of the Amateur Radio Service, by preempting state and local regulations that preclude amateur communications in their communities."

The ARRL argued that whether CC&Rs are "voluntary" is "irrelevant . . . to whether the municipality is violating Federal communications policy." The FCC said, "While we agree that the vol-

untary nature of CC&Rs do not always preclude preemption, we believe it is a relevant factor in preemption analysis." In the over-the-air reception device (OTARD) ruling the FCC noted " . . . there was a strong statutory policy against restrictions that impaired a viewer's ability to receive over-the-air video services."

The decision continued, "Here, there has not been a sufficient showing that CC&Rs prevent amateur radio operators from pursuing the basis and purpose of the amateur service. In this regard, we note that there are other methods amateur radio operators can use to transmit amateur service communications that do not require an antenna installation at their residence. These methods include, among other things, operation of the station at a location other than their residence, mobile operations, and use of a club station."

The OTARD rule " . . . was designed to promote two complementary federal objectives: (a) to ensure that consumers have access to a broad range of video programming services, and (b) to foster full and fair competition among different types of video programming services. The Commission concluded that preemption was necessary in order to meet those objectives."

The FCC said " . . . none of these objectives applies to the Amateur Radio Service, which is a voluntary noncommercial service. Furthermore, ARRL has not demonstrated that private covenants have a substantial impact on the ability of amateurs to fulfill the fundamental purposes of the Amateur Radio Service set forth in Section 97.1 of the Commission's Rules. Thus, we conclude that . . . while preemption is appropriate with respect to state and local regulations, it is not similarly appropriate with respect to CC&Rs."

The Commission acknowledged that while " . . . ARRL is proposing a policy of reasonable accommodation, as opposed to the total preemption imposed in the OTARD proceeding. Nonetheless, given the great variance in the size and configuration of amateur antennas, we are concerned that such a policy would be considerably more complicated for HOAs and ACCs to administer."

In fact, the League had objected to the Wireless Telecommunications Bureau's reliance upon the fact that some amateur antennas can be much larger than OTARDs [such as satellite dishes]. The Commission disagreed, saying, " . . . the Bureau's reliance upon the distinctions in antenna size between amateur antennas and OTARDs was reasonably based on legitimate policy considerations."

The Commissioners concluded with a firm refusal but included a near-invitation for the ARRL to pursue Congressional action on the CC&R issue. "Finally, we note that ARRL has submitted no specific evidence that would persuade us to abandon our long-standing policy of excluding CC&Rs in private covenants from our ruling in PRB-1. We recognize the importance of preserving the integrity of contractual relations.

"We are therefore reluctant to preempt private parties' freedom of contract unless it is shown that private agreements will seriously disrupt the federal regulatory scheme or unless there is another strong countervailing reason to do so, a showing that has not been made here. However, should Congress see fit to enact a statutory directive mandating the expansion of our reasonable accommodation policy, the Commission would expeditiously act to fulfill its obligation thereunder.

"Accordingly, for the reasons discussed above, we conclude that the Bureau's denial of the subject petitions for reconsideration, insofar as they pertain to inclusion of CC&Rs in private covenants, was correct and should be affirmed. Therefore, the scope of the limited preemption policy of PRB-1 for amateur radio stations remains applicable only to regulations of state, county, municipal, and other local governing bodies, and is not applicable to HOA bylaws and ACC regulations." (Action by full Commission by *Memorandum Opinion and Order* adopted December 18, 2001).

Where Do We Go Next?

How will these two actions—possible "refarming" of the HF Novice bands to expand the phone bands and the FCC's refusal to require "reasonable accommodation" of amateur antennas in private housing developments—affect amateur radio in the coming years?

Obviously, the first is only a recommendation and there's no assurance at press time that the ARRL Board of Directors, let alone the FCC, will go along (*We'll try to update you on the ARRL Board's decision in "Zero Bias," which is also devoted to these two topics.—ed.*). On the second issue, it is now clear that the only hope of changing federal policy on CC&Rs and amateur antennas lies in persuading Congress to order the FCC, as it did with OTARDs, to preempt these "private laws" as they concern amateur radio as well. 73, Fred, W5YI

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World Of Ideas

BY DAVE INGRAM, K4TWJ

A Look At The World Around Us

Keys 2002—New, Old, and Always Terrific! Part I

Rejoice, dear friends, fans, and followers near and far. Your continuing requests for more key views and CW tales have been heard, and we are proudly answering them with another two-part series here in *CQ*. I am not sure which is more exciting, the brand-new keys awaiting their time in the limelight or our "get involved" ideas for ensuring CW's history lives on in the annals of time. One fact rings clear, however: CW is alive, well, and flourishing among amateurs of all lands. You say that your own enthusiasm for CW is not quite as intense? A sheltered life for sure, but there is still hope. Gearing up with a new key or paddle will raise your spirits at least 10 dB! The thrill is akin to using a new rig, but a new key is much less expensive and you can enjoy it in the shack, in the den, while mobile, or even when operating portable.

So what's new in keys for 2002? Glad you asked, but let's recognize the folks behind the keys before jumping into the views. Our special thanks for sharing photos and details of their keys goes to Jim Richards, KD6VDH; Toshihko Ujiie of Japan; Anton Koval, UT7CT; Marshall Emm, N1FN, of Morse Express; Felton Mitchell, WA4OSR, of Vibroplex; master collector Gil Schlehman, K9WDY; and Bob Wertz, NF7E. That is enough preliminaries; now let's bring on the keys!

Delightful Debut

First up is a trim new paddle made by a California-based craftsman rapidly becoming well known for his remarkable handiwork: the dual-lever beauty made by Jim Richards, KD6VDH, and shown in photos 1 and 2. The paddle measures 4.25 by 2.25 inches and sports a nice brushed-brass mechanism set on a heavy, black granite base with an anti-skid bottom pad for solid footing. The levers have molded cocobolo wood fingerpieces and permanently lubricated ball-bearing assemblies both above and below their center pivot point, producing a smooth, responsive "feel" during operation. Adjustment screws beside each lever permit setting gap, tension, and lever position to personal preference, and rear binding posts make connection to a rig or keyer a snap.

Photo 1– Trim, low slung, and very enjoyable to use best describe this new dual-lever paddle presently being made by Jim Richards, KD6VDH, in California. It sports full ball-bearing race assemblies, molded cocobolo fingerpieces, and a smooth granite base. It is available through Marshall Emm, N1FN, of Morse Express.

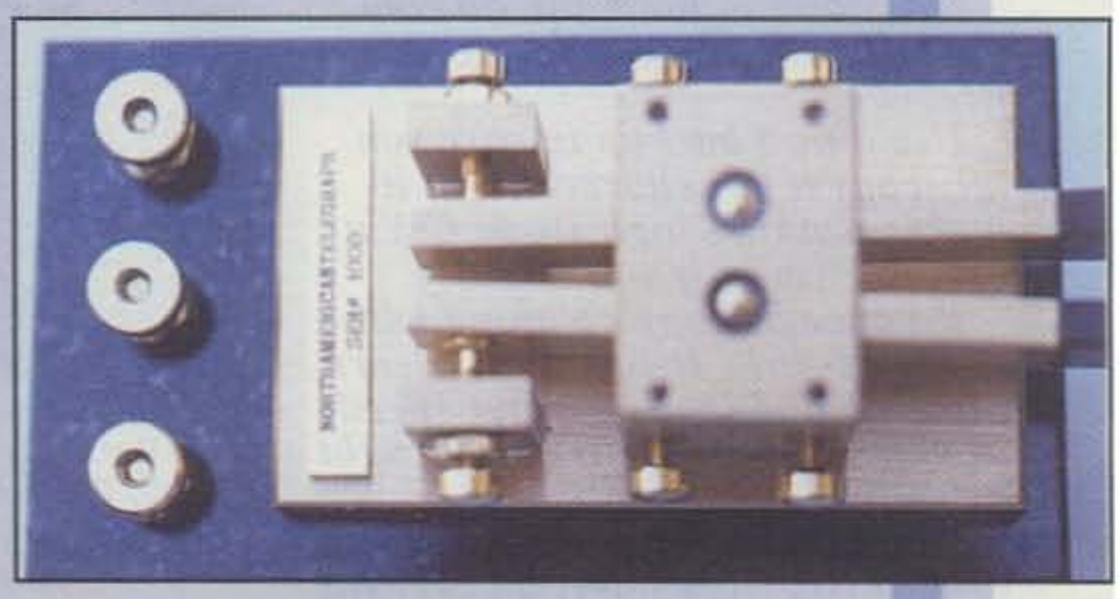

Photo 2– A more "top-side view" reveals the new North American Telegraph nameplate KD6VDH recently began adding to his paddle, and it also allows us to study more of the gem's finely crafted details. It is agile, built to last, and also available with custom fingerpieces. (Details in text.)

The paddle you see in the photos, incidentally, is Jim Richards' traditional dual-lever, or iambic version. He also makes custom versions with different base materials and with other exotic wood fingerpieces such as bocoto, purple heart (it really is purple!), and ebony. His traditional paddle (and also the next two items featured, the GHD and UT7CT keys) is available through Marshall Emm, N1FN, of Morse Express, 2460 South Moline Way, Aurora, CO 80014 (telephone order line 1-800-238-8205 or <www.morseX.com>). If you prefer a more custom version, check directly with Jim at 33451 Galleon Way, Dana Point, CA 92629; telephone 949-481-5623) and he can make one specifically for you.

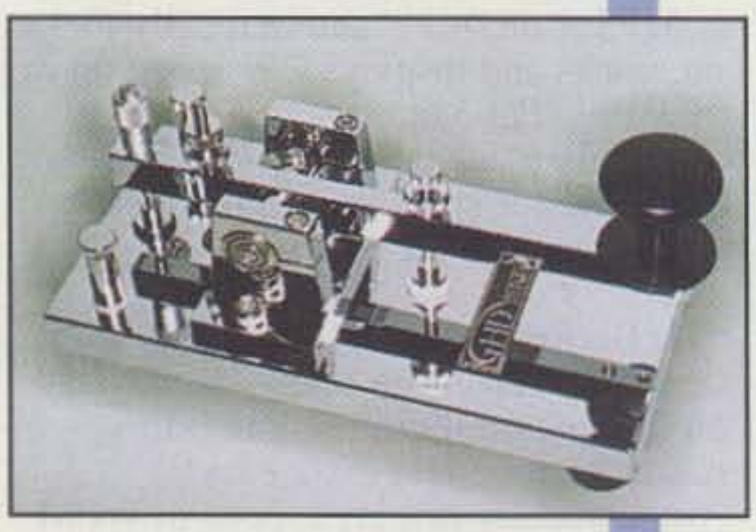

Photo 3– This magnificent work of art is made by GHD of Japan (Model 501M), and its fancy chrome finish is simply dazzling. The key's arm is long, expertly balanced, and supported by full ball-bearing race assemblies to produce a quite elegant "feel" during operation. (Photo courtesy Marshall Emm, N1FN, of Morse Express)

Top-Line Pumpers

Next in the spotlight are two top-line hand, or pump keys made by GHD of Japan, a well-established company with a reputation of high-quality products (photos 3 and 4). The model 501M (photo 3) is a large (approximately 7 inches long), heavy (4 pounds) beauty.

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

T-2X, $619.95. *Extra heavy duty Tailtwister antenna rotator!* For large antennas up to 20 square feet wind load when mounted in-tower, or 10 square feet when mast mounted with optional support bracket. Triple 138 ball bearing race, strong electric locking steel wedge brake. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches. Accepts masts up to 2 1/16 inches diameter. Rotator size is 14 1/16Hx9 3/16D in.

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

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

Call your dealer for your best price!

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

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CD-45II

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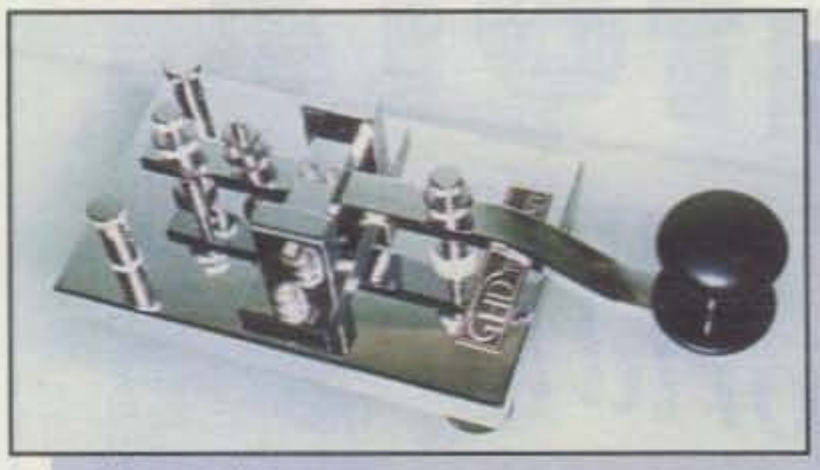

Photo 4– A creditable number of today's amateurs still prefer using a hand key for working CW, and this smaller (but still dazzling!) GHD Model 504 is the perfect answer. It too has a brilliant chrome finish, excellent "feel," and is available from N1FN of Morse Express.

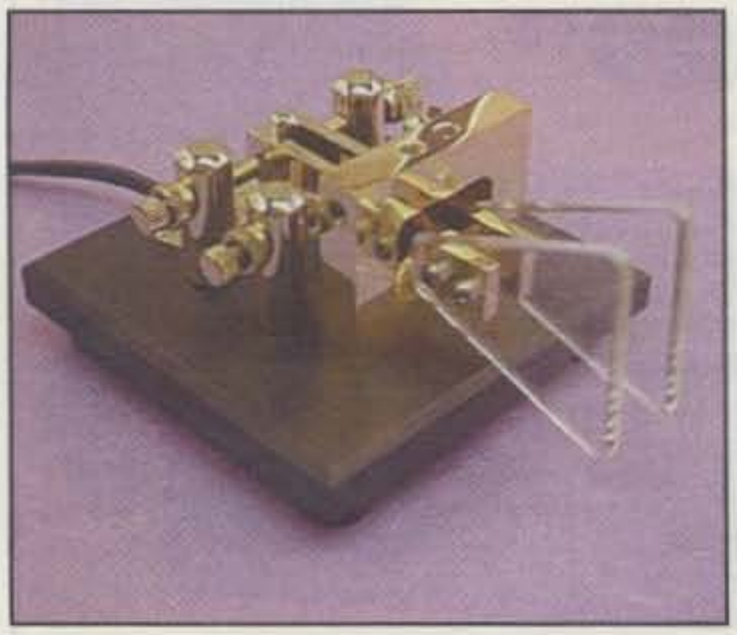

Photo 5– This little iambic beauty is called the CT22 and comes from Anton Koval, UT7CT, in the Ukraine. It has a highly polished brass mechanism mounted on a matte-black steel base, clear triangular-shaped fingerpieces, and full adjustments for both levers. This delight is also available from Morse Express.

It sports a dazzling chrome finish with base contact set into a white teflon insulator (This thing is stout enough to key a microwave oven!) and a full ball-bearing race assembly at the fulcrum. It also has precision gap adjustments that can be set right down to a fraction of a millimeter; a long, well-balanced arm; and an exquisite "feel" during use. It is classy!

The second, smaller key (Model 504, photo 4) also boasts an ultra-high-gloss chrome finish with white teflon-insulated base contact (a "clean," smart-looking combination). This key has a more traditional bent lever, or arm, that sits closer to a desktop, probably to address different operator preferences. Like its larger brother, the 3 pound model 504 has a full set of precision adjustments. Both GHD keys are topped with classic Japanese knobs and small skirts (their shape reminds me of those Junior Mints we bought at the theater on weekends), and both are also absolute showpieces. They are a mite expensive, but they are first class all the way.

Whether you appreciate using an elegant hand key rather than a bug or paddle or would simply like to own the world's most exotic doorbell button, these two marvels from GHD fill the bill!

Ukranian Delight

Our next CW delight comes from the workshop of Anton Koval, UT7CT. in the Ukraine. It is the tastefully designed, dual-lever paddle with clear, triangular fingerpieces shown in photos 5 and 6. The paddle measures 3 inches square by 2 inches tall and weighs 22 ounces. It has a brass mechanism polished to the luster of fine jewelry and set on a matte-black steel base with a felt pad on the bottom. Each lever is supported by needle-bearing trunnion pins at its pivot point, and each lever's travel and tension are independently adjustable to fit your fist. It is an impressive paddle available at an attractive price, and it is available from N1FN at Morse Express.

Since this paddle is made in the Ukraine, some of our readers may question if it can send Morse code in English. Relax and trust my infinite wisdom on this one, friends. I have been sending CW since Methuselah was a little kid, and I can assure you the paddle can send good English—that is, assuming *you* can send good English to start!

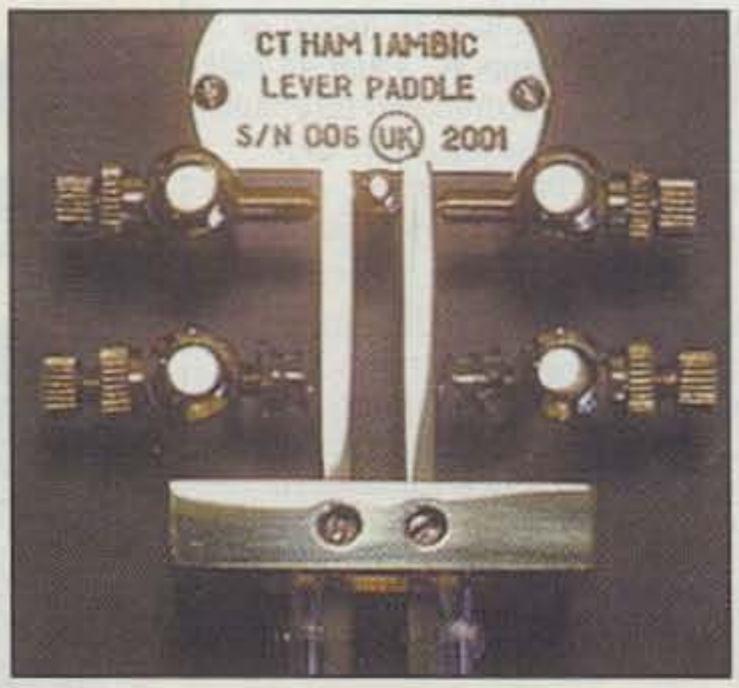

Photo 6– Top view of the UT7CT paddle gives a second look at the mechanism and also the nameplate stamped with serial number and date of production. (Photo courtesy Marshall Emm, N1FN, of Morse Express)

New from Vibroplex

Now shifting focus back to the United States, two new offerings from the oldest name in amateur radio, Vibroplex, enter the limelight. The round-base "Venus" shown in photo 7 will definitely set serious CW aficionados reeling and rockin' til the break of dawn. It is a brilliant-chrome dual-lever paddle with red fingerpieces, magnetic tensioning, and positive snap action set on a heavy 3.5 inch diameter base. Study the arm's center pivot points, outer contacts, and center stop post, and you can almost feel the solid action of this special-order, custom-built masterpiece.

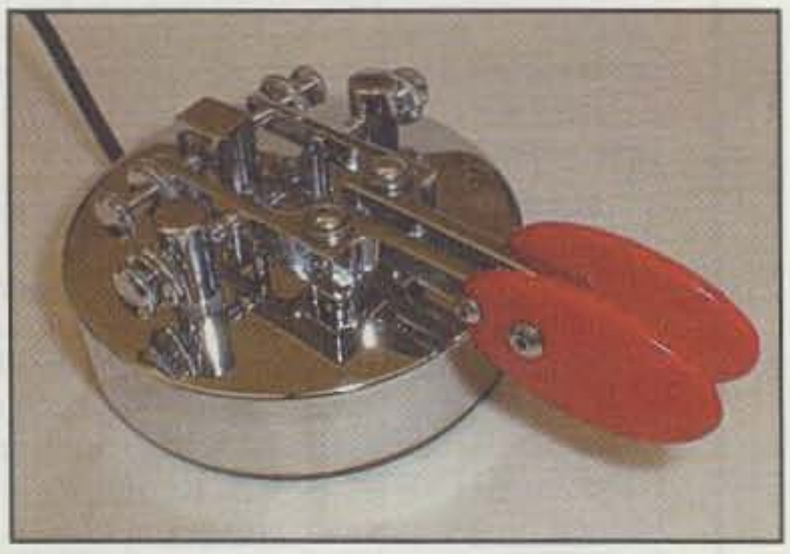

Photo 7–Glitz and glamour galore! This new round-based Vibroplex "Venus" paddle features dual magnetically tensioned levers, positive action, and a great "feel." Its rich chrome plating and red fingerpieces also capture attention like crazy. The top-of-the-line item is custom built to order. Contact Vibroplex for details.

Another new item from Vibroplex is the miniature "Code Mite" hand key shown in photo 8. This little pumper measures 1.5 by 3 inches, weighs 6.2 ounces, and has chrome parts mounted on a dark plastic base engraved with the famous Vibroplex logo. This pocket key just begs to see portable and/or QRP action, and since it is the first miniature key from a major U.S. manufacturer, it may become a collectible.

As you may know, miniature keys and paddles are extra-hot items today. More details on both new keys are available through amateur radio dealers nationwide or direct from the Vibroplex Company, 11 Midtown Park E., Mobile, AL 36606 (telephone 1-800-840-8873 or <www.vibroplex.com>).

Stars from Sparks

As our sidebar in this month's column emphasizes, spark operators and their

Photo 8– The new Vibroplex Code Mite pocket key begs to go where you go, do what you do, and tell the world about it. The little gem measures 1.5 by 3 inches and sports chrome parts mounted on a plastic base engraved with serial number and the famous Vibroplex logo. (Photo courtesy Felton Mitchell, WA4ORS, of Vibroplex)

original-era spark keys represent a very important but rapidly fading page in amateur radio's proud history. The sidebar also encourages everyone to seek out surviving spark operators, document their tales from spark, and protect their spark keys from extinction.

Spark keys are usually recognized by their large size and massive contacts, which usually flamed with high current. A slip of the wrist could cause smart burns, so skirts on knobs helped protect an operator's fingers. As further explanation, let's briefly study some spark keys in the magnificent collection of Gil Schlehman, K9WDY.

In Memory of W4DXB

This month's keys column is dedicated to Slaughter Reed, W4DXB/SK, an original spark operator and genuine radio pioneer who passed on to the great ethereal waves in the sky during late 2001. Reed was a true "dyed in the wool" amateur, always working CW and checking in to the Quarter Century Wireless Association and Society of Wireless Pioneers 40 meter CW nets right up to his last days with us. I only knew Reed a short time, but his CW fist was very good for his age, and his memories of the era of fire-breathing spark rigs encouraged me to relate the "Nostalgic Notes" in our December column for next-generation amateurs.

Reed's now silent key also highlights the important role each and every one of us can play in perpetuating amateur radio's proud history. How? By seeking out other surviving spark operators in your area, encouraging them to talk about their experiences with spark, then documenting their tales and preserving their original-era spark keys. Patience, persistence, and good "detective" work will be necessary in this most commendable pursuit, as spark ops will now be in their 90s. They probably do not attend club meetings, but they may be listed in club records. Some may be in retirement homes. Getting them talking and focused may require kindness and understanding. Locating, cleaning, and preserving their spark keys may also prove challenging, but the end results will more than overshadow the efforts.

What is the best way to ensure a rescued spark key (and your documentary of its owner's use) is preserved and protected from extinction? Make it a family heirloom if a "hand-down path" seems feasible, or place it in an "appreciation environment" or local museum for preservation. Imagine the impact if someone had placed Joan of Arc's sword in such safekeeping decades ago.

Each and every amateur today can help, and every amateur can make a notable contribution to our history. Are you up to the challenge? How sincere is your amateur radio loyalty? Would someone volunteer to set up a website for collection and dissemination of related information? Resultant details will be included as a sidebar in a future column. Watch for it!

—K4TWJ

A large number of spark keys were made by the machinery division of the Boston Navy Yard between 1900 and the mid-1920s, and one of their big-time models is shown in photo 9. Notice the huge contacts and the bottom contact's knurled edge for quick field replacement. Also notice the heavy continuity-ensuring strap between the arm and base near the fulcrum; it minimized sparks flying from the fulcrum pins. Look carefully and you can also see a trunnion-pin-securing set screw in the arm's fulcrum, a design used in very old, rare keys.

Next study the Marconi model CM425 spark key shown in photo 10. Again notice the massive (and field-replaceable) contacts and skirted knob. The trunnion pin is also extra

Photo 9– This rescued-from-extinction Boston Navy Yard spark key was made around 1910 and used with fire-breathing spark transmitters of the same period. Notice the massive contacts on this key. They are rated at 50 amperes and can be field-replaced when burned out from high current. (Photo courtesy master key collector Gil Schlehman, K9WDY)

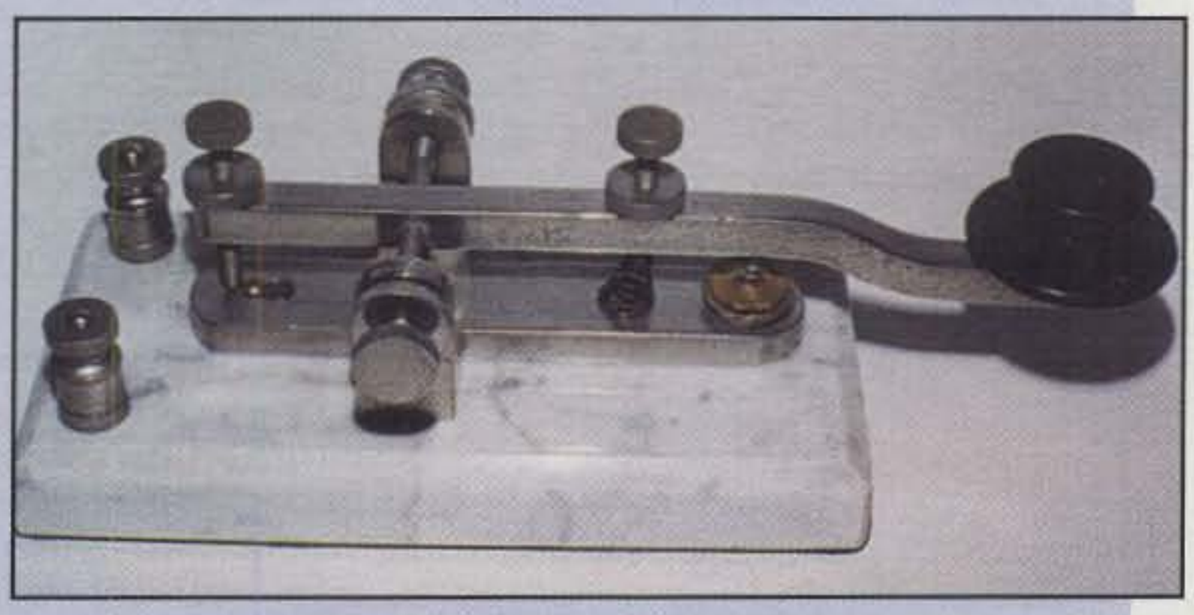

Photo 10– Although this United Wireless key has small contacts, it was also a popular, often-used item during the days of spark. Just watching such a setup in action was a frightening experience for onlookers, especially when large sparks flashed in their direction. (Photo courtesy Gil Schlehman, K9WDY)

Photo 11– Spark keys such as this heavy-duty item made by the Marconi Wireless Telegraph Company of America are immediately recognized by their huge contacts. Every one is an important piece of history, and tales of use from their owners are equally important aspects of history. (Photo courtesy K9WDY)

Photo 12– Some spark keys have large contacts, some even have heat sinks, but the contacts on this marvel made by The Massie Wireless Telegraph Company are immersed in a beaker of oil. The whole operating desk and the floor beneath it probably flashed when this thing was in action! (Photo courtesy K9WDY)

large. It looks more like a bar fit into hollowed-out side nuts, evidently to minimize sparking.

The United Wireless spark key in photo 11 points out some of these historically significant gems had small contacts—and they also burned out quickly. Many operators could not afford

Photo 13– Here is the perfect QTH marker for your yard or driveway—a Wind Key made by Bob Wertz, NF7E. Wind turns the propeller, which drives the hand up and down to activate the key, which is a beautiful humpback type with large, wide-spaced contacts. Wind Keys are available directly from NF7E. (Details in text.)

replacements, so they soldered dimes (which in old times contained real silver) to the contacts. Look at how the trunnion pin at this key's fulcrum is secured in side screws; that's what we call *needle bearings* (It is crude here and easy to see; modern versions are more refined.).

Precious little information is available on the incredible oil break key made by the Massie Wireless Telegraph Company of Providence, Rhode Island during eras past (photo 12). I am sure, however, you will enjoy studying it. The key's contacts appear replaced by an adjustable set screw and plunger activating a larger set of contacts within the beaker of oil beneath the key. Large copper straps then connect the contacts to keying terminals on the beaker's retaining ring below the key.

Our special thanks to collector Gil

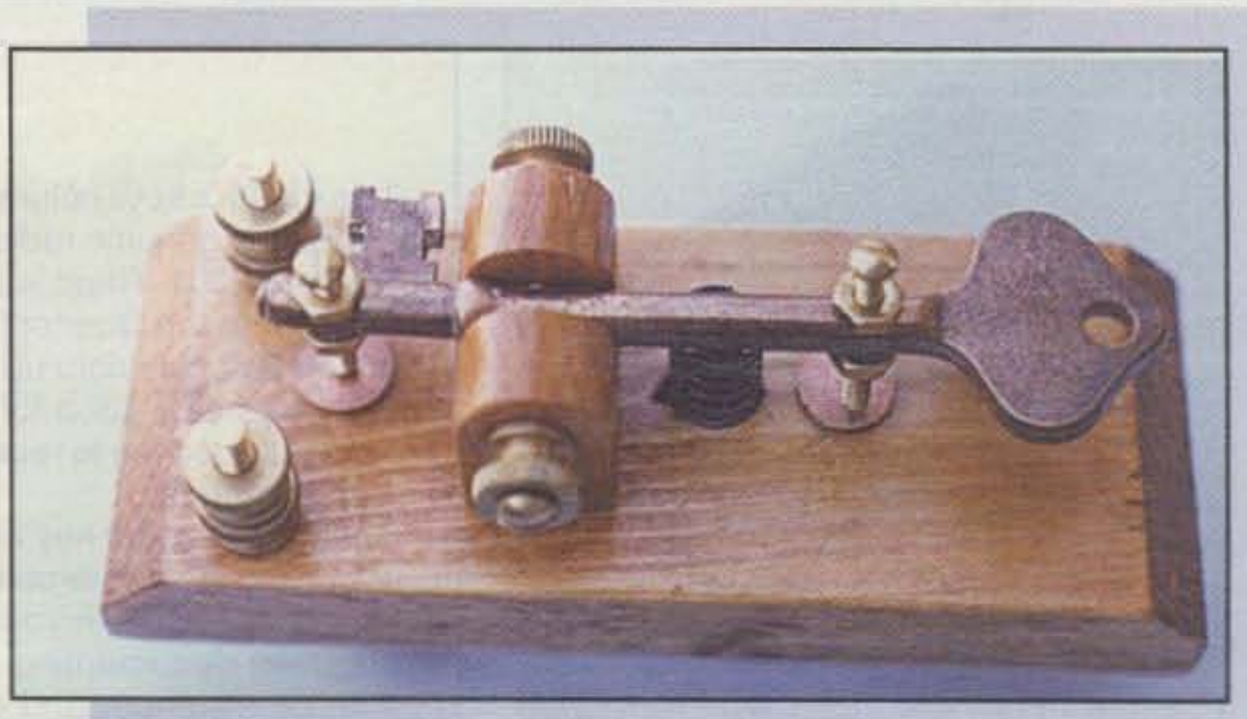

Photo 14– The appreciation for CW of Bob Wertz, NF7E, carried over to this unique skeleton-key key, and it is a real conversation piece—total class!

