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CQ Amateur Radio

NOVEMBER 1999 VOL. 55, NO. 11

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ON THE COVER: Just what exactly is Dick Pechie, KB1H, doing in this photo? He's checking the phasing lines and Comtek switch box for the 80 meter four-square array at his E. Killingly, Connecticut QTH. First licensed at age 16, Dick's station serves as the regular operating spot for the relatively new "Barnstormers" contesting group, which usually runs multi-op in major contests such as the CQ WW and ARRL DX. The modest three-station multi-multi consists of four towers each running a stack on a band: 40 meter 3-el KLM and 2-el Mosley pointed south; 20 meter 5 over 4 over 4; 15 meter 5 over 5 with a 4-el fixed south; and 10 meter 5 over 5 over 5 with a 4-el fixed south. As a member of the YCCC, Dick also operates a Packet Cluster node (KB1H) in the New England Network. In real life, Dick is an Electrical Engineer and precision-gauge salesman. Look for him and the Barnstormers later this month in the CQ WW DX CW Contest. (Photo by Larry Mulvehill, WB2ZPI)

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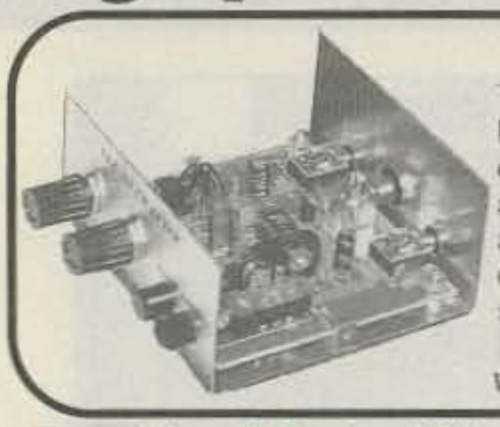

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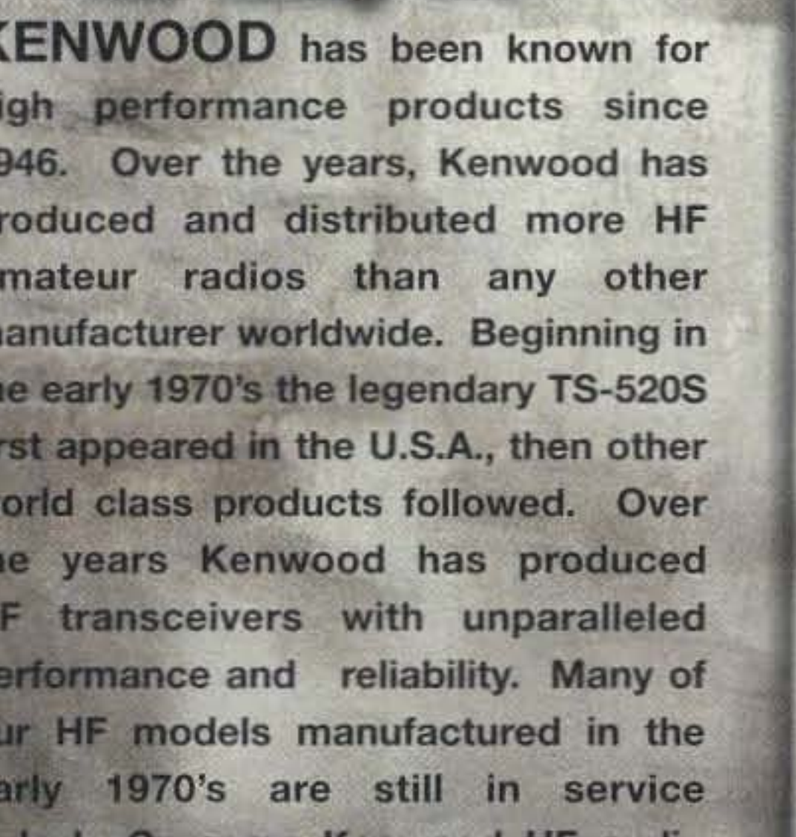

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Zero Bias

An Editorial

As promised in this space last month, we take this opportunity to introduce the new Editor of *CQ*. Effective with this November 1999 issue, Rich Moseson, W2VU, is the eleventh person in the history of *CQ* magazine to bear the title of Editor.

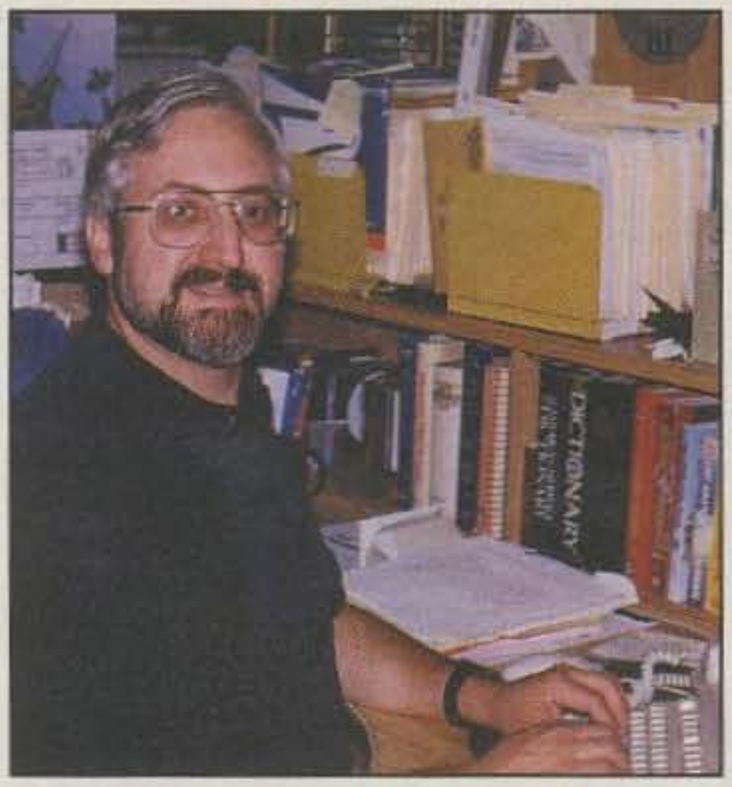
Those of you who pay attention to such details will recognize Rich from a variety of other notable projects he's successfully undertaken in his 7 1/2 years with CQ Communications. Rich wrote, produced, and directed CQ's award-winning series of amateur radio videos a few years ago, followed by his creation of the highly acclaimed 50th anniversary issue of *CQ* in 1995. Having wrapped up that monumental project, he then brought our company into the Internet age by creating our very popular web sites, one for each of our magazines. As with all web sites, ours are "works in progress," as they are continually improved, refined, and broadened to meet the growing needs of our readership. Not content with just those endeavors, Rich then turned his attention to another project four years ago—the launch of one of our newer publications, *CQ VHF*.

Now W2VU embarks on still another journey, this time as Editor of *CQ*. He brings a unique perspective to our magazine, the perspective of youth. At first we didn't believe him when he observed the other day that he is the first editor of *CQ* who is younger than the magazine itself. Is that possible? Some careful thought revealed that he is absolutely correct. Rich is 44 years of age; *CQ* will be 55 years old with the January 2000 issue. What is the significance of that age differential? Only time will tell, but I suspect that having his entire professional career evolve in tandem with the digital revolution may provide a clue to the future.

So after fulfilling the role of editorial writer for the last two months following the death of our friend and colleague K2EEK, I gratefully turn over this page to Rich Moseson, W2VU, the new Editor of *CQ*. —*K2MGA*

Hello. It is an honor and a privilege to have been asked to take over the editorship of *CQ*. At the same time, all of us here continue to mourn the loss of our friend and colleague, Alan Dorhoffer, K2EEK, whose words and unique insights occupied this page for nearly a quarter century. We all miss him.

So who is this W2VU guy and what makes him qualified to be Editor of *CQ*? Well, I've been a ham and a journalist for nearly 30 years. My high school radio club sparked my interest in both. As a journalist, before joining CQ Communications in 1992, I worked



Rich Moseson, W2VU.

in radio news and sports on the local and network levels, as a writer and editor for the Associated Press and as a writer and producer for CBS News.

On the amateur radio side, I was first licensed as a Novice (WN2QQN) in 1970, and slowly (*very* slowly) clawed my way up to Extra by 1987. Eight years as a Technician, back when all Techs had to know code but had no HF privileges, gave me a lifelong love of VHF operating. However, that hasn't dampened the thrill of getting on, say, 17 meters to check out a new antenna and having someone half a world away respond to my CQ.

On the air I'm a dabbler. I like to try a little bit of everything. On HF my favorite bands are 17 and 10 meters; on VHF it's a toss-up between 6 and 2. I work mostly phone, but again, I try to do a little of everything. As a result, I know a little bit about a lot of things—and a whole lot about nothing!

Now, what about *CQ*? What radical changes do I have planned for *your* favorite magazine? None. Sure, there will be some changes, as any magazine needs to change periodically to stay fresh, and there is always room for improvement. But I don't anticipate anything earth-shattering or immediate. I have inherited the stewardship of an essentially excellent magazine, and the rest of *CQ*'s staff remains the same. Managing Editor Gail Schieber, KC2DHK, who has performed the monthly miracle of transforming a stack of articles into a magazine for 20 years, will continue to do what she does so well. Our staff of contributing editors is unchanged, as are all the behind-the-scenes folks in the advertising, art, and production departments.

At the beginning of this transition process, our publisher, K2MGA, asked me to draw up a "mission statement" for what I thought *CQ* ought to be doing and where it ought to be heading as we approach the 21st century. I never did that, because this magazine's founders did a perfectly fine job of that in the very first issue of *CQ*, in January 1945. Their mission statement, taken from the magazine's first editorial, is as follows:

> This, then, is the *raison d'etre* for *CQ*—a magazine for the radio amateur, with a particular invitation to the newcomer. It should not, however, be inferred that we shall confine ourselves to the ABC's of ham radio. We visualize *CQ* as a magazine that will stick with the ham long after the parts of his first rig are dust-laden in the junk-box, and as a monthly refresher course for the old timer. While placing some emphasis on the elementary, we are still under obligation to carry through with articles on modern techniques and apparatus. Similarly, we shall follow up tradition (with which every ham must be familiar) with all the vital news of amateur radio today and tomorrow.
>
> In radio transmissions, the letters "CQ" have somewhat different meanings in the commercial and amateur fields. With commercial wireless, "CQ" is the nature of a general call announcing a broadcast. In ham radio, it is most often a friendly invitation to get together and rag-chew. As a publication, *CQ* will similarly play a dual role—in the broadcast sense as a disseminator of what one should know to make the most out of ham radio, and in the less formal character as your own magazine, welcoming criticism as well as bouquets, and, above all, the cordial exchange of ideas that is so vital a part of ham radio on the air.

This mission statement is as sound today as it was 55 years ago. Our challenge—now, as always—is to follow it.

FCC license restructuring (whenever it's announced and whatever the specifics) is almost certain to bring many newcomers to the HF bands, exploring the wonderful world of DXing and contesting. *CQ*, with its strong tradition of promoting both of those activities, will be in a unique position to welcome those new HF operators, give them a tour, and show them how to do things the right way, the first time. In other words, we need to extend the "particular invitation to the newcomer" that our founders felt was important as well. In addition, we need to share with all of our readers the wide variety of activities that make up the whole of amateur radio: HF and VHF, CW and phone, digital and visual, and the list goes on. With your help—and we'll need your help in the form of articles about all aspects of our incredibly diverse hobby—*CQ* in the 21st century will be even better than it's been in the 20th! —*73, Rich, W2VU*

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(80 M with optional add-on)
HEIGHT
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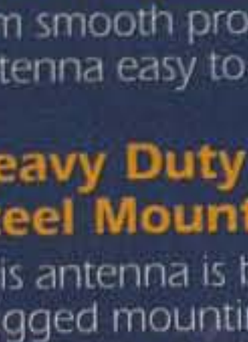
R6000 SPECIFICATIONS

FREQUENCY
6, 10, 12, 15, 17, 20 M
HEIGHT
R6000 - 19 feet (5.8 M)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Announcements

Military Mail – Mail from all over the nation is sent to Friends of Our Troops headquarters (P.O. Box 65408, Fayetteville, NC 28306-5408; send SASE for info)), where it is sorted and forwarded to military men and women at home and abroad. With almost 35 years of service, those interested can check the program at <http://www.militarymail.org/leaders.htm> and <http://www.militarymail.org/album.htm>.

ZK1AX – All amateur radio operators are invited to attend the 25th anniversary celebration of the Royal Cook Island ARS on November 4. First meeting at the Tangaroa Restaurant, Back Road, Tutakimoa, Cook Islands, visitors are welcome to attend, with free club membership and use of all club facilities at ZK1AX, including Telrex HF Yagi and stacked 7-element wide-spaced Long John Yagis at 120 ft. for 6 meters. Free dormatory-style accommodations for visiting overseas amateurs. For details contact John Abbott, ZK1AX/VK4SKY, fax 0015-682-20964, or check into the Pacific Inter Island Net daily at 0800Z on 14.315.00 for more info.

•The following Special Events are scheduled for November:

W4NC, from Sesquicentennial of city of Winston and county of Forsyth; Winston-Salem, NC; Forsyth ARC; 1300–2100Z Nov. 6; lower portion of General bands, SSB and CW. For certificate send SASE to Rick Cochran, WØ8L, 121 Warbler Rd., Pfafftown, NC 27040.

N5VA, from Veteran's Day commemorative event, Veteran's Medical Center, Albuquerque, NM; AARC and N5VA; 1600–0400Z Nov. 11; on 14.287, 21.325, 18.130, and 7.245 MHz ±QRM. For 9 × 11 certificate send large SASE to VA Medical Center, 1501 San Pedro Dr. SE #117D, Albuquerque, NM 87108.

W5CRC, from celebration of return of the Snowbirds to south Texas; CHARRO Radio Club; 1500–2300Z Nov. 11; SSB 28.455, 21.355, 14.255, and 7.255. For certificate send QSL and 9 × 12 SASE to CHARRO, 3554 Boca Chica Blvd., Brownsville, TX 78521.

KH6E, from arrival of *HMS Bark Endeavor* on island of Kauai, Waimea, HI; Kauai ARC; 1900Z Nov. 20 to 1600Z Nov. 21; HF bands 10–40 meters (other bands may be added), 28.450, 21.350, 14.250, 7.080/7.220 (±QRM); plus VHF and UHF for local contacts. For certificate send QSL and $2.00 US to Kauai ARC, Special Event Station, 6605 Alahele, St., Kapaa, HI 96746. More information: <http://www.KARC.net/Activities/Endeavour.html>.

N8F, remembering the *SS Edmund Fitzgerald*, Great Lakes Shipwreck Museum and Lighthouse, Whitefish Point, Michigan; Stu Rockafellow ARS; November 5–8; on 7.270, 14.270, 28.370 MHz and 75 meter Upper Penninsula Net check-in. For certificate send QSL and 9 × 12 SASE to Ben Creech, K8LHR, 416 Sunset Street, Plymouth, MI 48170 (e-mail: <K8LHR@arrl.net>).

• The following hamfests are scheduled for late October and November:

Oct. 24, **Boone & Clinton Co. ARC Hamfest**, Boone County Fairgrounds, **Lebanon, IN**. Contact Sara Lecklitner, KB9OEZ, 765-482-9152. (Exams nearby 9–11 AM)

Nov. 6, **W4GS BeachFest '99,** Old Myrtle Beach Air Force Base, **Myrtle Beach, SC**. Contact Jim Wood, 843-238-0800; or e-mail: <KF4CJE@w4gs.org>; homepage <www.w4gs.org>. (Exam info <WØRXR@w4gs.org>)

Nov. 6, **LARA Hamfest & Computer Show**, East Lake Chamber of Commerce Building, **Sorrento, FL**. For information, contact Chuck Crittenden, KE4EXM, P.O. Box 615, Altoona, FL 32702 (352-669-2075); e-mail: <capias@gate.net>. (Exams)

Nov. 6, **Enid Annual Hamfest**, Garfield County Faigrounds (Hoover Building), **Enid, OK**. Contact Tom Worth, N5LWT, 580-233-8473, <N5LWT@hotmail.com>; or Fred Selfridge, N5QJX, 582-242-3551, <frednnel@ionet.net>. (Exams)

Nov. 6, **6.91 Friendly Fest,** Waukesha County Expo Center Arena Forum, **Waukesha, WI**. Contact Milwaukee Repeater Club, P.O. Box 2123, Milwaukee, WI 53201; web: <http://www.execpc.com/~mrc/~friendlyfest.htm>; or Mike, N9NPB, 414-367-3953. (Exams)

Nov. 6, **KB9PAU Hamfest**, Belleville Area College, **Belleville, IL**. For information, contact Skip Mize, KA9VKE, 618-277-9767; or e-mail: <fiuinc@peaknet.net>. (Exams)

Nov. 6, **Interstate Repeater Society Hamfest & Fleamarket**, St. John's Church, **Manchester, NH**. Call Paul Gifford, K1LL, 603-432-1538, or e-mail: <K1LLX@juno.com>.

Nov. 7, **Central PA Repeater Assn. Hamfest**, Linglestown Fire Hall, **Linglestown, PA**. Contact Harold Baer, KE3TM, 717-566-8895. (Exams; handicapped accessible)

Nov. 7, **Fox Cities ARC Hamfest**, the Starlite Club, **Kaukauna, WI**. Contact FCARC, 1912 Russet Ct., Apt. #7, Appleton, WI 54914, Attn: Chad Pennings, N9PRC (920-993-0485). (Exams, must preregister, 8–9 AM only, more info call N9FZL, 920-993-0485)

Nov. 13, **1999 Alabama ARRL Convention and Montgomery Hamfest & Computer Show**, the Garrett Coliseum, South Alabama State Fairgrounds, **Montgomery, AL**. For more information call Phil, 334-272-7980 (after 5 PM CST); e-mail: <wb4ozn@worldnet.att.net>; web: <http://jschool.troyst.edu/~w4ap/>. (Exams beginning 8 AM)

Nov. 13–14, **Fort Wayne Hamfest & Computer Expo and 1999 Indiana ARRL Convention**, Allen County War Memorial Coliseum, **Fort Wayne, IN**. Call 219-484-1314; web: <http://www. acarts.com>. (Exams Saturday)

Nov. 19–20, **West Jackson Co. Hamfest/Swapfest**, St. Martin Community Center, north of **Ocean Springs, MS**. Contact Phil Hunsberger, W9NZ, 228-872-1499, or Stan Hecker, N5SP, 228-875-0222. (Exams 11 AM Sat.)

Nov. 20, **Waltham ARA/1200 RC Ham Radio & Electronics Auction**, Newton Masonic Hall, **Newtonville, MA**. Contact Eliot Mayer, W1MJ, phone 617-484-1089, or e-mail: <W1MJ@amsat.org>.

Nov. 20, **1999 RMRL Hamfest**, Jefferson County Fairgrounds, **Golden, CO**. For information, contact Ron Rose, NØMQJ, 303-985-8692; e-mail: <NØMQJ@arrl.net>. (Exams)

Nov. 20–21, **Suncoast Amateur Radio & Computer, ARRL Florida Convention**, Florida State Fairgrounds, **Tampa, FL**. Contact Jean Endicott, KC4KZU, 727-525-5178, or KR4YL at <kr4yl@arrl.net>; web: <http://www.fcgcarc.org>.

Nov. 21, **JARSfest,** American Legion Building, **Benson, NC**. Contact Paul Dunn, KD4BJD, 101 Carolyn Dr., Benson, NC 27504 (919-894-3100); <www.jars.net>.

Nov. 28, **GMRS Radiofest & Electronics Fleamarket**, DuPage County Fairgrounds, **Wheaton, IL**. Call 815- 436-7090 or 630-393-3937; e-mail: <alf3148@megsinet.net>.

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Our Readers Say

A Fun Project

Editor, *CQ*:

I enjoyed building the homebrew keyer by Paul Carr, N4PC, in the July issue of *CQ*. I'm not technical enough to have been able to detect from the schematic whether or not it was iambic in operation, but I suspected it was not, as there was no mention of this in the article, nor was there any mention of this in *Solid State Design for the Radio Amateur* by Hayward and DeMaw which was referenced in the article. My keyer keys beautifully and was fun and easy to build. I learned a bit about the 555 and 556 chips that I didn't already know. I just wanted to mention that this is *not* an iambic keyer, as I suspect most keyer operators nowadays are used to iambic operation and it would take a bit of getting used to if an op were already accustomed to an iambic keyer. All in all, it was a fun project and I'd recommend it to anyone, but with this caveat.

Marty Harpen, KK4RF

Dangerous Speaker Placement?

Editor, *CQ*:

I just read the August "World of Ideas" column, and I found it to be a good article except for one item. On page 54 there is a picture of a speaker fastened to the headrest of the driver's seat. The headrest is put there for the protection of the driver in the event of a rear collision. A speaker put in this position could cause very serious injuries to the head and neck of the driver. Over the years I have been a first aid and rescue instructor and a member of a volunteer ambulance service. I also have been in the towing business for the last 20 years. I have seen just about every kind of accident you can imagine. For your magazine to endorse this speaker idea seems wrong. Remember, a car hit hard from the rear will drive the head and neck into the speaker. You may want to write run a correction in the next issue of *CQ*. Otherwise, I liked the article.

Glenn Becklund, NØHBK

A Clarification

Editor, *CQ*:

I want to thank you for publishing my article on Jo Jennings in your June issue. I've had excellent response. I have to believe perhaps the photo was authentication of Jo's being the first train-to-land mobile contact.

Incidentally, the note on getters you inserted is used only with high-speed receiving tube merry-go-round rotary vacuum pumps (like ducks at the shooting gallery). Transmitting tubes use strips of titanium or zirconium. They are placed in the vacuum and absorb oxygen or other gasses starting at a temperature of 500°C and above.

Jack Quinn, W6MZ/EI2MC

Making the TH-D7 "Transparent"

Editor, *CQ*:

Every month when I get my *CQ* issue, I jump right away to Buck Rogers, K4ABT's packet column. Each issue gives his share of interesting information. Back in the April issue, Buck wrote that with the new TH-D7 Data Communicator from Kenwood, he regrets that there is no "transparent" mode available and limiting, thus, the data transmissions to ASCII or TXT only. I would like to remind everyone that there is a German freeware widely used in Europe and elsewhere called 7PLUS (written by DG1BBQ) that allows one to transform *any* binary file to pure ASCII and transmit this file in smaller parts (user selectable). 7PLUS also allows some CRC checking and has a fantastic error/correction feature that allows one to correct any error when transmitting a large file (several kb) without having to resend the ALL file again and cluttering up the frequency.

The TH-D7A/E or *any* other TNC is able to use 7PLUS-type files, and so it makes it possible to always transmit a binary file to stations not using the same software or hardware. The only thing is that both stations need to have a copy of 7PLUS.

It's just a matter of a few software tricks. The TH-D7 is a superb little radio with a built-in two-chip-only TNC. With a bit of software expertise, you can easily bypass limitations such as the lack of a "transparent" mode. And 7PLUS is a good old DOS software.