Schlehman, K9WDY, for sharing the previous views of spark keys.

NF7E Does It Again!

Remember the incredible Wind Key or ham whirligig being made and sold by Bob Wertz, NF7E, and featured in our December 2001 column (photo 13)? Wind turns the whirligig's propeller, which drives the hand up and down to operate the key and send CW. The harder the wind blows, the faster the hand activates the key. It is fascinating to watch, the humpback key is beautiful to study, and Wind Keys are still available in fully assembled form or as a full-scale set of plans for homebrewers. Contact Bob directly for details (6315 East Townsend-Winona Rd., Flagstaff, AZ 86004; e-mail <Bob6315 @earthlink.net>).

Bob recently devised another novel item—not for sale, but for enjoyment—and I am sure you will appreciate studying it (photo 14). This skeleton-key key is an actual working key, and its arm is a key. Yes, indeed: click-clunk, squeak-squeak, it's a gas, gas, gas! Life in the CW lane is a blast!

Coming Up: Adopt-A-Depot

We have almost totally overflowed space, and the best is still ahead! Stay tuned for Part II next month, including exciting details on my new "Adopt-A-Depot" program for setting up a classic telegraph system/display in some of the numerous railroad depots being restored and used as Chamber of Commerce offices and museums in townships across the country. Meanwhile, here's hoping we meet on 30 meters CW one evening soon.

73, Dave, K4TWJ

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SS-18	15	18	1⅝ x 6 x 9	3.6
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SS-30M*	25	30	3¼ x 7 x 9⅝	5.0

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SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

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

MODEL SRM-30M-2

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

WITH SEPARATE VOLT & AMP METERS

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

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SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

Public Service

BY BOB JOSUWEIT, WA3PZO

Public Service and Emergency Communications

A Touch of Home for the Holidays

As I write this column it's the start of a new year. I've managed to visit, write, or talk to the entire family in two weeks. Unfortunately, many families were not able to be together over the holidays. Many were away from home serving their country.

This month we take a look at hams providing a link back home from inside various operational areas or war zones.

Keeping in Touch

In mid December Army MARS (Military Affiliate Radio System) reported that Army Special Forces troops on duty in Islamabad, Pakistan, "and other undisclosed locations," are keeping in touch with home through the phone-patch service operated by MARS members.

"The service makes it possible for deployed troops to call back to the United States from areas where commercial connections are not feasible or simply nonexistent," said Bill Sexton, Army MARS Public Information Officer. "Specially trained amateur radio operators in MARS provide the connection between military shortwave stations deployed overseas and the telephone system at home."

This is not the first time MARS members have geared up to keep members of the military in touch with family back home. Sexton explained that over the last several years Special Forces members deployed on peacekeeping missions to Kosovo, Macedonia, West Africa, and other areas lacking regular or affordable phone service have relied on MARS. During Operation Desert Storm, and of course the Vietnam War, phone patches were a major source of comfort to families and service members. (See "A Look Back—MARS in Vietnam" for recollections). Today, while many members of the armed forces have access to e-mail, there are some calls originating from battery-powered backpack transceivers with a power of 20 watts or less.

Sexton reports that even the more sophisticated base military stations have had their problems. He said one overseas communicator reported that turning on a linear amplifier tripped the circuit breakers on the local power system. A communications sergeant who recently returned from a three-month Special Forces mission in Africa said, "All the guys wanted to make sure everything was running smoothly in their absence." For the guys making calls to their wives, they did

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Hams Support the Holidays

Across the country amateur radio operators helped bring in the Christmas holiday season. In New York, Operation Santa took place at JFK Airport in New York City, looking after the needs of children with disabilities, as it has done for the past 56 years.

Amateur radio first got involved with the project in 1997. At the time ten amateur radio operators from Staten Island, New York ARES (Amateur Radio Emergency Service) supplied communications for the event. In 2001 the number increased to 26 hams. Following events in September, there was a need for increased security. As one official said, "Communications were very high on their list of crucial first decisions." The organizers knew that ham radio was key to the success of the event. Even a brief try of using FRS (Family Radio Service) radios to supplement the ham coverage showed them that using FRS was a mistake.

Parades

Hams provided logistical support for several parades around the country. In Philadelphia members of the Holmesburg Amateur Radio Club made sure Santa got to the end of the parade route, a 1.5 mile course plus another one half mile in the staging area. Radio operators with each division were responsible for reporting problems and marchers who did not show up. They also kept in contact with medical personnel in case they were needed.

In Atlanta, Georgia hams began gathering at 6:30 AM for the city's 1.25 mile long holiday parade. Tim Rosing, KC4ELV, said they started early so they could get their T-shirts and a biscuit before they went on assignment. A ham was assigned to shadow or stay with each of the 24 parade officials. Each was responsible for a major aspect of the parade, including bands, floats, balloons, banners, operations, and even the TV coverage. Once the parade kicked off, the hams were reassigned to positions in the parade line-up to control the starts and stops of the marchers that were required to keep the parade from getting strung out during the TV commercial breaks and to ensure smooth flow along the route. This is very important, since the parade is carried live during a 1.5 hour broadcast.

Radio Coverage Key

While the hams at both parades kept everyone in contact, their jobs were made easier by ham radio technology. In Atlanta, the MATPARC (Metro Atlanta TelePioner Amateur Radio Club) 2 meter repeater was used along with a simplex frequency. In Philadelphia club members used a combination of a crossband repeater and simplex

Lee Jucket, AF4IA (right in Santa cap), with Telecast Coordinator in Atlanta. (Photo courtesy Tim Rosing, KC4ELV)

operation. The parade route in Philadelphia is just about a straight line, but there is a hill near the beginning of the route which makes it impossible to communicate from start to finish using just HTs. To solve the problem Dave Hogan, Jr., KB3AKK, who lives along the parade route, was able to set up a radio at his house as a crossband repeater. When there was a need to communicate from end to end, the hams used the crossband repeater, transmitting on 440 MHz and receiving on a 2 meter simplex frequency. When possible, the 2 meter simplex frequency was used for everyone else on the route. This has worked successfully for several years.

A Look Back: MARS in Vietnam

The original NØEFA was a young ham radio operator's dream. (All Vietnam photos courtesy Barry Weathersby)

Thanks to Barry Weathersby, W6YDK, of Romona, California we are able to share a little history of MARS operations during the Vietnam War.

In Vietnam there was a small number of Marines, all ham radio operators, who were given civilian ham radio equipment and told to use their skills and run phone patches for their fellow Marines. Each of the operators was given a MARS callsign. By today's standards you would think you were located in the Midwest. The stations were assigned callsigns as they went on the air. Weathersby said the first station was NØEFA (November Zero Echo Foxtrot Alpha). Eventually the stations in Vietnam and on hospital ships off the coast reached NØEFX. (Current Navy-Marine MARS callsigns follow a NNNØxxx pattern.) The operators had their own chain of command, since no other Marine Corps unit wanted anything to do with them. They seldom wore rank insignia and answered only to other MARS personnel.

Many of the MARS operators were members of their high school amateur radio clubs just a few months before they went into the service. Many did not have the money to go to the store and buy a new radio. Now they were handed 50 to a 100 thousand dollars worth of state-of-the-art ham equipment.

The original NØEFA was located on a hill in Da Nang, South Vietnam. It was a young ham's dream. It included a Collins KWM-2A transceiver, and a complete Collins S-Line, (32S-3 transmitter, 75S-3A receiver, phone patch consoles, and a Henry 2K-2 linear amplifier). Many seasoned veterans didn't believe it would work.

According to Weathersby servicemen, "There was no way some kid with a civilian radio, often under horrendous enemy fire, was going to figure out when the peak of the sunspot cycle would ionize the *E*-layer of the ionosphere, then be able to point an antenna at exactly the right spot a hundred miles out in space at the right time and reflect a high-frequency radio signal off the ionized layer, over the curve of the Earth, into a similar station in the U.S. . . . much less hook it all up to a telephone line to his family."

"But these 'kids' knew how to do exactly that," said Weathersby. "They had learned it to pass the Federal Communications Commission's test to get their licenses, some when they were 13 or 14 years old." Then they wished for the opportunity to own a radio to practice what they had learned. For various reasons, they became United States Marines. When they got to Vietnam they concentrated on doing their jobs and staying alive. Ham radio just didn't seem important. Slowly the right people learned about the hidden talents of various combat infantrymen and cooks. They were reassigned to MARS stations.

The Marine Corps MARS operators ran hundreds of thousands of phone calls from Marines to their loved ones back home. When the signals became too weak to be "phone patch quality," they pulled out telegraph keys and sent and received messages, or MARSGRAMS, for the troops. Suddenly their 5 words per minute FCC exam to get a Novice ticket had developed into a skill of passing messages at speeds of 30 to 50 words per minute.

In early 1967 the 3rd Marine Division moved to within range of the big guns in North Vietnam. After one year NØEFA was badly damaged. "It had more holes than walls and roof," said Barry Weathersby.

Jim Elshoff stands guard over the new NØEFA sign. →

Barry Weathersby shows the basic equipment for a MARS operator in the field—two Samsonite suitcases (custom made to hold a Collins KWM-2A and its power supply), an antenna and vertical mast, and an M-16.

Messages from the Front Lines

In early 1967 the 3rd Marine Division moved from Da Nang to Dong Ha, within range of the big guns in North Vietnam. After one year NØEFA was badly damaged. According to Weathersby, "It had more holes than walls and roof." Wounded operators and destroyed equipment had taken a toll on the phone patch count. Weathersby said the Seabees were convinced to build a new station. They used phone calls home and other bribes to get what they wanted. Eventually 'Alpha' (NØEFA) moved to a few hundred meters south of the Demilitarized Zone between North and South Vietnam. The station ran over 500 phone patches during Christmas of 1967.

Pennsylvania Hams Activated For Nursing Home Fire

In mid December there was a four-alarm fire at a nursing home just outside of Allentown, Pennsylvania. The fire caused power, smoke, and water damage. Over 500 nursing home residents had to be evacuated and placed in shelters. Local emergency management officials called in members of Lehigh County RACES (Radio Amateur Civil Emergency Service) to staff the shelters and provide additional support at the Emergency Operations Center, on the scene, and at the local trauma center. For the next 24 hours 24 RACES members provided communications at the temporary shelters until all of the residents were transported to facilities that could provide proper care.

Three days later plans were in the works to return the patients to the county nursing home. Since the residents were spread out over a four county area, RACES was again called in to coordinate the trip home. All of the emergency management officials agreed that their radios would not have had the same coverage RACES was able to provide. RACES operators from Lehigh and Northampton counties provided the necessary coverage using three repeaters in the area (W3OI and W3OK on 2 meters and N3FMT on 440). Over a 10-hour period 20 operators helped move all 515 residents safely to their home. The move was done in a relatively short period of time in a large part due to amateur radio.

not like the idea of talking on the open airways. They got accustomed to the idea, though, and started using the phone patch more and more and ending their transmissions with "Over."

Since there is an ongoing war on terrorism, we will not report on specific or current operations. Reports coming in to *CQ* indicate that many hams are busy serving their country. Some are on board a ship in the Operational Area. Others are on land. Some expressed disappointment that they were not able to fire up the MARS rig, but looked forward to getting back on the air, yet they put their skills to use as trained communicators to serve our country.

The e-mail coming into your editor has been very uplifting. We hope at some point we can share it with you. For now, be proud of our servicemen and women and know that when possible our fellow hams are "radioactive."

Do You Have a Story to Tell?

Each month we present an interesting story about hams serving in the public interest. In many cases you provide the lead to the story. This month I want to thank Barry Weathersby, W6YDK; Ryan Jairam, AB2MH; Tim Rosing, KC4ELV; Jeff Kelly, N3MFT; and Bruce Bobo, KB3FIH, for supplying information.

We would like to hear from you about what your group is doing. Activities can happen on HF or VHF and above. Just drop us a note and let us know how you are serving in the public interest.

73, Bob, WA3PZO

Getting Involved!

Each of these public-service events was successful because of previous operating events. Ham involvement with Operation Santa started with a meeting at an earlier event. In the Atlanta area hams are involved in many public-service events during the year. In Pennsylvania hams play an active role in county emergency management. When you are part of the process, emergency management and event coordinators can learn what your group is capable of doing.

Training is the key. In many cases just having a radio is not good enough. There is an increasing demand to show the sponsoring organization that your group is made up of trained communicators. This may be as simple as saying that your members participate in organized nets on a weekly basis. In some cases you may have to show that you have knowledge in emergency communications. For example, the Salvation Army Team Emergency Response Network (SATERN) recognizes the ARRL Amateur Radio Emergency Communications Course.

In Philadelphia a crossband repeater was used for the parade. Would you know how to set up your HT to take advantage of this communications tool? Consider setting up a club meeting and review the features on some of the new HTs. If you have a mobile radio capable of operating crossband, why not have your members program their HTs by setting the correct frequencies, PL tones, and frequency offset. Show how the radio operating in the crossband mode works and then have them use the radio to make a contact. It's much easier to learn how to do something when you are in a quiet room and not under pressure than it is during an emergency or in a large crowd with high school bands playing as loudly as possible.

What other techniques could you teach on 2 meters? With so many people using cell phones to make calls, maybe there is a need to demonstrate the use of the autopatch. Remember, cell sites get overloaded easily. Ham radio autopatch can circumvent clogged cell sites. Some groups have specific instructions to follow when calling the county 911 system via an autopatch.

Other items that can be discussed are using an HT for direction finding. A technique called the "backbone null" is very useful when you want to find out what direction a signal is coming from. To do this, tune the HT to the frequency you want to listen to. Place the HT next to your chest. Slowly turn until the signal becomes the weakest or possibly disappears completely. When you reach that point, your back should be pointing towards the signal. In other words, your body is between the radio and the signal. (*If you can't identify a null using this technique, try removing the HT's antenna and repeating the process.—ed*).

Do you have some other ideas for demonstrations at club meetings? Let's hear about them!

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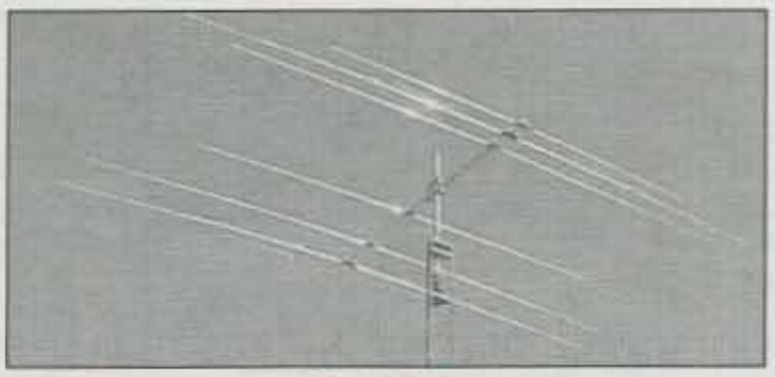

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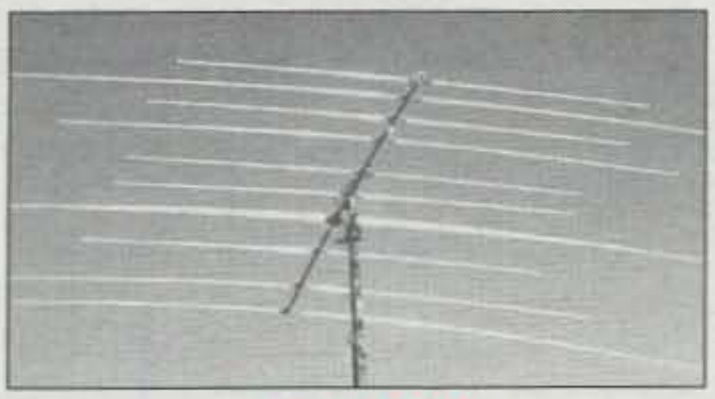

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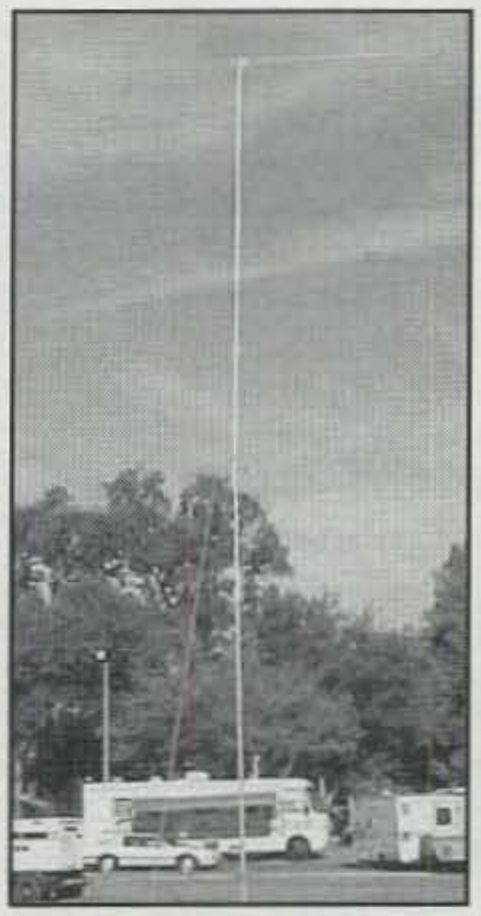

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40 mtrs, whole band <2:1,
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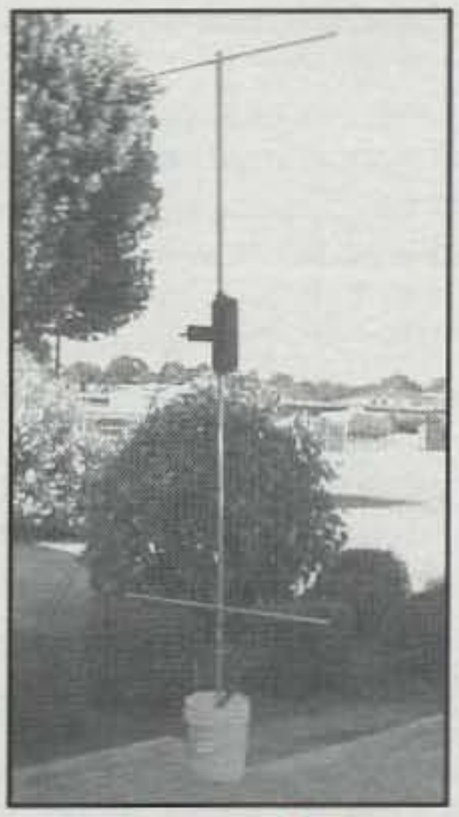

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Beginner's Corner

BY PETER O'DELL, WB2D

For the Newcomer to Ham Radio

Lightning Protection

Remember the movie *Back To The Future*? When Marty gets stuck in 1955 without plutonium for the reactor, the only source of power capable of propelling him through time is a bolt of lightning. That science fiction movie is a lot of fun to watch, but there is nothing fictional about the power contained in a bolt of lightning. I don't know if it can actually propel you through time, but it could easily "propel" you into the next world.

When I first got licensed, I never really thought much about lightning. Then I went to work servicing two-way radios. That was an eye-opener. Very quickly I learned to fear thunderstorms more than ever—not so much for personal safety, though, as I had always subscribed to the Falstaffian belief "Discretion is the better part of valor where lightning is concerned." It was, however, because the days after the storm would be filled with lots of fun experiences and exotic smells.

One morning after a storm we got a call from a local company that said their low-band radio was not working (in the two-way biz "low-band" refers to 30–47 MHz). This was in a rural area with lots of hills. Radios were almost always located in hilltop shacks at the end of long, winding dirt roads. Mice, rats, and snakes that loved to dine on them were the only natural residents of these areas.

When the concrete block building came into sight, I knew something was wrong. There was a hole in one wall, sort of like the picture of your average building in Afghanistan these days. Parking as close to the building as I could, I made my way through the knee-high grass and weeds to the door and unlocked it. The electricity was off, so I used a flashlight to look around. Other than the smell of burnt insulation (and the 2 foot hole in the concrete wall), initially everything looked okay. I just needed to get the power back on.

The power was not to come back on, however. Why? The circuit-breaker box was gone. In fact, the circuit-breaker box was the projectile that left the 2 foot hole in the wall. It had been surface mounted on the wall opposite the one with the hole. Later we found the remains of it about 50 feet from the building. It appeared that lightning had come in through the telephone lines and jumped to the grounded circuit-breaker box. Something exploded with enough force to hurl the breaker box 10 feet across the room, through the concrete block wall, and then another 50 feet or so out into the field.

I had a lot of other experiences cleaning up the mess that lightning made, but that was the most dramatic one. Oddly enough, there was no electrical damage to the radio equipment. On numerous other occasions the equipment was fried, but there was no apparent physical damage to the building.

Lightning does not limit itself only to attacking commercial installations. A few years back a friend of mine lost most of his ham equipment, two sections of tower, a TV, a bunch of audio equipment, and two computers to lightning. He had an 80 foot tower in the backyard with an HF tribander and 2 meter beam antenna. Other than a ground rod at the base of the tower, he had paid little attention to lightning protection. It was not surprising, then, that he lost stuff when he was hit. The real surprise was what happened to the tower (Rohn 25). Half of one section was missing! Our best guess was that there had been so much heat in the strike that a portion of that section simply vaporized!

One thing both of these episodes have in common is that they are extreme cases; both were direct hits. If you have a direct hit, chances are you are going to experience some losses unless you have done an exceptional job of preparing your station for the possibility. Fortunately, few of us ever suffer direct hits. You are far more likely to experience a secondary strike of some sort.

I once lived in an apartment that prohibited antennas of any sort. Fortunately, my unit backed up to a swamp, so no one paid a lot of attention to what I did back there. I put up a random-wire antenna that was about 500 feet long and used an antenna tuner with it. Shortly after putting up the antenna, I was awakened in the middle of the night with a repeated "BZZZT" sound. At first I thought maybe some misguided alien was about to abduct me. Then I realized that the sound was accompanied by two things: There was a faint light in the corner where I had the ham shack, and a distant thunder storm was lighting up the night skies.

The distant lightning was inducing a voltage in the wire antenna, and it was arcing over in the antenna tuner. In those days I followed the "Ugly is Good; Cabinets are for Wimps" credo, so I could see and hear the arc. It was a tube rig (a long time ago), so the radio itself was not damaged. The next day I wired in an SPDT switch that grounded the antenna when not in use. No more arcing when thunderstorms were around.

I would like to think that what I am about to tell you is so obvious that you would be insulted that I even mention it. However, I've known too many hams who were totally oblivious when operating. Here's the deal: ***If there is any chance of lightning, shut off the radio and get the heck away from it.*** With the possible exception of a hand-held with a rubber-duck antenna, this applies to all radios—HF, VHF, UHF, microwave, what have you.

I know a lot of hams who disconnect antennas outside the house. They only connect them when they are operating. In this case, just to make a casual contact you have to go outside and connect the antenna you want to use. Not for me. Give me the lightning arrestors and other precautions. I'll take my chances with the equipment, but not with my personal safety. When a storm is nearby, I leave the shack and go to another part of the house.

If I have any warning that a storm is coming, I disconnect equipment from any sort of wire coming into it—antenna feed line, rotator cable, telephone line (to the computer modem), power cords, etc. That is not always possible, since I live in the state that is billed "The Lightning Capital of the U.S." (Florida). We even have a website that is devoted to graphically displaying lightning strikes across the state in the last few minutes (http://www.flamedia.com/

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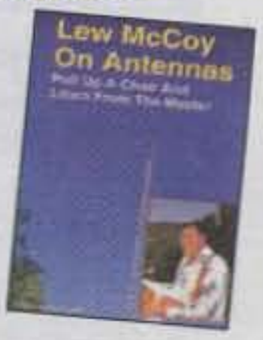

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lightning/light.htm). I will say that not having a tower up, I breathe easier here. A couple of wire antennas for HF and handhelds for 2 meters and 440 MHz make life pretty simple these days.

I remember one storm on Long Island. It came in the middle of the night and went on for about 2 1/2 hours. The lightning strikes were all around. It would seem to die down and then start right back up again. I had all sorts of aluminum hanging in the sky—2m/440 verticals, 2m/440 beams, 6 meter quad, HF tribander, 80 meter vertical, dipoles, etc. Nothing had warned me of what we were in for that night. I thought about going to the basement and disconnecting everything, but decided against it. It wasn't safe. Besides, it had to end sometime soon. It did not, however. On it went. I didn't sleep until the storm finally faded out.

The next morning the TV weather man reported that it had been a most unusual night. A front had "parked" right along Long Island. What seemed like one huge storm was actually a series of eight to ten normal storms that "slid" along the front. Numerous strikes had hit less than a quarter mile from my house, some much less than that. There was no damage though. That morning I felt like Jimmy Stewart at the end of *It's A Wonderful Life.*

From a practical standpoint what do you do? First of all, you need to make yourself aware of the danger at any given moment. Because of the difference in the speeds of light and sound, it is pretty easy to estimate the distance of a lightning strike. For practical purposes, light is instantaneous, but sound is relatively slow. Depending on a lot of conditions, it takes between 4 and 5 seconds for sound to travel 1 mile. Thus, once you see a strike, you start counting: "One-thousand-one, one-thousand-two, one-thousand-three," and so on. That will quickly let you know how near the strike is.

On a good night (low wind, no rain), you can hear thunder up to about 10 miles from you. But lightning can strike miles away from the storm! According to the National Weather Service, three miles is a highly dangerous zone, and even six miles is still considered a threat. Their advice is this: ***"If you can see it, if you can hear it—flee it!"***

Proper grounding is the number one defense against lightning damage, particularly from indirect strikes. An earlier column discussed grounding (June 2001). You might also want to consult *The ARRL Antenna Book*. The first chapter contains a short, but easy to follow discussion of lightning protection. There are numerous products on the market for lightning protection.

The policy that I have always followed is to protect every line coming into the house with some sort of device. That includes antennas and rotator cables (obviously), but it also power lines and phone lines. If nothing else, you can always add surge protectors. All my station equipment plugs into a single "power strip" with a built-in surge protector. I can unplug the whole station from the AC mains with one plug. Of course, these days my station is very simple. If you have a more complicated setup, your solution probably will be more complicated, too.

At my QTH all antennas have a lightning arrestor. The phone lines to the computer are routed through a surge protector. Everything is grounded as best I can, living on a 400 mile long, 100 mile wide sandbar.

When you put up an antenna, follow the manufacturer's instructions for proper grounding. Make yourself aware of the state-of-the-art techniques.

It's not just your equipment that depends on lightning protection, it is your life and lives of those who live with you.

Call for Photos and Stories

We'd like to hear from you about your experiences as a newcomer. If you have questions, we'll try to incorporate them into future columns. If you have photos (color prints or slides okay) of your station or antennas, please send them along and we'll publish the best ones. If you have a solution to a common problem that new hams experience, we'd like to hear about it so we can pass it along. You can contact me at <wb2d@cq-amateur-radio.com> or Peter O'Dell, WB2D, Beginner's Corner, 123 NW 13th St., Suite 313, Boca Raton, FL 33432.

Some Useful Web Links About Lightning

Lightning Links: <http://www.sirlinksalot.net/lightning.html>
All You Need To Know About Lightning: <http://www.2dog.com/cat/lightning.html>
Detailed Article Grounding Systems: <http://www.tercel.com.au/earthing_systems.htm>
National Weather Service: <http://205.156.54.206/er/cae/svrwx/lightning/ltg.htm>
Lightning Safety: <http://www.lightningsafety.com/>

What's New

BY KARL T. THURBER, JR., W8FX

A New Column for A New Century

Super Spring Stuff for the Well-Equipped Shack

Once again the refreshing scent of spring soon will be in the air. With that exhilarating thought in mind, we'll first focus on some neat new radio gear and accessories, while also saving room for some new antennas, software, books, and other goodies. Are you ready?

Radio Gear

Ten-Tec RX-350 HF DSP Shortwave Receiver. Scott Robbins, W4PA, of Ten-Tec, recently told us of the firm's new full-featured HF DSP shortwave receiver, the RX-350. According to Scott, "the world of IF-level digital signal processing is now available in a powerful desktop SWL receiver unlike anything that has come before it."

The RX-350's IF-DSP technology offers exceptionally clean signal readability, where you can take advantage of a wide variety of DSP filter choices to suppress undesired adjacent interference. IF-DSP also allows Flash ROM updating of your receiver with the latest features and functions—for free. If new functions and features are added to the RX-350, you simply visit the Ten-Tec website, download the latest version of the receiver, and it's as if your radio just rolled off the assembly line.

The RX-350 features a clean, modern look (see photos A and B) and a large, multi-function LCD graphics panel for display of all functions, with pushbutton operation of major controls from the front panel. Some of the radio's many features include support of a number of operating modes, sophisticated sweep functions, passband tuning, built-in clock display on the LCD screen, and more "under the hood." Price is $1199.

For more information on the RX-350, contact Ten-Tec, Inc., 1185 Dolly Parton Parkway, Sevierville, TN 37862 (1-800-833-7373; e-mail: <sales@tentec.com>; web: <www.tentec.com>).

By the way, Ten-Tec recently established a full-line, 1000 sq. ft. amateur radio dealership and retail store to complement the Ten-Tec manufactured line of ham gear. The retail store and outlet center is located at the Sevierville, Tennessee manufacturing facility. According to Scott, Ten-Tec is bullish on amateur radio, and the move actually has the firm coming full circle, from leaving the dealers about nine years ago to now competing with them. The Ten-Tec store carries more than 20 other manufacturers' accessories, in addition to its own equipment.

DSP Multimode SCS PACTOR-Controller from Farallon Electronics. Farallon Electronics is located in Sausalito, California. It specializes in the distribution of electronic systems designs for the transmission of data over HF radio, performance yachting, specialty marine applications, and industrial equipment.

The firm is especially proud of its top-of-the-line series of German-import Special Communications Systems (SCS) PACTOR II HF/VHF modems. Of special note is the new SCS PTC-IIpro DSP Multimode PACTOR-Controller (photo C). The new multiport modem works with PACTOR-I, PACTOR-II, AMTOR, NAVTEX, RTTY, PSK31, SSTV, FAX, and CW modes. It's based on powerful, 24-bit DSP technology running at 100 MHz.