Eric, ON7LE/KA3WII

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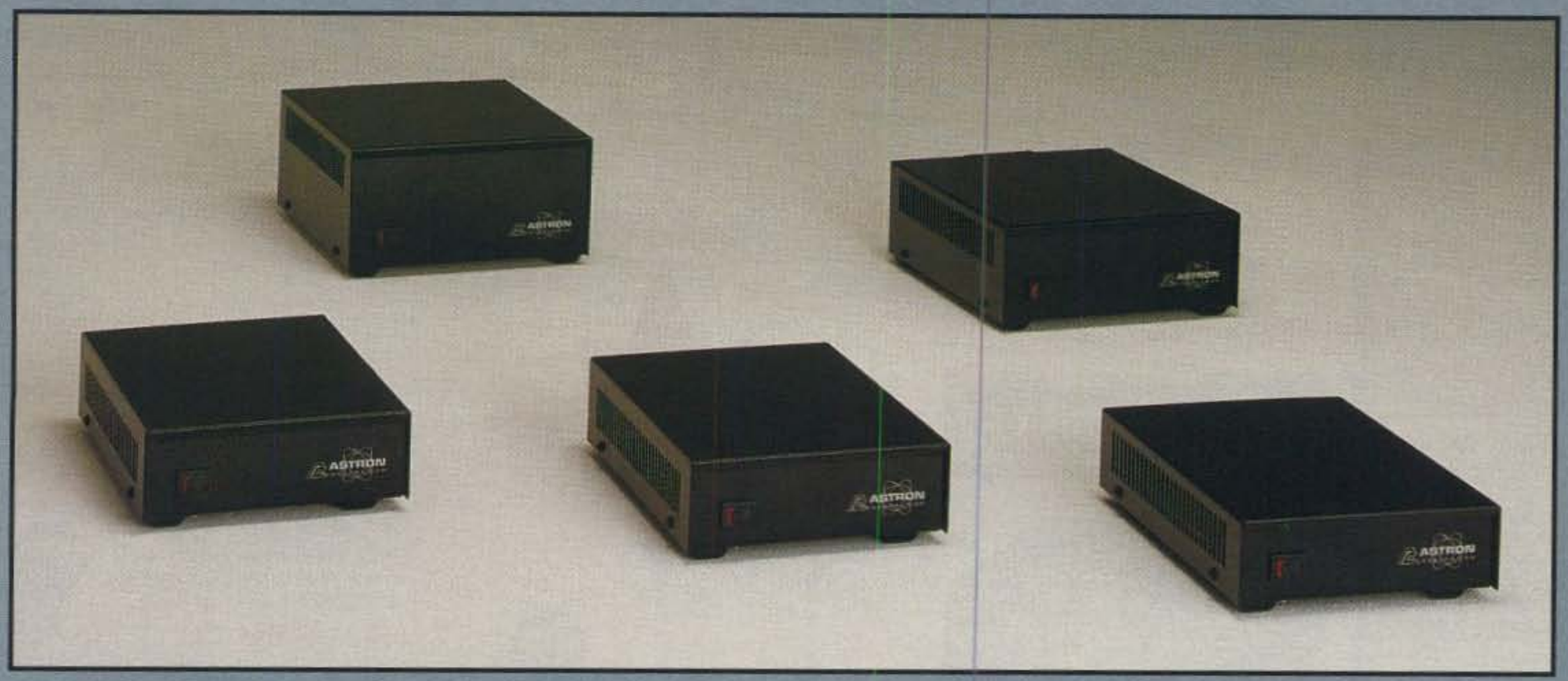

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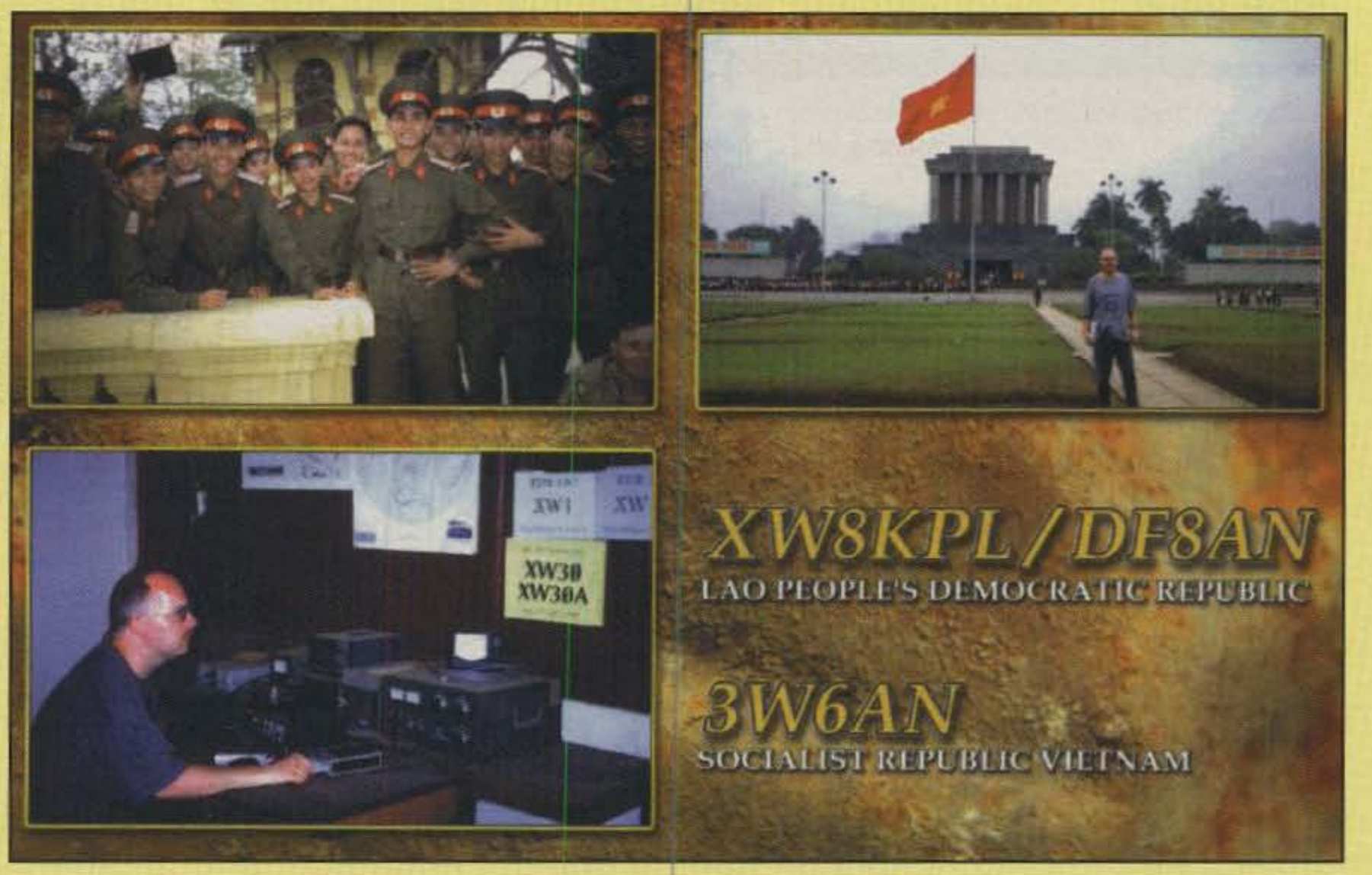
Twenty-three years have passed since the end of the Vietnam War. A sense of "normalcy" has begun to seep into the entire southeast Asian region. And even in this graveyard to tens of thousands of soldiers and civilians, the spirit of amateur radio flourishes.

QRV From The Golden Triangle

A DXpedition to Laos and Vietnam

BY MICHAEL NÖRTEMANN*, DF8AN/KC4KBF

Each year I am off to another country. That's my way of life. Most of the rare DXCC countries are still very expensive to go to, or it is impossible to obtain permission to operate from them. I then thought of Laos, the number 25 country on the European Most Wanted list. Many DXers were looking for a contact with Laos. There had been some DXpeditions to Laos by a multi-national group headed by Zorro, JH1AJT, but time had gone by since then and a Laotian call was still attractive. Laos could be an interesting, exciting place for a combination DXpedition and holiday, and its neighbor, Vietnam, was an attractive prospect, too.



The XW8KPL/DF8AN and 3W6AN QSL.

For a few years now it has been possible to obtain a visa for travelling into the People's Democratic Republic of Laos because of the country's economic development plan. In addition, since the end of the war tourism has brought a great deal of money into the country.

Getting permission to operate from Laos was the problem. XW8KPL is the club station of the Lao news agency, KPL. This station is the only permanently licensed amateur radio station in the country. I tried contacting but received no answer from the ministry of post and telecommunications and likewise from the Lao Embassy in Germany. Amateur radio friends warned me not to take radio equipment into a socialist country without a license, but I was sure I would be able to obtain a license when I applied in person.

It was March 7, 1999 when my YL and I landed in Vientiane, the capital of Laos P.D.R. Declaring the equipment was easy, as no one at customs was interested in a transceiver. We entered the beautiful, warm country of Laos with no problem.

Vientiane is one of the smallest, quietest capital cities in Southeast Asia. One problem was to find a nice hotel with space for my longwire antennas. We found a bungalow for about $32US with a pool and garden. Directly opposite the bungalow was the ministry of communications, where I wanted to try to get the license. However, the office was closed because of a holiday. We therefore decided to do some sightseeing in the city.

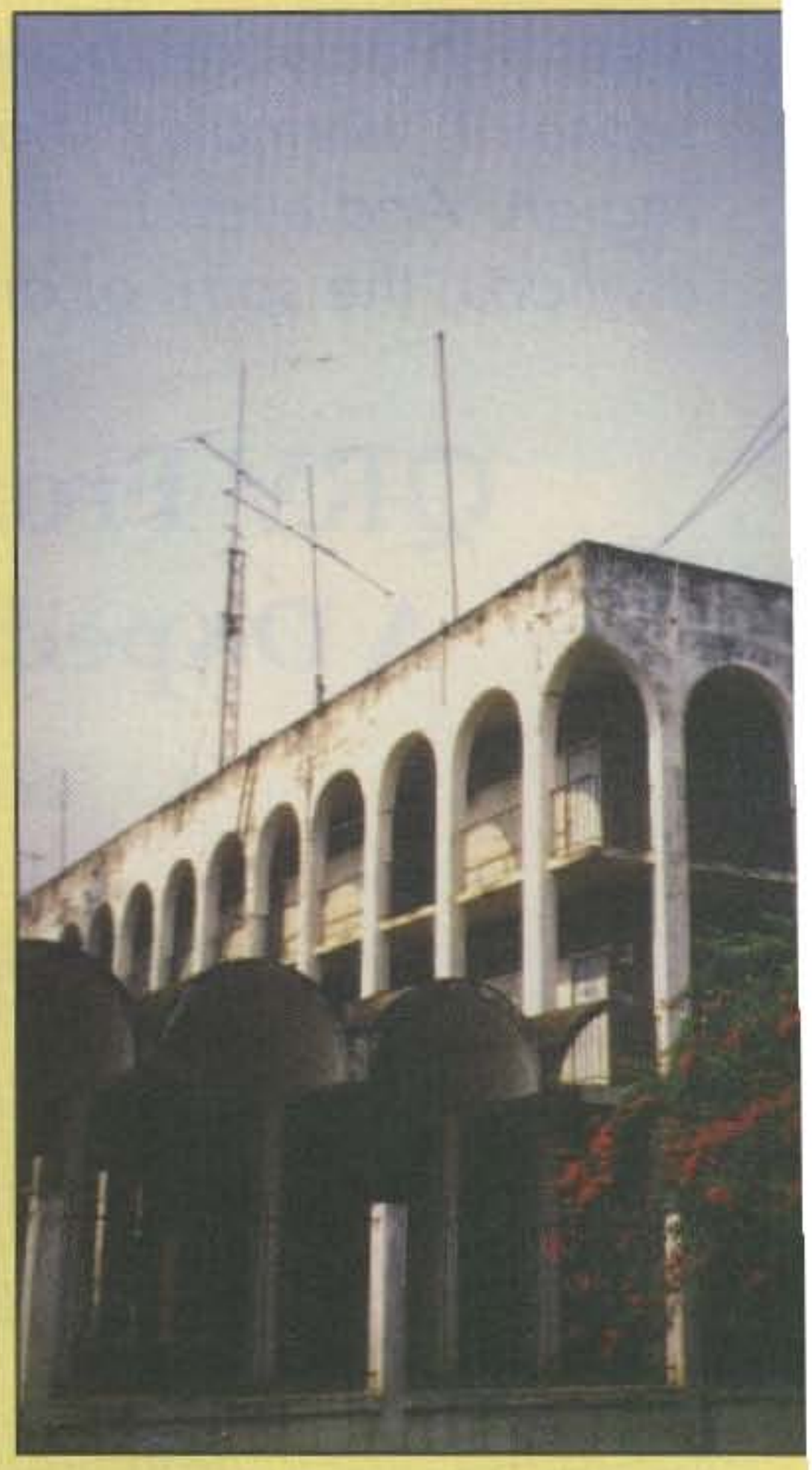
Vientiane is also called the "town of the temples." Nearly all the inhabitants are Buddhist, and colorful temples and pagodas, and Buddha-park and the Mekong River are spots of interest. At the market you can find everything you want: clothes, meat, fruit, plants, live animals, and more. Many people want to spend money on this black market.

On March 9th I met the director of the ministry. He told me that at the moment there was no chance of getting a license as an individual operator. Amateur radio was allowed, but only for the XW8KPL club station. He gave me the address of the station's manager, Mr. Inh. I had heard his name a few months earlier, when I read about the Japanese DXpedition of JH1AJT in our club's magazine.

For years Mr. Inh has been the only permanently licensed amateur radio opera-

*Neustadt 18, D-37154 Northeim, Germany

Left to right: Mr. Inh, XW8KPL; the author, DF8AN; Marianne; and YL of Mr. Phan in Vientiane, the capital of Laos.



The QTH of XW8KPL.

tor in Laos. After the Japanese DXpedition no one else had put XW8KPL on the air again. I wondered if I would be able to use that call during my stay in Laos.

I took a bicycle-*Rikscha* (one of the most important means of transportation systems in Laos) to the news agency. Right from the beginning Mr. Inh was sympathetic to my plight. He told me that he worked as an officer for the ministry of information. He said that at the moment it was impossible to get an XW8 call as a visitor, but he believed that this might change in the future.

Mr. Inh invited me to use the club station at the ministry a few days later. He said he had to contact some officials and I should contact him in four days. Before I left, he showed me the place where XW8KPL was QRV for the first time. The amplifier was still there. The other equipment didn't work at the moment, but the antennas were fine. Above the shack I saw the golden callsign "XW8KPL." I would have to wait four long days before knowing if I could operate from that station.

We planned to stay 14 days in Laos and booked some flights into the mountain region to see the native people, the "Meo," and the highlands, with reminders of the last war. We visited the former capital, Luang Prabang, and the old king's palace. Last but not least, we visited the Plain of Jars in the Xiang Khouang region.

During our travels, though, I didn't forget to try to call Mr. Inh's office. I did not have any success. Each day was the same; he wasn't in his office. I began to believe that my dream would not come true.

On March 18th we travelled back to Vientiane, and I again went to Mr. Inh's office. Finally, in a friendly voice he said, "Mike, you can be QRV as XW8KPL/DF8AN." I asked him for written permission, and he said it was no problem: "You will get it tomorrow when you'll pay the $75US fee."

It was absolutely necessary to write a time schedule for the operation, because each radio transmission would be monitored by the Laotian ministry. And I had to bring my own equipment into the XW8KPL radio shack. I was glad that I had brought my rig with me.

I gave Mr. Inh a time schedule for his office and installed my FT-747, key, and matchbox. The monobanders were still working. SWR was 1:1.2—fantastic!

"XW8KPL/DF8AN de BV6GM RST 599 pse k" was the answer to my first CQ call on 15 meters at 08:17 UTC. It worked! On SSB I received 59+ from JA1YUT, who didn't believe that I was not a pirate. He wanted to send a message to the Japanese packet radio DX clusters. The DXpedition had begun.

At 14:45 UTC I logged my first US station: WA8TNO on 21.005 kHz gave me 599, so I turned my beam to the US. It was wonderful to hear all parts of the US—W3UR, AA6YQ, W1JR, N7TZ, N6RFM—at the same time. The bands (especially 21 and 18 MHz) were open, and it seemed as if the whole world was calling. I heard weak African stations, many Europeans, and North and South Americans. Even during split operation I heard them calling everywhere. I changed to 28 MHz, and the log started to fill up with exotic Pacific stations: T32, WH6, KP3. Everyone wanted a contact with Laos.

I received permission from Mr. Inh to operate all bands and modes. I prefer CW, but the US operators especially wanted SSB contacts. Turning to another band, it was just a few minutes before I had the same pile-up as before.

Many stations wanted RTTY or PSK31 contacts. I was very sorry that I did not have a rig for these modes. Some stations worked me on four bands, while some wanted 160 meter contacts. I tried my best to catch them all.

It was a late night for me. Forgotten were all the prior worries about the license and customs. At 15:58 UTC I went to bed, but at 23:41 UTC I was QRV again. I told UR4LCD on 20 meters, "Good morning from Vientiane." Day two had begun.

The second day I was QRV around the clock. My YL went shopping, and I had enough time to serve all stations some specials—24 and 28 MHz. You wanted 18 MHz SSB? No problem! It was still fantastic, and I had a lot of fun.

Early that afternoon Mr. Inh came to my office and brought me a valid three-day permit for the callsign XW8KPL/DF8AN. He also told me about the holy white elephant, which is at the Vientiane zoo.He asked if I was interested in seeing it. I looked at the log—nearly 700 QSOs. The world was calling, but I had the chance to see the holy elephant. In the past the king was the only person who could own a white elephant. However, the socialist

Mr. Inh, station manager of XW8KPL.

The former border between North and South Vietnam, on the Ben Hai River.

party of Laos also wanted one, and now the Laotian white elephant lives in a zoo 30 miles from Vientiane.

Mr. Inh drove for two hours through the countryside to the zoo in his old Russian "Lada" car. When we arrived, the zoo had already closed. However, Mr. Inh again showed his influence, and a few minutes later the zoo was opened for us. We saw the white elephant, and I wondered if it had had any influence on my getting the operating license.

Later we went to a Laotian floating restaurant. During the exotic meal Mr. Inh told me that amateur radio equipment is very expensive in Laos. XW8 is so rare because of the economic conditions in the country. Even a government official only earns around $50US a month. However, they hope to get some old radio equipment as gifts from amateurs in other countries so they can become more active.

Back in the city, my last night in Vientiane had begun. I knew it should be a night at the rig. At 22:33 local time I was in contact with AD1Y, back in the world of radio amateurs. I was on the air seven more hours before leaving the shack after nearly 1400 QSOs.

After passing through customs at the airport, we waited for our flight to Hanoi. Here we were surprised again: Mr. Inh had come through customs without any questions asked and wanted to say goodbye to us. It was goodbyes said in a place that has retained much of its charm, in spite of war. *Suubeidi, Laos*—goodbye!

Reminders of the war. Unfortunately, often children sell soldier ID tags, bullets, and coins as souvenirs.

Vietnam

Only an hour and a half later we arrived in Hanoi, the capital of the Socialist Republic of Vietnam. The traffic jams were terrible, and a great deal of noise would surround us during the next 13 days.

My first visit was to the ministry of telecommunications, where I held my 3W6AN license in my hands. It cost around $40 US, but the license was valid only for 20 meters and only for operation in Hanoi and Ho Chi Minh city, better known as Saigon.

I asked for an all-band license, but the woman smiled and told me why I could not have one. Amateur radio is a very young hobby in Vietnam, and the ministry had orders to monitor the bands for legal and illegal transmissions. Some years before it had been impossible to get permission for CW operation; now the monitor sta-

tions can also watch for CW signals, but amateur radio visitor permits still are only valid for one band. They allowed me to use 20 meters.

It also was a great pleasure to have no time limit. Normally amateur radio visitors have to submit an operating schedule and all the times of planned operations. My license was valid for 24-hour operation, but still only on 20 meters.

We drove to our hotel and searched for a good place for the longwire. On March 23rd at 10:37 UTC I sent my first CQ on 14.188 kHz. CP6EB replied and gave me 599 from Bolivia. Ten minutes later I switched to CW and reached KH6AK, who also gave me 599 from Hawaii. There was still one direction possible, and very quickly I saw the difference in not using the 3-element monobanders . There were fewer QSOs than in Laos, but many stations, especially Europeans who needed Vietnam, were happy for a new country on CW.

Many tourists visit Vietnam. Most of them are French and US veterans journeying back into the past. We visited the former Khe Sanh combat base, the site of battles with the Vietcong; now you see only dust, coffee plants, and children who sell war souvenirs for the price of a dollar. Holding in my hand about 30 of the soldier ID tags, reading the names, birth dates, and ranks of American and South

A U.S. tank at the war museum in Saigon.

Vietnamese young boys, I wondered why it is possible for these things to be sold as souvenirs.

At Khe Sanh there is also a small museum with weapons, and pictures of the former air strip and of the evacuation during the last days of Khe Sanh. These are pictures which I can't forget.

I also saw the beauty of the country, though—lonely beaches and quiet places to walk await visitors. But do not leave the main paths, as even today many land mines remain, although companies are trying their best to locate and destroy them.

I was QRV from both the former communist North Vietnam and the former Republic of South Vietnam. The reunification in 1975 made it possible to create the Socialist Republic of Vietnam, and we walked through the 37th parallel, better known as the demilitarized zone (DMZ).

We also visited the tunnels of Vinh Moc and the war museum in Saigon. Most of the museums are very strictly anti-American and don't show pictures of the crimes of the Vietcong. Inspired by the musical *Miss Saigon,* which I had seen in Germany a few months before, I wanted to see the former US embassy in Saigon. At the end of the war I was still a schoolboy, and I remember seeing pictures of the evacuation on television. Today only the walls around the embassy are still there. The former large embassy building with its helicopter landing strip was destroyed, and in the same place the US government built a new consulate.

In Vietnam I made about 600 contacts. But remember, I only was allowed to operate from Hanoi and Saigon. All my days of travelling through the countryside I had to be QRT, and that's why many stations didn't get a chance at a contact. Many US stations reached me in both countries and on both modes, and some worked me from both parts of Vietnam. As you can see, a little wire and a little

The Khe Sanh museum at the former U.S. Khe Sanh combat base.

output can be enough for worldwide operation, especially when you use an interesting callsign.

Heading Home

On April 1st I left Vietnam from Ho Chi Minh airport and flew to Singapore. There was no chance of getting a license in Singapore, because only residents are able to get permission to operate. I know that many stations need 9V on CW, but during my visit to Singapore telecoms, they told me that Singapore officials are not supportive of DXpeditions. The station was QRT, and we took a sight-seeing tour of Singapore and its neighbor, Indonesia.

My thanks again to Mr. Inh of the Lao ministry of information and to all who helped me make this trip possible. Special thanks to the European DX Foundation (EUDXF) for their financial support.

Thanks to all who worked me, and apologies to those who missed me. Now you know some of the reasons why I couldn't contact more stations.