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

Photo A– Here's a front view of Ten-Tec's full-featured HF DSP shortwave receiver, the RX-350. The RX-350 features a clean, modern look featuring a large multifunction LCD graphics panel for display of all receiver functions, with pushbutton operation of major receiver controls from the front panel. (Photo courtesy Ten-Tec)

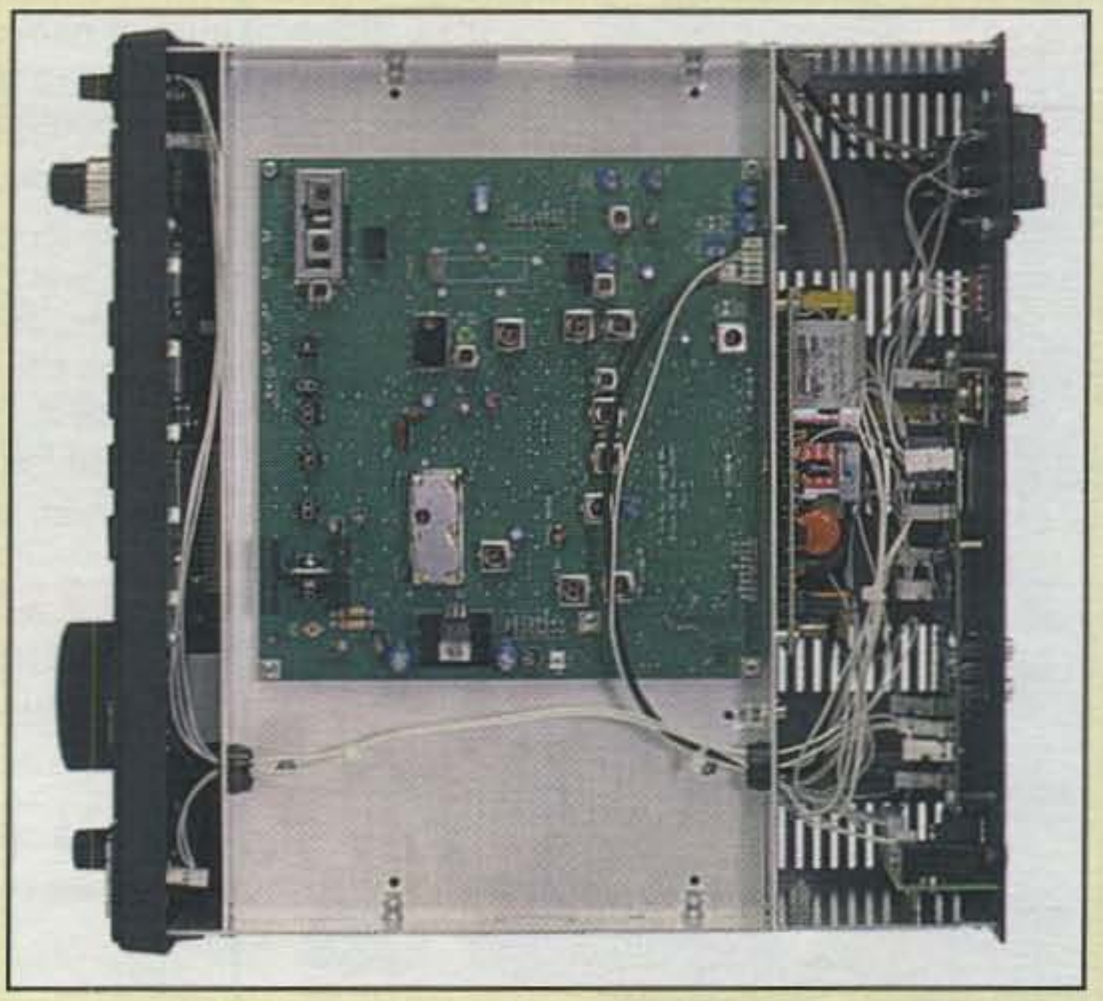


Photo B– View of Ten-Tec's RX-350 with the top cover off. Some of the radio's many features include support of a number of operating modes, sophisticated sweep functions, passband tuning, and built-in clock display on the LCD screen. (Photo courtesy Ten-Tec)

Photo C– The new SCS PTC-IIpro DSP Multimode PACTOR Controller. The unit works with PACTOR-I, PACTOR-II, AMTOR, NAVTEX, RTTY, PSK31, SSTV, FAX, and CW modes. It is based on powerful, 24-bit DSP technology running at 100 MHz. A simplified, single-port version, the PTC-IIe, also is available. (Photo from the Farallon Electronics website)

Other features include 2 MB static RAM; a high-quality case; a built-in audio amplifier; a highly stable, temperature-compensated oscillator; a sophisticated transceiver control port; a DSP-based audio "denoiser/filter"; three simultaneously available communication ports; an optional VHF/UHF DSP module; and much more. The SCS PTC-IIpro is $950. A simplified, single-port version, the PTC-IIe, also is available, at $649.

For more information, contact Farallon Electronics, 2346B Marinship Way, Sausalito, CA 94965 (415-331-1924; e-mail: <theoffice@yachtwire. com>; <http://www.yachtwire.com>).

Accessories for the Shack

Two New Keys from The Vibroplex® Company. Is there a Vibroplex® in your life? Most readers are at least somewhat familiar with the venerable Vibroplex name and the firm's proud history and many contributions to telegraphy. Indeed, The Vibroplex Company claims to be the oldest name in amateur radio, tracing its roots back to 1890. Over the years the name has come to represent the best of the telegraphic, and later amateur radio, industries. Since 1994 the company has been owned by Mitch Mitchell, W4OA, the first amateur to own the company.

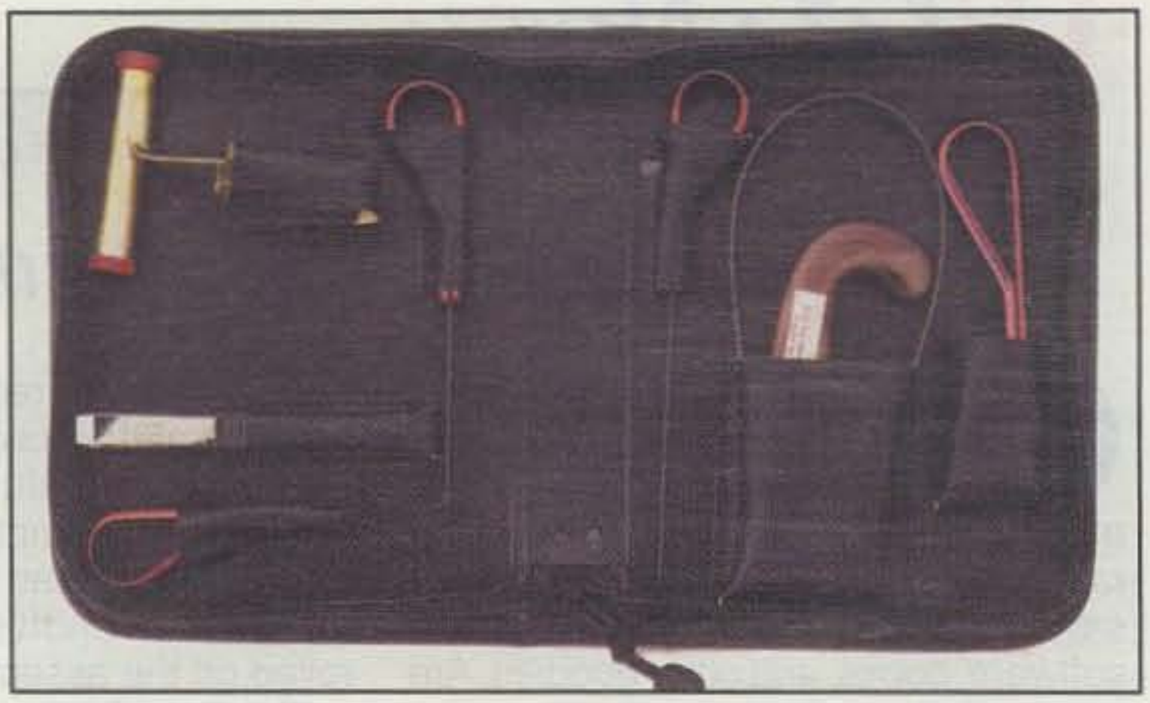


Photo D– Jensen Tools now offers a complete set of tools specifically designed for cable sheath slitting, ring cutting, lacing, sewing, and more. The TK-2 Telecom Toolkit comes in a handy, padded zippered vinyl carrying case. (Photo courtesy Jensen Tools)

Vibroplex has introduced two new hand-crafted keys to add to its extensive line of amateur radio keys. The Venus Key features bright chrome parts on a heavy, engraved chrome

base. This iambic paddle incorporates magnetic tension adjusters, red paddles, and an attached cord. The hefty (2.4 lb.), limited edition unit must be custom ordered; it's $499.95.

The Code Mite can fit in the palm of your hand. It's a straight key mounted on a 3" × 1.5" engraved, plastic base. The 2.6 ounce key has chromed upper parts and a black knob; it's priced at $59.95.

For more information, or a catalog, contact The Vibroplex Company, 11 Midtown Park East, Mobile, AL 36606-4141 (phone 1-800-8408873; e-mail: <catalog@vibroplex.com>; <http://www.vibroplex.com>).

TK-2 Telecom Cable Toolkit: New from Jensen Tools. Jensen Tools now offers a complete set of sophisticated, specialized tools specifically designed for cable sheath slitting, ring cutting, lacing, sewing, and more—just about everything you might need for cable work. The TK-2 Telecom Toolkit (photo D) comes in a handy, padded, zippered vinyl carrying case. The kit includes a sheath stripper; sheath slitter; ring cutting tool; curved sewing needle; straight 7 inch sewing needle; wire loop lacing needle; aerial drop wire slitter; and straight, flat metal sewing needle.

For more details and pricing, contact Jensen Tools, Inc., 7815 S. 46th St., Phoenix, AZ 85044-5399 (1-800-426-1194; e-mail: <Jensen@stanleyworks.com>; on the web: <http:// www.jensen-tools.com>).

Antennas and Accessories For the Radio Shack

EZ Raze Mast System. Old Stone, Inc. offers commercial and military multipurpose, ruggedly dependable mast systems. These include lightweight, "man portable" compact systems that require a small setup area on level or uneven terrain, or inside of or on top of buildings. A single mast, in addition to supporting multiple antennas, also supports multiple lights, speakers, satellite dishes, motion detectors, and cameras.

Of special interest to us is the EZ Raze Mast System, a portable antenna mast designed for amateur radio operators and radio and TV broadcasters. The patented EZ Raze Mast System (photo E) is self-supporting to a height of 29 ft., or it can be guyed to a height of 42 ft. The mast is easily transported or stored in the trunk of most compact and midsize cars. The mast features a safety interlocking system for each section. It is user friendly, requiring only one person to set it up in 5 minutes.

The EZ Raze Mast System can be used with just about any type of antenna. The mast, versions of which currently are being used by the U.S. Armed Forces, is said to be easy to set up, use, carry, and store, eliminating many of the headaches and worries associated with portable- and disaster-related operations. The knocked-down height is just 4 ft., and its weight is but 58 lbs.

For pricing and delivery information, contact Old Stone, Inc., P.O. Box 4051, Eden, NC 27288 (1-800-538-4977; e-mail: <Sales@AntennaMast.com>; on the web: <http://www. antennamast.com>).

New Surge Protectors from Alpha Delta Communications. We've profiled Alpha Delta's equipment protectors before, notably their Transi-Trap™ surge protectors. They use the fast-acting, field-replaceable gas-tube Arc-Plug® cartridges to isolate equipment from transients coming through coaxial feedline. The devices have been available since 1981 in several versions. The units have convenient stud hardware for direct mounting to a bulkhead, ground strip, or ground wire; commercial models are fully weatherproofed. The protectors are designed for 50 ohm coaxial circuits, and Arc-Plug cartridges are included.

Alpha Delta now offers several sig-

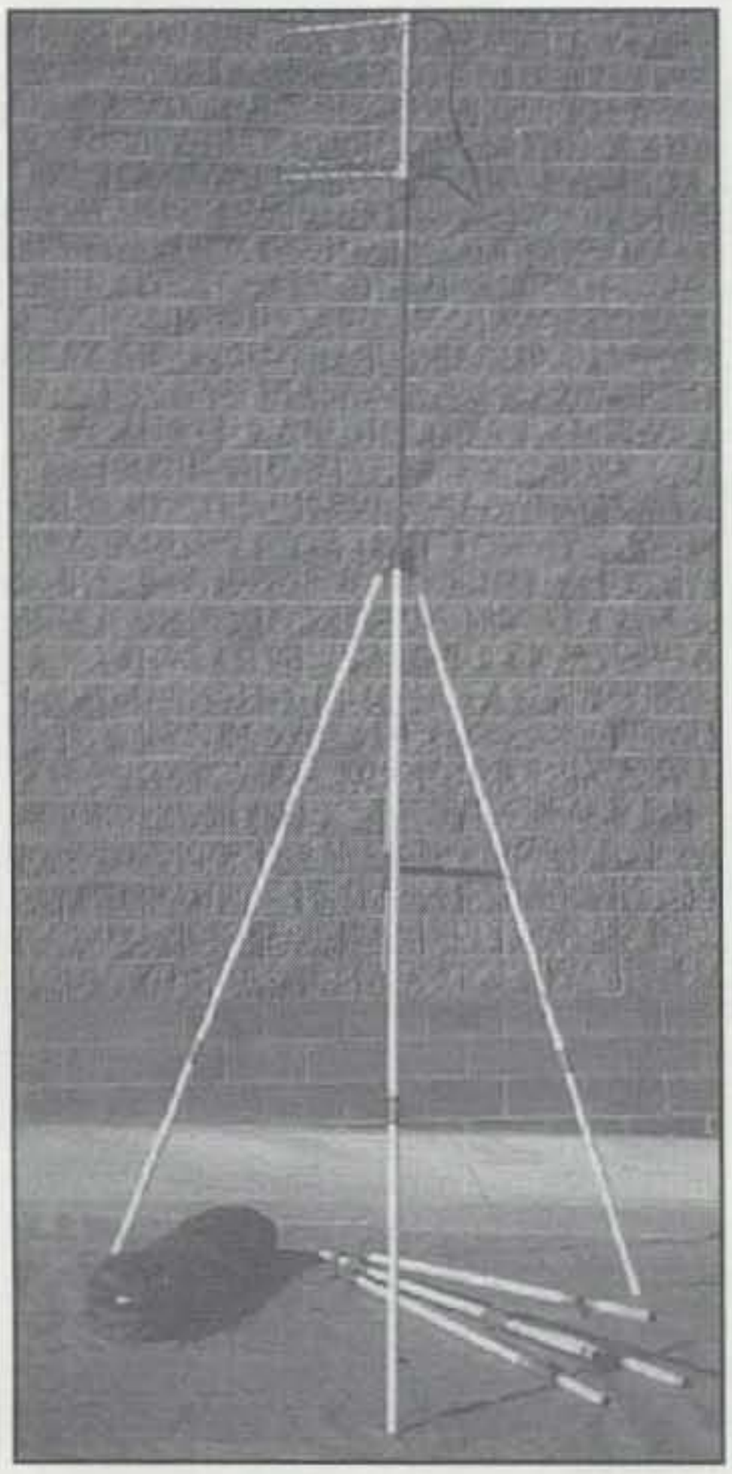


Photo E– Old Stone, Inc. offers a variety of commercial and military multipurpose, ruggedly dependable mast systems. The EZ Raze Mast System, shown here, is easily transported or stored in the trunk of most compact and mid-size cars and requires only one person to set up the mast in 5 minutes. The mast can be used with just about any type of antenna; it is shown here with a small Yagi antenna installed. (Photo from the EZ Raze website)

nificantly improved models. The new TT3G50 series, which covers 0 to 3000 MHz with a characteristic impedance of 50 ohms, is the same family of advanced surge protectors used by commercial, military, and government agencies around the world. In fact, adds Alpha Delta's Jim Burns, WB4ILP, the TT3G50 was recently chosen by the U.S. Coast Guard to protect its new Differential Global Positioning System (DGPS) being installed worldwide.

The TT3G50 series is available from all major amateur radio dealers, as well as directly from the manufacturer. Units are available in 200 watt or 2000 watt versions at the same cost, and with either UHF- or N-type connectors. Pricing for protectors with UHF connectors is $49.95 and $59.95 for N connectors. The units are available in stud- and bulkhead-type mountings. Contact Alpha Delta Communications, Inc., P.O. Box 620, Manchester, KY 40962 (1-888-302-8777; e-mail: <antennas@alphadeltacom.com>; <http://www.alphadeltacom.com>).

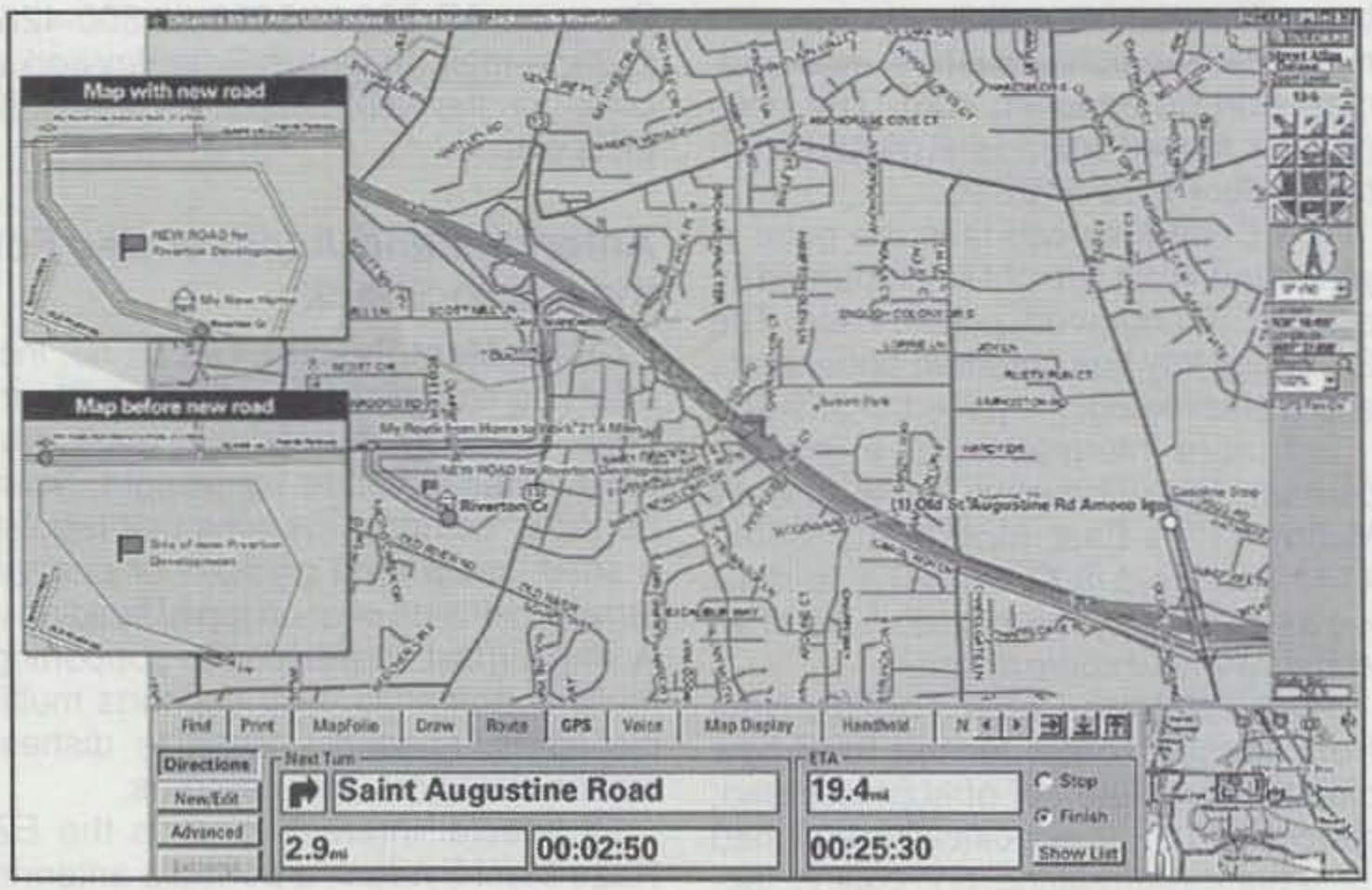


Fig. 1– Street Atlas USA® Deluxe, with its spiffy new interface shown here, is considered ideal for those looking for high-performance travel-planning software. If a new local street is missing, you can add, name, and then plan your route on it. The product features more than 6.2 million miles of routable roads, as well as over 4 million points of interest (POIs). (Graphic courtesy DeLorme)

Software and Computers

Choose Your Street Atlas USA®. DeLorme offers a variety of street mapping software for every need, whether that need be business or consumer oriented. One of my favorite products in this arena is Street Atlas USA®. Of special note is that DeLorme now offers both Street Atlas USA® Deluxe and Street Atlas USA® 9.0. (We covered Version 8.0 one year ago, in March 2001.)

One challenge that every map user and map maker has had to face is the thousands of new roads being added every day in towns across the country. With Street Atlas USA® Deluxe, DeLorme has tackled this challenge by introducing the first product to let users become their own map makers and add their own routable, searchable roads to the map.

Street Atlas USA® Deluxe (see fig. 1) is the successor to DeLorme's Street Atlas USA® Road Warrior Edition. The new product is considered ideal for those looking for high-performance travel-planning software. Why? If a new local street is missing, you can add, name, and then plan your route on it. The product features more than 6.2 million miles of routable roads, as well as over 4 million points of interest (POIs), including hotels, fuel stops, restaurants, and more—even ATMs!

Deluxe even features cutting-edge voice-command technologies that allow you to speak to your computer and have the software obey your commands. Some of the many new features include a multi-day travel/time planner, an improved interface with drag-and-drop routing and right-click map controls, a new print-preview feature, turn-by-turn voice commands for GPS navigation, and much more. The suggested price of Deluxe is $59.95.

At about the same time, DeLorme also announced the latest version of their classic street-mapping software, Street Atlas USA® 9.0. It features new road data, including over 200,000 new roads and over four million POIs. Like its Deluxe sibling, the new software update also offers more than 6.2 million miles of routable roads. It's $49.95.

For more details, contact DeLorme, Two DeLorme Drive, P.O. Box 298, Yarmouth, ME 04096 (1-800-452-5931; e-mail: <info@delorme.com>; web: <http://www.delorme.com>).

PC Relocator™ 3.0. PC Relocator™ 3.0, also known as Alohabob™ PC Relocator™, is said to provide the fastest, easiest way to comprehensively transfer programs, settings, documents, and everything else to your new PC or laptop computer, letting you be "up and running" in no time.

The product is designed to meet head-on the problems and hassles of moving all your stuff from an old PC—e-mails, photos, music files, wallpaper, bookmarks, shortcuts, programs, and other data—to one with a new Windows® operating system. It does this by seamless transferring of your existing software environment to the new PC from the beginning. It scans both PCs, compares the operating environments, and merges the source and target PCs using an included parallel transfer cable (faster USB and TCP/IP transfers are possible, but no cabling is provided).

The new product works interchangeably between laptop and desktop computers, and it functions on standalone as well as networked PCs. There are some limitations, however. The operating system (OS) must be any version of Windows® 95, 98, ME, 2000, or XP, and the OS on the target (new) PC must be the same or higher than the version of the OS on the source (old) PC. Also, the relocation and transfer is all-or-nothing: You can't select which applications or data to transfer.

PC Relocator 3.0 was developed by and is supported by Eisenworld, Inc. (web: <http://www.alohabob.com>). Software distribution is through Pearson Education/Macmillan Software, 201 East 103rd St., Indianapolis, IN 46290-1097 (phone 1-800-858-7674; e-mail: <info@mcp.com>; web: <http://www.mcp.com> or <www.macmillan-software.com>).

Fig. 2– CRB Research Books includes among its titles books catering to a rather eclectic audience. While most of the books the firm distributes are about conventional shortwave radio, amateur, and electronics topics, many books are quite offbeat. Check out the interesting online catalog at <http://www.crbbooks.com>.

From the Bookshelf

CRB Books Online. CRB Research Books, with its "top secret information" byword, has been doing business since 1967, and the firm includes among its titles books catering to a rather eclectic audience. While most of the books it distributes are about conventional shortwave radio, amateur, and electronics topics, many books are quite offbeat and specialized, including many new titles on terrorism and related topics. Their online catalog is very interesting, to say the least, and you'll find it at <http://www.crbbooks.com> (fig. 2).

The online catalog is organized into some 18 book categories so you can go directly to the types of books you prefer; new items also are profiled. You can receive free e-mailed catalog updates and savings coupons, and you can print sections of the catalog from the website. Although the firm no longer mails print catalogs, you can request custom printouts of selected categories of interest be mailed to you.

For additional information, contact CRB Research Books, Inc., P.O. Box 56, Commack, NY 11725 (1-800-656-0056; e-mail: <customer_service@crbbooks.com>; web: <http://www.crbbooks.com>).

Wrap-Up

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

Overheard: Whether on the air or in person, always be pleasant—especially to those you just can't stand.

73, Karl, W8FX

Computers and Internet

BY DON ROTOLO, N2IRZ

Ham Radio's Online Connection

PDAs—Fertile Ground for Amateur Experimentation

This month we'll be taking a closer look at those ubiquitous handheld computers commonly referred to as Personal Digital Assistants (PDAs). If you don't own one, you surely have at least heard of them—Palm Pilot, Handspring Visor, etc. While their intended use is admirable, a kind of catch-all for business folks on the go, we hams have a way of warping reality and using common items far beyond their intended capabilities.

For the remainder of this discussion it would be very helpful to keep in mind that these little PDAs are much more than simple date and address books and to-do lists. The current generation of PDAs is in fact very powerful group of computers in their own right, incorporating a keyboard-like input device (which recognizes handwriting!), an LCD display capable of character and graphic display (some in color!), serial or USB I/O capabilities, a few Megabits of memory, simple sound capability, and a fairly powerful CPU (compare with a '386). Oh, yes . . . The best part is that they run off DC and have internal batteries as well.

Although my experiences, and therefore what I'll be writing about, are limited to the Palm Pilot Vx, I know that most of this applies to many other PDAs as well. Some PDAs are better than others for certain applications, and there are wide variations in capabilities and prices.

One simple application that comes to mind immediately is that of a dumb terminal for operating packet with a conventional TNC. When you're at home, you'll probably opt for the desktop PC, but what to do out in the field during remote or emergency operations? A laptop PC has been a good choice, but these can be expensive and generally are not what one might consider "ruggedized." Of course, the average PDA has quite a bit more CPU power than necessary, which can be harnessed to simplify operations considerably.

PDAs as APRS Terminals

A popular operating scheme today for packet is APRS®. In case you've been living in a cave for the past decade, the Automatic Position Reporting System was designed by Bob Bruninga, WB4APR, as a tactical aid in keeping track of multiple (ostensibly mobile) stations or objects. Take a look at <http://www.aprs.org> and <http://aprs.rutgers.edu/>. Each APRS station, which usually includes a GPS receiver, sends a position report every few minutes as a single UI (Unnumbered Information) packet frame. Other stations receive these packets, either directly or via "dumb" digipeaters, and can plot locations and movement onto a map. APRS also supports simple one-line text messages. (There are new features being developed for voice and image transfer, but that's out of our scope this time).

Mike Musick, NØQBF, has written an APRS application named **PocketAPRS** for the Palm Pilot and other compatible PDAs. Add a TNC and radio, and you have a complete APRS station, including map displays. PocketAPRS is relatively large for a PDA application at 220k, but it is still plenty small enough to fit even when memory is at a premium.

I downloaded a trial copy of PocketAPRS from the website <http://www.pocketaprs.com>, made up the simple null modem necessary to be able to use the desktop HotSync adapter, and within 10 minutes I was able to see reports from local stations popping onto the map on my Palm's screen. I didn't take the time to connect a GPS receiver, nor did I actually transmit, but there's no doubt that both those exercises would be nearly as easy.

Like all of the APRS applications (dosAPRS, MacAPRS, WinAPRS, JavAPRS, xAPRS, etc.), PocketAPRS is shareware. The trial version is fully functional and never expires, but you can't save the configuration information (such as callsign, TNC type, etc.). If you end up using it, the $40 registration fee is trivial when you think of how useful this software really is. It's worth it for the maps alone!

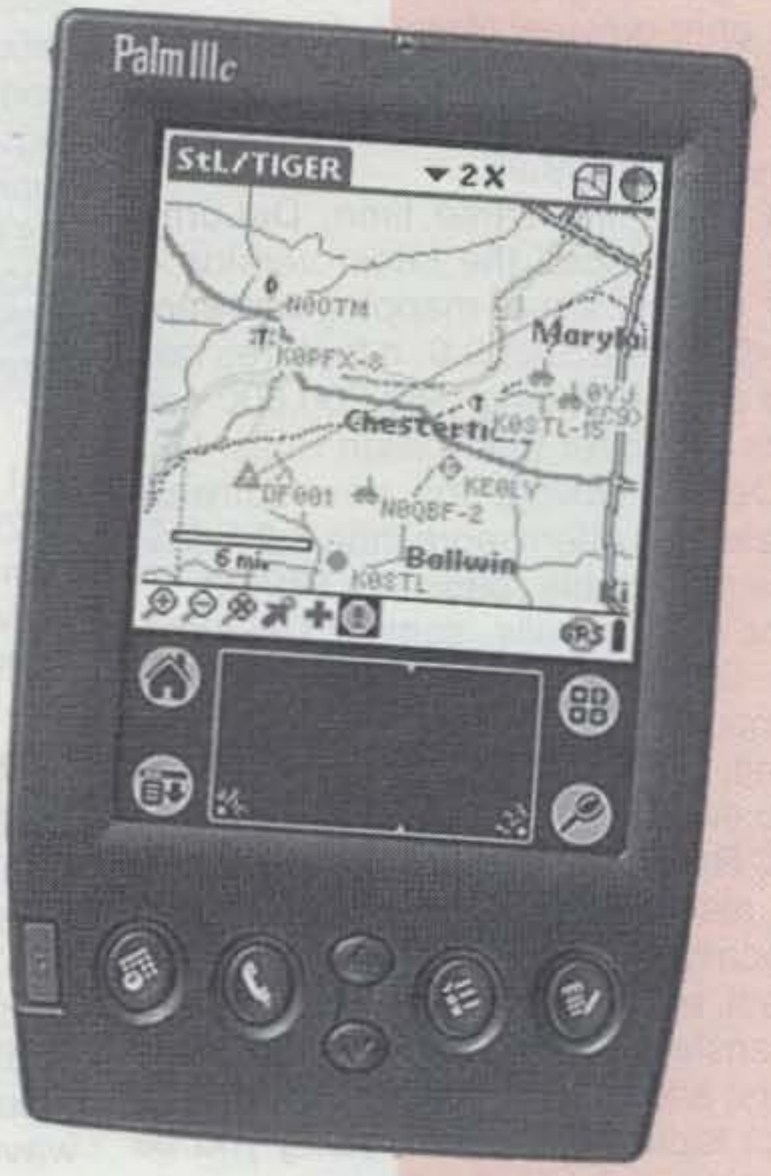


Fig. 1– A Palm IIIc showing a sample pocketAPRS screen. It has the functionality of other APRS software, but fits in your pocket. (Photo courtesy Mike Musick, NØQBF)

For the Palm Pilot series of PDAs swing your web browser over to <http://www.palm.com> for a listing of tens of thousands of downloadable applications for your PDA. Most are not ham-related, but a search of a term such as "radio" brings up some useful items. Note that many of these downloads are not freeware, but rather shareware or "costware." I guess it depends on how important it is for you to have a particular application and how tolerant you are of bugs.

Expanding Your Horizons

For amateur-radio-related applications the best site I've found is Peter Hodgson, VA3PKH's Amateur Radio and Palm OS site, <http://www.qsl.net/va3pkh/palm-ham.html>, with nearly a hundred links to PDA applications specifically for ham radio. All of the links mentioned below were found via this

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

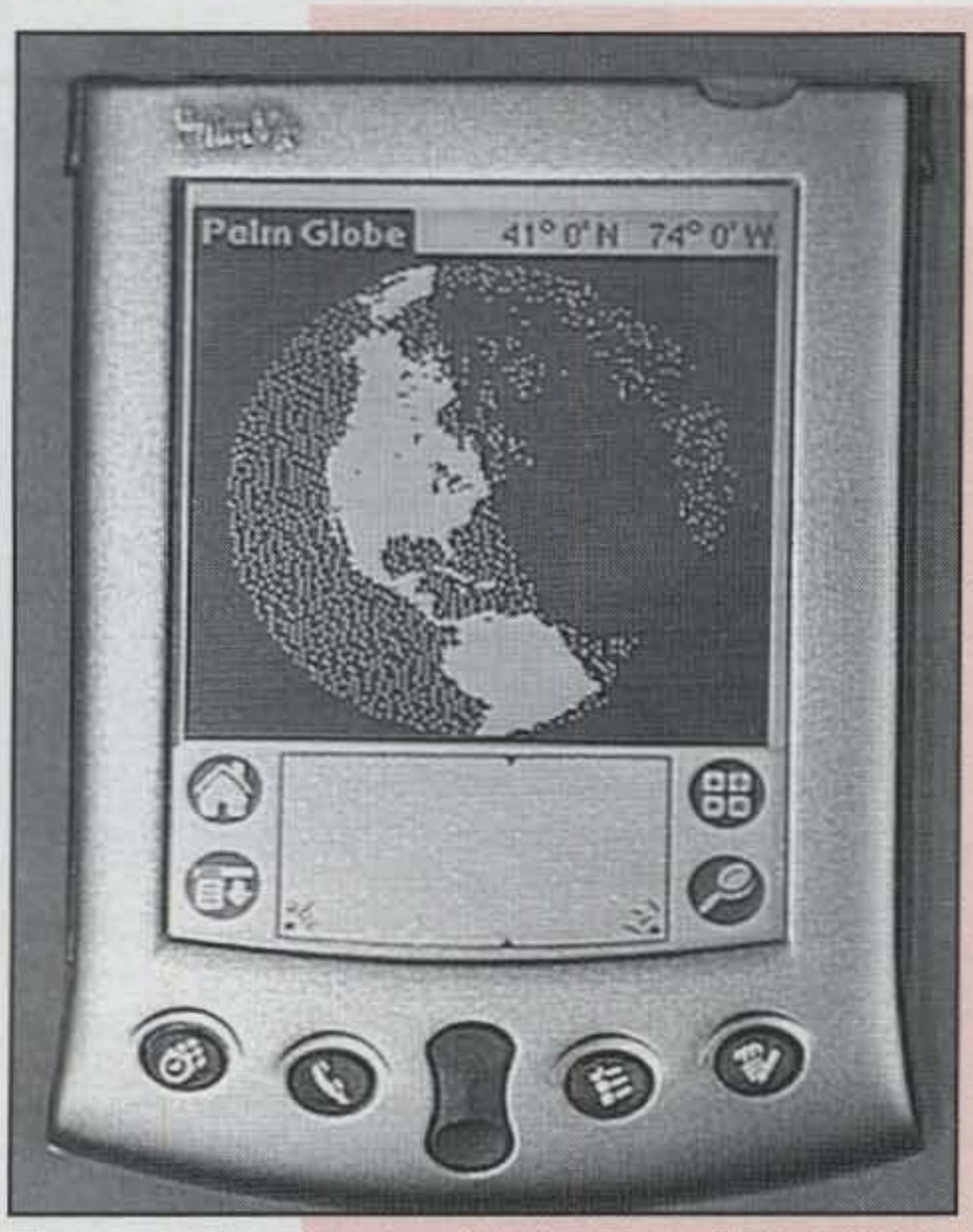


Fig. 2– A Palm Vx showing the PalmGlobe screen for my QTH. True to the display, it was twilight outside when this photo was taken.

page. In the rest of this month's column I'll offer mini-reviews of some of the programs I downloaded and found cool.

One of the first applications to catch my eye was **Palm Globe**. This very simple application shows you the Earth from above any selected position, with areas of day and night accurately depicted. You can select different twilight settings (theoretical, civil, nautical, etc.). The resulting display is not only useful for predicting gray-line DX propagation and local sunrise/sunset, it is also useful for impressing your colleagues. Visit <http://www2.hursley.ibm.com/pglobe/pglobe.html> for a copy.

A similar but more sophisticated application is **PocketSat**. PocketSat allows you to select any number of satellites (limited to five in the trial version) and calculates when these will be visible at your location. You select the date range, and a table of visible passes for the selected satellites is calculated. This application really stretches the CPU power of my Palm Vx, taking about a minute to calculate a few days' worth of data for a single satellite. You get the date and time of the satellite's pass, along with details of where it will appear and how "good" the pass will be, and you can even plot the satellite's track in the sky. I used this, with an updated set of Keplerians, to predict when the International Space Station would be visible, and there it was, a large speck in the sky, just drifting past at 6:01 one Wednesday morning. Visit <http://www.bigfattail.com/pocketsat/index.html> to download a copy.

DotDash is a neat little code learning and practice application. It will send (as audio tones) whatever text you write into its transmit buffer, or random text, at speeds ranging from about 7 to 20 wpm. It includes modules to help you learn the Morse characters, and then provides training for your ears. One nice feature is a battery voltage display to keep you from wearing out your Palm. Visit <http://break.org/gisle/

PalmOS/>. Once I really started to use it, DotDash helped me improve my CW abilities.

Palm Radio Log, or PRL, is one of many fast and easy logging applications available. I see these as coming in handy when operating mobile or from the wilderness. Some logging programs include an interface to your computer, so you can generate standard electronic logs for contest submissions. I like PRL's simple and quick input format, handy when you're juggling a microphone, tuning knob, and Palm Pilot in the back seat of the family van. The registered version comes with a companion Windows version, which increases the versatility of the program considerably. For example, you can generate Cabrillo logs for contests. Visit <http://www.ke4iof.com/index.html>.

Then there are the document readers. Two that seem to stand out are **AportisDoc** and **iSilo**. Both are used as a convenient way to display and read relatively large documents. They appear to read many of the same kinds of files—for example, the Extra class question pool or the AportisDoc user manual. Aportis Doc seems to be the more professional product of the two, coming with its own installation program, but this forces you to download a 1.2 MB file to get the 125 kB reader program. iSilo has a much more convenient user interface for me, with a scroll bar on the right side to control movement in the document. Try them both! Visit <http://www.aportis.com> and look for AportisDoc Mobile, and visit <http://www.isilo.com/> for a copy of iSilo. (*One more program in this category is* WordSmith, *which reads and writes "rich text" files compatible with many major word processors. See <http://www.handmark.com>.—ed.*)

Looking Ahead

Nearly any digital mode is fair game for a PDA. Text I/O capabilities are critical, as are portability and DC power, specifications that all PDAs share. The folks at AOR <http://www.aorja.com/> were seen at Dayton last year using a PDA to operate PSK31 through one of their new Multi Mode Terminals (*see review in last month's issue—ed.*). Then there are the folks at Shine Micro, and the future . . .

A posting on the TAPR NetSIG gave news about a Digital Signal Processing chip from Shine Micro <http://www.shinemicro.com/>. The SM2496DSP is a DSP-based modem capable of emulating any existing amateur radio modem. It also includes an MP3 player, and given the power of the base DSP (a Texas Instruments 320C54xx), there's probably little it can't do. The SM2496DSP is aimed at the Handspring Visor, but there's no reason why it can't eventually be used on other PDAs. It's just a matter of time.

If we note that the Palm OS contains a well-developed, stable TCP/IP stack, then we see there's little standing in our way. Palm, Handspring, and others have software developer's kits available. There are a few VT100 terminal emulators, as well as a Telnet client available today for downloading. What I see here is the next fertile ground for amateur experimentation, using a PDA as the human-machine interface.

All of this should have you convinced that those little PDAs are good for a lot more than just a to-do list. There is some powerful software out there just waiting to make your life easier. Also, as an added bonus, those darned PDAs really *do* make good date and phone books and to-do lists as well, so when the fun's over, you can still look up just what the XYL wanted you to get on the way home.

Until next time . . . 73, Don, N2IRZ

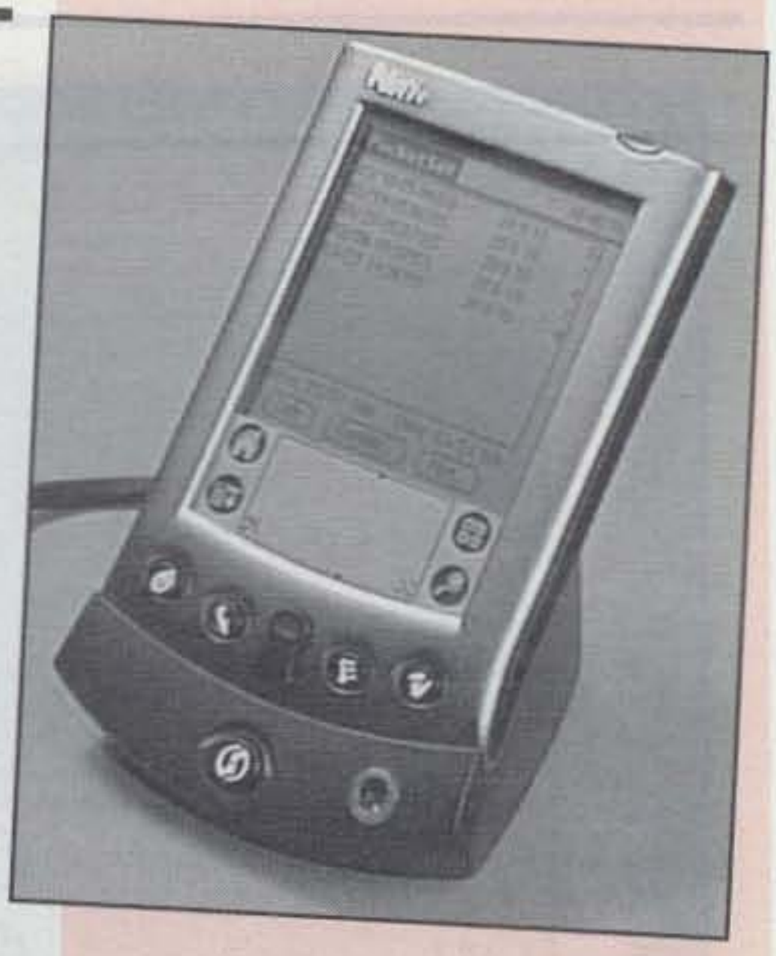


Fig. 3– The Palm inside its HotSync cradle. The cradle is used to transfer data between your computer and the Palm, via the RS-232 port. Shown on the screen is a table of International Space Station passes that will be visible from my QTH during March 2002,computed by PocketSat.

How It Works

BY DAVE INGRAM, K4TWJ

Theory 'n Practice

Cells and Battery Packs Simplified

Battery packs, cells used in battery packs, and chargers are popular items among radio amateurs of all license classes, and with good reason. We use them almost every day—in handheld FM talkies, portable all-band transceivers, antenna analyzers, keyers, tape recorders, digital cameras, and much more. They head the list as our most-often purchased accessory for all types of portable activities.

In light of that fact and considering today's increased emphasis on survival communications and emergency preparedness, this month's column presents a straightforward, plain-language discussion of cells and batteries. We will consider the various types, their similarities and differences, and which type(s) best suit your particular needs or lifestyle. This is prime information you can use right now for numerous applications. Some folks may find it eye-opening and enlightening, while some may find it a review of known facts. Both points of view are fine. Our objective is simply to ensure you know what is available in today's market and your options in selecting and using cells and batteries.

Before getting started, I wish to extend a special thanks to Amy, Ian, and all the fine folks at Maha Energy Corporation for sharing details on their energy cells and battery packs for FM handhelds and other electronic items. A quick study of Maha's outstanding product line produced a good reference for comparing similar items, and it also made me aware that Maha handles some of today's highest milliamp/hour-rated cells and battery packs. It also inspired me to investigate the outstanding capabilities of their universal MH-C777 Plus charger and conditioner (see sidebar). Now let's move forward and begin with a quick overview of presently popular energy cells.

Photo 1– Two popular, stout-hearted versions of alkaline cells are Eveready's Energizer and E² Titanium shown here. Both types have the same total capacity of 2850 maH, but the E² Titanium is designed for heavier current loads and thus is more attractive for use in high-power talkies and transceivers.

Cell Talk

In the same way automobile manufacturers produce different models of vehicles to fit various customer interests, battery manufacturers make different types of cells to fill various user needs. Some cells are designed for occasional light-duty use. Some are more suitable for more heavy-duty daily use, and still others deliver best results in abnormally hot or cold environments, etc. Which type(s) best fit your needs? You are the most qualified person to answer that question, so let's consider the main characteristics of each type and let you be the judge. Our following discussion will mainly focus on "AA"-type cells, as they are the most popular types used in ham gear. Refer to Table I as we continue.

Standard Zinc-Carbon cells are our "bottom of the line" choice, as they are the least expensive, have the lowest current rating, and also exhibit the shortest lifespan. Typically, this cell should be limited to light applications that use or draw

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

Battery/Cell Type	Voltage	Milliamp Hour Rating	Approx. No. of Charge Cycles	Charge Retention or Shelf Life	Special Attributes and Characteristics
Standard Zinc-Carbon	1.5v	300–500 maH	N/A	2–3 years	Basic low-cost cell for light loads.
Alkaline	1.5v	2850 maH	N/A	7 years	Good for occasional use and medium loads.
Rechargeable Alkaline	1.5v	1500–2850 maH	10–20 times	5 years	Likes to stay topped up and ready for action.
Titanium Alkaline	1.5v	2850 maH	N/A	7 years	All around best bet in a non-rechargeable cell for heavy loads.
Lithium	1.5v	2900 maH	N/A	10 years	Wider temperature range, high output, longer shelf life.
NiCd	1.25v	600–700 maH	1000–1500 times	3–6 months	The "old standby," it is now losing ground to the more stouthearted NiMH cell.
NiMH	1.2v	1300–1700 maH	500 average	2–3 months	High maH capacity, high load limit, reasonable cost, and quite powerful!

Table I– Comparison of various rechargeable and non-rechargeable cells such as those used in battery packs and battery trays. (Discussion in text.)

Photo 2– Supercells! These new 1700 maH Powerex NiMH cells are extra powerful, reasonably priced, and available from Maha Energy Corp. and their dealers nationwide. Replacing your existing NiCd cells with NiMH cells typically gives you double the "hamming time" with talkies and portable transceivers.

20 percent or less of the cell's total maH rating. If the cell is rated at 500 maH, for example, its maximum load should be 100 ma. Items such as a pocket AM/FM radio or a small smoke alarm fit in this category.

Alkalines offer a favorable blend of economy and medium- to heavy-duty service in a non-rechargeable cell. They are readily available, exhibit good shelf life, and work well in low-power talkies or test equipment used on a once-every-couple-of-months basis. In checking with Eveready®, I learned their popular Energizer AA alkalines are rated at 2850 maH. That is more than four times the capacity of NiCds and almost double the capacity of heavy-duty NiMH cells! Do not jump to the conclusion that basic alkalines are ideal for powering 5 watt transceivers drawing around 2 amps of current, however, as their load limit is 20 percent of their full maH capacity, or around 570 ma. You can "push" that figure just like we push duty cycles with tubes and transistors in RF amplifiers, but be aware that the more you "push," the shorter the life of any type cell, including alkalines, NiCds, and NiMH cells.

Rechargeable Alkalines are attractive for medium-duty service, especially when long shelf life and "grab 'n go" convenience are desired. Indeed, rechargeable alkalines thrive on occasional use and frequent top-ups. Are they prone to the classic "memory syndrome," or does their maH capacity decrease with chargings? Possibly, but remember they are designed to be short-run rather than long-run devices. They are alkalines, not NiCd or NiMH cells. They also have a load limit of 20 percent of their full maH rating. In the case of 2000 maH, that equates to 400 ma. I have "pushed" rechargeable alkalines to 800 ma in talkies, but the trade-off was ultimately fewer recharge times.

Titanium Alkalines such as Eveready's Energizer E^2 are stout-hearted, reasonably priced, and rapidly becoming the top alkaline of the day. A small amount of titanium is fused into the cell's electrolyte during manufacture, increasing the load limit to 55 percent of its full maH rating. In case of 2850 maH E^2 cells, that translates to 1470 ma—and that looks attractive for use in all types of handheld transceivers. The titanium alkaline is thus a natural workhorse in a readily available and non-recharging cell. It responds to heavy loads with longer life than regular alkalines, but exhibits the same life and characteristics as regular alkalines when used for light loads. In other words, regular alkalines economically are good choices for weather radios or FRS talkies, whereas titanium alkalines are preferred choices in non-rechargeable cells for high-power 2 meter talkies or even Yaesu/Vertex FT-817 transceivers. Two popular examples of alkaline cells, Eveready's Energizer and E^2, are shown in photo 1. Do you recognize them?

Lithiums are a very good choice in non-rechargeable cells for survival communications and emergency preparedness (and that fact also applies to rechargeable lithium-ion cells). They exhibit a high maH rating with a 55 to 65 percent load limit, have exceptionally long shelf life, and operate in a wider temperature range than other cells (–40 to +140 degrees, as compared to –4 to +130 degrees). If you are traveling on snow-covered mountains or sunny tropical waters, carrying an extra battery pack filled with lithiums may prove worth the extra cost. If you use a QRP rig that operates from 9 volts, incidentally, check out the 5169-U9VL-FP 9 volt, 1200 maH, 10-year battery available from Mouser Electronics (1-800-346-6873). At 1200 maH it has 13 to 14 times more capacity than a regular 9-volt battery!

Nickel Cadmiums (NiCds) have been our most popular rechargeable cell for many years, but cadmium is proving detrimental to the environment and they are now being phased out. The current ratings of NiCds are not exceptionally high, but their load limit is typically two times, or double, their maH rating. That equates to 1400 ma for 700 maH cells, making them attractive for use in talkies of all types. The down side, however, is short life between rechargings. A talkie requiring 1400 ma can deplete a 700 maH NiCd pack in 30 minutes. When left charged and unused on the shelf, NiCds will self-discharge in three to six months. Their prime attraction thus centers around daily use rather than long-run emergency preparedness.

Nickel Metal Hydride (NiMH) cells are the up-and-coming substitute for NiCd cells. They are rugged, reasonably priced, environmentally friendly, and can be recharged just like NiCds—even using the same charger but for a longer period

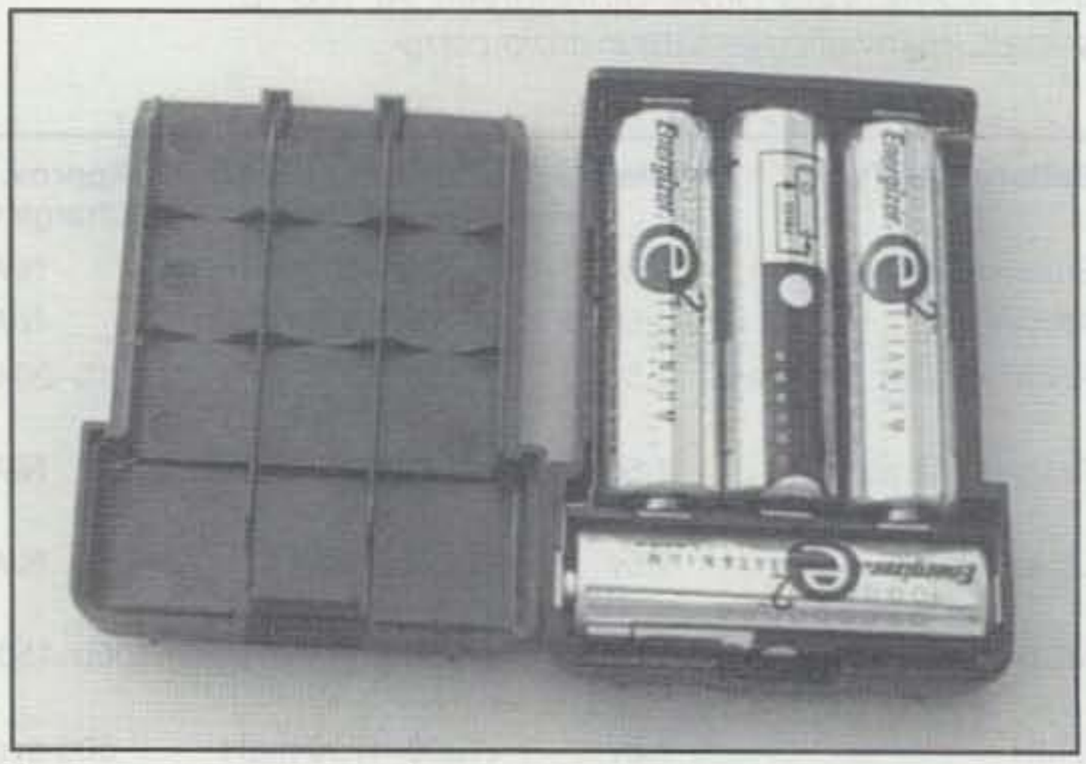


Photo 3– Battery packs and battery trays are made up of several individual cells. The cells are wired in series, so output voltage is equal to the sum of all cells' voltage and output current is equal to the current/maH rating of each individual cell (example: 1.5 × 4 = 6 v. @ 2850 ma).

of time *(although fast charges require current-limiting circuitry for NiMHs, to avoid overcharging—ed.)*. The difference is NiMH cells have a much greater maH capacity than NiCds (typically 1300 to 1700 maH; see photo 2), and their load limit is equal to their maH rating. They can power handheld gear even better than NiCds and last roughly twice as long between recharges to boot. Now that's stout! What is the down side? NiMH cells exhibit shorter shelf life and are useful through fewer charge cycles than NiCds (the exact number depends on use, abuse, and conditioning). Overall, however, they are terrific, exciting new products with a good future.

Which type of cell or battery pack is best for you? As I said earlier, that is strictly a personal choice. If you use a talkie only two or three times a year for listening and a few brief transmissions at hamfests (when NiCds or NiMHs would self-discharge between uses), alkalines are a good choice. If you use a portable transceiver almost daily, NiMHs are the logical choice. Consider the types and then make your selection.

Notes on Battery Packs

Snap-in battery packs are handy for use in all types of portable gear and accessories, as they can be used to depletion and field-changed in a flash for continuous operation—a real asset when traveling or during emergencies. Remember, however, to protect their output terminals from short circuits when carrying a spare pack. Otherwise, car keys or coins pressing against them could produce extreme heat or spark a fire.

Looking inside a typical battery pack or refillable battery tray, we find a group of individual cells connected in series to obtain a required voltage (photo 3). NiCd or NiMH cells are used in most modern battery packs; alkaline, titanium alkaline, and lithium cells are popular choices for filling optional battery trays. Such trays or empty cases can prove quite attractive for homebrewers, as you can make them up to fit specific needs and save money in the process.

Rechargeable battery packs are akin to refillable energy tanks, and with practice you can estimate when they need refilling with surprising accuracy. How? Look in your rig's manual to determine the pack's milliamp-per-hour, or maH, rating and the transceiver's squelched, receive, and transmit currents (in milliamps), and then tally and compare figures. Assume, for example, your pack is rated at 1300 maH, and the rig's squelched drain is 25 ma (that's 25 ma

The Maha MH-C777 Plus—A Terrific Charger!

Need a convenient and effective way to keep all your cells and battery packs charged, healthy, and rarin' for big-time action? Check out Maha Energy Corporation's microprocessor-controlled MH-C777 Plus universal charger, conditioner, and analyzer shown in photos 4 and 5 and also advertised here in *CQ*. It works with NiCd, NiMH, and lithium-Ion cells, and packs from 1.2 to 14.4 volts. It sports adjustable contacts to mate with battery packs of all shapes and sizes—a real "no fumbles" item. You just set a pack on the charger's magnetic platform, slide its contacts to mate with the pack (or use the supplied jumper cable with clip leads), and switch on the C777 Plus. It applies a brief surface charge, senses the pack's voltage and maH capacity, shifts into rapid charge mode, then reverts to trickle charging when the pack is full.

If you press the "discharge" button after placing a pack on the charger, it will automatically analyze and display the pack's voltage and maH capacity, then discharge it, pause 15 minutes, and begin rapid-charging the pack as previously described. While in charge mode, the C777 Plus LCD readout indicates voltage, maH of charge, and elapsed charge time. Assuming such conditioning is performed every 10 or 15 charge cycles (and on all your ham, video ,and camera battery packs), the C777 Plus could actually pay for itself in fewer battery purchases.

More information on Maha chargers, Powerex cells, and battery packs is available from Maha Energy Corp., 545C W. Lambert Rd., Brea, CA 92821 (telephone 714-990-4557, or on the web at <www.mahaenergy.com>). Maha products are also available from amateur radio dealers nationwide.

Photo 5– The Maha MHC777 Plus with sliding contacts and temperature sensor in place and charging a Kenwood PB-22 battery pack. Notice use of a pack's top contacts permits quick-charging both NiCd packs and/or battery trays filled with NiMH cells.

Photo 4– The Maha MH777 Plus charger sports microprocessor control, sliding contacts to mate with various battery packs, a magnetic base to hold the pack in place, and a snap-on temperature sensor. It is elaborate!

per hour use, or 25 maH), 50 ma receive (50 maH), and 1.3 amp transmit (1300 maH). If you use the transceiver on receive for a total of 6 hours (300 maH) and transmit a total of 45 minutes (975 maH), the pack will almost fully discharge. Substitute figures for your own battery pack and/or transceiver here and try the technique yourself. Scribble a few notes on the amount of time used or time remaining while practicing the technique. It works and it's fun!

Charging and Conditioning Batteries

As discussed earlier, rechargeable cells and battery packs can be discharged and recharged approximately 1000 times—less for NiMH types, more for NiCd types. The exact number of charging cycles of either type depends on the cell/pack's use, current rating, rate and level of discharge, and how it is conditioned or maintained. A good rule of thumb on use is to swap or recharge a pack precisely when it "hits empty" or your rig's monitor circuit indicates low battery level. Do not push beyond that point, or one or more cells may reverse polarity and become permanently damaged.

What is the best way to condition for good health and long life? First, start out new cells/battery packs with two or three regular, full charge and discharge cycles before introducing them to rapid charging and occasional "top ups." A regular charge is defined as applying 10 percent of the cell/pack's full maH rating for 14 hours. As an example, a 1300 maH pack should be charged for 130 ma for 10 hours plus 4 more hours/520 ma to overcome charging losses. *Note:* if you are charging NiMHs with a NiCd charger, double charging time will be required to fill the NiMHs, because their maH rating is close to double that of NiCds. Second, condition or "exercise" your cells/packs for fully discharging (to the "low battery" point only) and then fully recharging them every 10 to 15 cycle times. Third, occasionally recharge fully discharged cells/packs at their regular rather than rapid rate for good health. Follow these tips, and you should reap maximum life from your batteries.

Conclusion

Once again we have reached the closing wire and once again we must quickly bow out with a couple of brief closing notes. First, tune in again next time when we will discuss solar chargers and explain how you can homebrew one to fit your needs and battery packs. Second, drop us a note on what subject(s) you would like to see discussed in this column. Please do not expect a quick e-mail reply, however. I receive more e-mail than three people can answer. Some overflows and jams the mail or the server deletes them. Postal letters and SASEs for quickly scribbled replies work best, as I can read them while flying to hamfests, at club meetings, or while vacationing in the Caribbean.

73, Dave, K4TWJ

Antennas

BY ARNIE CORO, CO2KK

Connecting Your Station To The World

Two Wires Will Do It!

Amazing as it may sound to the uninitiated, setting up a 2-element wire beam is as easy as installing a classic half-wave dipole, but your chances of working DX will increase a great deal. Using a folded-dipole driven element makes things a lot easier for a direct match.

As many more radio amateurs around the world gain access to the HF bands due to changing rules and regulations, the task of becoming familiar with antennas to operate in the frequency range of 3.5 to 29.7 MHz becomes an important aspect of setting up a new station.

Remember how easy it was to add a gain antenna to the 2 meter band handie-talkie? Or wasn't it a cinch to follow that *CQ VHF* magazine article and build a nice 70 cm band Yagi? Well now that you can operate on HF, things are a bit more difficult, as the size of both the antennas and the masts needed to install them is considerably greater than that of those needed for the VHF and UHF bands. You probably will spend some time reviewing antenna handbooks, consulting your Elmer, and polling the opinions of other amateurs at your radio club, only to find out that if you are on a tight budget, really nice HF antennas simply are out of the picture.

There are, however, two types of antenna systems using just wire and insulators that are low in cost and provide rather high efficiency. I will deal with one of these systems here—the wire, two-element optimized Yagi—leaving the other (also a system made with wires) for a future column.

The 2-Element Wire Yagi

The 2-element, optimized wire Yagi is rather easy to assemble, install, and adjust for minimum standing-wave ratio, and you can even make two of them and hang them from three supporting masts or other high structures. Close spacing and a folded-dipole driven element do the trick!

Without a doubt, the HF bands antenna that is the easiest to set up is the classic half-wave dipole. You can feed the dipole at its center with 50 ohm coaxial cable and a coaxial choke balun, or you can use a balanced, 72 ohm polyethylene-insulated transmission line (The latter is becoming very hard to find, though.). Feeding the dipole with a 400–600 ohm impedance open-wire line ending at an antenna tuner, like in the old days, is also a possibility.

A half-wave dipole when installed at a height of at least 0.18 wavelength above the ground will work, but it will not make much of a DX antenna due to the rather high take-off angle. Changing the simple single-wire dipole to a folded element will provide better bandwidth and an impedance at the feedpoint anywhere between 225 and close to 300 ohms, depending on how high above ground the antenna is installed. However, you still will need to install the antenna at no less than 0.3 wavelength above ground to achieve a really low take-off angle, essential for working DX.

Now . . . by just adding another wire and placing it rather close to the half-wave dipole, you will have created a 2-element wire Yagi-Uda antenna system that will provide both GAIN on receive *and* transmit, and a lower take-off angle!

If you attempt to make your 2-element beam using the standard single-wire, half-wave-dipole driven element, it will be rather difficult to achieve a good match, because the feedpoint impedance will drop to a very low value, especially if you try to use close spacing to keep the antenna small and achieve maximum possible forward gain. The folded dipole will solve the problem by raising the feedpoint impedance of the driven element to very near 50 ohms, the ideal for a direct connection to a 50 ohm coaxial-cable transmission line.