Where am I going next? I'm not sure, but look for me on the bands next March.

This month W8FX takes us on the first leg of an interesting archaeological dig. Here's a fond, nostalgic look at "classic jurassic" amateur radio and shortwave equipment and manufacturers of the past.

Classic Jurassics—Part I

BY KARL T. THURBER, JR.*, W8FX

Are you ready to join with us in a return to some interesting archaeological "digs"? This article profiles "classic jurassic" amateur radio and shortwave radio equipment and manufacturers of the past. It includes both products and companies, and shows what happened to them. "Boat anchor" radio gear from Collins, Drake, Hallicrafters, Hammarlund, Heath, E. F. Johnson, National Radio, World Radio Laboratories, and others is fondly depicted. Included is a background of today's radio nostalgia, radio rehabilitation considerations, and resources of interest to the radio buff. First, some history.

RME was established in 1932, when they produced the RME-9 receiver. The classic RME-45, circa 1945–1947, is shown here. (Photo by Jim Hanlon, W8KGI, via Electric Radio *magazine)*

Yesterday's Background to Today's Radio Nostalgia

Many radio hobbyists hold a special place in their hearts for the seemingly clunky amateur and shortwave radio gear of the past. Almost all of the great radio names of the 1940s, '50s, and '60s are gone. Yes, it's true that most of the firms no longer are in business.

While most receivers and transmitters today are solid state, and many hobbyists thumb their noses at tubes, you'll find many older rigs still do a creditable job. And to many, the best part of amateur radio and shortwave listening (SWLing) is the nostalgia. To these amateur radio operators, there's magic in those older sets, the tube filaments of which glow brightly and warmly in the dark and possess a unique character definitely not found in modern radios.

Amateur radio and SWL equipment of past eras—even top-of-the-line gear—was simplistic compared to the sophisticated receivers, transmitters, PCs, and accessories of today. In the 1950s and earlier, most stations (at least transmitters) were "homebrewed." But by the end of the 1950s, factory-finished transmitters and transmitter kits were common. Transceivers? You wouldn't find them just yet; bulky, separate vacuum-tube transmitters and receivers were the rule. And the bigger the radio "boat anchor," it seemed, the better the signal.

Classic Receivers and the Companies that Made Them

In the 1930s, reportedly fewer than 20 percent of amateurs used commercial receivers. However, this changed in the late 1930s. By 1938, 80 percent of amateurs used commercial receivers, and by 1941, over 90 percent did so. Today, receivers are complex and difficult to align, so almost all amateur radio operators and shortwave listeners (SWLs) use ready-made equipment.

Receivers before the solid-state era were a sore spot. Often, one's transmitter far outreached the receiver's ability to capture signals. Tuning resolution, selectivity, sensitivity, and stability are among the main determinants of a set's quality. Typically, however, receiver sensitivity was low, selectivity was poor, and frequency stability left much to be desired. You get the picture!

Older general-coverage sets typically covered 540 kHz to 30 MHz on one dial, with a bandspread dial for fine tuning. Classic ham-bands-only radios covered only the "old" HF amateur bands from 1.8 to 30 MHz, not the newer bands at 10, 18, and 24 MHz. Dial calibration often was haphazard, and many sets just had a bandspread dial that was uncalibrated or a generic "0–100" logging scale. Amateurs dreamed of sets with calibration markers

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every 5 or 10 kHz. Collins Radio offered 1 kHz or better calibration, but very few could afford the premium-priced sets.

Some older tube-type radios you may find include those by Drake, Collins, Hallicrafters, National Radio, Hammarlund, TMC, and others. Some top-notch classics include the R-390A, a military radio by a variety of manufacturers; Collins 75A-4, 51J-4, 51S-1, and 75S-3 series; National NC-303, NC-400, and HRO-60; Hallicrafters SX-73, SX-88, SX-101, and SX-115; Hammarlund PRO-310 and SP-600 series; and TMC GPR-90 and GPR-91.

Allied and Knight-kit. A kit company very popular with radio amateurs and SWLs was the Knight-kit division of the Allied Radio Corporation of Chicago, Illinois (some equipment also was made under the parent name, Allied). Although not known for cutting-edge technology, the kits were of sturdy construction and fair-to-good performance, and instruction manuals were very good. Knight-kits disappeared after Allied Radio was acquired by Radio Shack in 1970 and became an industrial electronic supplier.

Collins. Collins equipment always has been the gold standard for reliability and performance. For decades Collins was closely associated with quality in communications gear. Everyone aspired to owning a Collins radio! And Collins-made single sideband (SSB) products have long been used by the U.S. military.

Art Collins, W9CXX (later WØCXX), began manufacturing radio equipment in his home in Cedar Rapids, Iowa in 1931, marking the first time transmitting apparatus was available as an assembled unit. His earliest amateur equipment eliminated the typical "radio shack clutter" by packaging the gear in neat units. The first Collins ad appeared in the January 1932 issue of *QST* magazine, under the name Arthur A. Collins, later as Collins Radio Transmitters, and ultimately as the Collins Radio Company.

By the late 1960s the company had suffered financial problems that ultimately prompted its acquisition by Rockwell International in 1971. Rockwell International's Collins Avionics & Communications Division (CACD) became the successor to the Collins Radio Company. Founder Art Collins died in 1987.

Drake. Radio design engineer Robert Lloyd Drake founded the R. L. Drake Company of Miamisburg, and later Franklin, Ohio in 1943. It began as a manufacturer of filters for the government and amateur markets. Drake entered the amateur communications receiver market in 1957 with its classic Model 1A. The company's amateur products soon were dubbed the "Cadillacs" of the field.

Many excellent receivers followed, culminating in the famous R-4 series of the 1970s. Drake exited the amateur market in 1981 to manufacture home satellite receivers, but they re-entered the market in the 1990s with the top-drawer R-8 and R-8A general-coverage receivers. Drake also introduced the TR270, an advanced 2 meter base-station transceiver. Bucking the trend, R. L. Drake actually is still going strong today!

The Heath Company once was the world's largest manufacturer of electronic kits. A popular amateur kit was the 180 watt DX-100 (and later DX-100B) AM/CW transmitter. An angled front view of an assembled DX-100B is shown here. (Photo courtesy Terry Perdue, K8TP)

Shown here is Heath's popular HM-2102 HF wattmeter/SWR bridge kit, a mainstay of its amateur accessory product line. (Photo courtesy Heath Company)

Hallicrafters. The Hallicrafters Company long was the premier name in communications receivers. In fact, in the 1940s and 1950s the name Hallicrafters practically was a synonym for "communications receiver" or "shortwave radio"!

Hallicrafters was formed in 1933 in Chicago by Bill Halligan, W9AC. Its first receiver (1934) was the S-1 Skyrider, a five-tube regenerative TRF (tuned radio frequency) set. The company made its first superheterodyne ("superhet") radio, the seven-tube Super-Skyrider, in 1935.

From 1936 on the company offered a complete line, starting with the Sky Buddy (at $29.50). World War II saw Hallicrafters going over to war production, building, for example, some 28,000 SX-28 receivers. After the war they re-entered the commercial market with the SX-42, the first set to use the new miniature tubes.

Hallicrafters experienced hard times in the late 1950s, with the owner selling the company and repurchasing it. By the mid-'60s Hallicrafters was in really bad shape. It was acquired by Northrop Corporation in 1966, and sales were off sharply by the early 1970s. It later became the Hallicrafters Division of Wilcox Electric, and still later, a unit of Braker Corporation. Sadly, the company and its name disappeared in the late 1970s. Hallicrafters founder Bill Halligan died in 1992 at the age of 93.

Hammarlund. Another long-lived classic radio name is the Hammarlund Radio Company, which traces its lineage back to 1910, when it was formed by Oscar Hammarlund. Its first real claim to radio fame was the 1931 Comet receiver (probably the first superheterodyne radio), followed by the much-improved Comet Super Pro in 1933.

The respected Super Pro series culminated in the SP-600 Super Pro, many of which—in various commercial and military versions—still are in use today. The company is best-known, though, for its HQ series general-coverage receivers, starting with the HQ-120 of 1938. Descendants include the HQ-129X of 1945, through the HQ-140, HQ-150, HQ-160, and HQ-180 of 1950s and '60s vintage.

Some Hammarlund products of the late 1960s were not so successful. However, the company continued to sell its top-drawer HQ-180 and SP-600 radios until 1973, when it dropped from the amateur market. The company was sold a number of times. Reportedly, Pax Manufacturing Co. still offers some parts.

Lafayette Radio Electronics. Lafayette Radio of New York City and Syosset, New York, is descended from the old Wholesale Radio Service Company (which offered communications receivers as early as the mid-1930s) and its successor, Radio Wire Television. Lafayette imported or manufactured a wide variety of receivers, transmitters, and transceivers, including SWL and CB gear.

The company offered many popular receivers in the 1950s through the 1970s, including the HE-10, HE-30, and several models in the HA series. The last model offered, the BCR-101, was technologically advanced (their other radios mostly were mediocre performers), but suffered from mechanical and circuit problems.

Lafayette also was in the retail business, a sort of "Radio Shack of the 1960s," but its store chain faltered in the 1970s. It declared bankruptcy in the late 1970s, closing 65 stores in downsizing. Lafayette Radio disappeared by the mid-1980s.

The National Radio Company. The National Radio Company had a 77-year history, from 1914 through 1991. By the early 1930s National had established a reputation with the amateur radio community based on their proud line of quality regenerative receivers, including the SW-3 and SW-5, both designed by National's technical wizard, James Millen.

In the 1930s National pioneered receiver features that culminated in the famous HRO receiver and contributed to its success as a major supplier of World War II radio gear. Later HRO series receivers, such as the HRO-50 and HRO-60 of the 1950s and '60s, are design classics. These sets helped National to almost become a household name in the 1940s, '50s, and early '60s.

Starting in the 1950s, National became involved in military contracting, letting its amateur market slip. A final example of state-of-the-art innovation was introduced in 1965. The HRO-500 was an all-transistor, synthesized receiver covering 5 kHz through 30 MHz in sixty 500 kHz bands. *Popular Electronics* even reviewed it as possibly the best amateur receiver ever.

In the 1980s, National operated under Chapter 11 bankruptcy rules but began liquidation procedures in 1991. Even the almost revolutionary HRO-500 and HRO-600 couldn't save the company.

Radio Manufacturing Engineers Company (RME). RME was established in 1932, first producing the RME-9. The small Peoria, Illinois company was a big receiver player in the 1930s, when it is said to have produced its very best receivers.

After the war, the company still produced a number of good sets. These included the early postwar RME-45 (see photo), RME-69, and RME-70 series radios; and the later model RME-4300, RME-4350, and RME 6900 series receivers. The latter radios were produced around 1962, after RME merged with Electro-Voice and relocated to Buchanan, Michigan. In 1962 the company faded.

Technical Material Corp. (TMC). Technical Material Corp. (TMC), of Mamaroneck, New York, was founded by Ray DePasquale and was a very prominent manufacturer of military communications gear during the 1950s and '60s. TMC entered the amateur market with the high-quality, military-style GPR-90 general-coverage communications receiver. It was followed by more radios in the GPR-90 series and later by GPR-91 and GPR-92 series units.

TMC still is in business today. However, it no longer manufactures receivers, instead making RF communications accessories and other products for military and commercial users.

Classic Transmitters and Those Who Produced Them

The typical amateur transmitter developed from the one-tube, free-running "power oscillator" of the early 1930s to the complex SSB ("Donald Duck modulation") transmitter at the end of the tube era, around 1981. Although since the 1930s most amateurs had tended to use commercial receivers, until the 1950s most used homebrew transmitters.

Overall, by the 1950s about 60 percent of stations used homebrew gear. But with the arrival of SSB in the late 1950s and '60s, this percentage dropped markedly as even transmitters became much more complex. Today, almost all amateurs buy their major gear ready-made, with the possible exception of antennas.

The 1950s and '60s were the heyday of

massive AM and early SSB rigs, and many transmitters by Collins, Heathkit, E. F. Johnson, Harvey Wells, World Radio Laboratories (WRL), and others still are in use today. Classic CW-only rigs were simple affairs, typically being crystal controlled and running power levels of 75 watts or less. They still can make good starter Novice rigs.

Central Electronics. Central Electronics was a pioneer maker of SSB equipment, having been founded in Chicago in 1950 by Wes Schum, W9DYV. The company's original offering was the 10 watt Multiphase 10A Exciter, followed by the higher-power (20 watt) 20A exciter, and later by the broadbanded 100 volt transmitter. Later products included the sophisticated 200 volt transmitter and the super-rugged 600L SSB linear amplifier.

The company was highly regarded and contributed greatly to the transition of amateur communications from AM to SSB. Little known is the fact that Central Electronics was acquired by Zenith Radio in 1959, but Zenith lost interest in the amateur market and shut it down in 1962. Under Zenith, the company even produced a receiver, the 100-R, but only one, a prototype, was produced!

EICO. At one time close behind Heath as a kit company was its competitor, the Electronic Instrument Company (EICO) of Brooklyn, New York. EICO introduced its first vacuum-tube voltmeter (VTVM) kit in 1945, when founder Harry Ashley converted his radio servicing business to electronic kit production.

EICO mostly offered tube-type test instruments for radio and TV servicemen, but it also sold CB and amateur radio transceiver and receiver kits. Best-known among their amateur products were the Model 720 and 723 transmitters, available as kits or wired-and-tested in the late 1950s and early '60s. In the late 1960s, they offered a relatively sophisticated amateur SSB transceiver.

Gonset. The Gonset Radio Company of Burbank, California was founded by Faust Gonsett, W6VR, in 1955. Gonset Radio was best known for its line of VHF transceivers, the G-66 mobile amateur band receiver, and the matching G-77 transmitter.

In the 1950s, their compact Gonset Communicator VHF transceivers were extremely popular. Amateurs toted them everywhere and affectionately dubbed them "Gooneyboxes." The company was sold to Young Spring and Wire Corporation in 1957, later to Aerotron, Inc., and then to LTV Ling Altec, Inc.

Harvey-Wells. Harvey-Wells Electronics, of Southbridge, Massachusetts, was formed in 1939 by two enterprising amateurs, Cliff Harvey, W1RF, and John Wells, W1ZD. The company specialized in police radios, transmitters, and accessories.

In 1947, the company entered the amateur market with its pioneering, inexpensive TBS-50 Bandmaster transmitter. The 50 watt units were compact enough so that they even could be used by amateurs for mobile work. Harvey-Wells Electronics is no longer around.

The Heath Company. The Heath Company of Benton Harbor, Michigan—or "Heathkit®"—was the world's largest manufacturer of electronic kits. It was founded by Ed Heath, a barnstorming pilot who in 1926 marketed an airplane kit, the $199 "Parasol."

Heath died in 1937, and the company was reorganized by Howard Anthony. After World War II, Anthony introduced a mail-order 5 inch oscilloscope kit for $39.50. The kit was successful, and the firm expanded in both test equipment and radio amateur fields. Amateurs will remember classic kits such as the DX-100 series transmitters, AR- and GR-series receivers, the Seneca, the Mohawk, and many more "rigs" and accessories.

Anthony passed away in 1954. His widow sold Heath to the Daystrom Company, and Daystrom sold it to the Schlumberger Company in 1962. Nevertheless, Heath continued to introduce successful kits in a line that at one point numbered over 350 items.

The interest in kit building declined, however. The faltering kit business then was sold to Zenith Data Systems, and in 1989 Zenith was acquired by the French firm Groupe Bull. In 1992, Zenith eliminated its mailorder catalog division. An era had ended.

(To Be Continued)

FT-8100R
The versatile FT-8100R Dual Band Mobile offers rugged RF design, 50 Watt (VHF)/35 Watt (UHF) power output, 310 memory channels, Dual Receive (VV/UU/VU), Enhanced Smart Search,™ CTCSS Encode, and a TX Time-Out Timer. (ADMS-2E programming software available.)

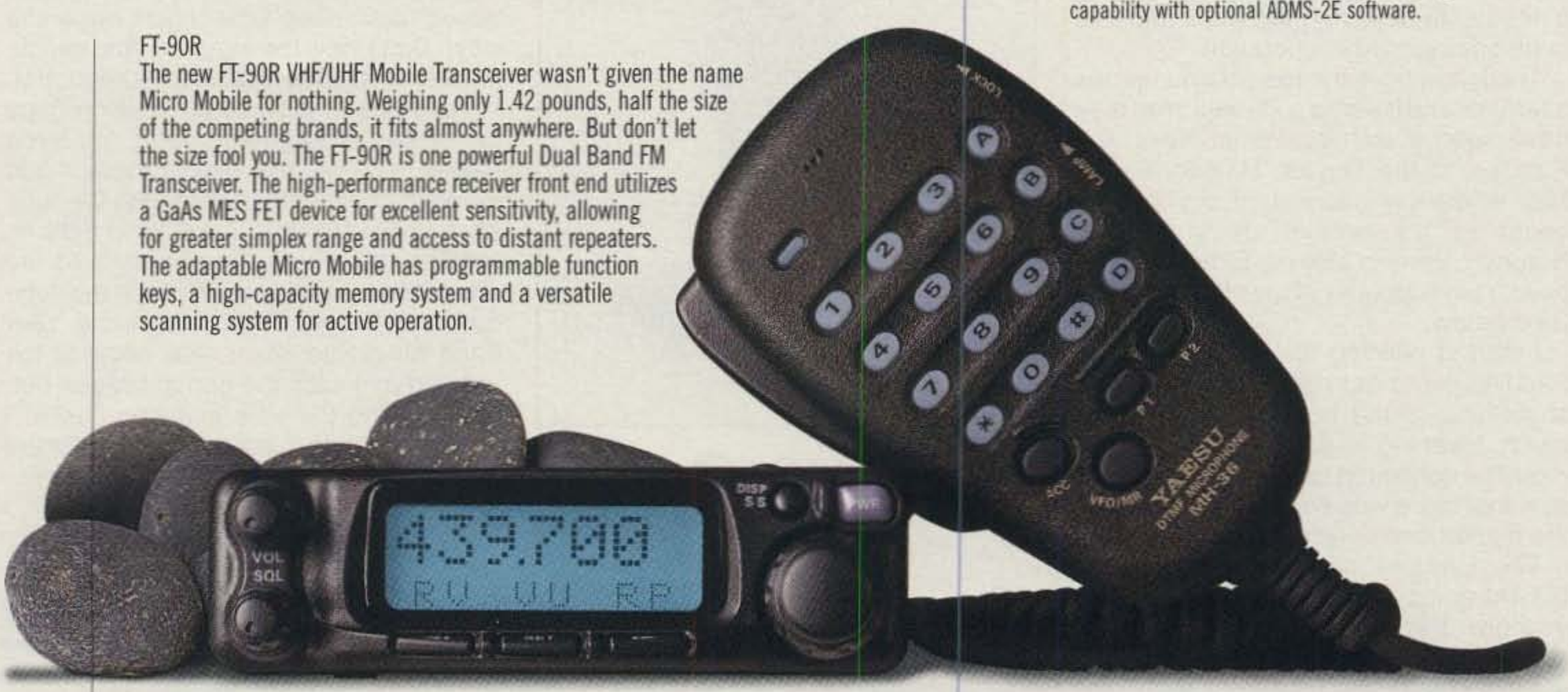
FT-100
This ultra-compact HF/VHF/UHF 100W Transceiver provides SSB, CW, AM, FM and AFSK coverage of the HF, 6M, 2M and 70 CM bands. Features include 300 memory channels, built-in Electronic Memory Keyer, DSP, IF Shift, IF Noise Blanker, and CTCSS/DCS.

FT-3000M
This 70W high-powered 2M FM Mobile provides extended UHF receiver coverage, AM Aircraft RX, and is MIL-STD approved. The FT-3000M features 81 memory channels, Smart Search,™ CTCSS/DCS, optional ADMS-2E programming software, and is 1200/9600 Baud Packet compatible.

FT-290RII
Ideal for base, vacation, or expedition use, this 25 Watt 144 MHz Multimode Transceiver is outstanding for emergency, travel, or weak-signal DX work. Optional battery pack allows over-the-shoulder portable use for search-and-rescue operation.

FT-2600M
This heavy-duty VHF FM Mobile is encased in a durable aluminum die-cast chassis/heatsink assembly, and manufactured to MIL-STD 810 requirements. Features include 60 Watt power output, 179 memory channels, direct keypad frequency entry from microphone, Alphanumeric memories, and PC programming capability with optional ADMS-2E software.

FT-90R
The new FT-90R VHF/UHF Mobile Transceiver wasn't given the name Micro Mobile for nothing. Weighing only 1.42 pounds, half the size of the competing brands, it fits almost anywhere. But don't let the size fool you. The FT-90R is one powerful Dual Band FM Transceiver. The high-performance receiver front end utilizes a GaAs MES FET device for excellent sensitivity, allowing for greater simplex range and access to distant repeaters. The adaptable Micro Mobile has programmable function keys, a high-capacity memory system and a versatile scanning system for active operation.

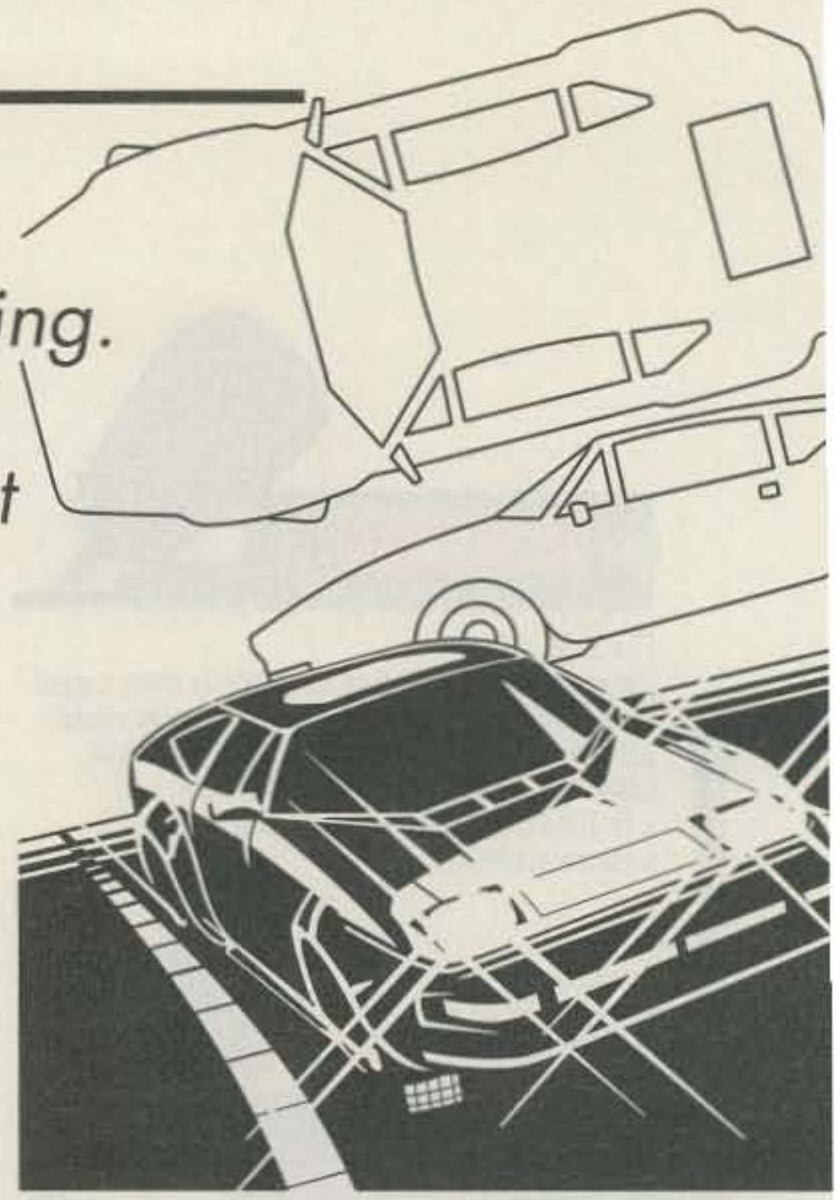


LITTLE BIG MOUTH.

Life is an adventure. So whether you're on expedition or vacation, you will probably encounter some rough going along the way. And when you do, you'll be glad that your mobile transceiver is a Yaesu. With units small enough to install almost anywhere and rugged enough to achieve military approval for shock and vibration, Yaesu is the obvious choice for dependability. Its exceptionally clear signal and wide dynamic range tame even the most crowded bands, and provide outstanding protection from intermodulation in urban areas. Learn more about Yaesu products on the web at www.yaesu.com

YAESU ...leading the way.

Here's an interesting project for yourself, or something to bring up at the next club meeting. While it may be fun to operate mobile CW with this innovative paddle, I'm not sure that I'd try to get it through airport security.



The "Car Key"

An Easy-To-Build Mobile CW Paddle

BY MIKE TRUAX*, KB9OCE

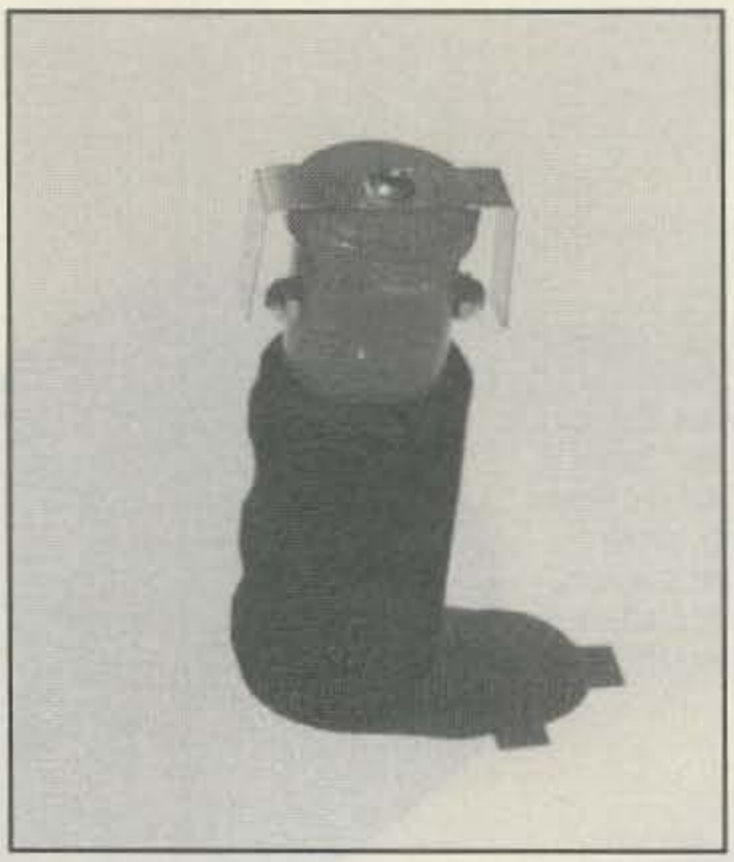
I've been making Wrist Keys and Paddles and selling them over the Internet for about six months now. I have had numerous requests for a simple, durable paddle that could be used for mobile use. It needed to have non-slip grips and had to be one-handed in operation.

The following is the result of numerous attempts, and it works quite well. You may have seen it with our Wrist Keys and Paddles at the Dayton Hamvention in May, where it was an instant, big hit at the booth of my brother Jerry, N3SEI. Naturally, Jerry is also my Elmer and has been a big supporter of my efforts, as outlined below.

I started building the Wrist Keys and Paddles not to get rich, but to give back something to the hobby that I love so much. I wanted to do something to promote the continued use of CW, and I also saw that there was something missing in the market and decided to fill that void.

The "Car Key" sold for $10 at Dayton, but I'm going to show you how to make your own. If your club is interested in building these as a meeting night program, contact me at <kb9oce@aol.com> and I'm sure we can work out something. I am not making any money doing this. I just want to help revive homebrewing as a part of amateur radio which sadly has fallen by the wayside.

Some of the items in the bill of materials are quantity items—i.e., the cushion grips. You will get 12 "grips" out of the package. The cost of each completed paddle will come to well under $5! You can't get started in homebrewing for much less than that, and besides, it's definitely a lot of fun.



The completed mobile CW paddle. All that's needed is the patch cable to your transceiver.

Preparing the Body

The first thing you will want to do is empty the M&M's® from the 1" × 4" plastic tube they come in. Maybe the kids will help you with this. I've made so many of these that I can't stand the sight of M&M's® anymore and have been giving Ziploc® bags of Mini-M&M's® to friends. Next, s-l-o-w-l-y peel off the label. What doesn't peel off can be removed with a strip of masking tape or with one of the many solvents sold for this purpose. Then wash out the tube. Remember to wash the tube *after* removing the label. It's much more difficult doing this the other way around.

At a 90° angle from the hinged lid, drill a 1/8 inch hole through both sides. Be careful, as this is soft material and will drill through fast. Keep your fingers out of the way! *Don't* drill the hole for the paddle mount yet. It will be aligned and drilled later.

Take one of the Huffy® cushion grips out of the package and cut it into three pieces. You will use one of these thirds for each completed paddle. Get the tube started into the grip; it will be a tight fit. Holding the tube in one hand, hold the other hand palm up and press the tube down into the grip on this other hand. Your hand will create an air seal, allowing the trapped air inside the grip to balloon out, thus making the tube insertion easier. I have tried doing this a number of different ways, and this way is by far the easiest.

Making the Paddle

Take your brass strip and mark it off as shown in fig. 1. The "paddles" themselves will be 1 inch long, with the center mount being 1 1/2 inches long. Drill the hole to match the jacks threaded part; the ones I've been using are 1/4 inch. *Please* be sure to clamp down the piece you are drilling, as it is very flimsy and will distort badly. It would be ideal if you were able to find a *heavy* paper punch of the proper size and use that instead of drilling. You will get three paddles from each strip, plus have a little scrap piece.

Let's Put It All Together!

Through the two 1/8 inch holes you drilled earlier, you will insert the brass screws as follows. Thread one nut all the way onto

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e-mail: <kb9oce@aol.com>

Materials

1 – Mini-M&M's® tube (Walmart, 44¢)
2 – #8 3/8" brass machine screws (Ace, 13¢ each)
4 – #8 brass nuts (Ace, 10¢ each)
1 – 1/8" stereo jack (varies, around $1.50)
1 – 1/2" × 12" × .o32" brass strip (Ace, 69¢ each)
1 – Huffy® #91720 Cushion Grips (ServiStar, $3.99 pack) *or*
1 – Franklin® #700856 Street Hockey Tape (Walmart $1.29 roll)
Insulated hook-up wire, any small gauge will do.

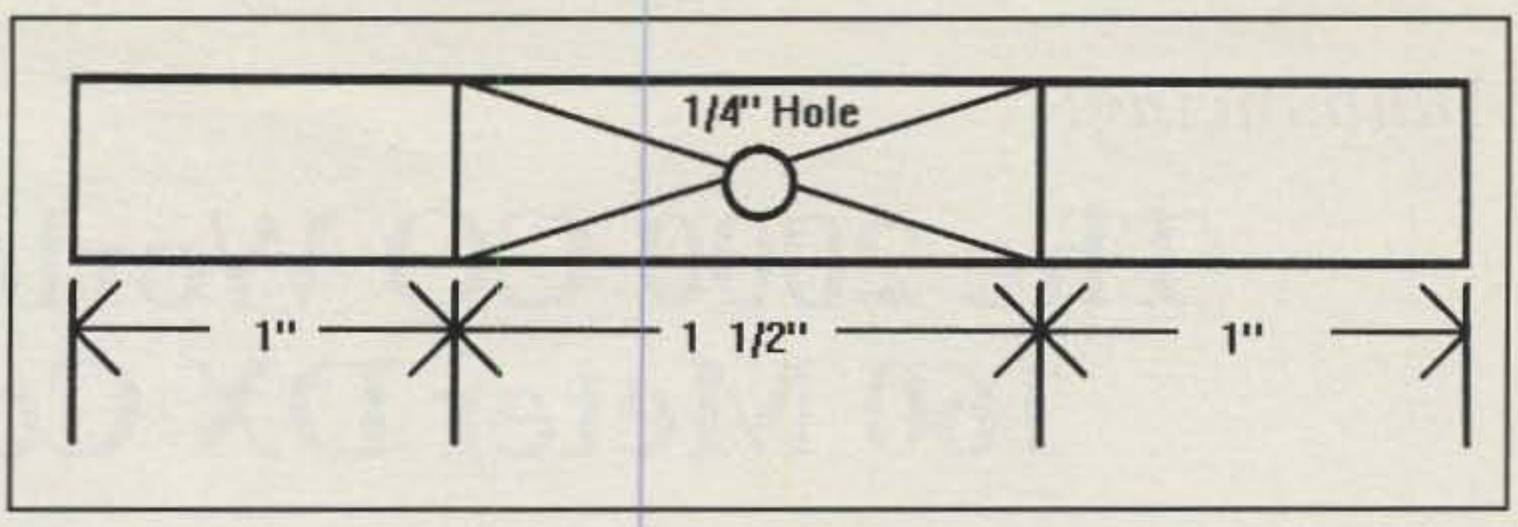

Fig. 1– Layout of the 1/2" × .032" brass strip used for the paddles.

Pop the lid of the Mini-M&M® container and you can see the simple construction.

each of the screws. Thread the screws into each of the holes until it just pokes through on the inside. Do not drive it all the way in yet.

The next step could be done either of two ways. The first method is cheapest. Solder a 2 1/2 inch piece of wire to each of the two remaining nuts. Solder the other end of each wire to two of the jack terminals, being careful *not* to use the terminal that is the shield, or ground. The second method is to use crimp-on connectors instead of soldering to the nuts. You still have to solder to the jack, so that's up to you.

Drop one soldered nut or crimp-on connector and its wire down into the tube. With a fingertip, maneuver the nut into position over the screw and hold it firmly in place. Thread the screw all the way in, tightening it. Repeat with the other screw. Close the cap, being careful not to crimp the wires in it.

Take your marked and drilled brass strip and position it on the cap so that the screws are centered on the centers of the paddles. Mark the lid, open it, and drill it. All that's left to do is insert the installed jack through the hole, add the paddles on top, and thread the jam nut onto the jack.

Plug a 1 ft. 8 inch stereo patch cord into the paddle, and the other end into your rig's paddle jack. To adjust contact spacing, open the lid and bend the paddles inward, then close the lid and bend them outward to the desired spacing. Hold the completed paddle between the thumb and index finger of your sending hand, with your thumb and index finger on the paddles. Allow it to swing down into your hand in a comfortable position. Send with your index finger and thumb. It will take a little getting used to at first, but within a few minutes you should be able to send as easily with the "Car Key" as you do with your desktop paddles at home.

Hopefully, this simple, inexpensive project will get you and your club started on homebrewing. If it gets just one person hooked on homebrewing, or just one more person on CW, then all my time will have been worthwhile. ■

Announcing:

The 2000 CQ World-Wide 160 Meter DX Contest

CW: 2200Z January 28 to 1600Z January 30
SSB: 2200Z February 25 to 1600Z February 27

The objective of these contests is for amateurs around the world to contact other amateurs in as many U.S. states, Canadian provinces, and countries as possible on the 160 meter band.

Classes: Single and multi-operator only. Use of packet, a spotting net, or logging assistance makes an entry multi-operator. Multi-operators should show the actual operator for each QSO. Under single operator there will be a designation of power level: H = power over 150 watts, L = power under 150 watts, and Q = 5 watts or less. There will continue to be only listings per state or country, but if there is sufficient activity or if a high enough score is made, then a separate certificate will be issued. Minimum score for the separate certificate is 5,000 points! Multi-operators will all be considered high power.

Exchange: RS(T) and state for USA, province for Canada, and either prefix or country abbreviation for DX. Contacts without some location indicator will be ruled invalid.

Scoring: Contacts with stations in own country, 2 points. Contacts with other countries on same continent, 5 points. Contacts with other continents, 10 points. *Maritime mobile contacts count 5 points. There is no longer any multiplier value for a maritime mobile contact.*

Multiplier: Each continental U.S. State (48), USA District of Columbia (DC), Canadian area (13), and DX country. KL7 and KH6 are considered DX and not states for this contest. DX countries are DXCC plus WAE (IT, GM Shetland Islands, et al). Canadian areas include VO1, VO2, NB, NS, PEI, VE2, VE3, VE4, VE5, VE6, VE7, NWT, and Yukon. Do not count States and Canada as separate countries. Remember that maritime mobiles no longer count as a multiplier.

Final Score: Total QSO points times the sum of all multipliers (states, VE, DX countries).

Penalties: Three additional contacts may be deleted for each unacknowledged duplicate or unverified contact removed from the log.

Disqualification: A log may be disqualified for violation of amateur radio regulations, unsportsmanlike conduct, or claiming excessive duplicate/unverified contacts or false multipliers.Logs that shrink more than 5% are subject to disqualification or warning. The calls of those warned or disqualified may be printed with the results.

Awards: Certificates will be awarded to the top scorers in each class by state, Canadian area, and DX country. Runners-up with high scores over 100,000 may also receive certificates. Low power or QRP entries may also receive certificates if there is sufficient activity or the score is outstanding. The following plaques, with donating sponsors as indicated, will be awarded for exceptional efforts.

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Canada	K2UFT	WØETC
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Zone 4 USA	K4WA	W4UCK
Zone 5 USA	N4XMX	K4ODL
Europe	K9UWA	N4NX
Africa	(TBA)	WB4ZNH
Oceania	(TBA)	K4IS
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Japan*	W4ZV	—
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(N4IN Memorial Plaques)		

MULTI-OPERATOR

World	N4RJ	SE DX Club
USA	W8UVZ, WØCD, K8GG	WB9Z
Zone 3	4X4NJ	4X4NJ

**There is no SSB operation allowed in Japan at the present.*
***North America outside USA and Canada.*

The plaque procedure is the top scorer in the indicated area wins the plaque. However, a station can only win one plaque per contest section. The plaque is then awarded to the next highest scoring station. For example, WX8ZZZ wins top World Multi-Operator. Then the next station in the U.S.A. wins the U.S.A. plaque.

Intercontinental DX Window: 1830 to 1835 kHz should be left clear for DX stations for intercontinental QSOs in both contests. This is still voluntary but essential if the contest is to continue to attract rare DX as entries. **USA, Canadian, and European stations should refrain from using the window for local contacts.** Please stay away from the window edges, too. This is a gentleman's contest and band, so let's help make intercontinental contacts happen.

Computer Logging: Please send us your computer disk. IBM, MS-DOS compatible disks are encouraged. E-mail logs are also accepted. The format preferred is the log in ASCII text, a summary page, and the dupe list (all calls in alpha sort order). Please *do not* send .bin types of files. The committee will require, on request, a disk for any possible high score, provided that the paper log or dupe checking material as originally submitted was a computer printout. The outside of the disk should be clearly labeled with the call of the entrant, the files included, the mode (SSB or CW), and the category. Disks **must** be accompanied by a paper summary and dupe sheet, or are subject to **penalties or disqualification**.

Manual Logs: Sample log and summary sheets may be obtained from *CQ* by sending a large SASE with sufficient postage to cover your request. You can make your own with 40 contacts per page with columns for GMT, exchanges, multiplier, and points.

Dupe/Check Sheets: All logs over 200 contacts must provide a check sheet or dupe list. A check sheet or dupe list is a list of all calls in alpha sorted order.

For All Logs: Show the multiplier only the first time it is worked. Each page must have sub-totals for multipliers, contacts, and points. A running total below the sub-total on each page is recommended. Dupe or check sheets with every entry are requested and are required with over 200 QSOs. Include a summary sheet with your entry showing the scoring and other essential information. Include a printed name/mailing address and a signed declaration that all rules have been observed. Please put the summary sheet at the front of the log. All logs should clearly indicate total multiplier, W/VE multiplier, and DX multiplier.

Club Competition: Any club that submits at least three logs can enter the Club Competition. The name of the club must be clearly identified under club competition on the summary sheet. Club competition is a "for fun" competition to foster more activity. There is a separate listing for the club scores.

Log Submissions: Mailing deadline for CW entries is Feb. 28, 2000; for SSB entries the deadline is March 31, 2000. *Exception:* You may send both logs in one package as long as the CW log is received by March 31, 2000. Try to mail early to assure receipt. For a return receipt enclose an SASE or SAE with postage or 1 IRC. Avoid the registered postal route, as this delays getting the log until someone can sign the receipt! Proofread your log before submission. Each year many errors are corrected that you should catch! Logs or sections of a log that are unreadable will be disqualified.

Send e-mail logs to: <**cq160@contesting.com**>. Remember to send text logs, summary sheet, and alpha sorted dupe list.

Send all other logs to 160 Meter Contest Director David L. Thompson, K4JRB, 4166 Mill Stone Ct., Norcross, GA 30092 USA. **Indicate CW or SSB on envelope or e-mail header.**

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This appears to be an idyllic suburban homesite, but there is more here than meets the average viewer's eye. What did you miss? Read W5THT's account of how he enhanced the appearance of his QTH and also erected an antenna not obvious to the casual observer.

A Thing of Beauty And Sneaky, Too

BY PATRICK E. HAMEL*, W5THT

I am sure that all readers have heard the expression "A thing of beauty is a joy to behold" and have accepted it without question. After all, a fact is a fact. How did our acceptance of that basic premise change when we learned that "Beauty is in the eye of the beholder?" What is beautiful to one may not be beautiful to another, especially when there are many possible facets to the interpretation of beauty. In the case of my flagpole, however, I found that the real definition of beauty must also include functionality.

Take a look at photos 1 and 2. Look at the sunlight gleaming off the aluminum flagpole. Observe the flower bed at the base. An attractive setting? You bet it is! But is it only a landscape-enhancing patriotic symbol, or is it something more? Does it have my additional requirement for *true* beauty—functionality? Believe me when I say it certainly does include that second factor. It happens to be my 40 meter vertical ham antenna.

This article was written for those who must live without obvious antennas or for those who merely want to build an effective vertical. This antenna can provide an efficient radiation capability without being readily identified as such. No exotic material is required, and the overall cost is quite modest. It was made primarily from 2 inch ID rigid aluminum electrical conduit, a product readily available at any electrical supply house. Assembling a 31 foot long section of conduit as shown in this article, along with appropriate radials, results in an efficient antenna designed for resonance on the 40 meter band. The construction is simple and yet rugged enough to withstand extreme weather conditions, including strong winds.

Aluminum conduit is normally sold "off the rack" in 10 foot lengths. Each section comes threaded at both ends, and one coupling is supplied with each unit. Four 10 foot sections are required for the 40 meter vertical. The radiator is made up of three of the 10 foot sections plus a 1 foot section cut from the fourth section of conduit. A portion of the remainder of the fourth piece is buried in the ground to support the entire mast. An insulator, constructed as described below, separates the radiator and the buried support pipe. See fig. 1 for an overview of the entire antenna structure.

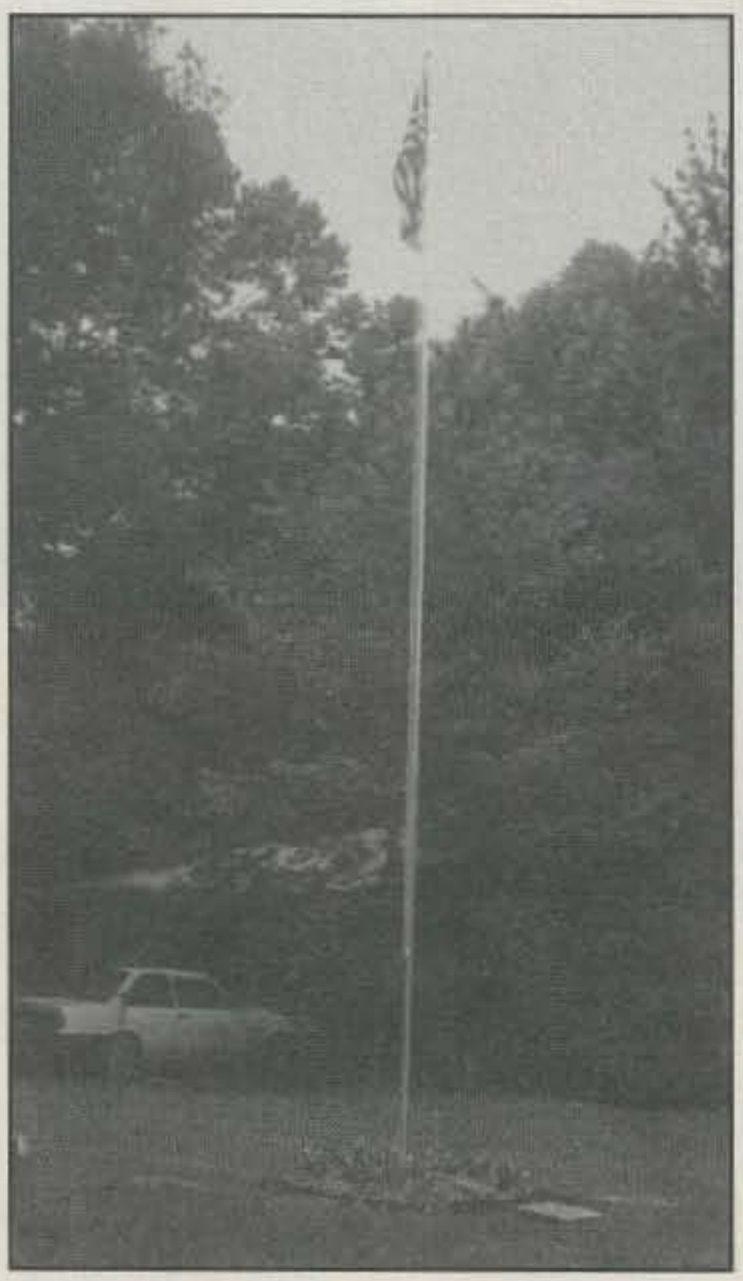

Photo 1– Flagpole at the QTH of W5THT.

Photo 2– Close-up view of the flagpole.