A Single-Band Antenna Optimized for 20 Meters

With the current, ongoing interest in using PSK31 and other similar digital modes, especially on the 14 MHz or 20 meter band, a good starting point for the newly-arrived-to-HF amateur would be to build and install a 2-element, close-spaced Yagi, which will provide almost 5 dB gain over a dipole to the area of the world where your beam heading is directed. Using a fat, folded-dipole driven element increases the bandwidth, and properly spaced fiberglass spreaders will make it look nice, too.

Start with the classic formulas for calculating wire half-wave-dipole elements (468/f[MHz]), use number 14 bare copper wire (or a larger diameter version), and separate the upper and lower parts of the folded dipole 20 to 30 cm (8–12 inch) using PVC pipe or better yet, fiberglass spreaders.

My advice is to test your folded dipole all by itself first using a 6:1 balun at the feedpoint (Yes, you can homebrew an excellent 6:1 balun.) that will match the standalone folded dipole's almost 300 ohm feedpoint impedance to standard 50 ohm coaxial cable. Install the folded dipole at no less than 5 meters (16 feet) above the ground or rooftop, and measure the standing-wave ratio from 14.000 to 14.350 MHz. My test folded dipole—exactly 10 meters overall in length (almost 33 feet)—when installed between an existing tower and a nearby building and sloping at about 20 degrees showed a rather broad resonance, and the SWR curve between the lower and upper edges of the 20 meter band never went higher than 1.25:1, proving that the fat-dipole configuration really was working well.

Yes, I did make quite a few contacts with the test folded dipole, which was installed in an almost perfect north-south configuration, but the real thrill came after installing the three spreaders , adding a director wire element, and carefully adjusting the distance between it and the driven element to obtain a minimum SWR reading with the antenna fed directly with 50 ohm coaxial cable via a classic 8-turn, 20 cm (10 inch) diameter coax choke.

You might ask how it was possible for the feedpoint impedance at the center of the folded-dipole driven element to change from almost 300 ohms to very near 50 ohms so abruptly. The answer is none other than the presence of the close-spaced director element. It's a narrowband beam, but it gives you almost 5 dB gain.

While the classic approach may call for a 2-element wire Yagi antenna to use the driven-element-plus-reflector con-

c/o CQ magazine
e-mail: <co2kk@cq-amateur-radio.com>

Additional Options

Commercially designed and built 2-element, single-band Yagi antennas are rare birds, except for some special, expensive ones that target the 40 meter band DX enthusiasts. Two-element wire beams using elements with sharp bends and very close coupling, mounted using a figure-X configuration of fiberglass or bamboo spreaders, are becoming popular with amateurs around the world because they are compact, lightweight, and pretty effective, but tuning them up properly is not easy. That's why if you want to boost your HF station's performance, the 2-element wire Yagi using the parasitic element as a director is your best option for an easy to homebrew and tune up, almost 5 dB gain skywire.

figuration, the fact is that using the driven-element-plus-director approach provides a bit more gain, and the spreaders can be made a little smaller, too. Keep in mind that if you use a reflector element, that wire will be about five percent longer than your driven element, something that translates into an added length of almost 60 cm (2 feet) for the longest element of the antenna. A director wire element will provide almost optimum performance for the 2-element wire Yagi when its length is set to about 4 percent less than the driven folded dipole—a bit less than 50 cm (2 feet) shorter than the antenna's longest element.

Of course, when properly designed, the driven-element-plus-reflector combination will provide a higher front-to-back ratio, but the smaller driven-element-plus-director antenna will have an edge on the forward gain obtained, something any of the popular antenna-modeling software will demonstrate.

Tilt Your Wire Yagi To Bring In More DX

Your two-wire Yagi antenna is now ready to go up! Of course, assuming you want to maximize your DX contacts, then instead of installing your antenna horizontally, tilt it to an angle between 15 and 30 degrees. This tilt will increase your chances of working DX stations at different distances, as the antenna will provide different take-off angles.

Ideal for Portable Operation

You can take two or three of these antennas with you to a contest station site. Due to its low cost and easy construction, the two-wire driven-element-plus-director Yagi antenna lends itself to portable operation, as the complete system can be packed into a very small space if you make the spreaders into two pieces that can be split and assembled easily using bolts and wing nuts. For the prototype 20 meter close-spaced antenna the spreader's overall length is just a bit more than 2 meters (6 feet), making transportation of the split spreaders very easy, as they are split into six parts, four of about 1 meter (3 feet) in length and two center pieces of about 20 cm (10 inches) in length. High-quality Dacron® ropes of the type used by sailboat enthusiasts complete the antenna package.

Easy To Make For Other Bands, Too

By just changing the dimensions of both the folded-dipole driven element and the director, it is possible to make these antennas for any of the HF bands from 10 MHz up and even for the 50 MHz or 6 meter band! The 6 meter version should be popular among the many owners of HF plus 50 MHz transceivers who want to be part of the recent upsurge in worldwide activity on 6.

Wrap-Up

Remember, start with the classic formulas for the wire-element dipole:

468/MHz = length in feet
143/MHz = length in meters

The separation between the upper and lower wire elements of the folded dipole is not at all critical, and in fact, a wider separation actually improves the bandwidth. My 6 meter version of this antenna has the two wires separated by 15 cm (6 inches). Build the folded dipole first, and test it for SWR using a 300 ohm transmission line and a 4:1 balun, or feed it via a 6:1 balun using 50 ohm coaxial cable. The parasitic-director element should be separated from the driven element starting at 0.11 wavelength, and the final adjustment to obtain a minimum SWR reading consists of moving the director's position in relation to the driven element until you see the SWR below 1.5:1. Careful adjustments will provide even lower SWR readings. I prefer to leave the parasitic-director length fixed at very near 4 percent less than the folded-dipole driven element, and achieve the best possible match by moving the wire back and forth along the spreaders. Using three spreaders is better than using just two of them, as the center spreader helps stabilize the antenna.

If you consider that this easy to homebrew, install, and adjust two-wire optimized Yagi is just one dB short of the 6 dB gain over a dipole mark, I'm sure you will agree that it is an excellent investment both for newcomers and old-timers, as it almost quadruples your transmitter's power while also giving a considerable improvement in reception.

Okay, I agree. It must be fixed in one direction and that's certainly true, but three supports will allow you to install two of these antennas beaming into two different areas of the world, and you can always flip them around to beam your signals in the opposite direction!

73, Arnie, CO2KK

Resources

Here are some recommendations for further reading that will help you learn more about wire antennas and how to match them:

Practical Wire Antennas
by John D. Heys, G3BDQ
ISBN 0-900612-87-8
RSGB, reprinted 1991

Backyard Antennas
by Peter Dodd, G3LDO
ISBN 1-872309-59-3
RSGB, 2000

Building and Using Baluns and Ununs
by Jerry Sevick, W2FMI
ISBN 0-943916-09-6
CQ Communications, Inc., 1994

ARRL's Wire Antenna Classics
Chuck Hutchinson, K8CH, Editor
ISBN 0-87259-707-5
ARRL, 1999

More Wire Antenna Classics
Chuck Hutchinson, K8CH, Editor
ISBN 0-87259-770-0
ARRL, 1999

BY CARL SMITH, N4AA

News Of Communication Around The World

The Most Wanted on the Air

It has been an interesting winter operating season thus far with promise of more excitement to come. I noted with considerable interest the activity on 6 meters in December and January. Also, who would have expected the solar flux to run well over 200 at this point in the 11-year cycle? Ten meters has been astounding, with signals from everywhere creating huge pile-ups all the way up to 28.600 MHz. I hope you have enjoyed these unusual conditions as much as I have.

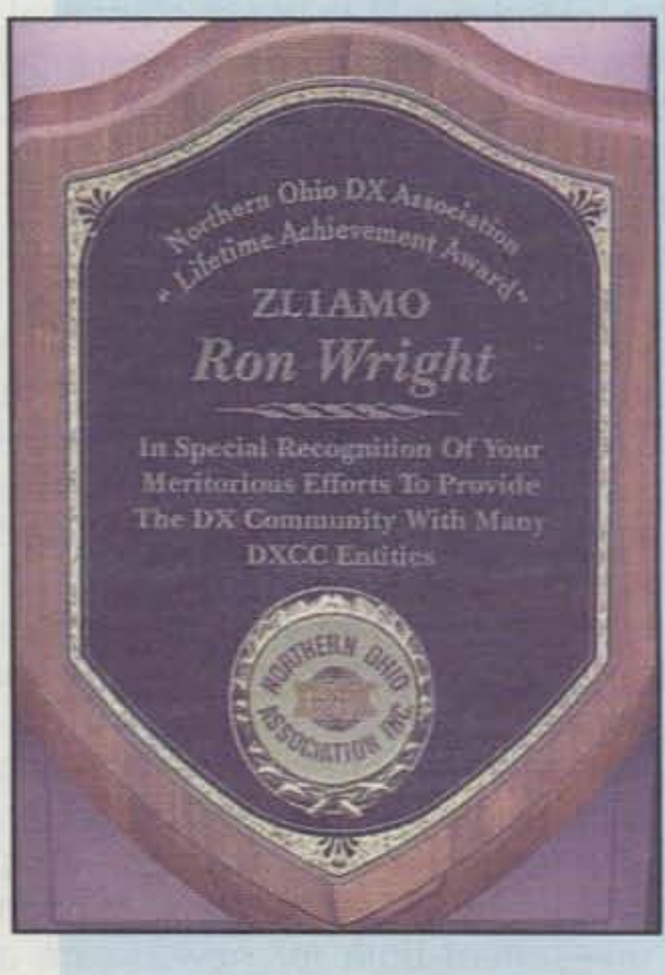
South Sandwich/South Georgia was expected to be on the air starting the end of January. With South Sandwich being ranked #6 and South Georgia #10 in *The DX Magazine*'s Most Wanted survey for 2001, this should be a madhouse when/if the team is able to make landfall on these islands. At this writing, it is unknown if the weather conditions will allow them to land. You may remember the announcement of this operation in last month's column. The team stated, "This DXpedition is *not* about QSO totals. Unlike previous DXpeditions you may have worked, this time we are taking far less hardware and presenting the DX community with much more of a challenge. We feel that DXers need to get back to basics and work harder, so this time the burden of working the DXpedition is being shifted back home."

This is an interesting philosophy and one I approve of. No rock-crushing signals coming from big amplifiers and antenna arrays. DXers will just have to utilize their individual skills to hear and work the signals coming from basic transceivers/simple antennas. What an interesting concept ! I applaud the team for its decision.

P5 – North Korea was expected to be back on the air toward the end of January with the return of Ed, 4L4FN, following his Christmas leave. I understand that he received the new vertical antenna and Bencher paddle before he left the country but didn't have time to get them installed. He is expected to do that upon his return, and presumably we can expect him to have a better signal, on more bands, as well as some CW activity by the time you read this.

There is a good probability that there will be more P5 activity in early March by Hrane, YT1AD, and some of his friends. Hrane was in North Korea back in December and reported that he had obtained a license to operate, along with two others, starting March 5. He reported that they would be training up to 20 North Koreans for amateur radio licensing during their visit in March.

Ron Wright, ZL1AMO, at Temotu as H40RW in March/April 2001. Also see the photo of Ron's plaque from the Northern Ohio DX Association (right). (Photo courtesy John, KDØJL)



When Ron Wright, ZL1AMO, returned home from Fuji, he had a package waiting for him from the Northern Ohio DX Association (NODXA). After Ron's announcement that he was retiring from traveling to rare and interesting place for DXpeditions, NODXA sent him a "Lifetime Achievement Award" plaque to show their appreciation. The NODXA group never forgot Ron's special visit to a NODXA meeting many years ago in Cleveland, Ohio, where he put on a slide presentation of his participation in the "1984 Scientific and Amateur Radio Expedition to the Kermadec Islands." Congratulations, Ron, and thank you for all the new ones you gave all of us to put in our logs. (Photo via Tedd, KB8NW, President NODXA)

TI9 – Cocos Island will have been activated by now, and I hope you were able to work this one, as it showed up at #24 in *The DX Magazine*'s survey. There was a change in QSL Manager announced before the operation. QSLs should go via AKØA.

VP6 – Ducie Island is due for activation in March. This will be an all-time new one for everyone, so it is sure to see heavy action. The previously scheduled operation had to be called off, as they were not able to reach the island due to stormy weather conditions along the way.

CEØX – San Felix will be active in mid-March as well with a 13-member team hitting this #22 Most Wanted island. The team includes familiar calls from the past: N7CQQ (FOØAAA), DJ9ZB (Franz has been everywhere), KK6EK (VKØIR), and others.

VK9M – Mellish Reef is scheduled for a major operation starting in mid-April. Ranked at #30, it too will create some interesting pile-ups. The team is making an effort to operate the bands/modes most needed around the world.

KH1 – Baker & Howland will also see a major effort in April. This one ranks #11 on the Most Wanted Survey for 2001 and should also generate considerable interest worldwide. The operation will be from Baker Island, the first time an operation has taken place from that island. All previous operations have been from Howland. Hrane, YT1AD, will be taking 12 friends along to operate from April 30 to May 10.

YA – Afghanistan should be "readily" available as more and more personnel go into the country. G4KUX/YA was re-

P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

Have you heard Peter, 9V1PC, on 160 or 80 meters? His antenna for these bands is strung between two 21-story buildings, 300 feet above the ground. Here is one of the end insulators at the edge of the roof. The 75 ohm balanced feeder drops down in a gentle curve to a balun in his shack on the tenth floor of one of the buildings. (Photo courtesy Rod, WC7N)

ported active in early January as the British moved into the area. Peter, ON6TT, and Mark, ON4WW, both were expected back in late January to operate with their call, YA5T. Afghanistan was ranked #7 on the Most Wanted Survey.

It's amazing to see so many of the top Most Wanted entities being activated in recent months. *Four* of the top ten either have been, or will soon be, active on the air. *Seven* of the top 25 will be active this "season." I can't recall another time when so many of the top Most Wanted have been activated within such a short time frame. Several others on the entire

CQ DX Awards Program

SSB

2360.....AI6A
2361.....W4PGC
2362.....HB9DDZ
2363.....W8GBH
2364.....W9HRQ

CW

1024.....W4PGC
1025.....W8GBH

SSB Endorsements

320.....W5RUK/332
320.....DL3DXX/330
320.....W5LLU/326
310.....W5GZI/311
310.....HB9DDZ/310
275.....W4PGC/288

CW Endorsements

320.....IT9QDS/333
320.....DL3DXX/333
320.....NØFW/329
320.....G3KMQ/329
300.....W6YQ/306
150.....W4PGC/160

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 333 active countries. Please make all checks payable to the award manager.

The WPX Program

SSB

2812.....K3OK 2813.....K3PD

CW

3081.....DK5HZ 3083.....KØCOP
3082.....OZ2JVG

CW: 400 DK5HZ. 450 KØCOP. 2100 S51NR

SSB: 650 IK8OZP. 800 IV3BKL. 1150 K3PD. 1250 WM4R. 1450 NG9L. 2100 LU5DV. 2250 WB3DNA. 2800 W8ESU. 3950 I2PJA. 5300 ZL3NS.

MIXED: 1350 WZ4P. 2150 ON4CAS. 3600 WB2YQH. 3950 I2PJA..

40 meters: JL6IPK

Oceania: VE9FX

Award of Excellence Holders: K6JG, N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP KØJN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, ABØP, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1PO, K9LNJ, YB0TK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, KZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, I7PXV, S57J, EA8BM, DL1EY, KØDEQ, KUØA, DJ1YH, OE6CLD, VR2UW, 9A9R, UAØFZ, DJ3JSW, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, W4GP.

160 Meter Endorsement: K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF N4NX, SMØDJZ, DK3AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR1QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N8JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, WBØDD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA5CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, UAØFZ, CT4NH, W1CU, EA7TV, LY3BA, RW9SG, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, W4GP.

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

The WAZ Program

10 Meter SSB

528.....CT1BWW 529.....IK1PFE

15 Meter SSB

560.....PY6WO 563.....JA9QD
561.....CT1BWW 564.....JA2SQ
562.....HL4GIK

20 Meter SSB

1086.....CT1BWW 1089.....JA7CVL
1087.....IK6GRT 1090.....EA5DHK
1088.....IKØLNN

40 Meter SSB

97.....CT1BWW

10 Meter CW

170.....JI1CQA 171.....K6YUI

15 Meter CW

295.....W6XA 297.....WA3GNW
296.....JA2SEQ

17 Meter CW

35.....JA1HSF 36.....K6VX

20 Meter CW

522.....BX7AA 523.....W6XA

30 Meter CW

46.....I2JQ 47.....K6VX

6 Meters

19.....9A3JI (25 zones)
20.....SP5EWY (26 zones)
21.....W8PAT (25 zones)
3.....JI1CQA (35 zone endorsement)

160 Meters

170.....W1NG (40 zones) 47....SV8CKM (30 zones)

All Band WAZ

SSB

4720.....W9LYN 4727.....JM1JZN
4721.....KF3BV 4728.....IK8YTA
4722.....SM5AAP 4729.....IK8GYS
4723.....W5GT 4730.....NT7Y
4724.....EA5AOM 4731.....F5INJ
4725.....JAØGX 4732.....K3PD
4726.....W7SNY 4733.....N6FUN

Mixed

8093.....US7MM 8101.....JF1CST
8094.....K3WA 8102.....N9GM
8095.....BX7AA 8103.....VE6ZT
8096.....BX2AE 8104.....JA6QHQ
8097.....JH8KFE 8105.....7N1LIO
8098.....JA2JIL 8106.....JA1MQS
8099.....K6GT 8107.....KØTHN
8100.....F5EMP 8108.....W6XA

All CW

282.....K9BWI 285.....PR7FB
283.....JH1AEF 286.....K7GT
284.....JH1SBE

RTTY

131.....KØJN

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>.

5 Band WAZ

As of January 15, 2002, 580 stations have attained the 200 zone level and 1238 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:
PY6WO W7CB

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
WØPGI, 199 (26)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
ABØP, 199 (23)
KL7Y, 199 (34)
NN7X, 199 (34)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (1)
KC7V, 199 (34)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
K4UTE, 199 (18)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
K2UU, 199 (26)
W1FZ, 199 (26)
UT4UZ, 199 (6)
SM7BIP, 199 (31)
PY5EG, 199 (23)
SP5DVP, 199 (31 on 40)
K7FL, 199 (23)
W1DIG, 199 (24)
EA5BCX, 198 (27,39)
G3KDB, 198 (1,12)
KG9N, 198 (18,22)
KØSR, 198 (22,23)
UA4PO, 198 (1,2)
JA1DM, 198 (2,40)
9A5I, 198 (1,16)
LA7FD, 198 (3,4)
K5PC, 198 (18,23)
VE3XO, 198 (23,23 on 40)
K4CN, 198 (23,26)
KF2O, 198 (24,26)
W6BCQ, 198 (37,34on40)
G3KMQ, 198 (1, 27)
W5BOS, 198 (18,23)
N2QT, 198 (23,24)
OK1DWC, 198 (6,31)
K7FL, 198 (23,37)
W4UM, 198 (18,23)
KY7M, 198 (17 & 34on10)
US7MM,198 (2, 6)

The following have qualified for the basic 5 Band

W1DIG (199 zones)
IZ5BAM (179 zones)
US7MM (198 zones)
DK6NP (190 zones)
W9LYN (155 zones)
ES1FB (154 zones)
K2IXQ (158 zones)
N3SL (188 zones)

Endorsements:
K7FL (199 zones)
W9RPM (200 zones)
KY7M (198 zones)
DK7YY (193 zones)
RU9TU (190 zones)
N5ORT (165 zones)
K3JGJ (196 zones)
W4QCU (200 zones)
UU2JQ (200 zones)
AI3Q (192 zones)
K4ZW (200 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $80 ($100 if airmail shipping is requested).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.

list of 100 Most Wanted will be active this year, so there will be no lack of interest in DXing any time soon.

If you're wondering about this Most Wanted Survey, the entire list of 100 is posted on the website of DX Publishing at <www.dxpub.com>. The survey has been conducted in the fall of each year for several years now and was previously done by the late Chod Harris, VP2ML/WB2CHO, the prior editor of this "DX" column, and the editor/publisher of *The DX Magazine.* This survey is consulted by many DX foundations, major DX clubs, and DXpeditioners to determine where their money and efforts can best be utilized for maximum benefit to the DXing community.

CQ and now... the 2002 CQ calendars

better than ever, all digitally photographed, and still 15 months of value.

The new 2002/2003 CQ Radio Classics Calendar features fifteen magnificent photos of some of the memory-jogging, heart-tugging gear that so many of us treasure or aspired to years ago. (Publisher's Note: They're making antiques a lot newer than they used to!) This year's Radio Classics Calendar features some of the great equipment of the '50s and '60s, with a smattering of the 1940s and 1930s.

Here's what's featured this year:

Collins 75S-3 Receiver, 1961; Lakeshore Bandhopper VFO, 1957; Gonset Commander II Mobile HF Transmitter, 1955; Gonset 913A 6 meter amplifier, 1964; Technical Materiel Corporation (TMC) GPR-92 Receiver, 1964; Hammarlund HQ-170 Receiver, 1958; McElroy Model 100 Straight Key, 1941; Sonar XE-10 Modulator, 1947; National NC-300 Receiver, 1955; Hallicrafters S-85 Receiver, 1954; Heathkit SB-500 VHF Transverter, 1969; Sideband Engineers SB-34 Transceiver, 1965; Swan 400 Transceiver, 1964; Drake TR-3 Transceiver, 1963; Utah UAT-1 Transmitter, 1937.

How many do you recognize? How many did you own? How many did you wish you owned?

The 2002/2003 CQ Amateur Radio Calendar brings you fifteen spectacular digital images of some of the biggest, most photogenic Amateur Radio shacks, antennas, scenics, and personalities. These are the people you work, the shacks you admire, the antenna systems you dream about having, all digitally captured by the talented Larry Mulvehill, WB2ZPI, CQ's own roving cover photographer. Larry's travels this year took him to Colorado, Montana, Wyoming, Texas, Florida and New York, capturing some of the greatest Amateur Radio photos of the year especially for this annual favorite calendar. From winter scenes of the frosty northeast to pedestrian mobile in the Rockies, you'll love this traveling Amateur Radio photo show.

All calendars include dates of important Ham Radio events such as major contests and other operating events, meteor showers, phases of the moon, and other astronomical information, plus important and popular holidays. The CQ calendars are not only great to look at, but they're truly useful, too!

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www.cq-amateur-radio.com

CQ Communications, Inc.
25 Newbridge Road, Hicksville, NY 11801

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries. With few exceptions, the ARRL DXCC Countries List is used as the country standard. The CQ DX Award currently recognizes 333 countries. Honor Roll listing is automatic when an application is received and approved for 275 or more active countries. Deleted countries do not count and all totals are adjusted as deletions occur. To remain on the CQ DX Honor Roll, annual updates are required. All updates must be accompanied by an SASE if confirmation of total is required. The fee for endorsement sticker s is $1.00 each plus SASE. Please make checks payable to the awards manager, Billy F. Williams. All updates should be mailed to P.O. Box 9673, Jacksonville, FL 32208.

CW

K2TQC 333	EA2IA 333	W8XD 332	KA7T 330	N4CH 327	I5XIM 325	KE5PO 322	CT1YH 313	KH6CF 301
K2FL 333	F3AT 333	WØHZ 332	I4LCK 330	I1JQJ 327	K5UO 325	K6CU 321	K9OW 313	K9HQW 299
K9BWQ 333	DJ2PJ 333	K6LEB 331	VE7CNE 330	YU1TR 327	N5HB 325	HA5DA 321	N7WO 312	F6HMJ 296
K2ENT 333	K2JLA 333	N5FG 331	N4AH 329	I4EAT 327	YU1AB 325	VE7DX 320	K9DDO 312	WG7A 295
N7FU 333	W7CNL 333	PT2TF 331	KZ4V 329	DL8CM 327	IK2ILH 325	HA5NK 319	W3II 312	KD8IW 288
K3UA 333	YU1HA 333	WØJLC 331	K9IW 329	SM6CST 327	W4UW 325	W7IIT 318	N4OT 311	W9IL 282
K9MM 333	PA5PQ 333	N4JF 331	K7LAY 329	NC9T 326	N5FW 325	K1FK 318	KF8UN 308	EA3BHK 282
K2OWE 333	DL3DXX 333	VE3XN 331	WB4UBD 328	IT9TQH 326	9A2AA 325	SM5HV/HK7 317	PY4WS 308	YC2OK 282
N4MM 333	IT9QDS 333	W1WAI 331	NØFW 329	K7JS 326	K8LJG 325	G3KMQ 317	IKØADY 307	UA9SG 279
W4OEL 333	N7RO 332	K2JF 331	G3KMQ 329	I2EOW 326	LA7JO 324	K8JJC 315	W6YQ 306	XE1MD 278
W7OM 333	K6GJ 332	WA4IUM 331	N4KG 327	OK1MP 325	W6SR 323	WG5G/QRPp 315	YT1AT 304	EA2CIN 278
F3TH 333	K4IQJ 332	4N7ZZ 330	K8PV 327	W4LI 325	9A2AJ 323	OZ5UR 315	LU3DSI 302	I3ZSX 276
WB5MTV 333	K4CN 332	W6DN 330	W4QB 327	K3JGJ 325	K4JLD 323	HB9DDZ 314	F5OIU 302	G3DPX 275
W2FXA 333	G4BWP 332	W2UE 330	K1HDO 327	WA8DXA 325	KUØS 322	N1HN 313	YU7FW 301	

SSB

K4MZU 333	VK4LC 333	WØYDB 332	EA1JG 331	W2FKF 328	DL6KG 326	N3RX 321	KD5ZD 312	KE4SCY 291
K2TQC 333	N5FG 333	OE2EGL 332	K1UO 331	KD8IW 328	W4LI 326	EA8TE 321	W5GZI 311	I3ZSX 290
K2FL 333	DJ9ZB 333	K4JLD 332	YV5IVB 331	KE4VU 328	K6BZ 326	XE1CI 321	WZ3E 311	KK4TR 290
W6EUF 333	EA2IA 333	KSØZ 332	VE2GHZ 331	K1HDO 328	W4WX 326	W6MFC 321	VE3CKP 311	W4PGC 288
K2JLA 333	XE1L 333	N5ZM 332	KX5V 331	K5UO 328	W6SR 326	KØFP 320	CT1YH 311	YV5NWG 287
K6JG 333	W6BCQ 333	WB4UBD 332	I8LEL 331	KF8UN 328	N4KG 326	N4CSF 320	HA6NF 310	N5WYR 286
K6GJ 333	XE1AE 333	WB3DNA 332	EA3KB 330	EA3EQT 328	W5LLU 326	N4HK 320	LU3HBO 310	RW9SG 286
K2ENT 333	4N7ZZ 333	CT1EEB 332	LA7JO 330	KB2MY 328	W9HRQ 326	DL3DXX 320	SV3AQR 310	VE7HAM 285
K6YRA 333	KE5PO 333	K4CN 332	W9SS 330	AE5DX 328	K9IW 325	WA4ZZ 320	HB9DDZ 310	F5RRS 284
K4MQG 333	PY4OY 333	K9PP 332	W7FP 330	W2JZK 328	WA4JTI 325	WØULU 320	EA3BHK 307	CT1CFH 284
K7LAY 333	VE1YX 333	W6SHY 332	WDØBNC 330	KZ4V 328	NI5D 325	EA1JG 320	N1ALR 306	WØIKD 283
IK1GPG 333	XE1VIC 333	I8KCI 332	K3UA 330	IT9TQH 327	KC4MJ 325	EA7TV 320	XE1MDX 305	EA3CYM 283
K5OVC 333	IN3DEI 333	VE4ACY 332	K8CSG 330	IT9TGO 327	IKØIOL 325	SV1RK 320	EA5OL 305	WN6J 281
NØFW 333	I4LCK 333	LU4DXU 332	W6DN 330	I1EEW 327	K1EY 325	K3LC 320	WB2AQC 305	F5JSK 281
OZ5EV 333	VE3XN 333	W5RUK 332	WA4IUM 330	SV1ADG 327	YV5AIP 325	N6RJY 319	N1KC 305	YU1TR 280
K9MM 333	OE7SEL 333	VE3MRS 332	W2CC 330	DL8CM 327	K3JGJ 324	WA4DAN 319	KC4FW 304	KK5UY 280
ZL3NS 333	W2JZK 333	VE7WJ 331	ZL3NS 330	W2FGY 327	K7HG 324	CE1YI 318	YC2OK 303	KA5OER 280
N4MM 333	EA4DO 333	K9OW 331	VE4ROY 330	I1JQJ 327	AC7DX 324	YV4VN 317	WB2NQT 303	EA3CWT 278
OZ3SK 333	VE3MR 333	PT2TF 331	YV1CLM 330	F9RM 327	KØHQW 324	EA5GMB 317	VK3IR 303	VE2DRN 277
N4CH 333	K5TVC 333	VE2WY 331	K9HQM 330	XE1MD 327	ZL1BOQ 324	W5OXA 317	W5GZI 302	XE2NLD 277
IØZV 333	PA5PQ 333	W8KS 331	CT1EEN 329	I4EAT 327	EA3BKI 323	CT1AHU 316	N5QDE 302	9A9R 277
YU1AB 333	W4UW 332	W8AXI 331	WS9V 329	W3GG 327	K4JDJ 323	N5HSF 316	KD4YT 302	W6UPI 276
W7OM 333	K9BWQ 332	W3AZD 331	I2EOW 329	AA6BB 327	W9IL 323	K6RO 316	SV3AQR 302	VE2AJT 275
KZ2P 333	KØKG 332	OE3WWB 331	K2JF 329	SM6CST 327	WW1N 322	K7TCL 315	YT7TY 300	Z31JA 275
K7JS 333	W4NKI 332	DL9OH 331	ZL1AGO 329	W9OKL 327	F6BFI 322	WR5Y 315	SV2CWY 300	G4URW 275
DU9RG 333	VE2PJ 332	N2VW 331	N5FG 329	WD8MGQ 327	LU7HJM 322	LU5DV 315	4X6DK 300	
W4UNP 333	YV1KZ 332	YZ7AA 331	DU1KT 329	CX4HS 327	K5NP 322	CP2DL 314	K6GFJ 299	
N7BK 333	YV1AJ 332	YV1JV 331	4Z4DX 329	IØSGF 327	NI5D 322	K9YY 313	K7ZM 292	
N7RO 333	W2FXA 332	WA4WTG 331	VE7DX 329	W4QB 326	PY2DBU 322	YT1AT 313	OA4EI 292	
IK8CNT 333	W8ZET 332	N4JF 331	N5ORT 329	K8PV 326	K6CF 322	NØMI 313	KØOZ 291	

RTTY

K2ENT 331	W2JGR 316	G4BWP 307	KE5PO 297	I2EOW 291	EA5FKI 284	W4QB 280	YC2OK 280	PA5PQ 272
WB4UBD 325	K3UA 315	NI4H 305	W4EEU 291	I1JQJ 289				

Speaking of DX foundations, I wonder how many of you have made a donation to one of these worthy groups? These are the people who provide *major* funding for DXpeditions. Without continuing support from the DX community, these DX foundations will not be able to continue their work. I'm talking about groups such as the following:

Chiltern DX Club: <www.cdxc.org.uk>
Clipperton DX Club: <www.cdxc.free.fr>
Danish DX Group: <www.edr.dk/dxgroup.htm>
Diamond DX Club: <www.ddxc.org>
DX Lovers Foundation: <www.kansai.or.jp/member/dxlf>
European DX Foundation: <www.eudxf.de>
German DX Foundation: <www.gdxf.de>
International DX Association: <www.indexa.org>
Lake Wettern DX Group: <www.hem.passagen.se/amradio/?noframe>
Lynx DX Group: <www.lynxdxg.com>
Northern California DX Foundation: <www.ncdxf.org>

The above are just the ones I found listed on the website <www.ac6v.com>. There may well be others that are not shown there who are worthy of your consideration. I urge you to think about contributing to one or more of these groups.

Famous DX personalities (left to right) Kirsti, VK9NL, and Jim Smith, VK9NS, are joined by Wojtek, VK9KNE, during his stay on Norfolk Island. (Photo courtesy Tom, SP5UAF)

QSL INFORMATION

2EØAPH via G3WRO
3CØN via DJ6SI
3DAØFR via DL7DF
3G5A via XQ5SM
3W2DC via N4CD
3W2ER via G4ZFE
3W2KHO via WB2KHO
3W2SF via WB2KHO
3W2XK via W9XK
3XY8A via VE2XO
4D69SAN via DU1SAN
4J6ZZ via UT3UY
4J8DX via DJ1CW
4K5CW via UT3UY
4K8DM via DK6CW
4K8DX via DK6CW
4T4I via DL2JRM
4T4X via DL2JRM
4XØJ via 4X4FJ
4X3A via WA4WTG
5A1ASC via DK4HB
5A1HA via DJ9ZB
5A1TA via EA3GIP
5B4AGU via LZ1MS
5H1X via KQ1F
5H2MN via DF8AN
5N6NDP via IK5JAN
5R8HD via KD6WW
5V7BR via F5RUQ
5WØMO via OM2SA
5WØVF via W7TVF
5X1Z via SM6CAS
5Z4KE via DF8AN
6LØUR via HL5AP
6YØA via WA4WTG
6Y2A via WA4WTG
6Y4A via WA4WTG
6Y8A via WA4WTG
6Y9A via WA4WTG
7J1AOE via K3DI
7Q7RV via ZS6DX
7Q7TV via ZS6DX
7S5A via SM5CEU
8P2A via K9PG
8P4B via KU9C
8P9HAT via K4BAI
8P9JA via K4MA
8P9JG via W2SC
8P9Z via K4BAI
8Q7KT via HB9KT
8S6M via SM6NM
9G5KW via W7XU
9G5XU via W7XU
9HØWW via GØOFN
9K9X via 9K2HN
9L1BTB via SP7BTB
9M6A via N2OO
9M6APT via SP9PRO
9M6EVT via SP9BRP
9M6NA via JE1JKL
9M6SEA via N2OO
9M6TBT via KD3TB
9M6TDC via JA1BRK
9M6US via N2OO
9M8AER via JA3AET
9M8ART via JA3ART
9M8HCK via JA4HCK
9M8JAA via JA3AA
9M8JUB via JA3UB
9M8MVF via JR3MVF
9N7MH via DL7VMH
9Q5MRC via G3MRC
9U5X via IK2ILH
9X/RV6LNA via UA6MF
A35OY via KF8OY
A61AJ via N4QB
A61AR via UA6MF
AP2AUM via KK5DO
BA4RF via BA4RF
BX4AE via SM3DBU
BX8AAA via BV8BC
C4W via 5B4WN
C6AKP via N4RP
C6AKQ via N4BP
C91MR via G3MRC
C96MR via G3MRC
CEØZ/KM9D via OM2SA
CE7AOY/8 via CE7ZK
CN2JS via F6BEE
CN8YR via K4KU
CO2PH via KB5UOK
CO2TK via F6FNU
CQ2T via CS6ARC
CQ7O via CT1BWW
CQ9K via DL1SBF
CS7T via DF4SA
CT7B via OH2BH
CT8T via OH1NOA
D44CF via SMØJHF
D44TC via IV3TAN
D902WSF via DS5UCP
DA1LDN via ON4JM
DJ4OA via K9QAM
DS01BN via HLØEMG
DT2001PAF via DS2AXU
DU1/SQ9BOP via SP6GVU
DU9/NØNM via W4DR

(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>.)

The Polish DXpedition to VK9N and 9M6 late last year provided photo opportunities. Here we find Jurek, VK9KND, and Wojtek, VK9KNE, during their stay on Norfolk Island. (Photo courtesy Tom, SP5UAF)

They are all over the world and have made significant contributions to the DXing community and can only continue to do so with your help.

A number of contests are on the horizon as I write this (see K1AR's "Contesting" column in this issue), and I hope you will participate as much as you can, or wish to, for whatever reason, whether it be for a score or just to add to your country totals. Whichever it might be, good luck and see you in the pile-ups.

73 and Good DXing, Carl, N4AA

VHF Plus

BY JOE LYNCH, N6CL

All About The World Above HF

New 241 and 322 GHz NA DX Records Set

Brian Justin, WA1ZMS, and Geep Howell, WA4RTS, have claimed new North American distance records for the 241 and 322 GHz ham bands. On 15 December at 0145 UTC contact was made between Brian operating with the callsign W2SZ/4 and Gordon on 322 GHz over a distance of 0.05 km. Both stations were located in FM07ij. As far as they know, it is the first North American QSO on that band.

Then at 0235 UTC a contact was made between W2SZ/4 (op: WA1ZMS) located at 37° 21' 13"N, 79° 10' 15"W (FM07ji) and WA4RTS/4 located at 37° 21' 49"N, 79° 10' 19"W (FM07ji) on 241 GHz over a distance of 1.1 km. According to Brian, this is a North American first for the band and a new NA record at the same time.

Both of the contacts were made using MCW and wideband FM IF receivers. Power output on 322 GHz was estimated to be just a few microwatts, while on 241 GHz the power was a measured 0.75 mw. The stations are constructed of 80.6 GHz free-running Gunn oscillators driving GaAs diode triplers (University of Virginia design) to give output on the 241 GHz band. The triplers have a tiny amount of fourth harmonic output, which was used for the 322 GHz QSO. Both stations use homebrew 6 inch parabolic dishes with hyperbolic sub-reflectors. Brian says he hopes the Gunns will be phase locked in the future, allowing the use of narrow-band modulation that would result in better DX.

Photos of the stations and WAV files can be found on the Mount Greylock Expeditionary Force URL <http://www.mgef.org/zms_241.htm>. Brian credits Pete Lascell, W4WWQ, for his assistance in making possible these record-setting contacts. Brian is no stranger to firsts, having earlier completed the first 75 GHz VUCC.

New 75 GHz Record

The following is from **Kohjin Yamada**, by way of Will Jensby, WØEOM: "JA1ELV and his group established the 75 GHz 151 km world record on 16 November at 0410 UTC on SSB, JA1ELV, using a 3 mw 50 cm dish, WX –2°C, 43% humidity, and JA1KVN, using a 1 mw 80 cm dish, WX 19°C, 45% humidity."

P.O. Box 73, Oklahoma City, OK 73101
(phone 918-627-6625; fax 918-835-9785)
e-mail: <n6cl@cq-amateur-radio.com>

VHF Plus Calendar

Mar. 3	Moderate EME conditions.
Mar. 5	Last quarter Moon.
Mar. 10	Poor EME conditions.
Mar. 12	Lowest Moon declination.
Mar. 13	New Moon.
Mar. 15	Moon apogee.
Mar. 17	Poor EME conditions.
Mar. 21	First quarter Moon.
Mar. 24	Good EME conditions.
Mar. 27	Highest Moon declination.
Mar. 28	Full Moon and Moon perigee.
Mar. 30	Moderate EME conditions.

—EME conditions courtesy W5LUU

KØFF DXCC

Speaking of firsts, in November of last year George Dowell, KØFF, became the first Missouri amateur to achieve DXCC on 6 meters. I asked him to tell his story:

The goal: To work the maximum number of countries on 6 meters in the shortest period of time.

The approach: Study the cyclical nature of propagation into my given area. Identify the various types of propagation available from my location to other parts of the world, analyze the optimum arrival angle for that type wave angle, and then build an antenna specifically optimized for that particular path.

The calendar days that DX can happen into my area seem to be very repeatable and structured. By studying my own logs as well as others that went back 30 years, I devised a "Magic Calendar" that gave me a clue as to when to really watch the radio closely. This also allowed for vacations, dinners on the town, et cetera, to be planned around the propagation down times.

From the upper Midwest we enjoy multiple-hop E_s to Europe (four hops usually) in the summer. In the spring and fall we can link into the South American and South Pacific TEP via E_s. On rare occasion we can access the TEP *(transequatorial propagation—ed.)* directly. During the peak of the sunspot cycle, in the mornings we can also have *F2* to Africa, and another path takes us to Europe; in the evenings the South Pacific is workable, but more rarely. In general, the E_s and E_s-linked paths all respond better to an antenna with a high take-off angle. *F2* and most of the direct TEP respond better to a very low take-off angle.

Almost all of our TEP is either sporadic-*E* linked or affected by the Pederson Ray. Nonetheless, it is definitely a high-angle path. To study and verify the arrival angles, I built an array of four 6-element beams with 34 foot booms in a box frame arrangement spaced 25 feet on a side. This was mounted on a crank-up tower so that the height can be varied. Also an elevation rotor was fitted so that tilt can be controlled from the shack. A very accurate readout azimuth rotor completes that setup. By varying the tilt of the array as I watched signal strengths via different paths, I worked out a rough estimate of the arrival angles. This was done on hundreds of signals, making thousands of comparisons.

The final operating station is an 11-element beam at 105 feet for use on all low-angle DX, and it is also best on tropo, and AU, just because it's so high up. For high-angle waves a 7-element beam is used on a 60 foot crank-up tower, but it is only set at 40 feet on purpose. Each antenna is fed by its own 400 watt amp and radio, and each receiver is fed into a different earpiece on my headset. Therefore, the right ear hears the signal from one antenna and the left ear hears the signal from the other. Each tower is spaced an ample distance from the other, so there is no interaction.

With this setup, and the 4 × 6 standing by on a relay switch for comparisons, the race was on. Tabulation: 100 countries in 6 years, 1996–2001.

WAS on 6 meters in 30 days!

Some hams, including stateside operators, have waited decades to complete WAS on 6 meters. Now comes word of WAS in 30 days—from Alaska! Joe Hannigan, WL7M, in Fritz Creek, Alaska, who has made his presence known on 6 meters in recent months, worked Hank Laughlin, W7YM, on December 10, 2001 for state number 50 in just 30 days. As Joe puts it, "Wow! What great openings we've been having on 6 meters!"

Six Meter Fun for December

Speaking of working Alaska, take a look at the following report from **Mark Schmidt, KB8GC**:

Here's some fun I've had on 6 meters the past month or so. This is to show everyone that you can have fun on 6 with very modest equipment—in my case, 100 watts to a pair of PAR loops on an extendable pole strapped to the railing on my second-story deck (or only one loop while mobile).

Beginning on 8 December 2001, I either heard or worked the following from EN74: on the 8th OX3SIX/b, OX3VHF/b, F5JKK, NL7Z, WL7M, NL7ZW, KLØBK, and KL7IKV; on the 9th G4DMA/KL7, KL7BK, and KL7NO; on the 10th VA7SS and VY1JA; on the 11th GIØOTC, OX3SA, KØKP/b (on backscatter), TF3?? (heard but he was wiped out by 4's and 5's on backscatter), TF3SIX/b, TF3AX, TF3FK, GM3PXK, MMØAMW, OX3SIX/b, VY1JA, KL7NO, AL7OC, KLØBK, NL7ZW, and AL7QH; on the 12th CU3URA/b, DK2PH, OZ4VV, SM7AED, ON4AOI, EA1TA, ON4GG, PAØRDY, F5QT, F5LNU, F5PAU, F6FHP, F8GB, F6HRP, CU3URA/b, and TF3??.

On 13 December CU5AM, GB3LER/b, PA3RDY, GW3MFY, GØRUZ, GMØEWX, GW3JXN, MMØAMW, OX3VHF/b, OX3SIX/b; on the 14th GIØOTC and OX3SIX/b; on the 16th CT1EEB, EH?? (heard various Spanish stations), and CT1RX; on the 17th KI6CG, W6RXQ, and K6HEW; on the 19th heard TF3GC and OX3HI; on the 21st K2RTH, KF4YOW, WB2QLP, and WA4DOS.

On 26 December the following stations were either heard or worked while I was mobile: YV1DIG, P49MR, NØLL/b, K8UK/b, NL7Z, and KL7FZ. On the 27th I continued DXing from my home QTH, working or hearing WP4KJJ, PJ2MI, C6AGN, V44KAI/b, and KL9A; on the 28th VP2VI, FM5AD, FG/LA2TAA, FG5FR, V44KAI/b, YV4???/b, FG5BG, KP2A, WP4LNY, OX3SIX/b, FM5AD, WP4KJJ, NL7Z, EI7GL, VY1JA (heard him calling KH6JC), K1TOL, AA1UT, AL7OC, W1RA/b, W1AN, K7SYO (MT for his 49th state on 6 meters in 2001), N5WNL, JH8HWL (heard with loops), and KD5MXF/b; on the 29th YV1DIG, PJ2BR, NP3GG, PJ2MI, TI2ALF, NP2BT, MMØAMW, P49MR, WP4KJJ, GMØEWX, WP4U, VP2VI, YV4AB/b, P43JB, and YV1DIG.

On the 30th I worked or heard TI2CDA, HK4SAN, 6Y5RC, SM7DA, TG9AJR, TI5KD, OZ4VV, TG9NX, JA6WFM/HR3, HP1AC, FM5WD, HK4SAN, TI2KI, TI5RVV, PJ2MI, YV4AB/b, TI7WAM, VY1AVO, YV1/KE5WJ, YV1DIG, FG5BG, and HP1AC; on the 31st YV1DIG, P49MR, HK4BKB, WP4LNY, WP3BM (worked on 52.525 MHz FM with a 350 foot wire just for fun), VE1ZZ, KP3W, WP4KJJ, YV4FJK, ZF1DC, TI5KD, NP3S, TI2KI, WP4MX, SV1DH, HP1AC, KMØM, KØKP/b, W5VAS/b, TI5KD, NP2JV/KP4, YV4AB/b, and FM5AD.

That's December 2001 on 6 meters! In January I added a few choice contacts, such as EH8BPX in the Canary Islands (finally Africa), PJ7LT in FK87 on St. Maarten, JQ90 at the top of Norway, and some new grids and provinces in Canada.

The real point here is that propagation really does *most* of the work, since I can do this with such a puny station. I have friends who live down in the valley and have 10 watts to a 4-element beam at 25 ft., and they've worked 30 countries this past year on 6. So tell your readers who have 6 meters on the end of their HF rig to hurry up and throw up a dipole or loop and start monitoring.

You can view Mark's station at URL: <http://lasermouse.tripod.com/pictures_of_my_par_loop_mobile_index.htm>.

Ironically, with all of the DX that Mark has either heard or worked, he did not complete a contact with North Dakota. He now will try for 50 states "within 12 months." Considering that Joe, WL7M, made his 50 MHz WAS in 30 days, Mark should be able to accomplish that goal.

While Mark's station is a bit atypical, the DX he logged during his reporting time frame was typical for 6 meters for the months of November, December, and early January. With the solar flux in excess of 200 almost continuously, many, many stations around the world worked DX. Other reports include the following.

From **Jim Crawford, K5YC**: Just a note to let you know of the activity my wife (KD5IHZ) and I (K5YC) have been working this past month on 6 meters. Band has been pretty good here in southeastern New Mexico. November 17, 18, and 19 were especially good during the time frame coinciding with the *Leonids* meteors. We worked stations in England, Spain, Canada, South America, and many islands, including HC8. Hawaii and Alaska made our day! The 20th and 25th of November also favored us with Belgium, Aruba, and Newfoundland. We wound up with 23 countries and 4 continents

worked and many new grids. We are running only 50 watts to a homebrew, wide-spaced 4-element quad.

From **Julio Medina, WP4LNY**: November 1, 2001 EH8BPS, CX1CCC/B, XQ6ET; November 2nd PY2SP; the 3rd LW5DX, D44BS, TR8XX; the 12th PY2DJH; the 13th PY2PAI, PY8MD, and PY3SOL; the 14th PY8MD; the 17th on 144.300 MHz, HI7EPH, Esteban in D.R. SSB, both using vertical antennas, and PY2BW on 50 MHz . Also on the 17th VE2WHZ, KO2R, N9SW, WØETT, WA7KYM, KBØZKX, KBØVMT, KØNII, KCØAKU, WAØCQG, WB9MVQ, WØRC, WØGHZ, W9ACF, W9GM, W9NAW, KCØCQN, KAØBZV, NØAQC, K7JE, NDØJ, KE7NR, N7IR, AA7A, and W7MC.

November 18th OZ1BTE, OZ1JXY, LA9DI, SM7WDS, OZ1LO, OZ3K, SM5NN, SM5DFF, OZ2LD, OZJX, OZ1BNN, OZ8ABX, OZ1IEP, OZ5IQ, SM6DOI, SP8NCQ, OZ4LP, SM7FJE, OZ4VV, DF9CY, OZ7IS, OZ1CDE, W9JA, W9GM, WØOSP, WØIR, XE1AOM, XE1AQX, and KA9FOX; on the 19th UR7QR, GMØEWX, MMØBJG, UY1HY, UU2JJ, SP5EWY, UR4LX, UR6IM, GM7NZI, UY9IF, SP2NJE, UT7IY, ES2QN, G4CBW, GM7PBB, OH2RF, OH4IH, OZ4VV, ES6BR, and OH3OZ.

November 19th open to USA at 1459 UTC. Worked the following: WØXV, W9JN, N9IGP, WØSD, N9MYK, AA9D, WØAUS, NØNZ, KB8GC, K9FA, AEØG, K8NNX, WA9RFT, KØWYN, WØGX, KB9ECA, WA9FVP, WO9S, N9SW, KGØND, KE9MOT, WØIR, VE4AAZ, KØAWU, WØOSP, NØJVO, NU8I, VA5DX, VE4AFC, K7TNT, W6OMF, K6HEW, N6JV, and K9HUY.

November 21st PY5AQ, CX1AO, PY2DJH, PY2EX, CX2PJ, HC8N, PP1CZ, PZ5RA, and PYØFM; the 22nd OA4DJW, XE1AQY, XE1AQX, KØTLM, KB9PJL, KCØSB, AB7UQ, KEØDL, N5OHL, WAØROI, KCØGOX, K5JN, KR5V, KCØEIG, KØTVD, WAØEBZ, KCØCQN, N9XJE, WØRC, WØZR, N5WKW, KCØHFL, KØZT, KS5V, KØUO, AB5K, KD5DSQ, NØUK, KBØZKX, KCØAKU, KC5ZMR, W5FUA, NFØG, N5EPA, NØVQA, WNØL, NØUR, and WØMTW; the 23rd KAØKIF, WH6LR, and AE7H, and also on the 23rd on 144.300 MHz HI7EPH.

November 24th GDØT, G3KWK, MØBUT, PE1GNP, G4EAT, DL6BF, PE2KP, DL5WG, DL8YHR, DD3DJ, DC9YC, DF7VX DF3EC, DF8XR, DG4FR, DK7ZB, DL8FAJ, DL8FBC, DL2YMR, DG1CMZ, DF7VO, PA3DOL, DK2PH, DK3RV, PA7FM, ON5SE, LX1ER, ON5GLC, OK1FRG, OK2VMD, F9YR, 9A2FJ, OE6FGG, F8ZW, IK4CDJ, I2JSB, S57A, I2WTY, F6FXU, HB9DLZ, EH3AVQ, 9H1CG, EH1TA, CT4NH, CT1FJC, and many others. On the 24th I made over 132 contacts with European stations, one of the biggest openings I have ever seen on 6 meters. That day I also worked KH6/K6MIO and AH8A, to make my date complete. On the 25th I worked OA4DJW, XE1KK/B, HC8/NØJK , WA7JTM, and XQ6ET.

December 1st ES2QN, ES1AJ, and SM7GSK; the 2nd HI7EPH 144.300 MHz. On December 3rd WL7M heard me calling CQ but I did not copy him. We are still looking for contacts with stations in Alaska from KP4 land and hope to make them soon if we are lucky with propagation. Also on December 3rd I had good propagation on 144.300 MHz. I made contacts with CX9DK at 0034, CX1DDO at 0036, and LU7FA at 0037 UTC.

Musings of a 50 MHz Op Since 1958

The following from Sam Whitley, K5SW, gives a bit of historical perspective on the current DX on 6 meters.

Having seen the tail end of Cycle 19 on through maybe the waning moments of Cycle 23, we have never had it so good.

Each cycle has had some DX that was worked. For Cycle 20 (late '60s) the best we had was some South America plus KL7 and KH6. Cycle 21 (late '70's and early '80s) included more South American countries plus JAs and KG6 (Guam) and KX6 (Marshall Islands) and the first European (EI2W, the only licensed station in Europe). Plus we worked many stations on 28–50 MHz cross-band (I had 12 countries x-band.) and the first Africa station, C5AEH. Cycle 22 (late '80s and early '90s) saw more countries get privileges in Europe, plus D44 in AF, and in the Pacific VK, ZL, 3D2, and FK showed up in our logs.

In October 1999 Cycle 23 started with worldwide DX like never before had been heard, especially all the new countries on for the first time. Since then, each spring and fall the openings have continued. Beginning with October 1, 2001 there has hardly been a day without some DX on the band.

Fellows, be thankful you were around for this cycle. Even though other cycles might have had better numbers, as compared to all the other cycles, with what has been worked, it is the Granddaddy of them all!"

The Life of a Ham

The following is a neat nostalgia story from Herb Krumich, WA2FGK, about the connecting quality of ham radio.

Holy crow, we have a sked with North Dakota during the upcoming *Leonids,* but the amp that was promised us is not here yet. Only a week to go and a phone call is a must. The call goes in to our mentor, Bill Ashby, K2TKN. We ask how it's going. His response: "I will have it for you." Days go by and we hear nothing from Bill. We call again. His reply: "Don't worry; I will get it done."

"Finally we receive a call from Bill: "Pick it up in the morning. Katie will be home." Up I go to Pluckemin, New Jersey. Katie with a smile opens the door and on the floor is a brand-new homebrew 2 meter KW amp. Wow, my face glows. In conversation Katie tells me Bill had started on the amp 10 hours ago. He stayed up all night and built a full KW with power supply for us in one evening. The amazing thing? He did it for free. For us there will never be another Bill Ashby, God rest his soul.

During the day we hook up all switching. Our Gonset Sidewinder is driving the amp to full power. Our W2AZL 417A converter is glowing with our Hammarlund receiver. We only have one problem: Our rotor is not turning our array. Stuck in one direction, it is a must to climb the tower and loosen the mast to turn our four big Telrex 15-element Yagis toward North Dakota. Finally we are ready for the quest for a new state.

The next morning we are up in plenty of time. Tuning our magnificent system, we are on frequency for our sked. We will be using the call WA2FGK with K2LNS at the operating position. Bang! Within minutes a contact is complete; so excited with disbelief that KØALL is so loud.

I start calling CQ with not many expectations, since our antenna is stuck almost northwest. Unbelievable as it might seem, we work many stations from WØ land to Texas and as far south as Florida. The signals have the symptoms of tropo, but with tremendous meteor bursts on top. Constant signals from all over are logged that day.

As you may have guessed, this was 35 years ago.

Our team of WA2FGK as engineer and K2LNS as operator has survived all these years. Andy still builds and adds to the UHF and microwave bands and Herb continues to operate. Last year it was very difficult to keep the station on the air due to work schedules, but 2002 should be the best year yet.

The reason for this story is to bring up our latest state. We moved to the Pocono Mountains 15 years ago. In putting up a new antenna for 144 MHz we decided to elevate our four 17B2s. With WAC on 2 meters complete, our next goal will be trying for WAS.

In two years we moved up to 43 states, the 43rd being KØGU, on his moonrise. Big signals off the moon from Colorado.

The last state reachable from Pennsylvania on scatter was North Dakota. The first station I can think of is our friend KØALL. Via e-mail Ron agreed to give it a shot. We tried two different showers. I believe that we could have made it during the *Perseids,* but our sked time was hours from the peak.

I called Ron and asked for a sked during the *Leonids.* He was ready to go. We planned on 1000 UTC. There was only one problem: My Omni 6 was locked in the CW mode. Worst than that, it was sometimes jumping frequency. I called Ron on the land-line and asked him if we could try CW. His response was "Real hams use CW!" Two minutes before our sked I fired up the 8877 into our four 17B2s.

Everything looked good. I released the transmit switch and prepare to call Ron, hoping to get a few pings to start. Nothing could have been further than the truth. He told me he was listening to me tune up with solid copy. The first transmission accomplished our QSO, solid 559 copy.

Thirty-five years have passed and Ron, KØALL, has me still smiling. State number 44 is now complete. This story is a tribute to my friend Andy, WA2FGK, and our SK mentor K2 Twenty Kinds of Noise.

Current Conferences

From Greg Robinson, KB4NVD, comes word of the Southeastern VHF Society Conference. Scheduled for April 26–27, 2002, the 6th annual Southeastern VHF Society Conference registration

information, program details, and hotel and travel information can be found at <http://www.svhfs.org>.

The conference promises to be an interesting and exciting event with presentations from accomplished VHF+ amateur radio enthusiasts from various parts of the country. In addition, there will be antenna-gain measurements, pre-amp gain and noise-figure measurements, a Friday evening fleamarket with vendor displays (Down East Microwave is one vendor planning to come), Saturday afternoon auction, and Saturday evening banquet, which is open to everyone. Drawings for door prizes will follow the banquet.

The conference has issued a call for papers. If you are interested in submitting a paper to be included in the conference proceedings, contact Skip, KG4QDZ, <kg4qdz@arrl.net>. Deadline for submission is March 1, 2002.

It's Back

Beginning in May, *CQ VHF* will return as a quarterly magazine. Thanks in large part to requests by you, the readers of VHF news, Publisher Dick Ross, K2MGA, has decided to roll out a new version of the magazine, with your columnist as the editor.

While I take on this new responsibility, I will continue to be your monthly columnist here in *CQ* magazine. Because the new *CQ VHF* will be a quarterly, there will be little time-dependent news in it. Therefore, we need the monthly venue of this column in *CQ* to keep you informed of upcoming events and to report on the latest activities.

Thanks in part to the success of this "VHF Plus" column, the original *CQ VHF* was started more than six years ago to meet the growing interests and needs of amateurs interested in the VHF and above spectrum. By all accounts it was an outstanding editorial success. However, by the end of 1999, the collapsing advertising and newsstand sales market made it no longer economically feasible to continue publishing the magazine. K2MGA stated in a press release announcing the new magazine, "The new *CQ VHF* is designed with these marketplace realities in mind and will rely primarily on subscription revenues to meet expenses."

It is ironic that in the two-plus years that *CQ VHF* has not been published, the most frequently heard comment from readers at hamfests throughout the U.S. has lamented the loss of *CQ VHF*. Not since the closing of *Ham Radio Magazine* (which itself continues to have an intense following) has the management at *CQ* heard such fervent comments from magazine readers.

Preliminary surveys of former readers and hams at large have indicated an intense desire for *CQ VHF* to return, albeit with a bit more technical slant. Therefore, for the most part the new *CQ VHF* will retain the friendly, conversational look and feel of the original, but its technical content will be somewhat higher level.

In commenting on the new magazine's editorial content, K2MGA stated, "While the original magazine was intended largely to reach newcomers to amateur radio, its primary audience, in fact, turned out to be the experienced and established VHFer. With this in mind, the new version will focus more on meeting the technical needs of experienced VHFers without sacrificing the attention to the newcomer that has always been a hallmark of CQ publications."

The majority of articles we have put in queue to date for this first issue are on antennas and related subjects. Therefore, the preliminary expectation is that the first issue will have an antenna theme. If you would like to write for the new magazine, please contact me immediately with your article ideas using my contact information at the beginning of this column. Even though we are working with a very short time constraint, we may be able to include your article in this first, premier issue.

The staff of the new magazine, in addition to myself as Editor, will include former *CQ VHF* Editor (currently *CQ* Editor) Rich Moseson, W2VU, as Editorial Director; *CQ* Managing Editor Gail Schieber, K2RED, in the same role for *CQ VHF*; and *CQ* Advertising Manager Arnie Sposato, N2IQO, taking on advertising responsibilities for *CQ VHF* as well. Former *CQ VHF* Contributing Editors Gordon West, WB6NOA, and Ken Neubeck, WB2AMU, will also return. In addition, Carol Lynch, W6CL, will serve as Editorial Consultant. The rest of the editorial team is still being assembled.

The magazine is available by subscription for $25.00 per year in the U.S. and on a per issue basis over the counter at ham dealers. To subscribe, contact CQ Communications, or go to our URL, <www.cq-vhf.com>, for internet subscriptions.

We expect to see you at the Dayton Hamvention with plenty of copies of the new *CQ VHF* available for your purchase for just one dollar. Therefore, if you are a bit on the fence about trying the magazine, come to Dayton and take a look. We are sure you will be pleased enough to sign up for your subscription on the spot!

And Finally . . .

As most of you know, I have a full-time job as a minister of a small United Methodist congregation. Thankfully, my wife Carol, W6CL, is a retired school teacher and has plenty of time to be the editorial consultant of the new *CQ VHF*. Without her help, I could not take on this additional responsibility.

Thanks again for all of your e-mail and other correspondence for this, your column. Thanks also go to those who already have congratulated us on the new editorial positions and wished the new magazine and us success. We look forward to continuing our coverage of your activities in the wonderful world of the VHF-plus ham bands.

Until next month . . .

73, Joe, N6CL

Contesting

BY JOHN DORR, K1AR

News/Views Of On-The-Air Competition

QRZ . . . Is This Contest Over?

March's Contest Tip of the Month

Here's an oldie but goodie. It may seem like old news to the experienced contester, but before the next contest take the time to mark your amplifier and antenna tuner with its proper band settings. There are a variety of ways to do this, but most folks use a 3×5 index card or the back of a QSL and precisely mark the tuning settings on it and neatly tape the card to the front panel. One of secrets to improving your score is to speed up the time it takes to change bands. This simple trick is a great start.

If you take a quick look at a set of contest rules on the web, you should be able to answer this month's discussion topic. After all, we all know that the CQ WW Contests end at 0000Z, ARRL SS at 0300Z, ARRL Field Day at 1800Z (unless you're one of those crazy groups that begins setting up at the beginning of the contest), and so on. However, in recent years with the focus on copying callsigns accurately, it seems reasonable that more of us are looking for the competitive edge that makes our "perfect" logs even more so. This desire for perfection has spawned some interesting post-contest activity that, for some, has become a contest in and of itself.

When do contests really end? Has a contest run its course when we power down our stations on Sunday evening? Many will argue that the contest is not really over until we actually submit our log by hitting the send button from our e-mail client. Although there are many views on this subject, they generally fall into two categories:

Position I: The contest ends with the last QSO. The log may only be modified to remove duplicates and identify unclaimed multipliers.

Position II: Although the "physical" time has expired for the contest, other methods may be employed to "sanitize" the log prior to submission.