The standard 2 inch conduit has an inner diameter of 2 inches and a 3/16 inch wall thickness. It is quite light, but it is strong enough for the purpose intended. If you plan to install a shorter vertical for higher frequencies, the diameter of the conduit can be scaled down appropriately and still be used safely.

In addition to the conduit, the only other materials needed are some PVC pipe and adapters, a short length of number 6 copper wire for the ground connection, at least 500 feet of number 14 house wire for radials, lugs (dual-rated AL/CU), and hardware. For the flag connection, a stainless-steel pulley, clips, cleats, eye-bolt, and 3/8 inch rope are needed (and of course a flag, if you want to complete the subterfuge).

Building a Good, Strong Base Insulator

The most critical part of the antenna is the base insulator; it must perform its insulating function but still be strong enough to support the antenna itself even when subjected to strong winds. The insulator is made from a 6 inch section of PVC 40 (see fig. 2) with a standard PVC repair coupling in the center and threaded PVC adapters at the top and bottom. The repair coupling adds to the strength of the assembly, and the threaded adapters allow connection to the aluminum conduit.

This "insulator" is potentially the weakest point in the structure. In my first design I used a 2 inch diameter waterproofed piece of wood inserted into the insulator

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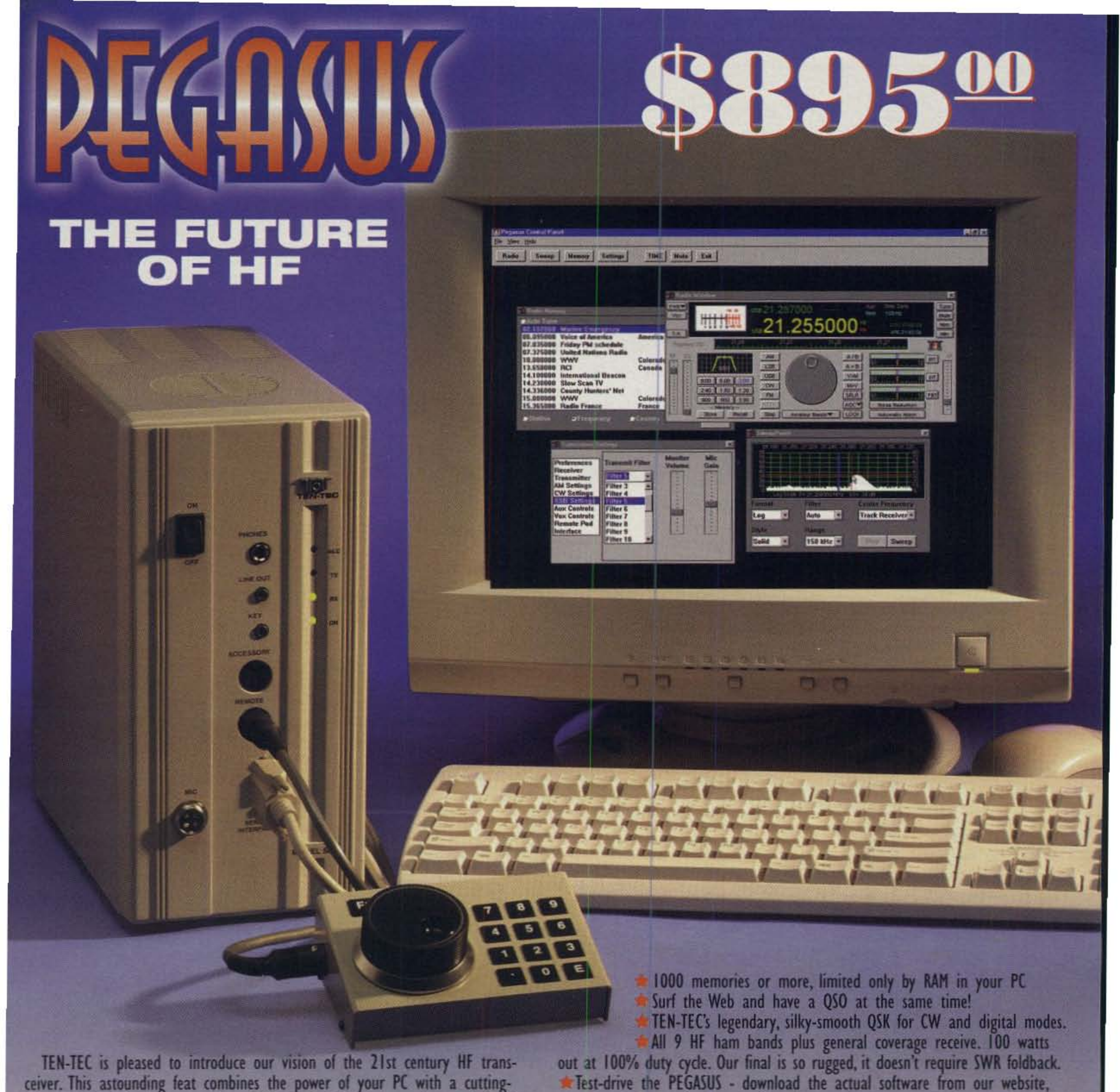

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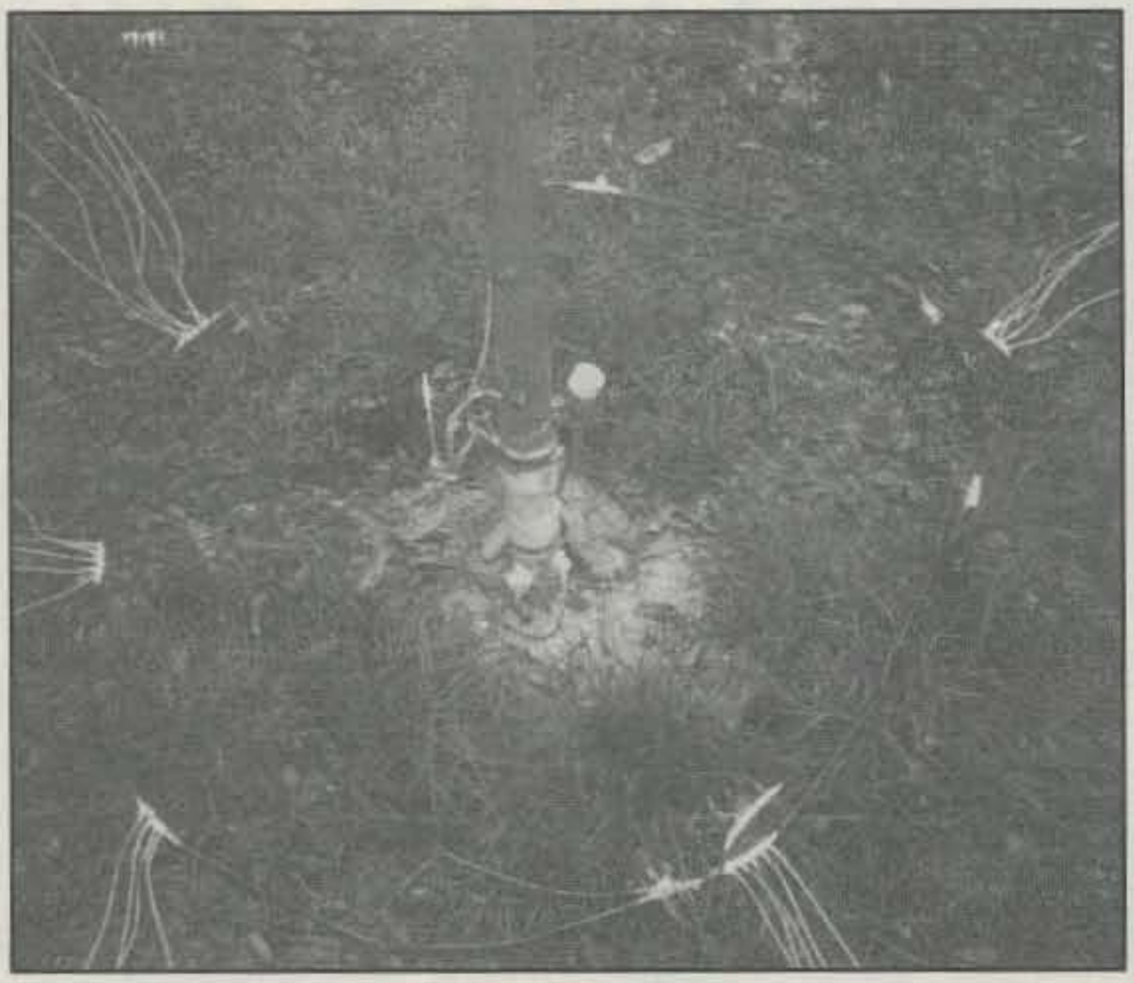


Photo 3– The ground system. The loop is connected to the buried ground conduit and 25 radials. The white material is liquid tape the author was testing for this application.

Photo 4– Close-up of the base of the antenna after all wires were buried.

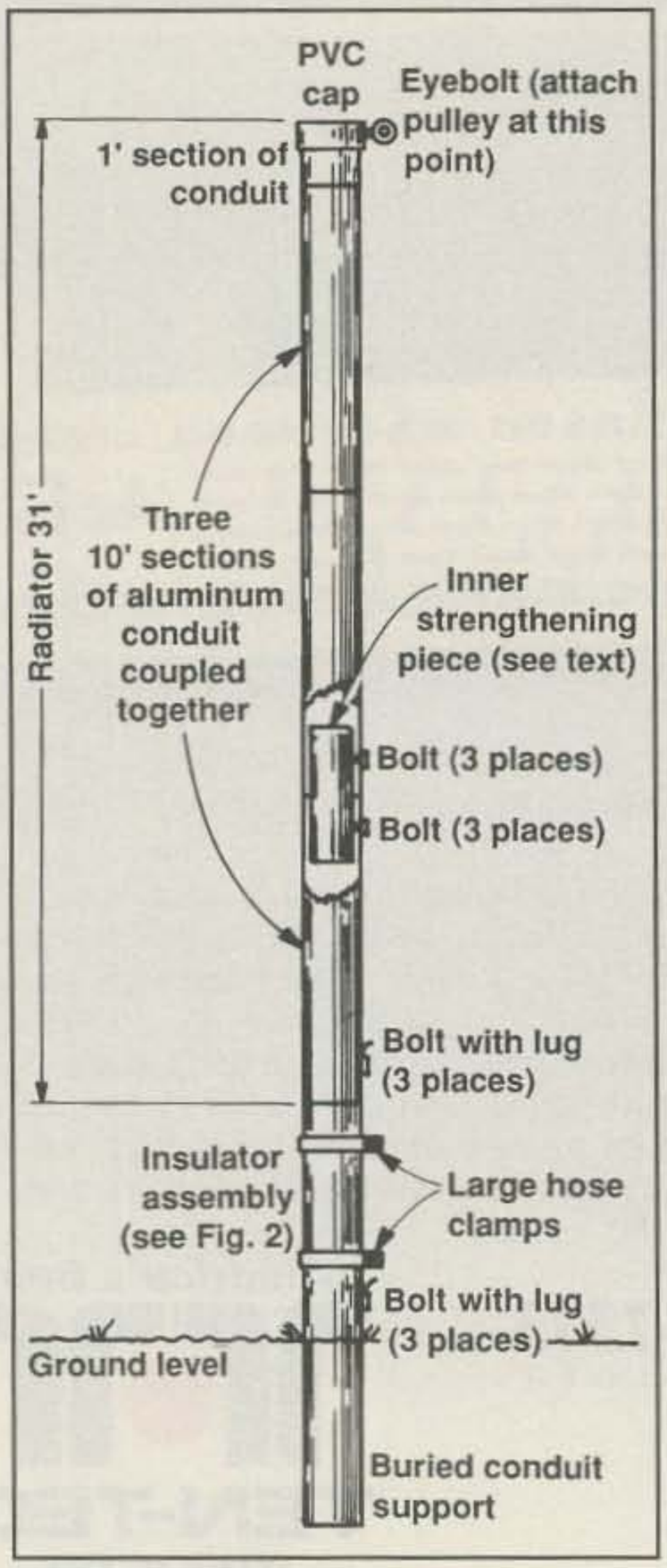


Fig. 1– Overview of the flag-pole antenna.

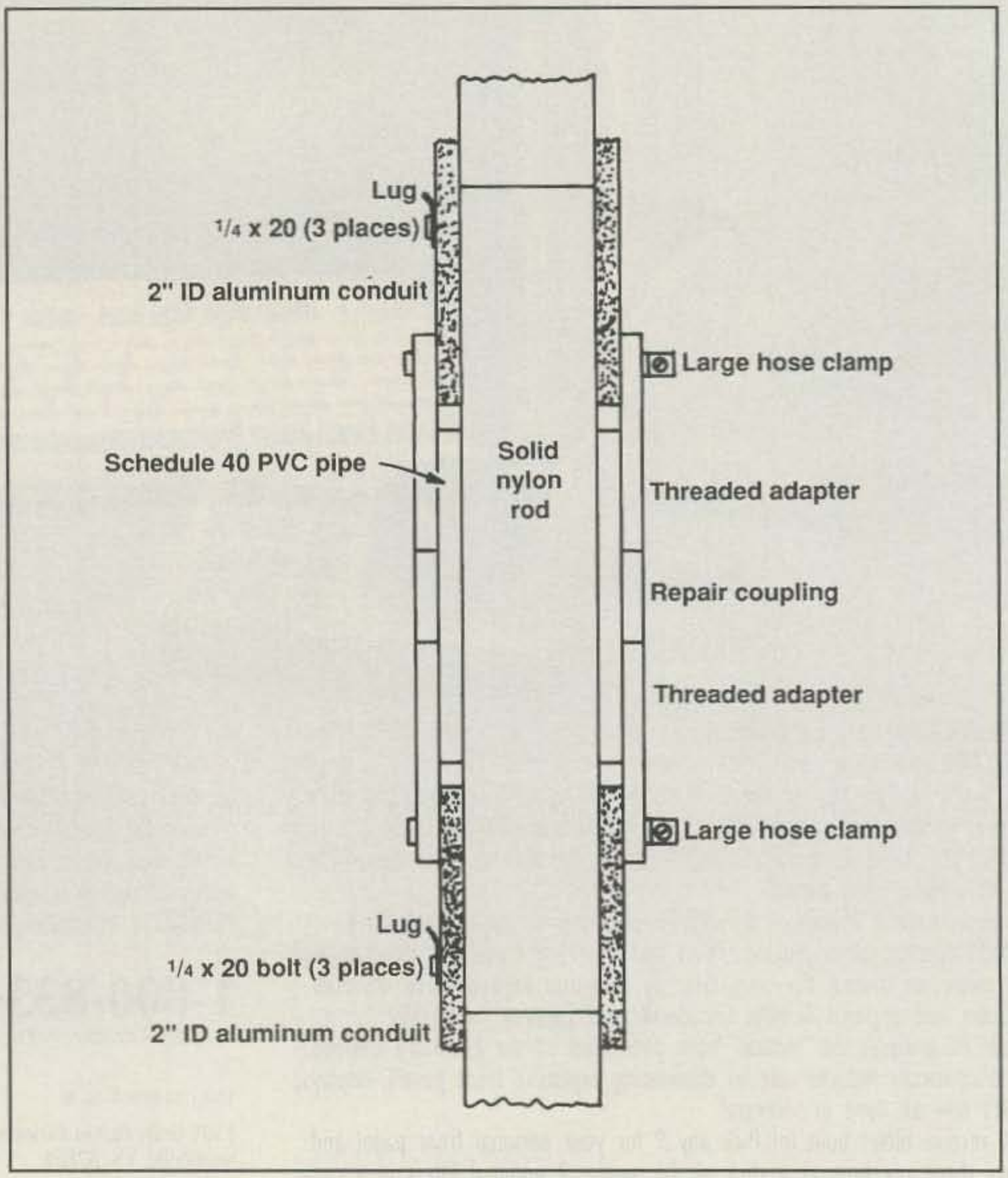


Fig. 2– Base insulator assembly, cross-section view.

body for additional strength. Hurricane Georges broke it off in a couple of hours—so much for wood. My final design uses a 2 inch OD solid nylon rod inside the PVC insulator. It is well "gooped" with RTV (tub caulk) to seal the assembly from moisture. As an added precaution, I installed large hose clamps around the top and bottom threaded PVC adapters. This final design has withstood the elements without any problems.

Assembly and Construction

The following are the steps required to build this antenna.

Assemble the insulator assembly per the instructions above and fig. 2. Let all cement dry; set aside.

Determine the length of conduit to be buried and cut that length from one of the 10 foot sections. The longer the buried piece, the stronger the final flagpole. Seal the unthreaded open end (a cap or RTV works well) and screw the conduit into the insulator assembly.

Just above ground level point tap the conduit and nylon rod around the circumference of the pipe in three places. (The aluminum is soft enough to be tapped easily.) Bolt together using 1/4 20 stainless bolts and washers, include lugs on all bolts, and ensure that the lugs make firm contact with the aluminum. These lugs will be used for connection of the radials and the coax outer shield. Attach a large hose clamp around the bottom PVC threaded adapter for greater strength.

Assemble three 10 foot sections and one 1 foot section of conduit for the radiator section. At the first joint (closest to the insulator) insert a strengthening element consisting of piece of 1 1/2 inch schedule 40 PVC pipe wrapped with enough aluminum ductwork tape to make a snug fit. Screw sections of conduit together tightly using two large wrenches (protect the surface of the aluminum while using the wrench). *Do not* use Teflon® tape in the joints. There *must* be a tight, clean, aluminum-to-aluminum contact between conduit sections. At the lower joint (the one with the insert) tap and insert three bolts above and below the threaded section to hold the insert in place. Additional support is not required for the top two joints in the radiator.

Close the top of the mast with a PVC cap and fasten the cap in place with an eye-bolt drilled through the cap and pipe. Use this bolt to attach a stainless steel pulley at the peak of the flagpole. Thread 65 feet of 3/8 inch rope (good marine grade) through the pulley to be used to raise and lower the flag.

Screw the assembled radiator section firmly into the insulator assembly. Tap and insert three bolts into the conduit and nylon rod just above the insulator. Again, include lugs on all of the bolts tightened firmly against the aluminum conduit; these will be used for connection to the feed lines. Use a large hose clamp around the upper PVC threaded adapter for strength.

Prepare a hole in the ground (I used concrete, but a well-tamped dirt installation should be acceptable.) and install the flagpole. Please note that it takes two fairly strong individuals to raise the mast, and suitable guys and supports should be used to minimize any risks.

Add a cleat to the radiator, which can be used to fasten the flag rope. Add clips to the rope to attach a flag when the installation is complete.

After installation and when everything is dry or set, prepare a grounding system by installing radials as described below.

Grounding

The ground system shown in photo 3 can be assembled elsewhere and placed around the antenna base just before the flower bed is planted over it. A large wire loop of No. 6 copper wire is connected at equal spacing to twenty 25 foot long radials. One 500 foot spool of No. 14 house wire was used for the radials. Both ends of the "loop" are connected to lugs on the lower section of conduit (the buried section). Good soldered joints should be used throughout the ground system. Bury the loop an inch or two below the surface. Spread out the radials and bury them in a similar manner.

Without the ground radial system, the flagpole input impedance measured over 120 ohms, making its usefulness as an antenna questionable. With the 20 radials shown, the SWR is below 1.5 to 1 for the entire 40 meter band. It has turned out to be a really super performer.

I have experimented to a limited degree with expanding the frequency capability of this antenna. I used the rope for the flag to haul an antenna wire up to the peak (31 feet). With a 120 foot length of antenna wire connected to one of the lugs on the radiator section, raised to the peak and then spread out at an angle to a convenient tree (or fence), I was able to get useful radiation on 160 meters. My tests are in too early a stage for any firm recommendations. However, I would be interested in any experiments readers conduct with this concept.

Conclusion

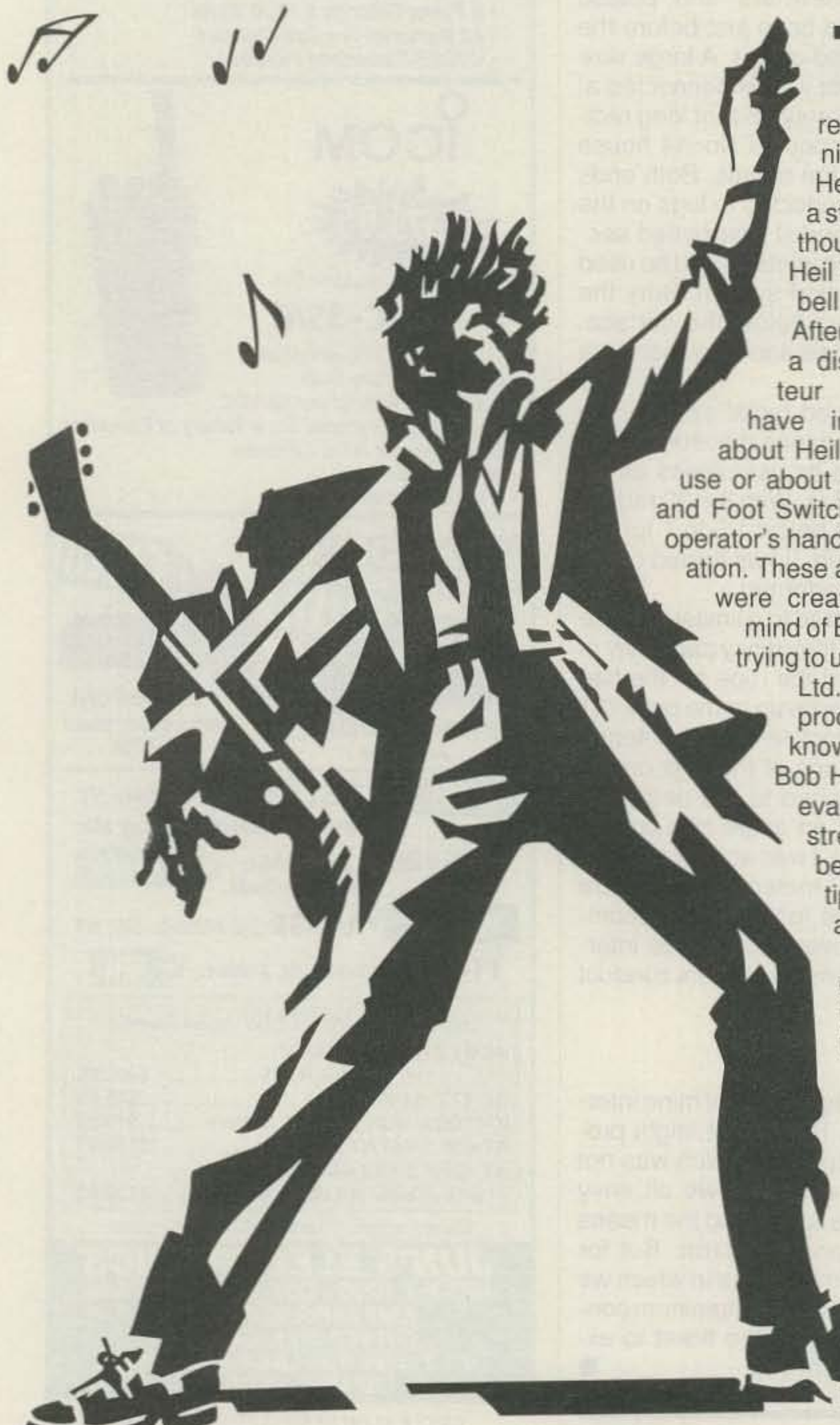
I hope you find this approach of mine interesting and helpful. Perhaps it might provide a 40 meter capability which was not available until now. I know we all envy those who have the space and the means to install a large antenna farm. But for those of us with a limited area in which we can install an antenna, this aluminum conduit flagpole can be just the ticket to expanding our ham horizons. ■

In amateur radio circles Bob Heil, K9EID, is perhaps best known for his microphones, Boomset™, and Foot Switch. There are, however, many other sides of this accomplished inventor and entrepreneur.

Amateur Radio and Rock 'n Roll

Bob Heil, K9EID

BY LEW OZIMEK*, N2OZ



There is a possibility that a number of readers may recognize the name Bob Heil, K9EID. There is a stronger probability, though, that the name Heil Sound Ltd. rings a bell of recognition. After all, during QSOs, a discussion of amateur equipment may have included remarks about Heil microphone(s) in use or about a Heil Boomset™ and Foot Switch which freed the operator's hands for ease of operation. These are products which were created by the fertile mind of Bob Heil. However, trying to use only Heil Sound Ltd. amateur radio products to get to know and understand Bob Heil is like trying to evaluate the size and strength of an iceberg by looking at the tip which protrudes above the water.

I became aware of the depth of interesting information surrounding the founder and guiding light of Heil Sound when I reviewed a new product for *CQ*. Some of the literature sent by the company briefly alluded to Bob's background, but it was a tantalizing glimpse at best. He is certainly an avid radio amateur and unquestionably a successful entrepreneur and recognized sound specialist, but—and this is what caught my eye—he is also an individual with unexpected multifaceted interests which go far beyond those already noted. To appreciate Bob as an individual, it might pay to probe, ever so slightly, into his background, his history, and his experiences.

Music

Bob had two major interests when he was in his pre- and early teens—amateur radio and music. There is no way of knowing which interest predominated, if either, but it is evident that both exerted strong influences on his life.

Bob's musical training started before he entered high school, when he began taking accordion lessons. His musical ability became evident shortly thereafter. Music was not a solitary attraction, because at the same time he developed an interest in amateur radio. With the objective of getting a ham license, he studied Morse code diligently with a friend. His friend's parents happened to have an organ in their home, and whenever Bob visited for code practice, he always found time to spend on the organ's keyboard. Not only did he become proficient in code, but his organ playing progressed beyond a level expected of someone studying on his own. His friend's father, who was the school music teacher, was so impressed with Bob's natural playing ability that he invited Bob's parents over to listen to him play. His parents were impressed, so much so that they bought

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AMERITRON's new 800/H amplifiers cover 160-15 Meters including WARC bands. The AL-800 has a single Eimac™ 3CX800A7 tube and produces 1250 Watts PEP. The AL-800H has two 3CX800A7s giving 1500 Watts plus.

Both amps have an adjustable slug tuned input circuit, grid protection, ALC control that is front panel adjustable,vernier reduction drives, heavy duty 32 pound grain oriented silicone steel core transformers and high capacitance computer grade filter capacitors.

These amplifiers have multi-voltage operation (14 user selectable AC line voltage from 90-140; 200-250 VAC), quiet pressurized ventilation systems, dual illuminated Cross-Needle meters that read peak forward and reflected power, SWR, high voltage, grid current and plate current.

Vernier reduction drives make tuning adjustments smooth and easy. Ameritron's exclusive *Step-Start Inrush Protection™* stops damage to your amplifier from inrush current. Ameritron amps feature an attractive Lexan front panel decal and superior, all metal construction -- it's built to last! Ultra compact desktop size is perfect for your operating station. 8½ x16½ x14¼".

AMERITRON no tune Solid State Amplifiers

Ameritron ALS-500M Mobile no tune Solid State Amp has 500W out, covers 1.5-22 MHz

ALS-500M
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Suggested Retail

Ideal Mobile amplifier -- uses 13.8 Vdc mobile electrical system, very compact 3½x9x15 in., extremely quiet, 500W output, 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm up, no tubes, SWR protected.

Ameritron ALS-600 no tune Solid State base amp includes heavy duty power supply, 600 Watts out

ALS-600
$1299
Suggested Retail

No tuning, no fuss, no worries -- just turn it on and operate. *Includes* AC power supply, 600 W output, continuous 1.5-22 MHz coverage, instant bandswitching, *fully* SWR protected, extremely quiet, very compact. Amp is 6x9½x12 inches.

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AMERITRON's legal limit amplifiers use a super heavy duty Hypersil® power transformer capable of 2500 watts!

Ameritron's most powerful Linear

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Ameritron's super powerful amplifier uses the herculean Eimac® 8877 ceramic tube. It's so powerful that 65 watts drive gives you the full legal output -- and it's just loafing because the power supply is capable of 2500 Watts PEP.

Ameritron's 3CX1200A7 linear Amp

AL-1200
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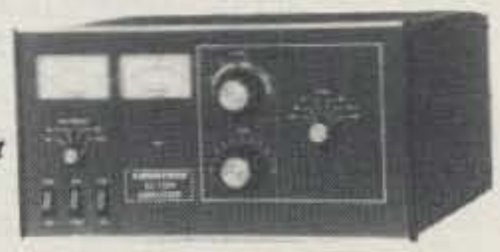

Get ham radio's *toughest* tube with the Ameritron AL-1200 -- the Eimac 3CX1200A7. It has a 50 watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loafs at full legal power -- it can deliver the power of more than 2500 watts PEP two tone output for a half hour.

Ameritron's dual 3-500 linear

AL-82
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This linear gives you full legal output using a *pair* of 3-500s. Most competing linears using 3-500s *can't* give you 1500 watts because their lightweight power supplies can't use these tubes to their full potential.

AMERITRON brings you the finest high power accessories!

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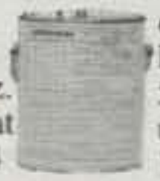
ADL-1500 Dummy Load with oil . . . $59.95



Oil cooled 50 ohm dummy load handles 1500 W for 5 minutes. SWR under 1.2 up to 30 MHz. Low SWR to 400 MHz.

ICP-120/240-$79

Stops power-up inrush current and absorbs momentary high voltage spikes to your amplifier. ICP-120 for 110-120V, ICP-240 for 220-240 V.

ATR-15 Legal Limit Antenna Tuner . . . $399

Designed for legal limit amplifiers! Covers 1.8-30 MHz, peak reading SWR/Wattmeter, 6 pos. antenna switch, 1:1 or 4:1 balun.

ARB-700/702 amp-to-radio interface . . 39.95

Protects your costly transceiver from damage by *keying line transients*, steady state current and excessive voltages.

QSK-5 Pin Diode T/R Switch . . . $349

Self-contained, connects externally to most HF amps. Handles 2.5 KW PEP, 2 KW CW. Six times faster than vacuum relay. 6x4x9½ in.

TP-100 Tuning Pulser lets you safely tune your amplifier . . . $49.95

Pulse tuning lets you *safely* tune up your amplifier for full power output and best linearity. Keeps average power to low safe level to prevent overheating, tube damage, power supply stress and premature component failure.

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Whisper quiet fan. Handles any legal limit amplifier -- 2500 Watts average power for 1 minute on, ten off. 300 Watts continuous. SWR below 1.25 to 30 MHz and SWR below 1.4 to 60 MHz.

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Here Bob Heil is checking 40 meters. It was with this very console that he invented his world-famous Key Element microphone cartridge and headsets.

Bob an organ in 1952. He could now constantly practice on the instrument of his choice in his own home.

Bob's talent was great enough to warrant being hired to entertain at functions such as local garden clubs and small neighborhood affairs. The types of functions involved gradually grew, until at the age of 14 he played a regular "gig" at a restaurant in a nearby town which proudly boasted of having a small Wurlitzer organ.

It wasn't long before Bob developed a group of followers at the restaurant, and one of his fans strongly urged him to contact Stan Kann, a virtuoso on the organ who was a popular fixture on local radio and the featured organist on a Mighty Wurlitzer at the Fox Theater in St. Louis, Missouri. Bob's parents thought that was a good idea and quickly arranged a meeting with Kann. This meeting actually became an audition for the young man.

Bob said, describing his audition, "I will never forget the first sight of that Mighty Wurlitzer in my whole life. Kann raised the organ from the pit while he was playing and I thought I was in heaven. Understand, I was a 15-year-old kid staring at this monster organ while listening to beautiful music. When he let me play it, I was overwhelmed. I asked the maestro how long it would take for me to really learn how to play that instrument and Kann replied, 'A long time, but we'll work on it.'"

Although Stan Kann was not a teacher, he was so impressed with Bob's ability that he arranged to give him hour-long lessons for the next year.

Strangely, the very next day Kann was called away to an important meeting and he imposed on Bob to fill in for him at the theater. Bob was shocked. "How can I play that?" he stammered. "Don't worry. I'll set it all up for you," Kann replied. "All you have to do is sit down and play. The audience will never know the difference." And play Bob did. In fact, he continued to play at the Fox every week for six years.

Early Amateur Radio

Despite his activity in music, Bob Heil's interest in radio was just as strong. In fact his radio/electronic knowledge and experience was growing as fast as his capability on the keyboard. He became a licensed amateur radio operator when he was 15. A chance contact on the air led to a personal meeting with Larry Burroughs, chief engineer of radio station KMOX. Thus, the same year he started working with Kann, Bob also had an opportunity to fully explore a commercial radio station engineering booth. Burroughs became his Elmer and taught him the fundamentals of electronics, including the building and repair of all sorts of radio equipment.

This dual interest continued unabated throughout high school. After graduation Bob went to the St. Louis Institute of Music. However, after a year of study he left formal education for keeps.

The Repair Business

In the early 1960s Bob was busy playing the organ at a Holiday Inn and teaching music in a small music shop in Marissa, Illinois. During a visit to the Fox Theater to see his old friend Stan Kann, Bob wound up taking home two huge speakers the theater was about to discard. He used those speakers and their enclosures to create a powerful sound amplification system. This creation eventually changed the face of rock 'n roll concerts forever.

"I used to take my sound system to the Panorama Bowling Lanes on Thursday nights when a young local group called The Guild entertained," Heil said. "They were kind of my guinea pigs for sound amplification, but I was also learning about rock 'n roll, and believe me I had a lot to learn. I was a theater organist who normally played the music of the '20s. What did I know about this new music?"

Bob developed not only a fundamental knowledge about how to use amplifier systems for musical groups, but also how

The original Heil plant in Marissa, "rock 'n roll equipment capital of the world."

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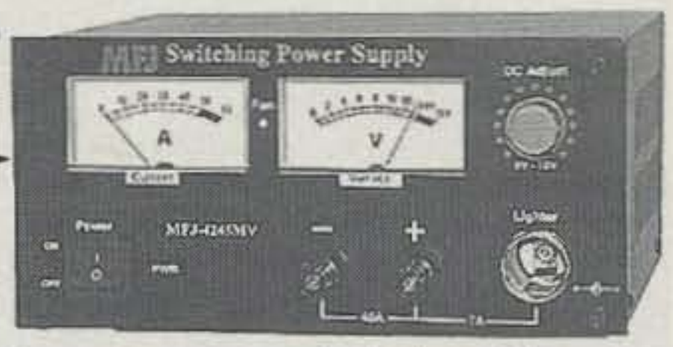

They are fully protected with Over Voltage and Over Current protection circuits.

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MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Replaceable fuse.

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Front-panel control lets you vary output from 9 to 15 Volts DC.

Front-panel has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Brightly illuminated 3 inch meters let you monitor load voltage and current.

A whisper quiet internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D in.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

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Super light, super compact switching power supply delivers 25 Amps maximum/22 Amps continuous at 13.8 Volts DC. Low ripple, highly regulated. *No RF Hash!* Five-way binding posts for high current. Quick connects for accessories. Over voltage/current protection. 110 or 220 VAC operation. Meets FCC Class B regs. 3.5 lbs. 5½Wx2½Hx10¾D in.

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Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

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MFJ's heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¼D inches.

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Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

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MFJ-1118, $74.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

Two pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

Built-in 0-25 VDC voltmeter. Six feet super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs. Heavy duty aluminum construction. 12½x2¾x2½ in.

MFJ-1116, $49.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $34.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

NEW! **MFJ-1117, $54.95.** For powering four HF /VHF radios (two at 35 Amps each and two at 35 Amps combined) simultaneously. Tiny 8x2x3 inches.

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Bob with the 1962 Fender amplifier he "hot rodded" for Paul McCartney.

to repair such equipment, eventually mastering the art of amplifier repair. Gradually musicians started to bring their amplifiers to the music shop, and Bob's reputation as a repair guru grew. Standard radio/television repair shops seemed to shun this type of work because the musician customers involved were considered unsavory. Bob had no such reticence, and he welcomed the chance to earn extra money. He helped Marissa, Illinois become a rock Mecca. Regional bands came from all over to the little music shop to get their amplifiers repaired.

The Big Break

In 1969 Bob's big break came. The Grateful Dead arrived in town without their sound equipment and without their sound man. The truck carrying the equipment had been confiscated by the FBI, and the sound man was being held under suspicion of carrying illegal substances.

About 6000 people waited outside the Fox to hear the concert, but The Dead were there without amplifiers. A Fox stagehand contacted Bob to see if anything could be done. Bob had his ex-theater speakers and amplifier system ready, and he quickly struck a deal with Jerry Garcia, the leader of The Grateful Dead. It did not take Bob long to move his gear to the theater and set up for the concert. When Garcia heard the system, he could not believe his ears; they had never used anything that came close to the big amplifiers and speakers put together by Bob.

Even though Bob still knew very little about rock 'n roll, he did have a performer's instincts and he recognized what went well together. He had invented the live concert sound reinforcement industry. Those "big P.A." systems enabled rock headliners to fill auditoriums and amphitheaters with sound that was not only loud, but of the highest fidelity. He set the standards for the types of sound systems we see and hear today in large concert halls. Garcia recognized it at once and insisted that Bob go on tour with The Grateful Dead until the original sound man was available to resume his duties.

The '70s

In 1970 Bob began a ten-year stint with The Who when he was invited to join their "Who's Next" tour. The Who had started that tour in Saratoga, New York with an outdoor concert for 200,000 fans. They used their standard small amplifier system, and the press panned the concert ruthlessly. The Who had heard about the sound system developed in Marissa, and a call to Bob resulted in his agreeing to join the group in Boston with the necessary equipment.

The first day of the Boston concert was still played with the old equipment and the newspapers massacred The Who. Bob arrived in time to set up for the second day's concert, and the band "blew the audience into the next state." The Who was so pleased with the results that they utilized Bob for the next ten years.

Bob spent a total of 12 years as a traveling sound man working with Humble Pie, Bachman-Turner Overdrive, J. Geils Band, Peter Frampton, Tina Turner, and Michael McDonald, as well as with The Who. He stopped touring in 1980, when

The Who retired after the death of Keith Moon. Bob's contributions to the industry are legendary.

In 1994 Bob was awarded the Pioneer Award by the 97th Audio Engineering Convention. It was the first-ever "Live Sound Award." The selection was based on votes from readers polled by *Live Sound International Magazine.* He beat out Terry Hanley, who helped do the sound for the original Woodstock; Harry McCune, who did the sound for the Beatles; and Stan Miller, who did the sound for Neil Diamond—a prestigious group of competitors!

Don't think for a moment that all of this was strictly accidental. Bob's training as a musician and his performances on large pipe organs had created his ability to analyze and dissect musical sounds and to understand what was needed to present them to an audience. He is capable of listening to music that might be a blur to most listeners and identify guitar, or any instrument for that matter, intricacies and harmonics which need special handling within the audio mixer or in other parts of the sound system. It is no surprise that The Who acknowledged his contributions by giving him one of their gold records to show their appreciation and in recognition of his talent.

The Inventor and Entrepreneur

Bob's many inventions are a testimony to his active mind and innovative approach to problem solving. He developed protective cases for amplifiers so they would not be trashed on the road. He created interchangeable spare modules that could be quickly popped in place to repair amplifiers. Many times he repaired a part of an amplifier system in the middle of a concert without anyone in the audience being aware that a problem had occurred. He designed a "talk box," which when used with a guitar made the instrument sound like it was talking or singing. It was made famous by luminaries such as Peter Frampton, Joe Walsh, and Bon Jovi. Bob has sold tens of thousands of these interesting devices.

Bob's approach to sound installations was never to just plug in a system and then walk away. He constantly experimented and tried different combinations of equipment. He made suggestions to the performers; they listened and their music profited thereby. Heil wrote five books, including *Practical Guide For Concert Sound* which is still used as a guide today by sound technicians.

Bob was quick to recognize talent in others. One summer a 19-year-old engineering student from the University of Illinois (Tom Holman) came to work for Bob. The two of them teamed together to rebuild consoles and design new equipment such as mixers and filters. Tommy Holman eventually went off on his own to carve out a brilliant career. He designed an entirely new theater sound system called THX (Tomlinson Holman Xperiment) for the legendary George Lucas. Holman is now Corporate Technical Director for Lucas.

Through all of this, Bob never stopped being an entrepreneur. He founded Heil Systems Ltd. in 1967, and even during the period when he traveled extensively with musical groups, he continued to devote time to the company and helped to build its strength and capabilities. The company initially built amplifier systems which were highly prized in the industry. These amplifiers used color-coded modules which could be combined in numerous ways to achieve special performance characteristics. He built and sold Talk Boxes, which were popular with guitar soloists. He was also busy with electronic crossovers.

The Amateur Radio Market

In the early 1980s, Bob, amateur radio operator K9EID, focused his attention on the amateur radio market. He determined that the quality of transmit audio of amateur operators was poor. As a corrective measure he designed his HC series of

Bob Heil and Peter Frampton holding the Heil Talk Box, which Bob invented for Joe Walsh in 1970. Bob gave one to Penny Frampton, Peter's wife, and she gave it to Peter on Christmas Day 1973. The Talk Box was instrumental in sparking Peter's career.

microphone elements. Before long he was able to claim "We're now one of the leading—if not the leading—manufacturer of microphones and headsets."

Bob used the same principles to improve amateur radio audio that he used to improve concert audio. He stated, "It wasn't enough to be loud. You must be loud enough, but you also have to be articulate so the spoken words can be understood." Heil Sound Ltd. microphones and earphones are now very popular in the amateur radio community.

In 1982 Heil was named the Amateur Radio Operator of the Year, a very prestigious international award. That same award was given to the late Barry Goldwater the year before.

Bob has constantly searched for new "worlds" to conquer. "We got into the satellite business in 1984," Bob recalled. "I was the country's satellite dealer of the year in 1989." It was a designation bestowed on him by more than 4000 satellite dealers nationwide. It also earned him an added career as a lecturer at trade shows and seminars for companies such as Dolby and Pioneer.

In the mid '80s Bob embraced the home theater movement, but this business did not take off until 1992. Eventually he designed and installed over 1000 home audio/ video systems. These efforts resulted in his being hired by a company called Home Theater TV as a design consultant, technical advisor, and teacher. His systems evolved into sophisticated projection TV devices utilizing improved definition pictures. They are fully automated and include an unbelievably realistic audio system. Bob calls his system The Roxy, and it includes almost everything required to create a small-size theater, including cushioned seats.

In 1997 Bob moved Heil Sound Ltd. to Fairview Heights, Illinois, just in time to celebrate the company's 30th anniversary. The new facility encompasses a total of 5200 square feet and includes 10 employees. Bob restructured the corporate organization and upgraded the technical capability of the entire team. It has evolved into three divisions. One is a custom home audio/video sales and installation company with specialties covering home theater to home audio systems. Another is an industrial division which provides a similar service for commercial customers including banks, restaurants, churches, factories, and schools. Systems used in these two divisions are created by selecting and combining different modules to satisfy customer objectives. A total of 12 to 15 installations are made monthly in each of the two divisions. The third division emphasizes the needs of the amateur radio fraternity. The primary products here, of course, are microphones and earphones with their related accessories. The volume of business is roughly equally divided among each of the three divisions.

Now and The Future

It is apparent that Bob has enjoyed involvement in some exciting arenas, and it is likely that his mind will lead him to new activities in the future. The scope of his interests go beyond the day-to-day business activities of Heil Sound. His fascination with organs continues to this day. He plays regularly on a new theater pipe organ located in the Lincoln Theater in Belleville, Illinois. This organ was created from parts of three others by R. Wright and M. Mackley with assistance from Bob. It incorporated a new console and was mated to a 486 computer and a midi synthesizer. It includes 1500 pipes and has a capability of selecting the sounds of many musical instruments as well as creating many kinds of sound effects. Concerts are held every weekend before movie showings. Bob not only plays this organ almost every Saturday night, he also records musical selections on it. He recently combined some of his new recordings with organ recordings he had made earlier in his career and created a single recording called "Bob Heil 'Live'—Then and Now."

Bob collects and tinkers with organs. He built organs early in his career. In fact, he is credited with creating a hybrid electronic and pipe instrument that travels easily. Samples of his personal collection of organs are displayed in the Heil Sound Warehouse. Stored also are items which Heil hopes someday will be installed in a very special museum. These include a console from The Who's original 1970 "Who's Next" tour; the practice amplifier used by Paul McCartney after he formed Wings; Jeff Beck's guitar monitor; and an amplifier used by Rolling Stones' guitarist Keith Richards. It also includes the sound board that brought an array of acts headlining the Mississippi River Festival to their full sound potential and the original "Talk Box" Heil invented in 1970. There are other items which have not yet been catalogued, including his special collection of microphones. No indication was made of where Bob's collection of Ford Thunderbirds is kept. That's another of Bob's hobbies, the one he calls "a horrible disease."

Trying to adequately cover an individual such as Bob Heil is an impossible task. There are so many facets to be considered, it is easy to miss important points or to emphasize the wrong elements. His current activities extend far beyond the management of Heil Sound Ltd. Besides the musical efforts at the Lincoln Theater, he does a regular monthly radio show on CBS and a regular local TV show "Hi Tech Heil" on Fox TV. His lecture and consulting work continues on a regular basis, and he is still called upon as a special sound consultant by some of the concert performing groups. And to top it all, Bob frequently contributes articles to various technical publications.