Many of the contesters I've spoken to recently agree that the Position I crowd has a very declining group of supporters. This will be substantiated further by the input I expect to receive from this year's CQ Contest Survey (see my closing remarks) to be run next month. Over the past few weeks I've been assembling a collection of techniques that contesters use when choosing the second scenario. If you haven't thought about this issue in great depth, I guarantee you will now. What follows are just a few examples of these techniques:

• Electronically record the entire contest and correct incorrectly copied callsigns/exchanges.

• Manually scan through an entire log and remove/correct incorrectly copied callsigns/exchanges.

• Compare your log to another and remove/correct potential errors (note that this can easily be accomplished electronically).

• Compare your log to a computerized "master database" derived from other contests to remove/correct potential errors (either during or after the contest).

• Utilize the readily available on-line callbook servers to remove impossible callsign combinations.

When studying this topic, I uncovered more questions in my mind than answers. For example, if you utilize some of these techniques, how should you use the new information? Is it fair to eliminate QSOs that retain high error

2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

Calendar of Events

Feb. 22-24	**CQ WW 160 M SSB Contest**
Feb. 23-24	REF SSB Contest
Feb. 23-24	North Carolina QSO Party
Mar. 2-3	ARRL SSB DX Contest
Mar. 10	Wisconsin QSO Party
Mar. 10	North American RTTY Sprint
Mar. 10	UBA Spring CW Contest
Mar. 10-11	Wisconsin QSO Party
Mar. 16-17	Alaska QSO Party
Mar. 16-17	Russian DX Contest
Mar. 16-18	BARTG Spring RTTY Contest
Mar. 16-18	Virginia QSO Party
Mar. 22-24	Oklahoma QSO Party
Mar. 30-31	**CQ WW WPX SSB Contest**
Apr. 6-7	MARAC County Hunters SSB
Apr. 6-7	SP DX Contest
Apr. 6-7	EA RTTY Contest
Apr. 14	UBA Spring SSB Contest
Apr. 20	Holyland DX Contest
Apr. 20-21	YU DX Contest
Apr. 20-21	Michigan QSO Party
Apr. 20-21	Ontario QSO Party
Apr. 27-28	Helvetia Contest
Apr. 27-28	Florida QSO Party
May 25-26	**CQ WW WPX CW Contest**

potential? More important, is it even ethical to correct identified errors and take credit for QSOs that were invalid as originally logged?

Now that virtually every ham has access to e-mail, I'm beginning to see an even more disturbing trend by some operators. In one week alone I received two separate requests from contesters asking me to verify whether or not I had actually worked them in a contest on a specific band at a specific time. When one uses this tactic, you have to wonder where it will stop. For example, should I publish a website of my CQ WW log and ask visitors to cross-check my log by scanning a form on-line for their callsign? Should I send an e-mail to an automatically generated list that asks for some form of post-contest verification?

I believe that contest sponsors have just begun to see one of the examples of the downside of today's competitive contesting. Any measure of enforcing guidelines becomes quickly impossible to administer. Can you imagine disqualifying someone's log for being too accurate? The resolution to this debate must remain with the individual contributor. It persists as a personal standard you wrestle with as you weigh your "real-time" operating ability against the pressures of winning. The bottom line, however, is that the contest ends at the end—period. It's simply not right to massage your log after the fact, especially when you are on a campaign to correct unknown callsigns and questionable QSOs.

With the advent of nearly 100% computerization (actually, nearly 90% in this past year's CQ WW), the time may finally be here to require log submissions within 24–48 hours of the end of a contest. What do you think?

PI4COM in ruins after vandals destroyed nearly the 15 years of work that had resulted in one of the finest contest stations in Europe. (Thanks to <www.contesting.com> and W4AN)

Help Needed for PI4COM

(Source: <www.contesting.com>)

PI4COM is located 20 miles south of Rotterdam in the Netherlands. It is a real nice contest location along the river Rhein, just few miles from the ocean.

On Saturday of the CQ WW CW Contest PA3EWP wanted to participate on 10 meters with his own call, so he fired up the station and did some operating during the day. After he left, the PI4COM shack was broken into with all of the valuables stolen by unknown suspects. After they finished their robbery, they set fire to the operating and sleep/storage shacks of the station, burning the building to the ground. The PI4COM group had no insurance, as the setup was remote, making coverage nearly impossible for them to obtain. Some of the team members found out about the fire on the local news, when during the interview with the fire chief, the antennas were spotted in the background.

Although the team worked hard for the last 14 years to get their station to a world-class level, they lost everything but the antennas. The guys were smart enough to remove transceivers and amps from the remote location, but they still lost the housing (mobile trailers) and all the accessories, such as rotor controllers, coax bandpass filters, computers and monitors, cabling, etc.

As you might expect, plans to put it all back up are in the works. The PI4CC team offered their help with cash and manpower as well. As contesters, I would like to call for you to pitch in and help the PI4COM crew rebuild their station by sending the team a monetary donation. Thanks to the efforts of Matt Strelow, KC1XX, and his operating team, an account on <www.paypal.com> has been opened, as well as a local bank account. If you are interested, please e-mail your donation on <paypal.com> using <kc1xx@rcn.com> as the recipient e-mail address. If you prefer, you can send a check to: PI4COM Fund, 814 Hurricane Hill Road, Mason, NH 03048. Please be sure to include your callsign and thanks in advance.

The members of PI4COM: PA3EWP, PA7FM, PA5ET, PA3DZN, PA3BWD, PBØAIU, PA1ZX, PA3FQA, PA5AT.

Final Comments

Well, that's all the space and time I have for this month. Next month I'll be running the 2002 CQ Contest Survey. We'll be sure to cover this month's topic, among other issues. I hope you take the time to respond. 73, John, K1AR

Awards

BY TED MELINOSKY, K1BV

News Of Certificate And Award Collecting

Generating Interest in Your Awards Program

Many clubs create an interesting awards program, then wonder why it languishes with hardly any applications received. First, the award must be interesting and relevant. Second, keep the award fees low enough to cover only the bare expenses (there's no money in awards, really). Finally, realize that you are in direct competition with several thousand other clubs and groups who are promoting their awards. The problem of generating interest is similar to that of all businesses; the answer is to create a good advertising program and related publicity events. However, unlike profit-making businesses, clubs don't have an advertising budget! Here are some tips that won't cost anything, yet may generate interest in your group and its program:

1. Publicize activity days in advance. If your award requires working members, make it easy for others to contact them by holding an on-the-air event.

2. Hand out labels or stickers that summarize award rules at club meetings. Stick them on outgoing QSL cards and allow them to carry the message all over the world.

3. Use your internet site to feature the award, and include an image of the certificate, provide member lists, and even list those who have already earned the award. Internet publishing is extremely inexpensive, and most clubs have a site and talented members who know how to do this.

4. Send free samples of the award to ham magazines, both local as well as foreign. There is substantial interest in awards hunting in England, Germany, and Japan, for example.

5. Sponsor contests that support making contacts required for your award.

One or more of these suggestions may be just what is needed to spark renewed interest in your program.

de June Sim, VK4SJ
USA-CA All Counties #1034

The following is from June, VK4SJ, who spent many nights on the air working toward All Counties #1034.

65 Glebe Road, Spofford, NH 03462-4411
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Honor Roll

500		2000	
I7PXV	3175	HAØDU	1224
W2WX	3176	WU9F	1225
JA2FUA	3177	N2KX	1226
1000		**2500**	
WU9F	1586	HAØDU	1146
JA2AJA	1587	WU9F	1147
1500		**3000**	
HAØDU	1324	WU9F	1056
WU9F	1325	DL9YC	1057
N2KX	1326		

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.

I first became interested in county hunting around 1996, when several other VK's invited me to join them in the quest to work all 3076 counties in the U.S. We started on 14250 kHz, then moved to 14255, and later to 14336, where I joined in on the Mobile County Hunters Net.

On quite a few occasions I almost gave up the whole idea, as it meant for us "down under" to start working mobiles around 10 PM, as the mobile hit the road in your U.S. mornings. Some nights I would be working well into the small hours of the morning chasing these elusive counties. Being a housewife first and a YL operator second, this meant there were many nights when I was just about falling into bed as my husband Doug, VK4BP, was rising. Needless to say, it is quite a few years now since I have prepared breakfast for him. I guess I am very lucky to have such an easy going and tolerant OM who has given me all the encouragement I needed to go on when the new counties were so hard to come by and the going got tough.

In 1996 we traveled throughout the U.S., and among the many amateurs we met we were delighted to meet and stay overnight with Jay, K6RLS, and his delightful XYL, Dixie. Jay was my first, and very capable, QSL manager for the MRCs and QSL cards. We were devastated when Jay became a Silent Key. We will never forget you, Jay. The QSL duties were taken up by Bob, KC6AWX, and he has been a tower of strength for me and other VK's in the group. Thank you, Bob.

USA-CA Special Honor Roll

Terry Bachman, WU9F
USA-CA All Counties #1036
December 13, 2001

Several months ago Doug and I had the pleasure of Bob's company for several days. It was an added pleasure to welcome him, as well as Eldon, N8STF, earlier in the year when he made his trip "down under."

Thanks also must go to the very dedicated bunch of mobile operators, both big rigs and the many private operators who over the years have gone out of their way to get counties for us. Some have driven great distances and at considerable expense to get difficult and last counties. Your efforts have not gone unnoticed, I assure you.

Our one big disadvantage in county hunting is the "short window" openings we usually have to VK land. This window is usually only good for a couple of hours, between 1200Z and 1500Z, or 10 PM to 1 AM in the morning here in this part of VK land.

Seasons also play a big part in propagation, and quite often we now suffer from QRM from commercial stations and unlicensed clandestine operations from Southeast Asia. For these reasons we are never able to QSY to 40 meters when the mobile operators go to that frequency, so the majority of contacts are limited to 20 meters on 14336.

In closing, many, many thanks to all who were so helpful. —*June, VK4SJ*

Awards Available

World Lighthouse Award. Lighthouses have always held a fascination for people. In recent years a series of amateur radio awards have been developed for working stations located on or near lighthouses.

The World Lighthouse Award Program was created by several French amateurs who have carefully crafted the rules for the excellent program outlined below and on their website. Since most lighthouses are now automated and contain expensive equipment, the rules permit amateur operations from a nearby location, but not from shipboard. Other requirements are that the lighthouse emit a strong enough light to be visible for a minimum of 10 nautical miles or be at least 15 meters in height.

Note the web address shown below, which contains full details of the award,

The World Lighthouse Award created by F5SKJ and F5OGG for working lighthouses around the world.

The EARS Presidential Award is issued to amateurs who work stations in the U.S. located in counties that have the same name as the last name of one of the U.S. presidents.

a list of all valid locations, and even a list of those who have earned the certificate. (This is an excellent example of a group doing it the right way.) The U.S. checkpoint for the award is the well-known county and island hunter Don Chamberlain, W9DC, whose website is featured in the URL of the Month at the end of this column.

The World Lighthouse Award was created by F5SKJ and F5OGG for working lighthouses around the world after 1 July 1997 (SWL okay). An official lighthouse list is available from the sponsor or online at their website. It lists reference numbers starting at LH001. The award may be earned for mixed, phone, or CW. Award categories sponsored are:

On the HF bands:

WLH50—50 lighthouses of the world on CW.

WLH50—50 lighthouses of the world on SSB.

WLH50—lighthouses of the world mixed mode.

(A series of continental lighthouse awards are in preparation and will be announced later.—ed.)

On 6 meters, VHF and UHF bands:

WLH15—15 lighthouses of the world mixed mode.

Endorsements: Available for each ten additional lighthouses on HF and each five new ones on VHF. Endorsements must be requested between 1 January and 31 March annually.

Contacts with /MM stations near lighthouses do not count. No use of relays, satellites, or packet radio. All contacts for the award must have been made from the same geographical region/DX country. Honor roll level is available for contacting 70% of all lighthouses activated since 1 July 1997. SWL okay.

Fee of $US10, 50FF, or 10 IRCs (endorsement stickers $US2, 10FF, or 2 IRCs) should be sent to: Guy Maillard, F6DGT, 27 Avenue Chanzy, F-44000 Nantes, France (<http://wlh.free.fr/>; e-mail: <f5ogg@worldonline. fr>).

U.S. EARS Presidential Award. County hunters may be aware of how many counties are named for U.S. presidents, but most others won't realize that at present there are 261 of them. This award honors the memory of these many presidents who were honored by their countrymen as pioneer areas of the U.S. were being settled and named It is sponsored by the Eastern Amateur Radio Society (EARS) for amateurs who work various stations in the U.S. that are located in counties that have the same name as the last name of one of the U.S. presidents.

The award has a basic level equal to the current number of presidents of the U.S. (43), George W. Bush being the 43rd. The basic award level will always be the number of past and current presidents as of the previous inauguration day. Applications postmarked prior to inauguration day will not require the higher count of presidents. Endorsements may be earned at levels of 100, 200, and the maximum currently avail-

able, 261. Special endorsements for bands or modes are available on request. All bands and modes, including repeaters, are okay; no date restrictions; e-QSLs accepted.

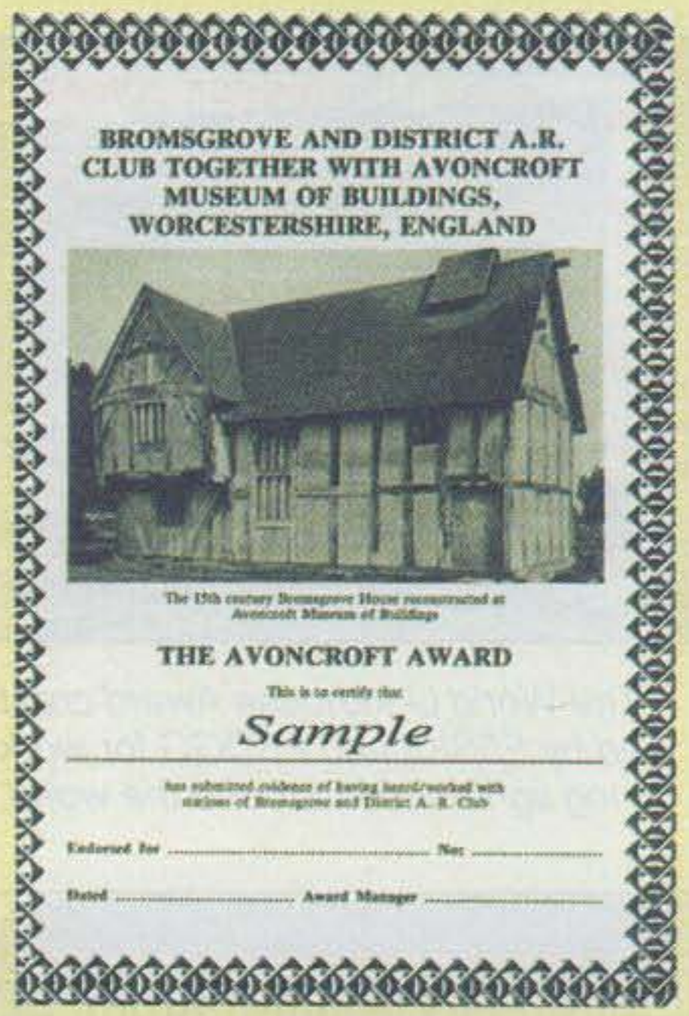
The application is available from the Presidential Counties Award Page at <http://www.qsl.net/ke4vyd>, or it may be obtained from the sponsor for an SASE. Send application and fee of $US4 for basic award; endorsement fee $US2 to: Eastern Amateur Radio Society, 144 Allen Douglas Drive, Richmond, KY 40475. *(Tks KE4VYD—ed.)*

England's Avoncroft Award. A 15th century home is featured on the Avoncroft Award. This is a good example of a club which uses a local historical motif as the centerpiece of their award.

Contact Bromsgrove and District club stations (5 points each), Bromsgrove and District club members (3 points each), or any amateurs in Worcestershire (1 point each). SWL okay; no date limits; no repeater QSOs. QSOs must be made from the same address, and cards may be requested at the option of the sponsor. UK stations need 20 points; Europeans 15; and all others 10. Send GCR list and £1.5, $3US, or 7 IRCs to John Burford, G4OAZ, 26 Shrubbery Road, Bromsgrove, Worcs, England B61 7BH.

British Postcodes Award. The British Civil Service ARS, many of the members of which are postal employees, sponsors this award for contacting stations in British postcode areas. England is credited with the invention of the postage stamp that dates back to 1840, and an example of this stamp is shown on the certificate alongside a stamp of 150 years later. This award was established during the 150th anniversary of the issue of the world's first adhesive postage stamp, the Penny Black, by the British Post Office.

Work United Kingdom postcode areas on or after 6 May 1990. The award is issued in three classes: Gold (all 120 postcode areas), Silver (100 areas), and Bronze (75 areas). A QSO with a Civil Service ARS HQ station (G1CSR, G3CSR, GBØCSR, GX1CSR, or GX3CSR) may be used as a substitute for *one* unworked postcode area. All modes and bands may be used, but the award may only be endorsed for a single mode. SWL okay. The application form and map of the postcode areas are available for an SASE/IRC sent to the sponsor. Apply with GCR list to:


BROMSGROVE AND DISTRICT A.R. CLUB TOGETHER WITH AVONCROFT MUSEUM OF BUILDINGS, WORCESTERSHIRE, ENGLAND

The 15th century Bromsgrove House reconstructed at Avoncroft Museum of Buildings

THE AVONCROFT AWARD

This is to certify that

Sample

has submitted evidence of having based/worked with stations of Bromsgrove and District A. R. Club

Endorsed for ..... Nos .....

Dated ..... Award Manager .....

Earn the Avoncroft Award by contacting Bromsgrove and District club stations and members, or any amateurs in Worcestershire, England.


the British postcodes award

1840 1990

This is to certify that ..... has satisfied the Committee of the Civil Service Amateur Radio Society in the City of Westminster that on or after the Sixth day of May 1990, being the 150th anniversary of the issue by the United Kingdom Post Office of the Penny Black, the World's First Adhesive Postage Stamp, the said ..... has established two-way communications with radio amateurs in ..... of the Postcode Areas of the United Kingdom and has qualified for the British Postcodes ..... Award in the ..... category

Certificate No. ..... Dated this day of .....

Chairman ..... Secretary

The British Postcodes Award is issued in three classes for working United Kingdom postcode areas.

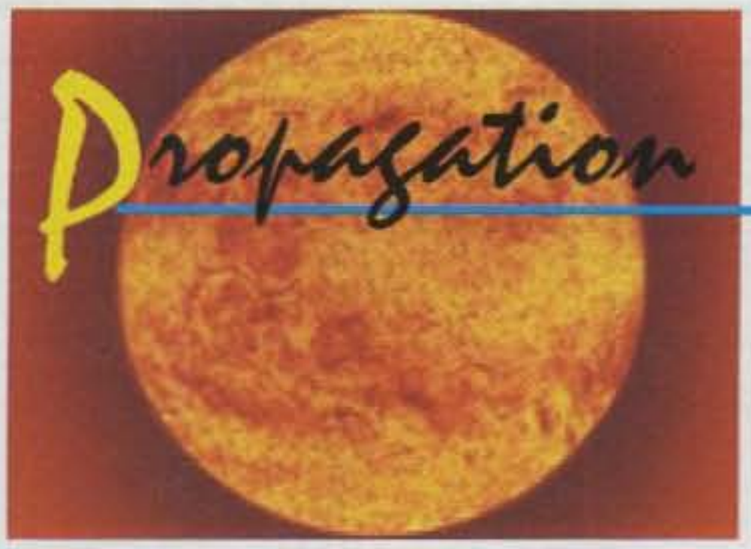
CSARS, Civil Service Recreation Centre, 1 Chadwick St., Westminster, London, England SW1P 2EP.

URL of the Month

Don Chamberlain, W9DC, has an excellent website dealing with his interest in island and lighthouse awards and contacts. A list of all of the available island awards may be found at <http://www.w9dc.com/island.htm>. The current mailing address is shown for those who are not on the internet; for the others just use Don's page and its links to check out two dozen of them.

Looking for free publicity for your award? Look no farther. Send a sample of the certificate and rules to me for usually favorable reception by readers.

73, Ted, K1BV



Propagation

BY TOMAS HOOD, NW7US

The Science Of Predicting Radio Conditions

A Surprise Turnaround

Solar Cycle 23 is full of surprises! During late fall and early winter 2001, the sunspot count jumped well above 260 with a 10.7 cm solar flux as high as 275. This was a bit of a surprise after the dip in activity at the end of 2000 and the first months of 2001. Some observers postulated that the cycle was going to be a mild one, with a quick decline. HF and 6 meter enthusiasts can testify that this cycle is alive and well, providing a number of High Normal to Above Normal days. Based on the observed "flipping" of the sun's magnetic field during 2001 and the smoothed sunspot numbers, the solar cycle maximum has already occurred. However, while not as active as the last two cycles, it looks as if we're in store for a very slow decline in solar activity. Looking at the solar cycle chart (fig. 1), you can see that Cycle 23 has peaked twice so far. I am sure that we will see many more surprises before the end of this cycle.

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly-observed mean sunspot number of 131.8, a 10.7 cm monthly-observed mean solar flux of 236.6, and an observed monthly mean *Ap* index of 8 for December 2001. The sunspot low for the month was 99, on December 19. The sunspot high of 167 occurred on December 26, 2001.

As noted last month in this column, the smoothed running sunspot number centered on April 2001 was 107.6, and centered on May 2001 was 108.7. The upward trend continued in June 2001, with 109.9. It is clear now that this trend continued through all of 2001, and will likely continue into 2002. I predict a smoothed sunspot level of about 100 and a 10.7 cm solar flux of about 159 for March 2002.

DX is Marching In

March is one of the optimal DX months. As the Spring Equinox approaches, the gray line begins to run straight north and south. With the current high average flux and the return of sunlight to the polar north, 10 through 20 meters are quickly improving. However, with summer approaching, the daytime MUFs decrease, causing the higher bands to close more quickly than the lower bands. Ten, 12, and 15 meters will continue to degrade over the next month or so, but do not neglect these higher HF bands.

Ten meters might close down more quickly than the lower bands, but it still holds a lot of activity, especially with stations in a northerly/southerly path. Through March the 10 meter band will continue to offer great DX openings, especially into Asia and Europe. These paths will gradually grow weaker as we move into April, so don't miss out.

Twelve and 15 meters will be spectacular. We will find 15 meters staying open long into the evenings. Fifteen is the band of choice as we move through the month and into April, when we occasionally will find 15 meters open all night long. Daytime paths will not degrade much until midsummer. You will see more early closures if you live closer to the North Pole.

Seventeen and 20 meters will remain in excellent shape. Both short- and long-path circuits are reliable and solid. All nighttime paths are wide open during March. Prime-time evening hours in the United States are the sunrise hours across Russia, Africa, and both the Near and Far East. Expect a lot of short- and long-path DX into these areas of the world.

Between sunset and midnight expect DX openings on all bands between 15 and 160 meters, with occasional openings on 10 and 12 when conditions are High or Above Normal. Conditions on 30, 40, 80, and 160 meters should favor openings to the east and south. These bands should peak for openings to Europe and Africa near midnight.

From midnight to sunrise expect optimum DX conditions on 30, 40, 80, and occasionally 160 meters. Conditions should favor openings toward the west and south. Some rather good 20 meter openings should also be possible toward the south and west during this time.

Daytime MUFs continue to drop and the *Ap* is on the rise, so take advantage of the current excellent conditions and work the world! This March promises to be one of the hottest months of this cycle. Look for me on the HF bands. I am often on the CW subbands looking for relaxing conversation, or you might hear me in that hot pile-up!

Marconi and Propagation

From time to time during the last 100 years since Marconi heard the first international radio signal, a challenge is made as to the validity of those first claims. It is argued that Marconi could not possibly have heard those signals due to the time of day they were transmitted and the frequency of the transmission. It is speculated that the fre-

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for March 2002

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1-3, 5-6, 12, 20, 26-30	A	A	B	C
High Normal: 8, 10-11, 14-15, 17-19, 21, 24-25	A	B	C	C-D
Low Normal: 4, 7, 9, 13, 23, 31	B	C-B	C-D	D-E
Below Normal: 22	C	C-D	D-E	E
Disturbed: 16	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 excellent (A) on March 1st through the 3rd, fair to poor (B-C) on the 4th, excellent (A) on the 5th and 6th, etc.

P.O. Box 213, Brinnon, WA 98320-0213
e-mail: <cq-prop-man@hfradio.org>

March VHF Report

By Ken Neubeck, WB2AMU

March is the worst month for sporadic-*E* activity on 6 meters. There have been some surprise openings in the past, but there has been no basis for predicting these openings or knowing why they occur. There is also minimal meteor shower activity during March.

Aurora activity, however, will most likely increase during March because of the seasonal increase in geomagnetic activity due to the favorable positioning of the Earth to the sun's active regions. March 2001 saw significant amounts of aurora activity, particularly at the end of the month after the arrival of some very intense solar flares. There probably will be some more events in March 2002, since the years following the solar peak tend to have high geomagnetic activity during the equinox periods. It is a good idea to monitor the various scientific governmental internet websites for flare alerts that can result in high *Kp* values that will result in extending the aurora down into the lower latitudes. If the *Kp* should reach 7 or higher for any three-hour time period, not only is there a good chance of aurora occurring on 6 meters, but also on 2 meters and 220 MHz. For stations in the Northern Hemisphere, remember to point your beams north toward the aurora, as it is a backscatter mode. Also, CW is the best way to go, particularly on 2 meters, since the distortion on the signals is very severe due to the aurora.

There is most likely going to be some *F2* activity on 6 meters during March, particularly if solar flux values remain fairly high (near the 200 mark). If *F2* does occur, it will most likely be in a north-south path direction such as the U.S. into the Caribbean or top part of South America. The spring of 2002 may be the last time for significant *F2* activity on 6 meters, so daily monitoring during the daylight hours is recommended for those chasing new countries on the band.

Transequatorial (TE) propagation also becomes more common this time of year on 6 meters (and sometimes on 2 meters) between stations in the most southernmost part of the U.S. (south Texas and south Florida) into Argentina. Openings typically occur during the late afternoon for stations in the TE zone. As sporadic-*E* is very rare this month, there is only a slim chance for a link up to the TE zone for the stations in the northern part of the U.S.

		2000		2001	
Month	Days	5 day average Solar Flux Value	Days of *F2*	5 days average Solar Flux Value	Days of *F2*
November	1–5	196	1	225	2
	6–10	170	3	246	3
	11–15	147	0	221	5
	16–20	169	2	193	4
	21–25	197	3	179	4
	26 – 30	194	2	199	2
December	1–5	163	3	234	5
	6–10	141	0	227	5
	11–15	166	0	220	5
	16–20	197	1	211	5
	21–25	191	2	254	4
	26–30	185	1	263	5

Table I– The data collected using 6 meter F2 *observations from WB2AMU's grid square on Long Island (FN30) and the published solar flux values that are averaged in 5-day increments.*

F2 Activity on 6 meters During Fall 2001

A number of 6 meter hams have been asking why the *F2* was much better for fall 2001 as compared to fall 2000. It seemed logical to assume that conditions during 2000 would have been good for 6 meters because it was so close to the sunspot peak, but conditions were moderate at best during that year. However, due to the double-peak configuration of this current cycle, solar flux values were considerably higher during the fall months of 2001. This can be witnessed by the following data in Table I which I collected using 6 meter *F2* observations from my grid square on Long Island (FN30) and the published solar flux values that are averaged in 5-day increments. I chose to arrange the data in 5-day increments as it is a good way to show trends.

It can be seen that for the most part the 5-day average solar flux values are significantly higher for the year 2001 compared to 2000. In fact, the solar flux during every day in December 2001 exceeded 200, whereas during the same month in 2000, there was only one day when this happened. A high value of 274.5 was reached on December 24, 2001. Overall, it appears that the cycle seems to have fared significantly better during fall 2001 as compared to fall 2000, the year that the solar peak occurred.

It also can be noted that conditions on 10 meters during fall 2001 were very good on a daily basis to the point of being routine. It was not always possible to tell that 6 meters was open strictly on the basis of 10 meter conditions, except for perhaps the general direction of the propagation which follows the path of the sun. While participating in the ARRL 10 Meter contest in December 2001, I also spotted some 6 meter openings to certain areas. Yet the conditions on 10 did not imply any exceptional conditions to these areas—i.e., super loud signal strength on signals to Europe on 10 meters when Europe was open to my area on 6 meters. Thus, it would appear that *F2* propagation on 6 is its own animal which re quires tracking of multiple indicators—beacons and TV videos, in addition to 10 meters.

quency was near or in the current AM broadcast band and that the signals were transmitted during sunlight hours. Some even have tried to model this with propagation software; they came to the conclusion that the band would have been much too noisy. The transmitted signal would have been lost in the noise.

There are two technical points I venture to present to you. First, because of the nature of the spark-gap transmissions used 100 years ago, it is quite possible that the frequencies transmitted were not confined to the AM broadcast band. It is likely that many harmonics were propagated via the *F*-layer, spread out over much of the shortwave spectrum. Could it be that Marconi heard these harmonics, which arrived by way of sky waves?