Bob is a credit to the amateur radio community and an icon in the rock 'n roll and sound reinforcement industry. ■

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Anything else is just an antenna

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CQ Showcase

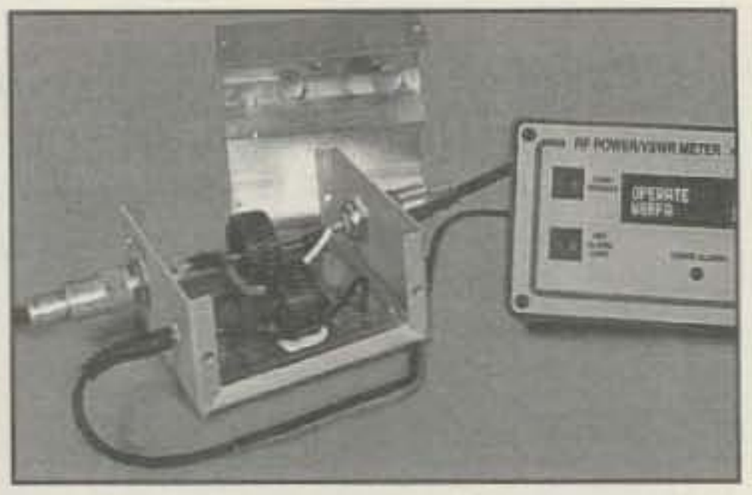
PAL Survival Light From Light Technology

A new state-of-the-art, palm-size (3 inch long) flashlight employs a white-light emitting diode (LED) rather than a conventional lightbulb. Weighing less than 3 ounces, the PAL Survival Light throws an intense beam of almost pure white light. Four light modes are offered: low beam, high beam, emergency flashing strobe light, and stand-by mode. The standby mode provides a pilot light that remains illuminated even when the switch is off, permitting the flashlight to be found even in the dark. It is moisture and shock resistant, and the unit's standard 9 volt battery (supplied) will last more than 20 times as long as batteries in a standard flashlight due to proprietary micro-circuitry that regulates power consumption.

The PAL Survival Light, available in a variety of colors, retails for $19.95, plus s&h and applicable sales tax. For more information, contact Light Technology, 571 Interstate Blvd., Sarasota, FL 34240 (800-593-7873; <www.lightechnology.com>), or circle number 102 on the reader service card.

RF Applications VFD Series RF Wattmeters

RF Applications has announced the new VFD Series RF wattmeters. The VFD features a two-line, 16-character vacuum fluorescent display that provides a 65-segment bargraph that shows peak RMS power and simultaneously indicates the power and VSWR levels alphanumerically. The HF model covers 1.8 to 30 MHz with a power rating from 15 to 2950 watts. A VHF model covers 50 to 150 MHz at 5 to 300 watts. The units have a settable SWR alarm (with optional VFD external relay for automatically protecting connected equipment), operate on 12 VDC, and connect to a feedline via a remote sensor. SO-239-type connectors are standard; N-type connectors are also available. A "power monitor" option provides a relay to control external devices when the unit senses power output, and a "vanity option" that personalizes the



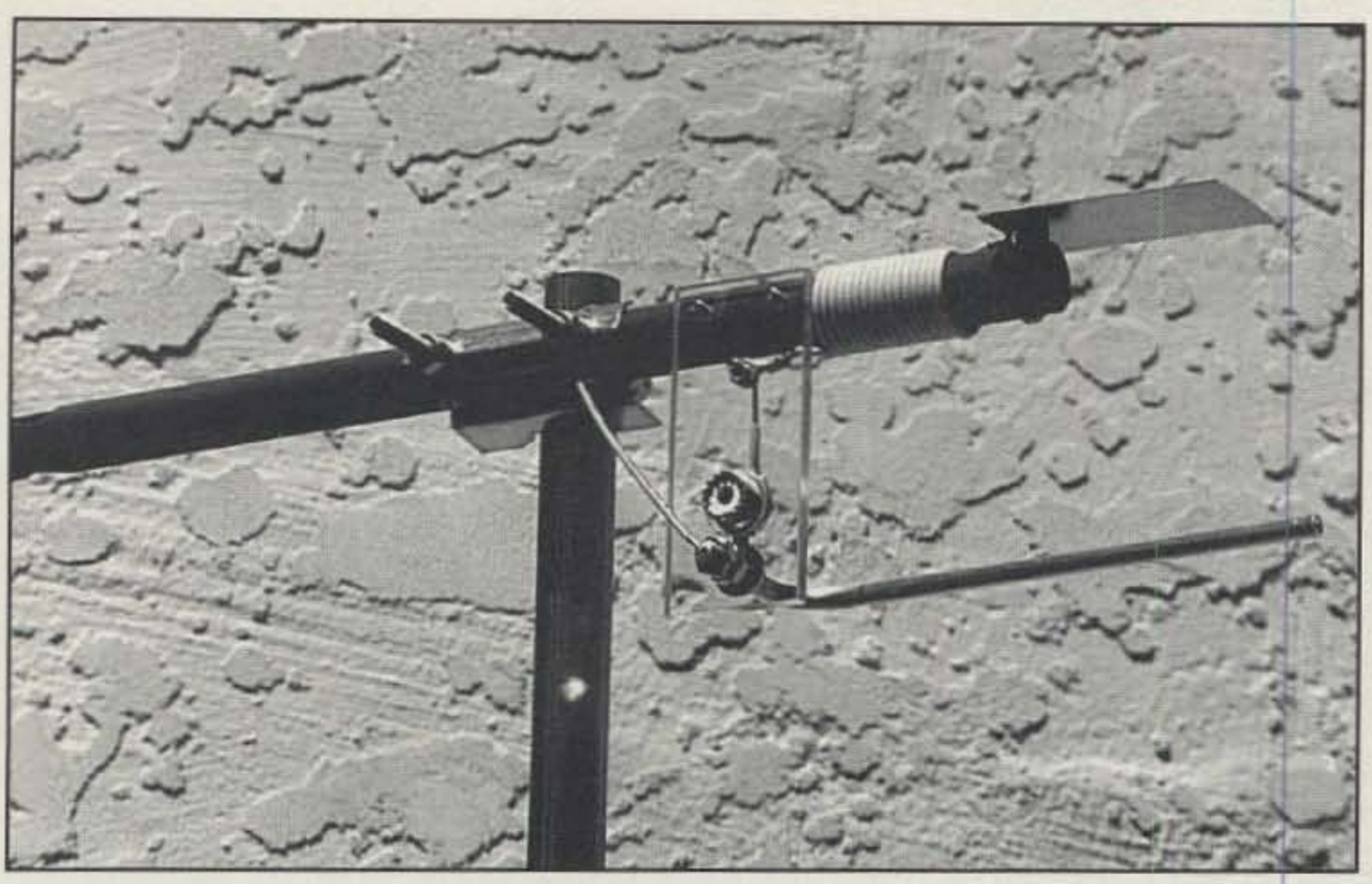
wattmeter display with the user's callsign (up to 11 characters).

List price for either the HF or VHF VFD series wattmeter is $249. The VFD relay option is $20; vanity option $20; and power monitoring option $35. For more information, contact RF Applications, 7345 Production Dr., Mentor, OH 44060 (440-974-1961; fax 440-974-9506; e-mail: <sales@rfapps.com>; web: <http://www.rfapps.com>), or circle number 103 on the reader service card.

Svetlana Y644 Tetrode

Svetlana's Y644 tetrode is a version of the 4CX250B. It is identical mechanically, but substantially different electrically because the Cossor CGR1020 VHF/UHF ground/air communications system was originally developed to use the Y644 by ECI in the US. The Cossor system is used by the British Military and military organizations around the world.The Y644 is fully qualified by the British Ministry of Defense for the CGR1020 ground/air communications system. It is now being used extensively by the British MoD and is exactly plug-compatible with the Y644 manufactured in the US. The Y644 is currently available from Svetlana distributors throughout the world.

For more information, contact Svetlana Electron Devices, 8200 S. Memorial Parkway, Huntsville, AL 35802 (phone 256-882-1344; fax 256-880-8077; e-mail: <info@svetlana.com>; on web: <www.svetlana.com>), or circle number 105 on the reader service card.



Bilal Isotron 6

The Isotron 6 for 6 meters features compact design (16.5"L × 2"W × 4"H); bandwidth at 10 watts of 1.25 MHz (may vary with environment); center frequency coverage of 50–54 MHz in two configurations (with two supplied capacitive hats—50–52 MHz and 52–54 MHz); 50 ohm coax feedline; power rating 300 watts on FM (outdoor rating); omnidirectional pattern with a random polarization; weight 1.5 lbs.

Made for rugged outdoor use, the Isotron 6 can be used mobile, but the user will need to provide a mast for the vehicle. It is priced at $69.95 plus shipping. For more information, contact Bilal Company, 137 Manchester Dr., Florissant, CO 80816 (telephone 719-687-0650; web: <www.catalogcity.com> [under "keyword search" enter Isotron]), or circle number 104 on the reader service card.

For those who still like to use those "boat anchors" of yesteryear, K4EJQ tells us how to build an external RF-actuated T/R relay system so we won't wear out the send-receive switches.

A "Boat Anchor" Buddy

An RF-Actuated T/R Relay for Your Vintage Station

BY J. G. "BUNKY" BOTTS*, K4EJQ

CONSTRUCTION

I recently became interested in the restoration of amateur radio gear from my early days in the hobby. As I soon found out, I was not alone! As much as I enjoyed bringing the older gear back to life again, I found it even more satisfying using it on the air on a regular and frequent basis.

Since the majority of my on-the-air time is spent using modest-speed CW for long ragchews, I found myself wearing out a lot of hard-to-find and sometimes difficult-to-replace "send-receive" switches on the equipment. Many of the older transmitters require that the entire front panel be removed to change these switches, a rather time-consuming task.

On some of the simpler transmitters—such as the little Ameco AC-1 and Philmore NT-200, as well as the more "sophisticated" Viking Adventurer and others—there were no provisions made to operate an external antenna switch or relay. You had to either operate a manual changeover relay or switch, use separate antennas for the receiver and transmitter, or use one of several commercial electronic T/R switches that were available. During my first few years of hamming I used all of these methods, although the electronic T/R switch spoiled me. The "word" back then was that electronic T/R switches, under certain operating conditions, would cause TVI. The truth of the matter is that back then *everything caused TVI!* But that's another tale.

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e-mail: <k4ejq@juno.com>

After having to replace several switches, I decided it was time for a change. Borrowing several ideas from more "modern" equipment designs, I built an external RF-actuated T/R relay system for my older gear. This was a design I had built years ago for use with QRP transceivers to drive a 50 watt solid-state amplifier. I knew it would perform well from 160 through 15 meters and required but a few hundred milliwatts or less to activate the relay, which in turn could safely handle 150 watts of transmitter power. The measured isolation between the transmitter output and receiver input at 40 meters with 50 watts of CW RF was 42 dB. This figure decreased to 35 dB at 15 meters—the highest recommended band for use. At 80 meters and below the isolation measured in excess of 45 dB. While these figures do not compare with the 60 to 70 dB of isolation one expects from using high-quality coaxial relays, it is more than adequate for safe T/R operation using the older types of receivers that are found in these kinds of operations.

How It Works

The circuit is straightforward. A very small amount of RF energy (probably less than 100 milliwatts) is coupled off the transmitter input to the unit through the coupling circuit of R1/C1. This small RF voltage is rectified in diodes D1 and D2, filtered with capacitors C1 and C2, with the resultant DC voltage applied to the base of transistor Q1. This causes Q1 to conduct, which in turn operates Q2, which causes Q3 to actuate relay R1, switching the antenna from the receiver to the transmitter.

The delay circuit that holds the relay in the transmit position between characters or words is adjustable for different keying speeds. The delay circuit consists of capacitor C4 and resistors R3 and R4, the values of which can be changed to suit your particular needs. Increasing the value of C4 will increase the amount of delay for any setting of R4, and vice versa. Diode D3 protects Q3 from reverse voltage spikes that occur in this sort of configuration.

A 4-pole double-throw relay was chosen to provide additional sets of contacts. The RF switching uses two sets of these contacts to achieve somewhat better isolation between the transmitter and receiver than would be had if only one set was used. One set of contacts is used to illuminate LEDs 1 and 2, the color of which indicates the mode the T/R relay is in. An extra set of contacts is brought out to terminal strip TB1 for switching additional external circuits if needed. The unit contains its own power supply utilizing a small filament transformer, rectifier, and filter network to obtain 11.5 volts DC (±10%). Voltage regulation is not required if the recommended power-supply components are used. The unit's AC input is protected with a 1/2 ampere 3AG type fuse.

Construction

The unit is housed in an aluminum box 5 1/4" × 3" × 2 1/8" (RadioShack 275-214 or

similar). The power transformer is mounted atop the box along with the plug-in type relay and terminal block TB1. The remainder of the power-supply components are mounted under the transformer towards the rear of the box. This will leave plenty of room for access to the relay socket's pin connections, as well as room for mounting the PC board that contains the switching transistors and delay circuit.

The PC board is mounted vertically using small metal spacers from the inside of the front apron of the chassis box. The transmitter input and receiver output coaxial connectors along with the small potentiometer for the delay adjust are all mounted on a diagonal line across the front of the chassis box. The antenna input connector, along with the fuse holder and AC input, is mounted on the rear apron of the box. The two small LEDs are mounted through the top of the box between the relay socket and terminal block where they can be seen by the operator.

The PC board itself measures about 1 1/2" square and contains Q1, Q2, and Q3 plus their associated components, with the exception of the delay adjust (R4) and the RF input network of R1 and C1. This network connects the center pin of the transmitter input coax connector to the remainder of the PC board circuitry, which puts it within easy reach should changes be required in these component values or should repairs need to be made.

As shown, the delay circuit provided approximately 1/2 to 3 seconds delay in returning to the receive mode after transmitting. I did not try for "full break-in" operation of the unit, although it should be possible with a reduced value of C4 and R3 and R4.

Four small stick-on rubber feet are used on the bottom cover to prevent scratching the operating table surface. Most, if not all, of the parts for this project can be obtained from a well-stocked RadioShack outlet.

Testing the Unit

The unit initially should be tested with the receiver disconnected from the receiver output connector of the T/R relay. Connect an SWR bridge or wattmeter between the transmitter's output and the TR relay unit's transmitter input connector. Attach a suitable dummy load and wattmeter to the antenna input connector. Tune the transmitter on all bands that you plan to use and at all power levels from the lowest to the highest to make sure the T/R relay system works properly. Failure to switch will be indicated by an excessive SWR reading and failure of the LEDs to change from "receive" to "transmit" mode.

If the LEDs do change when RF energy is applied but the SWR reading is excessive, look for a wiring error in the relay's contact wiring or PC board input

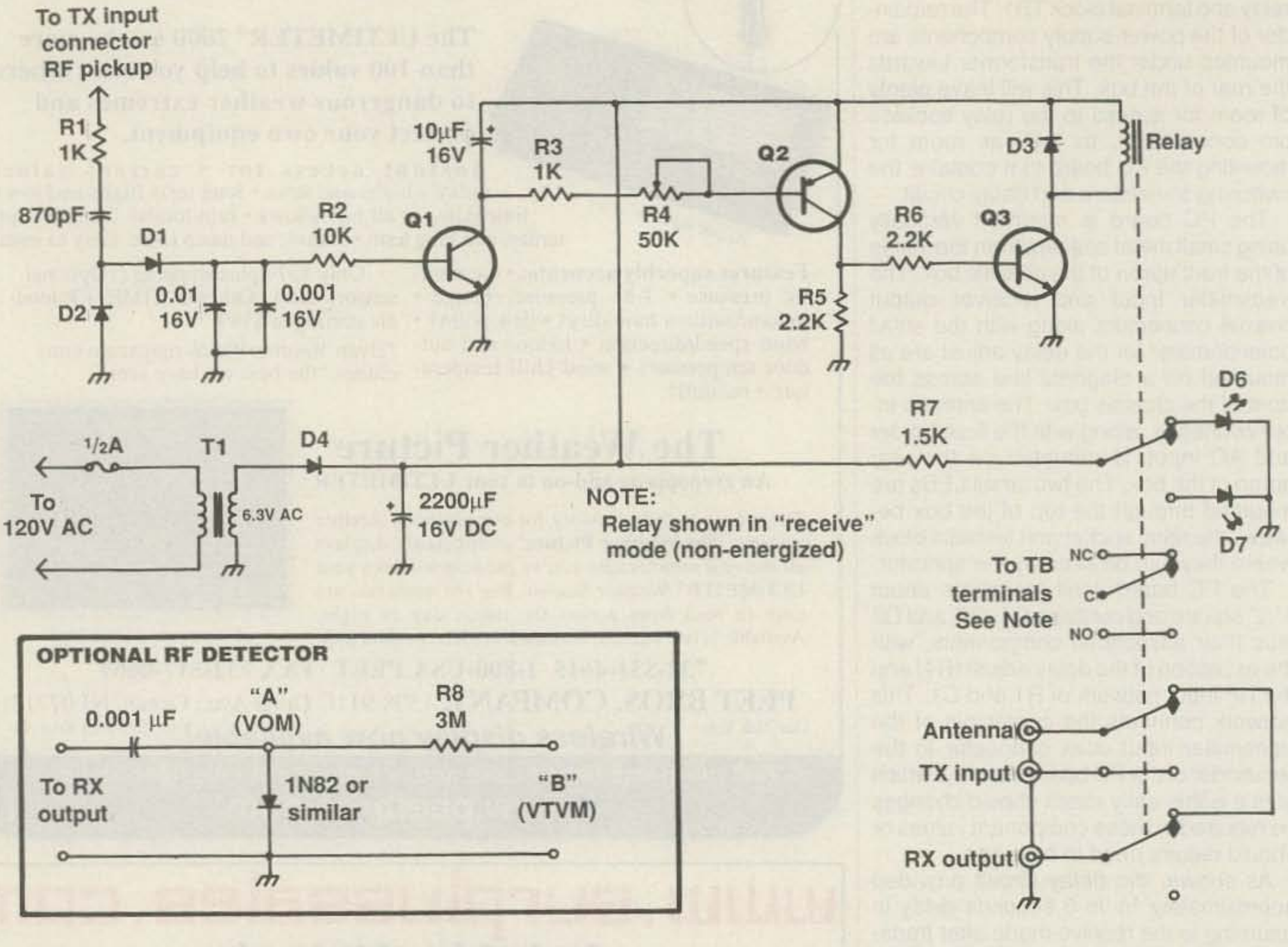


Fig. 1– Schematic for the "Boat Anchor" Buddy RF-actuated T/R relay.

wiring. Check R1 to make sure it has not overheated from excessive current flow, which could happen at the higher power levels and/or at the upper frequency bands if there is an abnormally high SWR. The wattmeter connected between the antenna output connector and the dummy load should indicate no loss through the T/R relay unit in the transmit mode.

At this point you should test the isolation of the unit by attaching a sensitive RF milliwatt meter to the receiver output connector on the T/R relay. Check to see how much RF is present while transmitting through the unit into a dummy load or antenna. This test should be made at the highest power level and frequency you plan to use. If the isolation is in the expected range of from 35 to 45 dB, you should see less than 10 milliwatts appearing at the receiver output connector with 50 watts transmitter power output. If you do not have a sensitive RF milliwatt meter, you can use the diode detector circuit pictured in the inset of fig. 1.

The value of R7 is not critical. You can use either a 20K ohms-per-volt VOM at point "B" to ground or a VTVM from point "C" to ground. Either should indicate roughly the same voltage for a given amount of RF. With the diode detector 1 volt DC is approximately 10 milliwatts. **Do not connect to your receiver if this voltage exceeds 1.5 volts DC.** Failure to heed this warning could cause damage to the receiver's "front end." The unit either has a wiring error, or is being operated at more than its rated power or frequency (150 watts from 160–40 meters, 75 watts on 30–15 meters).

I hope this little gadget will allow you to get even more enjoyment out of putting your vintage station "ON THE AIR." ■

Parts List

Chassis enclosure: 5¼" × 3" × 2⅛" aluminum box (RadioShack #270-238 or similar)
Power transformer: 6.3 VAC @ 1.2 amp filament transformer (RS #273-1365 or similar)
Fuseholder-panel mount: for "3AG" type fuses (RS #270-364 or similar)
Relay: 4-pole, double-throw, plug-in type recommended (RS #275-214 or similar)
Relay socket chassis mount (RS #275-221 or similar)
PC board: "proto-type" project board (RS #276-150 or similar)
R4: 50K ohm linear taper potentiometer (RS #271-1716 or similar)
Three RF connectors: chassis-mount type "UHF"—S0-239 (RS #278-201 or similar)
Metal standoff spacers, approx. ¾" high (RS #276-195 or similar)
Q1 = 2N2222 (NPN), Q2 = SK-3466 or 2N1305 (PNP), Q3 = ECG-128 or SK-3024 (NPN)
D1, 2, 3, 4 = 1N4005 diodes; D5 = 1N82 germanium diode; D6, 7 = LEDs of your choice
Terminal barrier strip, 4 positions recommended (RS #274-658)

Math's Notes

What's New And How To Use It

BY IRWIN MATH, WA2NDM

A Laser Diode Transmitter

Every time we describe circuitry for fiber-optic or optical communications, we get a great deal of mail indicating interest in this subject. Also, since in my opinion communicating at light frequencies is one of the areas where the individual without a full-blown electronics lab can still make some significant contributions, I encourage such experimentation.

This month I would like to offer a circuit for a laser diode transmitter that can be used with some of the optical receiver circuits we have published in the past.

Fig. 1 is a circuit of a solid-state laser diode driver described in an application note from Linear Technologies. It is designed to be used with the type of visible laser diode commonly employed in laser pointers or CD players which are inexpensive and easy to come by. These laser diodes also contain an integral monitor photodiode optically coupled to the laser itself in the same package for power control purposes.

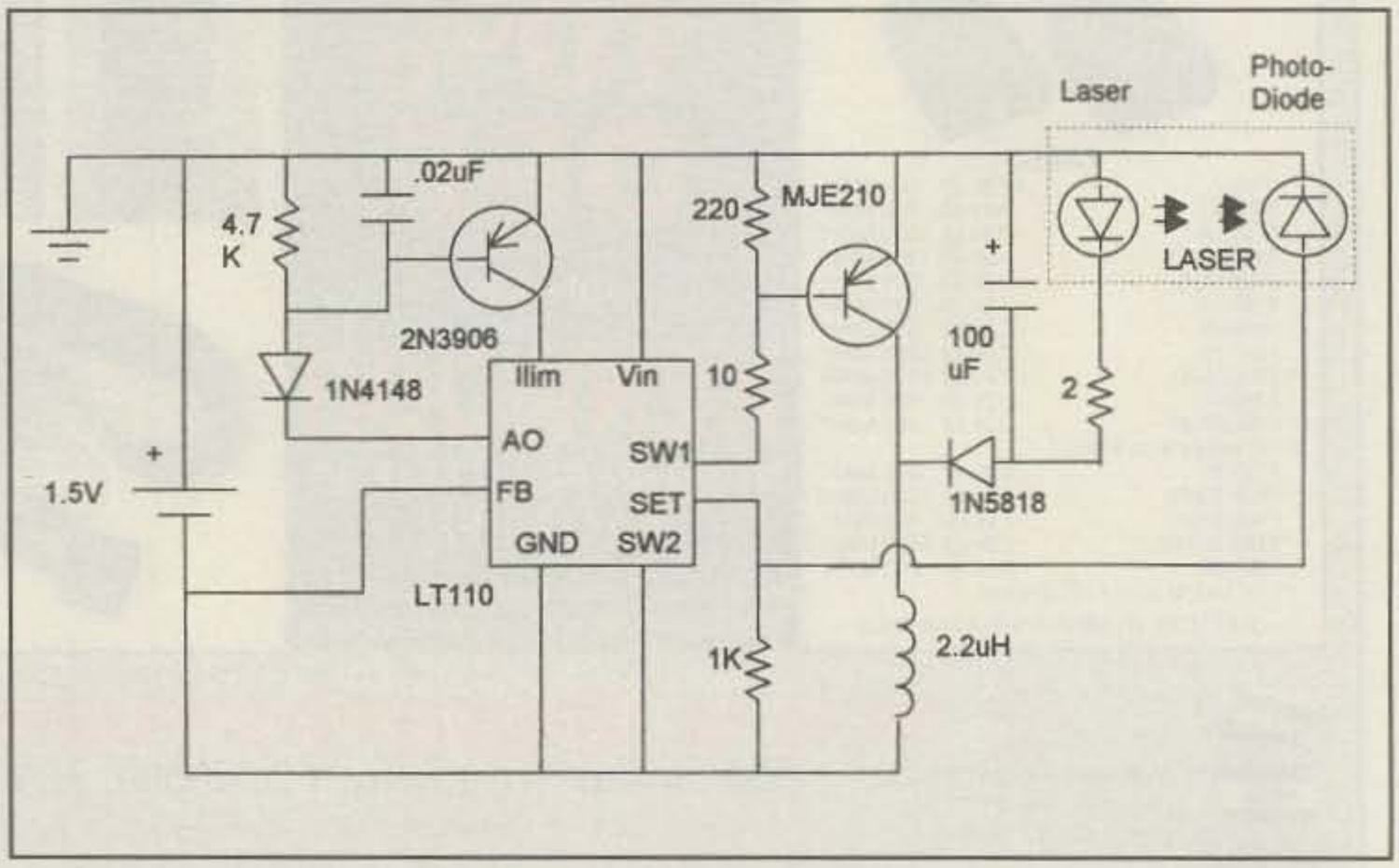


Fig. 1– Laser diode control circuit.