The second point is one of record. If you look at the sunspot record of that year, and especially of the month in which Marconi conducted those experiments (December 1901), you will see an observed sunspot number of zero. Yes, you read correctly—zero! The running average was a meager 3, smoothed over 12 months. With no activity on the sun, the *Ap* would have been very low, perhaps even zero. With no geomagnetic storminess and very little solar influence, combined with the fact that there was no man-made radio noise, it is easy for me to accept that signals could have been heard, even with the equipment of the day. It would be quite interesting to recreate today the conditions as optimal as those of

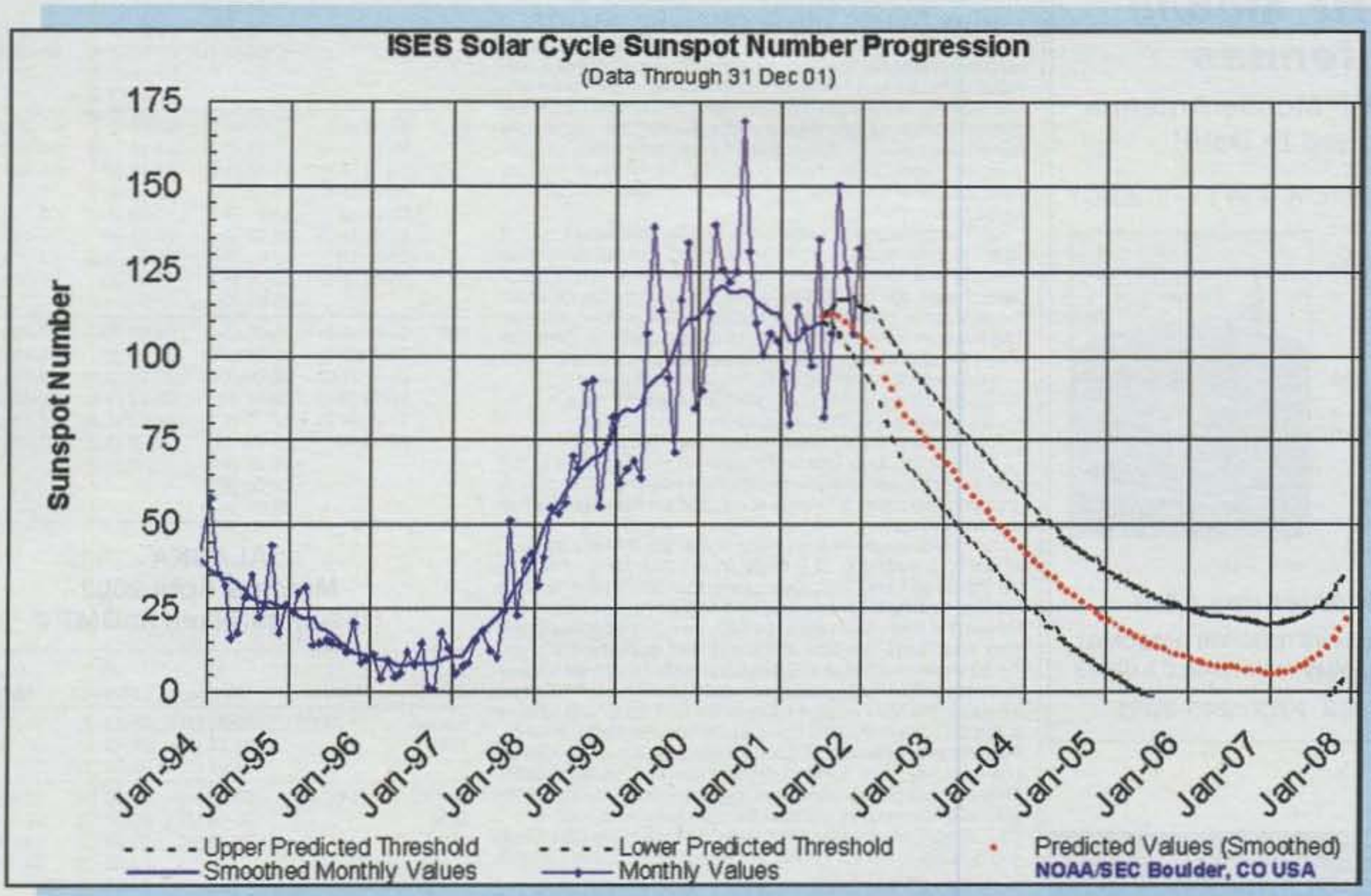


Fig. 1– The progression of solar Cycle 23. Note the double peak. Conditions during the winter of 2001, even on 6 meters, were excellent. (Graph from the NOAA/SEC Boulder, Colorado website <http://www.sec.noaa.gov/SolarCycle/sunspot.gif>)

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 80 meter openings.

2. The propagation index is the number that appears in ( ) after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of days during the month on which the opening is expected to take place, as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

3. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 AM; 13 is 1 PM, etc. On the Short-Skip Chart appropriate *standard* time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EST, on a circuit between New York and Texas, the time at the midpoint would be CST, etc. Times shown in the Hawaii Chart are in HST. To convert to standard time in other USA time zones add 2 hours in the PST zone; 3 hours in the MST zone; 4 hours in the CST zone; and 5 hours in the EST zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 14 or 2 PM in Los Angeles; 17 or 5 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *standard* time in other areas of the USA subtract 8 hours in the PST zone; 7 hours in the MST zone; 6 hours in the CST zone; and 5 hours in the EST zone. For example, at 20 GMT it is 15 or 3 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 kw PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

CQ Short-Skip Propagation Chart
March & April 2002
Band Openings Given In Local Standard Time At Path Mid-Point (24-Hour Time System)

Band (Meters)	*Distance From Transmitter (Miles)*			
	50-250	*250-750*	*750-1300*	*1300-230*
10	Nil	Nil	08-09 (0-1) 09-12 (0-2) 12-14 (0-3) 14-16 (0-2)	08-09 (1-0) 09-12 (2-1) 12-14 (3-2) 14-16 (2-3) 17-18 (1) 18-20 (0-1)
15	Nil	08-09 (1) 09-15 (0-2) 15-17 (0-1)	07-08 (0-1) 08-09 (1) 09-10 (2) 10-15 (2-4) 15-17 (1-3) 17-18 (0-2) 18-20 (0-1)	07-08 (1-0) 08-09 (1) 09-10 (2-3) 10-15 (4) 15-17 (3) 17-18 (2-3) 18-20 (1-2) 20-21 (0-1)
20	11-13 (0-1) 13-15 (0-2) 15-16 (0-1)	07-10 (0-1) 10-11 (0-2) 11-13 (1-3) 13-15 (2-4) 15-16 (1-3) 16-18 (0-3) 18-20 (0-2) 20-07 (0-1)	06-08 (1-2) 08-10 (1-3) 10-13 (3-4) 13-15 (4) 15-18 (3-4) 18-20 (2-3) 20-22 (1-2) 22-06 (1)	06-07 (2-1) 07-08 (2) 08-10 (3) 10-15 (4-3) 15-18 (4) 18-20 (3-4) 20-22 (2-3) 22-02 (1-2) 02-06 (1)
40	06-07 (1-2) 07-09 (2-3) 09-18 (3-4) 18-19 (2-3) 19-21 (1-2) 21-00 (0-1)	06-07 (2-3) 07-09 (3-4) 09-11 (4-3) 11-13 (4-2) 13-15 (4-3) 15-18 (4) 18-19 (3-4) 19-20 (2-4)	06-07 (3-2) 07-08 (4-2) 08-09 (4-1) 09-11 (3-1) 11-13 (2-1) 13-15 (3-1) 15-17 (4-2) 17-19 (4-3)	06-08 (2-1) 08-15 (1-0) 15-16 (2-0) 16-17 (2-1) 17-19 (3-2) 19-21 (4-3) 21-22 (4) 22-00 (3-4)
80	07-08 (2-3) 08-11 (3-4) 11-18 (4-3) 18-20 (3-4) 20-22 (2-3) 22-02 (1-2) 02-05 (1) 05-07 (1-2)	07-08 (3-2) 08-11 (4-1) 11-16 (3-0) 16-18 (3-2) 18-20 (4-3) 20-22 (3-4) 22-02 (2-4) 02-05 (1-2) 05-07 (2)	07-08 (2-1) 08-11 (1-0) 11-16 (0) 16-18 (2-1) 18-20 (3-2) 20-02 (4) 02-05 (2-3) 05-07 (2)	07-08 (1-0) 08-16 (0) 16-18 (1-0) 18-20 (2-1) 20-22 (4-2) 22-02 (4-3) 02-05 (3-2) 05-07 (2-1)
160	05-07 (4-2) 07-09 (3-1) 09-17 (2-0) 17-19 (3-1) 19-20 (4-2) 20-05 (4)	05-06 (2-1) 06-07 (2-0) 07-09 (1-0) 09-17 (0) 17-19 (1-0) 19-20 (2) 20-22 (4-3) 22-03 (4) 03-05 (4-3)	05-06 (1) 06-19 (0) 19-20 (2-1) 20-22 (3-2) 22-03 (4-2) 03-05 (3-2)	05-06 (1) 06-19 (0) 19-20 (1-0) 20-22 (2-1) 22-03 (2) 03-05 (2-1)

ALASKA
March & April 2002
Openings Given in GMT

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	21-23 (1)	20-21 (1) 21-23 (2) 23-01 (1)	20-23 (1) 23-02 (2) 02-05 (1)	06-13 (1) 07-12 (1)*
Central USA	21-00 (1)	20-22 (1) 22-00 (2) 00-02 (1)	20-00 (1) 00-02 (2) 02-04 (3) 04-05 (2) 05-06 (1)	07-09 (1) 09-12 (2) 12-14 (1) 08-12 (1)*
Western USA	21-01 (1)	20-22 (1) 22-00 (2) 00-02 (3) 02-03 (2) 03-04 (1)	18-21 (1) 21-00 (2) 00-03 (3) 03-05 (2) 05-07 (1)	06-08 (1) 08-09 (2) 09-12 (3) 12-13 (2) 13-15 (1) 09-10 (1)* 10-12 (2)* 12-13 (1)*

HAWAII
March & April 2002
Openings Given in Hawaiian Standard Time

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	10-12 (1) 12-14 (2) 14-15 (1)	08-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-17 (1)	07-13 (1) 13-15 (2) 15-19 (3) 19-21 (2) 21-05 (1) 05-07 (2)	18-20 (1) 20-22 (2) 22-00 (3) 00-02 (2) 02-03 (1) 20-22 (1)* 22-01 (2) 01-02 (1)*
Central USA	10-11 (1) 11-14 (2) 14-16 (1)	06-08 (1) 08-13 (2) 13-16 (3) 16-17 (2) 17-18 (1)	08-13 (1) 13-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-23 (2) 23-05 (1) 05-08 (2)	18-19 (1) 19-22 (2) 22-01 (3) 01-04 (2) 04-05 (1) 19-21 (1)* 21-02 (2)* 02-04 (1)*
Western USA	09-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-15 (4) 15-17 (3) 17-18 (2) 18-20 (1)	15-18 (4) 18-20 (3) 20-00 (2) 00-04 (1) 04-06 (2) 06-09 (4) 09-11 (3) 11-13 (2) 13-15 (3)	17-19 (1) 19-20 (2) 20-21 (3) 21-23 (4) 23-05 (3) 05-06 (2) 06-07 (1) 19-20 (1)* 20-22 (2)* 22-04 (3)* 04-05 (2)* 05-06 (1)*

**Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.*

For 12 meter openings interpolate between 10 and 15 meter openings.

For 17 meter openings interpolate between 15 and 20 meter openings.

For 30 meter openings interpolate between 40 and 20 meter openings.

Propagation charts prepared by George Jacobs, W3ASK.

1901. I am sure many top-band DXers would love to have a winter that quiet.

Blame It on the Moon

Arnie Coro, CO2KK, editor of *CQ*'s "Antennas" column, made a comment with regard to the idea that the sunlight reflected off the moon causes some ionization, improving nighttime propagation of lower frequencies in the HF spectrum. He added, "In relation to the better propagation conditions on certain frequencies during different phases of the moon, it is a fact that the ionosphere has *tides,* exactly the same as the Earth's oceans. Ionospheric tides will move the regions of higher free electron concentration up and down, effectively changing propagation conditions on certain frequencies."

Coro continues, "It would be very interesting to make more observation on our lower frequency bands . . . in order to try to learn more about the phases of the moon and propagation on those frequencies. There are two elements that could play a role in this research: (1) The vertical free electron concentration (Chapman distribution), and (2) the actual height of the *D-*, *E-*, and *F*-layers. Yet another area where amateur radio can help science learn more about the ionosphere!"

StratWarns?

I have been asked by many operators what a *StratWarn* is. NOAA posts these StratWarns in their regular "Geophysical Alert Message." A StratWarn notice occurs only during winter months.

StratWarn refers to *sudden stratospheric warmings,* which occur in the polar regions in winter, but are not equally distributed between the two hemispheres. Scientists are actively researching them and have already discovered that there is a correlation between solar cycles and StratWarns. However, does the warming of the stratosphere in such large regions have an impact on propagation of radio signals?

Some amateurs have conducted preliminary investigations, but there remains a great deal of experimentation and investigation of data before we can say one way or the other. I am interested in this phenomena and hope to dig up answers that might be of use to the amateur radio community.

Take a look at this month's Short-Skip Charts for the best times to work the openings. Get on the air and make a friend. I'm looking forward to working you on HF. Best DX!

73, Tomas, NW7US

Zero Bias

(from page 7)

eliminate the proposed expansion on 15 meters. Under the plan that the ARRL will submit to the FCC, current Novices and Technicians with code credit would be given access to all General Class CW frequencies on these bands, with a power limit of 200 watts output. The lower end of the 75-meter phone band would be extended downward from 3750 to 3725 kHz, and the 40-meter Novice segment would be cut in half, with 7125-7150 being opened up for voice use. The committee also recommended adding 25 kHz to the 15-meter phone band, but the board took that out of the plan.

On the surface, this looks like a good, workable, plan—even with the board's "tweaks." Overall, the plan seems to balance the interests of SSB and CW operators, while providing some real operating space for the remaining Novices and Techs who have passed their code tests.

We'd propose one further simplification: Give Novices and Techs with code credit *all* General Class CW and data privileges on *all* bands, and forget about the 200-watt maximum (Techs can use 1500 watts above 50 MHz, why not below? The original power limit for Novices —75 watts—outlived its usefulness long ago and was replaced with the 200-watt limit. That, too, has outlived its usefulness and should be eliminated. A Tech who can be trusted to run a moonbounce station on 432 can certainly figure out how to properly operate a kilowatt on HF.). Why not let Novices and Techs-with-code onto the CW portions of 30, 20, 17 and 12 meters? They've passed their code tests. Let 'em operate code on all bands. PSK-31 and RTTY, too. Why not? These digital modes are hot, and if our goal is to get folks excited enough to upgrade, what better incentive? The CW subbands aren't exactly overcrowded, anyway, except during a half dozen major contest weekends. They want to work phone on more than 200 kHz of 10 meters? Pass the General written exam.

One of the major reasons that "Novice Enhancement" in the 1980s didn't do much to keep the Novice license popular was that even "enhanced" Novice privileges were extremely limited at best. The "WARC bands" of 30, 17 and 12 meters were just being opened up to hams, so they weren't even considered. Now, they're major sources of HF fun. Let's open them up for CW and digital use to everyone who's passed a code test. It just makes sense.

An Apology

It appears that some parts of January's article, "What on Earth," by Phil Harman, VK6APH, were not properly credited to one of the article's primary sources, the RSGB book, *HF Antennas for All Locations*, by Les Moxon, G6XN. Mr. Moxon's book was listed in the footnotes as a source, but with no specific text references. There were several instances where the wording of VK6APH's sentences was so close to the original that Mr. Harman would have been much more honest with us and with you if he had simply quoted Mr. Moxon and given full credit to the original author. We apologize to G6XN and to our readers, and we thank K5IU for bringing this to our attention.

CQ VHF Returns

It gives me great pleasure to let you know that, as of this May, *CQ VHF* will be returning as a separate magazine. It will be a quarterly, with a somewhat higher technical level than before, and will be edited by our own "VHF Plus" editor, Joe Lynch, N6CL. I will keep my hand in as Editorial Director.

Why are we doing this? Because you, our readers, are demanding it. I haven't been to a single hamfest in the past two years without hearing a comment from several people about how much they miss *CQ VHF* and wish it was still being published. I hear that *CQ* doesn't do as good a job as *CQ VHF* of covering VHF and UHF and you're right. We try to cover *all* aspects of amateur radio here, and we can't devote the amount of space to VHF/UHF as can a magazine dedicated to the bands. But the fact is that several hundred thousand hams make their radio homes above 50 MHz, and only a separate magazine like *CQ VHF* can do an adequate job of covering the many aspects of VHF/UHF operating.

So we're going to try again.

But if the magazine is going to succeed financially, we're going to need your support. Magazine advertising generally is soft right now, and the newsstand business is a wreck. This means that we'll be making *CQ VHF* available primarily by subscription, and we'll be relying more on subscription revenue than advertising revenue to meet expenses. We believe we've come up with a workable business plan, but you are a key element. Our feedback from former readers has been incredibly positive, and now's the time to put your money where your mouth is ... if you're active on VHF, you owe it to yourself to support the new *CQ VHF*, which will again be the only major magazine devoted to "Ham Radio Above 50 MHz." Look for ads elsewhere in this issue for subscription details.

73, Rich, W2VU

Announcements *(from page 8)*

minster, BC, Canada. Contact Bob Kungl, VE7KW, 8445 11th Ave., Burnaby, BC V3N 2P5 (phone 604-524-9177; e-mail: <VE7KW @rac.ca>. (Talk-in VE7RBY 145.35–)

Mar. 16, **Charleston, WV Area Hamfest & Computer Show,** Coonskin Armory, Charleston, West Virginia. Contact Jim Damron, N8TMW, e-mail: <n8tmw@arrl.net>. (Talk-in 145.35; exams 12:30)

Mar. 16–17, **Midland, TX ARC St. Patrick's Day Hamfest,** Midland County Exhibit Building, Midland, Texas. Contact Midland ARC, P.O. Box 4401, Midland, TX 79704; or Larry Nix, N5TQU, e-mail: <oilman29@home.com>; <http://www.w5qgg.org>. (Exams 1 PM Saturday)

Mar. 16–17, **Kennehooche ARC Hamfest & Emergency Communications Expo,** Jim Miller Park (formerly Cobb County Center Park), Marietta, Georgia. Contact Mike Fisher, KG4DPF, 770-971-3610 before 9 PM EST or e-mail Bob Butler, W4RBB, <w4rbb@arrl.net>. KARC, P.O. Box 1245, Marietta, GA 30060; web: <http://qsl.asti.com/hootch/KARC-HamF.html>. (Talk-in 146.880–, PL100; exams for Tech class Boot Camp 5 PM Sat., all others 9 AM Sat.)

Mar. 17, **Toledo Mobile Radio Assn. Hamfest/Computer Fair,** Lucas County Recreation Center, Maumee, Ohio. Contact TMRA, P.O. Box 273, Toledo, OH 43697-0273 with SASE (phone 419-535-6594; <www.tmrahamradio.org>).

Mar. 17, **Two Rivers ARC Hamfest/Computer Fair,** Palace Inn, Monroeville, Pennsylvania. Contact Two Rivers ARC, P.O. Box 225, Greenock, PA 15047-0225 (e-mail: <n3lqc@attbi.com>).

Mar. 17, **Tr-County ARC Hamfest 2002,** Jefferson County Fairgrounds Activity Center, Jefferson, Wisconsin. Contact TCARC, 213 Frederick St., Fort Atkinson, WI 53538 (920-563-6381 evenings; e-mail: <tricountyarc@globaldialog.com>). (Talk-in 145.49 repeater)

Mar. 23, **Canada's HAMEX 2002,** Brampton Fall Fairgrounds, Brampton, Ontario, Canada. Contact Jason Staines, 416-878-0576, e-mail: <va3ngv@rac.ca>; or Lorne Jackson, 905-858-8574, e-mail: <ve3cxt@rac.ca>; <http://www.peelarc.org>. (Talk-in VE3PRC 146.880–, VE3MIS 145.430–; exams Basic, Advanced, and CW)

Mar. 24, **Lake County ARA Hamfest/Computerfest,** Madison High School, Madison, Ohio. Contact Lake County ARA, P.O. Box 868, Painesville, OH 44077; or Tom Brown, KB8WFD, 440-209-8553, e-mail: <tbrown@ncweb.com>. (Exams)

Mar. 30, **Brenham, TX Hamfest,** Washington County Fairgrounds, Brenham, Texas. Contact Brenham Hamfest, P.O. Box 44, Brenham, TX 77834-0044 (979-836-9417; e-mail: <angdenis@academicplanet.com> or <briang@comwerx.net>).

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

Ham Radio News *(from page 4)*

The Quarter Century Wireless Association (QCWA) wants amateurs to be able to designate a club to receive their vanity callsign "in memoriam" after their death. QCWA points out that current rules require a club to request the call after getting an okay from a family member of the deceased ham, but make no provision to effectively allow a ham to "will" his callsign to the club while still alive.

Another petition seeks greater phone and CW privileges on HF for Novices. It seeks phone privileges on 17 and 12 meters for Novices and Technicians with code credit, plus new or expanded operating privileges on 80–10 meters.

Finally, the amateur radio club at NASA's John Glenn Research Center wants the rule permitting the retransmission by hams of space shuttle communications expanded to include the International Space Station and other manned spacecraft.

Comments were due by February 7th. No word, as usual, on when or whether the FCC will act on any of the petitions.

Question Pools Shift to Four-Year Schedule

The Question Pool Committee of the National Conference of Volunteer Examiner Coordinators has decided to issue a new question pool for each amateur radio written exam element on a four-year rotation instead of the current three-year cycle. According to the *ARRL Letter*, Committee Chairman Scotty Neustadter, W4WW, said the change will let the QPC do a better job in developing syllabi and questions and will allow more opportunities for public input. Currently there is very little input from the amateur community despite repeated requests from the QPC for public participation.

The new timetable will take effect with the new Extra Class question pool (Element 4), which was released last November and takes effect July 1, 2002.

New LF Record Claimed

The new claimed long-distance record for receiving signals on 136 kHz is now 15,645 kilometers, or approximately 9700 miles. According to the *ARRL Letter,* John Currie, VE1ZJ, in Nova Scotia, Canada, was able to copy and positively identify LF signals transmitted by ZL6QH, the Quartz Hill Amateur Radio Club station near Wellington, New Zealand. A petition to permit 136 kHz operation by US amateurs is pending before the FCC.

Members Sought for US ARDF Team

The *ARRL Letter* reports that members are being recruited for the US national Amateur Radio Direction Finding (ARDF) team to compete against other national teams this September in Slovakia. There will be five categories for men and four for women, and each team may have up to three members per category. Team member selection will be based on performances in the first USA national ARDF Championships last year and in the second USA ARDF Championships upcoming in Atlanta next month.

There is a fee of $300 US per person, which includes hotel, meals, local transportation to competitions, and a "cultural program." Interested foxhunters should contact ARRL ARDF Coordinator Joe Moell, KØOV, as soon as possible at <homingin@aol.com>.

UK Foundation License Off to Good Start

The United Kingdom's new "slow code" Foundation license appears to be getting off on the right foot. *Newsline* reports that as of January 7th, 600 of the new M3 licenses had been issued, and during a Foundation License "QSO Party" starting midnight on January 1st (when the license privileges took effect), some 110 M3 stations were on the air on 80 meters working each other and a variety of DX stations. *Newsline* notes that with the UK's total of about 58,000 licensed hams, an influx of 600 new licensees is the equivalent of over 6000 new hams in the United States.

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.

Looking Ahead in CQ

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

- Results: 2001 CQ WW WPX CW Contest
- CQ WW WPX Contest All-Time Records
- "Heyday of CW at Sea, Part 2," by W6BNB
- "*CQ* Reviews: The Win-EQF Logging Program," by AAØA

Plus...

- "Softbrewing a Logbook," by KB2ZPE
- "Build an ES2B Antenna," by VE3ERP

Our Readers Say

Thanks for the Memories...

Editor, *CQ*:

I just wanted to say "thanks" for the great job on the January issue of *CQ*, which featured three articles on vintage radio. I've been in touch with Mike Bryce and urged him to continue to write about Heathkits. I hope *CQ* will also be able to publish more articles like his in the future. Maybe it's due to the "graying" of the ham demographics, but I think a lot more folks will be interested in buying *CQ* to read this kind of article than those endless pages of contest stats that you used to run ;-).

Here is a post I put on the "Old Tube Radios" mail reflector. These articles have had a lot of positive response from those like me who enjoy reliving the "golden era of ham radio":

CQ Magazine is starting to "Get it!"...

The January 2002 issue features a nice article, "Confessions of a Heathkit Collector," by Mike Bryce, WB8VGE; another by Gil McElroy, VE3PKD, "Batteryless—Ted Rogers and the Invention of the AC Vacuum Tube"; and "An OT Remembers—Starting Out with a Crystal Detector," by Bob Shrader, W6BNB.

These aren't the first articles about "our kind of radio" and I don't think they will be the last. Against the background of deregulation and the changes that have already occurred in the amateur service, it is great to see interesting articles containing radio history (and vacuum tube symbols!) in a contemporary ham magazine. Based on my experience with local "no code" hams, there is a strong desire to learn more about radio theory—and yes, even CW skills!—beyond what is required to pass the FCC license exam. Articles like *CQ* has been publishing stimulate the curiosity of these new hams who have yet to experience the fun of a crystal set, the simplicity of a "firebottle" transmitter, or the magic of building a Heathkit...

Bob Nickels, W9RAN
via e-mail

Editor, *CQ*:

I just wanted to tell you how much I am enjoying the January issue, especially the article by Mike Bryce. As a fellow collector of the "Green Stuff," I fully appreciate all he had to say. The discussion on the RigBlaster was also timely as I have been thinking about buying one.

I would love to see more articles about the old boat anchor stuff. Keep up the good work.

Gary H. Harmon, Jr., K5JWK
San Antonio, TX

Editor, *CQ*:

A very nice, interesting, and useful issue *(January—ed.)*! As a Heath collector, old timer (licensed in 1958 as Novice), but very involved in antique radio (built a Doerle Duplex twin triode regen recently), I loved the "OT Remembers" article. Only there was a problem; all the amplifier stage triangles were backwards! The convention, of course, is the point goes to output end. Now for a transistor/FET version of a twin triode regen....

Karl, WA2KBZ
Jefferson City, MO

Editor, *CQ*:

Just a quick "thank you" for the article on Heathkits by Mike Bryce. Took me back many years. Terrific!

Gilles Masson, VE2AMN
via e-mail

The following letter was sent to author Bob Shrader, W6BNB:

Bob,

Congratulations! Great article on the development of early receivers and transmitters. I like to build regen radios and crystal sets and always enjoy articles on vintage radio. Glad to see *CQ* running so many good articles on vintage radio and radio history, such as yours, and the article on the AC vacuum tube by VE3PKD.

I am also in the Santa Rosa area and wish I could find a local group that shares my interest in old radios and history.

Rich, W3HWJ
via e-mail

Thanks, but No Thanks...

Editor, *CQ*:

Well another trip down Antique Lane (January issue, p. 22)! Endless pictures about CW paddles in other issues and of course (p. 11) the boat anchors. Getting hard to justify $7.00 (Canadian) for your magazine. What happened to the technology part? How about some articles on microwave bands, how to build, etc.? We are in danger of losing these frequencies, if not used, to commercial interests. How about a feature on U.S. band limits? So many operating out of band these days. U.S. stations on SSB trying to work DX on 7.055 and below the 20 meter edge. Maybe a reminder would be helpful.

Dennis Furnell, VA7FU

Dennis – Well, you've just given them a reminder and I hope it will be helpful. As you can see from other letters, nostalgia articles are very popular right now. You should realize, though, that our December and January issues were nostalgia specials. We do have more this month, but we balance it with cutting-edge research on 160 meter propagation, the latest in LED technology, and a look at using the internet to link repeaters worldwide. As for microwave articles, you may be happy to note the return of CQ VHF *magazine this spring, with a higher technical level than before.*

How To Work It...

Editor, *CQ*:

This is a quick note to thank you for your recent review of the RIGblaster in *CQ* magazine. While it was a product review, it also was the most concise explanation of how to listen to PSK31 that I've ever read. I'm now monitoring PSK and looking forward to transmitting as soon as I get an interface such as the RIGblaster.

By the way, a number of folks on the internet attempted to help me set up PSK on my OMNI V without an interface. Some people use VOX to key the transmitter, but I'll be darned if I can make that work, especially since you have to adjust the VOX every time you go back to SSB, etc. That's been waaaay too confusing to me. Hi. I think an interface to my Kenwood TS570 will be the way I go.

Again, thanks for the article.

Rick, WO8L
Pfafftown, NC

Rick – You've tapped into one of my pet peeves in amateur radio ... describing the technical operation of something new without getting into operation. I try to make sure we always tell readers "how to work it" as well as "how it works."

Limit Contesting Frequencies

Editor, *CQ*:

I operate QRP CW with the exception of keeping an occasional sked on SSB. This is what I like to do. When contesters have their big events like CQ WW and ARRL SS, etc., I'm out of luck, because I'm not in it for the contesting.

Contesters don`t care if you are using the frequency, only that they can dominate the frequency, keeping other contesters from assuming control. Regular hams are out of luck.

I have nothing against contesting, but how about you guys making part of your rules that there must be sections of the band that are *not* allowed to be used in the contest? This would certainly help mitigate the complaints you guys get from regular hams, and more important it would be unselfish to the point of being downright fair, and even considerate (important values in a post Sept. 11 America, don`t you think?).

Dennis Powers, AB6QR
Forest Ranch, CA

Code and the ITU

Editor, *CQ*:

I have to agree with the Russians when it comes to retaining the testing for Morse code to obtain an amateur radio license. I see this as another way to dumb down the American amateur radio operator. I also think it should be left up to the individual country. In addition to this if the existing amateurs in that country want to keep that as part of their communications mode, then so be it.

Leo Casey, K8HZK
via e-mail

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- Convenient Icon Display Mode
- Smart Search™ Automatic Memory Loading
- Automatic Repeater Shift
- Auto-Range Transponder System (ARTS™)
- Multiple Battery Savers
- Time-Out Timer (TOT)
- Busy Channel Lock Out (BCLO)
- Versatile High-Speed Scanning
- 16-Digit 9-Memory DTMF Autodialer
- One-Touch Emergency Channel
- ADMS Windows™ PC Programmable
- Innovative Multi-Section Antenna
- Full Line of Accessories

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New IC-V8000

75W
OUTPUT POWER!

Power when you need it!

75 Watts of output power! With ICOM's new IC-V8000 you can reach that mountain top, punch through that urban canyon - talk and be heard further! The combination of the 'V8000's one piece die-cast aluminum chassis and 75W of transmit power gives you the most powerful 2M moble in its class. But that's not all. We've added features like: Weather Alert and Weather Channel Scan (first time in an amateur radio); 207 Alphanumeric Memory Channels; Remote Control Mic; ICOM's exclusive DMS Scan System (see below); and much more. Pick up a 'V8000 and let your signal be heard! Coming soon to your authorized ICOM dealer.

IC-U8000. Power to punch through.

2M • 75W • Weather Alert • CTCSS/DTCS • FM Narrow Mode • 207 Alphanumeric Memory Channels • Remote Control Mic • Dynamic Memory Scan • DTMF Encode • 10dB Squelch Attenuator • Priority Watch • Versatile Cloning • Front Firing Speaker • Rugged Construction

IC-U8000 Features

- **75W OF OUTPUT POWER.** The most powerful 2M mobile in its class. Your signal will get through!
- **WEATHER ALERT SCAN.** A first for amateur radio! The weather alert function keeps you informed of any weather emergencies, so you can respond fast.
- **CTCSS AND DTCS OPERATION STANDARD.** Get onto the repeater fast! 104x2 DTCS and 50 CTCSS codes gain you quick repeater access and eliminate unrelated chatter. With pocket beep and tone scan.
- **207 MEMORY CHANNELS.** A total of 207 alphanumeric memory channels including 1 call channel and 6 scan edges. Each memory channel stores 6 character name, tone frequency, skip info, and more.
- **HM-133V REMOTE CONTROL MICROPHONE.** Control everything from the palm of your hand! ICOM's exclusive "Hot Keys" lets you program the features that you use the most. Bigger backlit keys allow you to operate in low light conditions.
- **DYNAMIC MEMORY SCAN (DMS).** ICOM's exclusive DMS system gives you flexibility to customize and manage the V8000's memory banks like no other 2M mobile ever offered.
- **DTMF ENCODE AND OPTIONAL PAGER FUNCTION.** 10 DTMF memory channels with up to 24 digit DTMF codes can be used to control other equipment. Optional UT-108 DTMF decoder provides code squelch and pager functions.
- **VERSATILE CLONING.** Clone from transceiver to transceiver or PC to transceiver.
- **FRONT FIRING SPEAKER.** Front mounted speaker provides crisp, clear audio when on the move.

SELECTABLE GREEN OR AMBER DISPLAY

RUGGED CONSTRUCTION. The one piece die-cast aluminum chassis ensures reliable operation against shock and vibrations. A large cooling fan on the back and large cooling fins keeps the internal components cool and allows you to operate in even the harshest environments.

Setting a new standard

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