The circuit features an LT1110 switching regulator with the laser being powered from a simple 1.5 volt battery (ideal for portable applications). In operation, light from the laser produces a proportional current flow in the monitor photodiode contained within the laser housing. This photocurrent flows through the 1 K potentiometer, developing a voltage across it which is then compared to an internal reference within the LT1110. The result is used to vary the duty cycle of the regulator's oscillator and in turn the average output current. The output of the regulator is then filtered by a 100 µF capacitor and flows through the laser diode. The result of all of this is a stable quiescent (non-modulated) optical power output that can be adjusted by the 1 K potentiometer.

Fig. 2 is a schematic of the same circuit with the addition of an audio modulator. You will note that the modulating signal is applied through a transformer winding in series with the laser diode. This is a technique that anyone familiar with classical AM will recognize readily. Audio applied to the transformer increases or decreases the laser current and the resulting output light level. Since the audio occurs at a much faster rate than the time constant

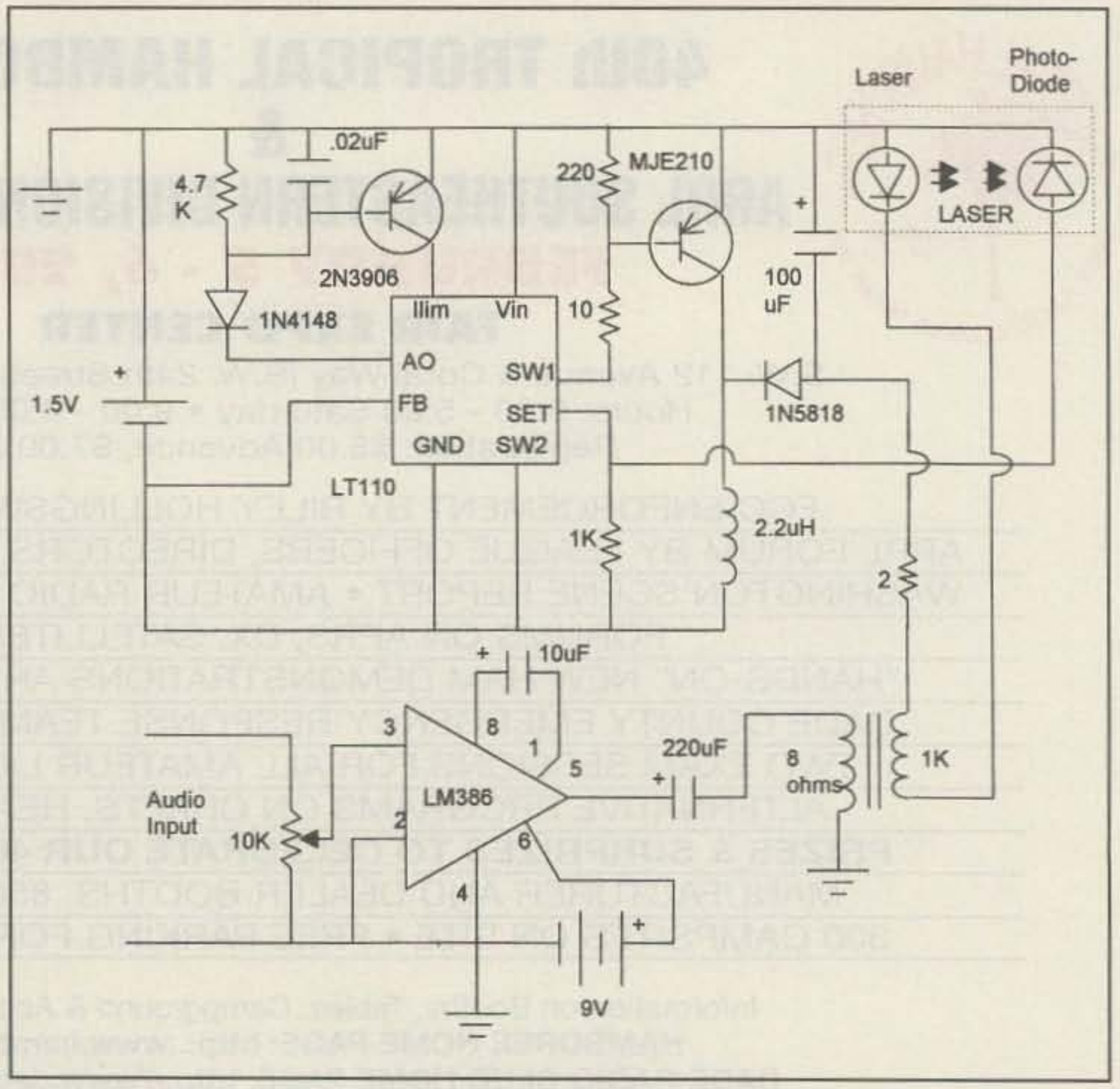


Fig. 2– Addition of audio modulator circuit.

c/o CQ magazine

The RF Applications VFD RF Power/VSWR Meter

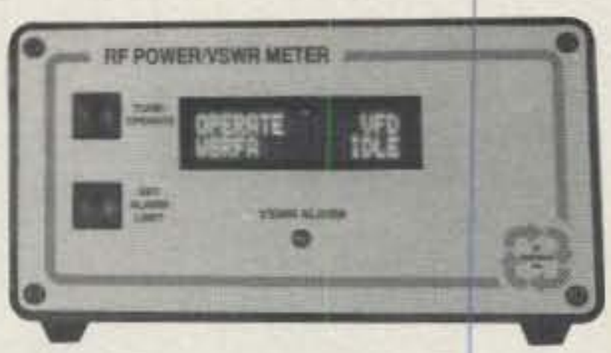
The ONLY Wattmeter for the Serious Operator

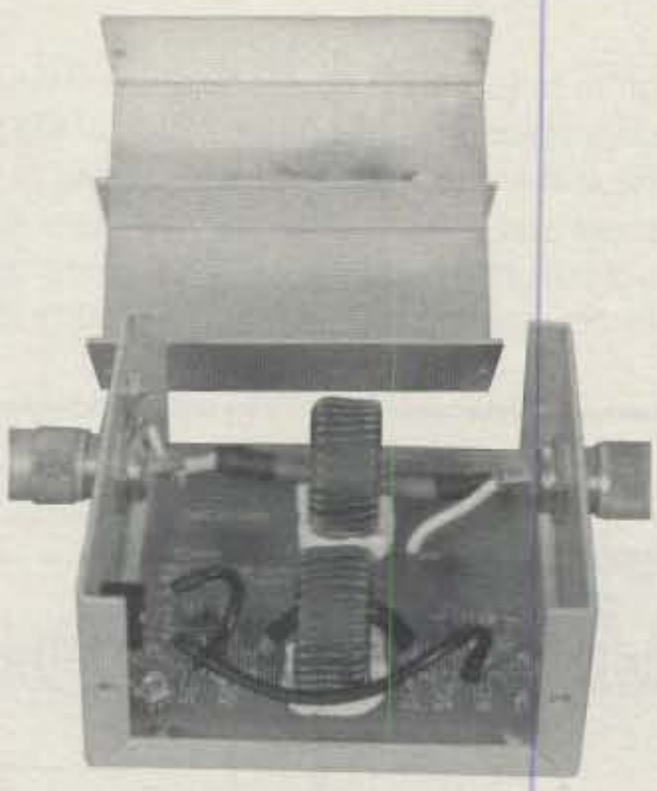
EXCITING NEW TECHNOLOGY

RF Applications, Inc. VFD Series Wattmeters represent breakthroughs in microprocessor, display and software technology. These units feature a 2 line by 16 character vacuum fluorescent display, tuning and operate modes, and a settable VSWR alarm limit. With our VFD External Relay Option, you can use this instrument to interrupt your transmit control circuitry to protect your valuable station equipment in high VSWR conditions (wrong antenna, bad cable, ice, etc.).

We can even *personalize* your wattmeter with your callsign (11 characters maximum). The Vanity Option is supplied as a separate chip (you keep the original), so your VFD can still be used by someone else!

Housed in a compact (5.75" by 3.0" by 2.0") enclosure, the VFD Series Wattmeters offer many features you cannot find anywhere else. The VFD Wattmeters use our "battle proven" remote sensor design being used around the world today. All this at a price you can afford.





ALARM INDICATION

You can set the VFD to tell you if your VSWR has exceeded a preset limit. A bright red LED tells you if you have exceeded 1.5:1, 2.0:1, 2.5:1 or 3.0:1 (the default). If you have installed the optional relay, you can disable your amplifier to prevent damage to your system.

THE BEST SENSOR

The VFD uses our P-3000-D sensor. Insertion loss and VSWR are minimal, and the sensor uses large cores that will not saturate, even above 1.5 kW. Network analyzer plots of the sensor's performance are available on request.

The VFD gives you a real time peak and hold display of your actual power and VSWR *every time you transmit*. This means that you'll always know that your system (exciter, amplifier, feed lines, antennas, etc.) are operating the way you intend them to. Tuning an amplifier has never been easier because the VFD's 65 element bar graph gives you better resolution than a meter. In addition, you can select a quick update for the displayed power (Tune Mode).

IS IT ACCURATE?

The VFD uses sophisticated technology that achieves remarkable accuracy in a low cost package. Compare it with your Bird™ or other accurate meter. You'll be amazed at this unit's performance.

WHAT YOU GET

The VFD is shipped with a display unit, the P-3000-D sensor and a 12 VDC power cable. This product is covered by RF Applications' standard two year warranty.

KEY SPECIFICATIONS

Frequency range:
1.8 to 30 MHz (60 MHz with recalibration)

Power:
5 - 2,955 watts (VSWR accuracy suffers below 20 watts)

Nominal impedance: 50 ohms

Accuracy:
Better than ±10% of the displayed reading

Operating power:
12 VDC at 130 mA average, 200 mA max

Connectors: SO-239 (2)

Signal cable length: 62" (24.4 cm)

Shipping weight: 3 pounds

COST AND OPTIONS

The VFD sells for $249.00, and the following options are available:

Vanity Option ($20.00)—You can special order a replacement chip for your VFD that can contain up to 11 characters of your choosing.

VSWR Alarm Relay Option ($20.00)—This option adds a reed relay output to the VFD that you can use to inhibit a radio or amplifier when your preset VSWR limit is exceeded.

Power Monitor Option ($35.00)—The Power Monitor Option allows your VFD to monitor your transmitted power and gives you relay contacts to let you know that you are applying RF to an antenna.

All options are available factory direct only.

OUR CUSTOMERS SAY

"This one is a keeper. Easy on the amp, and easy on the QRM."

--WXOB

"Best station accessory value since computer logging."

--W3LPL

"Best wattmeter I own."

--W4AN

Founded in 1992, RF Applications has products installed and operating around the world.

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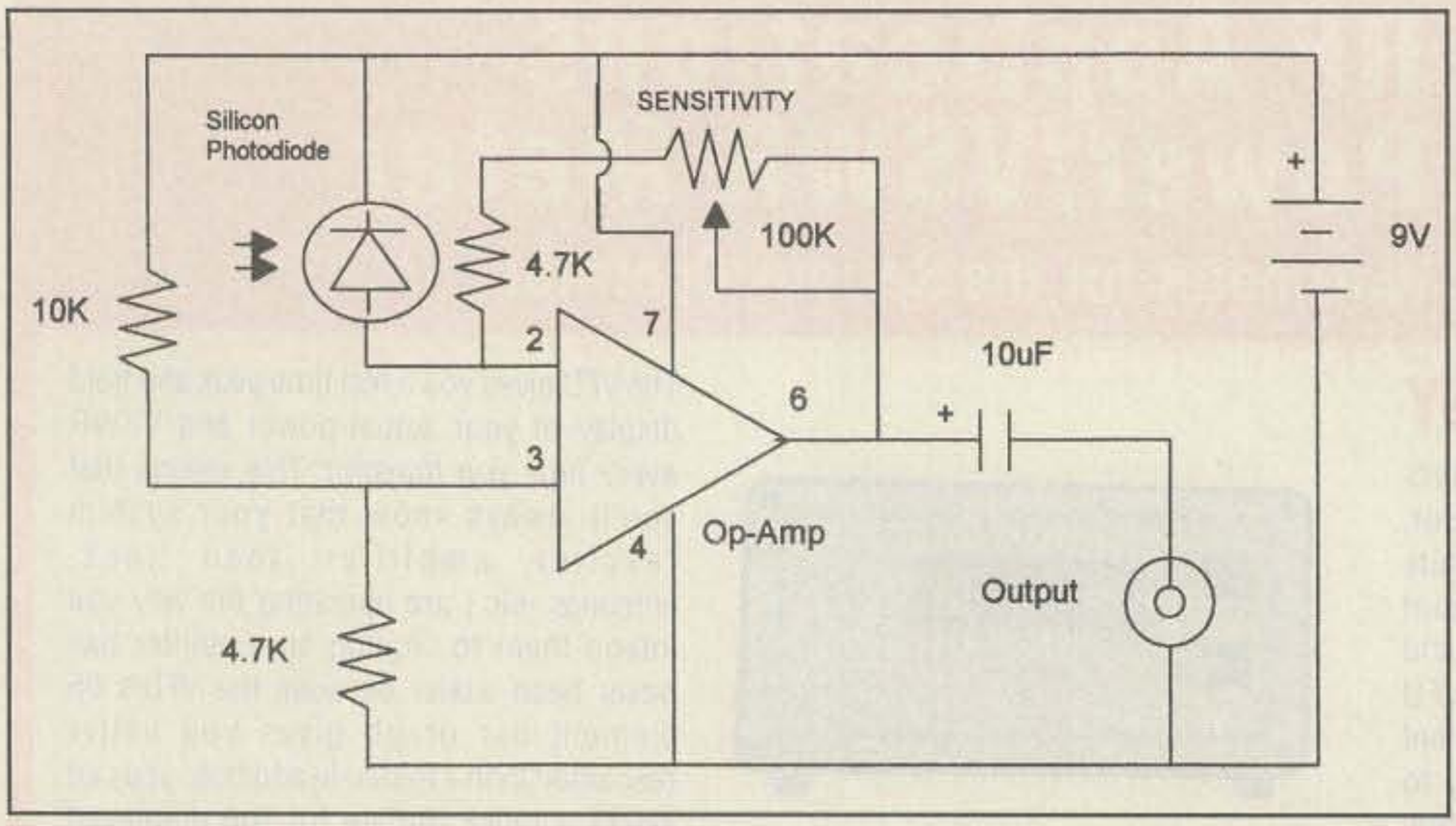


Fig. 3– Simple op-amp light detector.

of the control circuit, short-term variations in light output consist of modulation, but the average power output level (long term) is controlled by the LT1110.

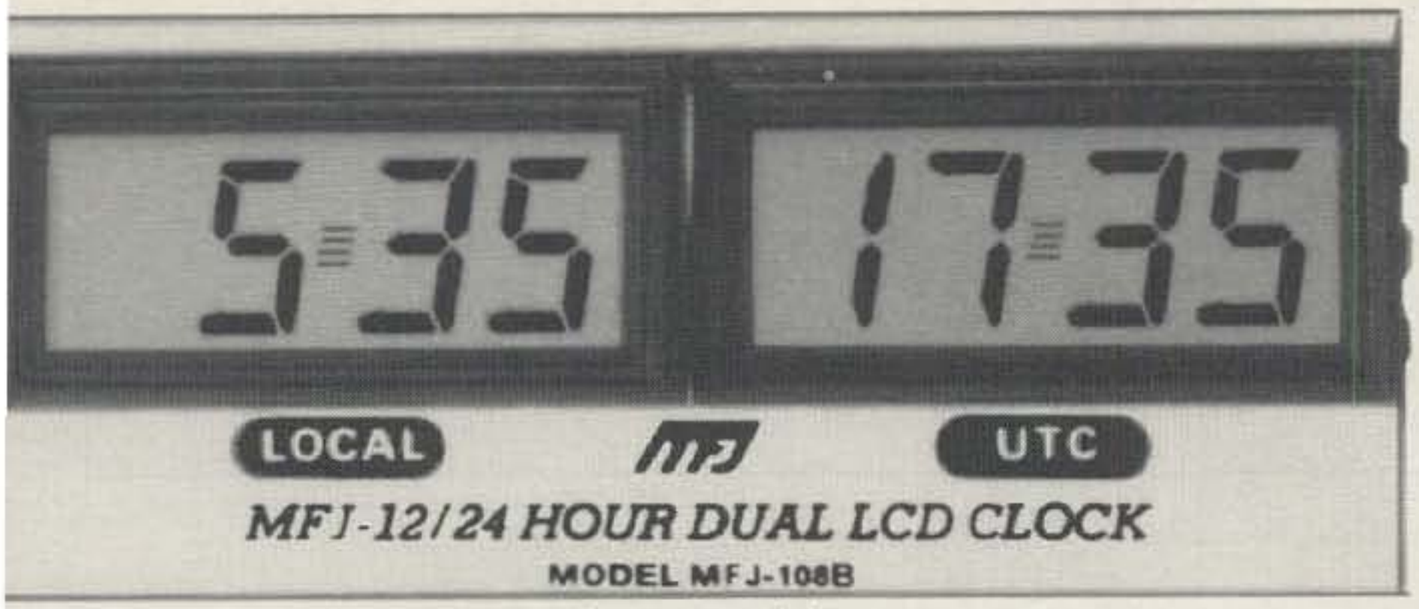
If you build the circuit, you must first adjust the laser diode to a point near 50% of its output with no modulation. This occurs at roughly one-half rotation of the pot. Next the modulating audio signal is applied and adjusted so that the laser does not cut off at voice peaks. This is best done by connecting a simple light detector to an oscilloscope using a 1 kHz sine wave for modulation and observing the resulting optical signal from the laser.

Fig. 3 is a circuit of a suitable detector for this task, and fig. 4 shows the waveforms to look for. Note than any common 5 MHz or faster op-amp will work in this circuit. You may need to connect a small 10 pF to 47 pF capacitor from pin 2 to pin 6 if the op-amp you use tends to oscillate. Once this is done, an audio amplifier can be added to the detector, as in fig. 5, and the controls can then be fine "tweaked" for best overall receive audio quality.

Receivers for the transmitter described above can be as simple as the circuit in fig. 5 or as complex as the experimenter wishes. The use of FM, digital encoding techniques, etc., all can be tried and indeed should be. The goal is to achieve reliable long-distance communications.

As in radio communications, modulation techniques are not enough. The antenna plays a dominant role. In optical communications the antenna is a lens or mirror assembly of some kind. Here experimentation is also necessary. While the scope of this month's column is not

MFJ 24/12 Hour Clocks



Shown actual size

Dual 24/12 hour LCD Clock

MFJ-108B **$19.95** plus s&h

MFJ-108B dual clock has separate 24 hour and 12 hour displays. Lets you read both UTC and local time simultaneously. Features huge high-contrast 5/8 inch LCD numerals that makes it easy to read across the room. Mounted in solid brushed aluminum frame with sloped face for easy viewing. Synchronizable to WWV for split-second timing. Quartz controlled for excellent accuracy. Long life battery included. 4½Wx1D x2H in. MFJ's famous *No Matter What*™ one year limited warranty. *$6 s&h.*

DXer's Wall Clocks

MFJ-125, $29.95. 12 inch DXer's Quartz wall clock gives 24 hour time plus more. Has three smaller independently settable dials for 12 hour time, day of week and date. No more day/date confusion when logging DX! Highly visible, easy-to-read dials! Has Seconds hand.

MFJ-115, $24.95. Set this 24 hour clock to UTC/ GMT and you can determine the time in any time zone of the world at any time of the day. Premier world cities encircle its colorful world map face to indicate time zone. 12 inch face is easy to see across room. Has Seconds hand.

MFJ-105C, $19.95. *World's most popular ham radio wall clock!* True 24 hour Quartz movement. Huge 12 inch black face with large white numerals give excellent visibility across room. Attractive gold colored hour, minute and seconds hands.

MFJ-126, $24.95. 12 hour Quartz movement gives 12 hour time on inner dial (for XYL) and 1200 to 2400 hour time on its outer dial (for you). Attractive clean, white face is highly visible. Real glass cover! Handsome hunter green trim. Has seconds hand.

Hi-Contrast LCD Clocks

MFJ-119B, $49.95. LCD Display 24/12 Hour Clock. Has *giant* see-across-the-shack 2¼ inch time digits. Digital calendar or clock modes. Displays inside temperature (F/C), relative humidity, month, date and day of week. Handsome hunter green and tan color. Wall mount. 8½x9 inches.

MFJ-118, $24.95. 24/12 hour clock has jumbo 1¼ inch LCD digits. Displays 24 or 12 hour time, year, month, date, and day of week. 100 year full calendar. Hang on wall or desk mount. 5¾Wx2½Hx½D in.

MFJ-107B, $9.95. 24 hour UTC Clock has large 5/8 inch LCD numerals. Synchronizable to WWV. Solid brushed aluminum frame lasts for years. Long life battery included. 2¼x1x2 in.

MFJ-112, $24.95. 24/12 Hour World Map LCD Clock displays time in *every time zone in the world*. Selected time zone flashes on LCD world map. Displays 24 or 12 hours, minutes, seconds, year, month, date, day, time zones, cities. Single button accesses pre-set second time zone. Alarms for two time zones. Adjusts for daylight savings time.

MFJ-152, $24.95. Read Indoor *and* Outdoor temperatures *and* 24/12 Hour time at-a-glance on huge 3/4 inch LCD digits! Choose F or C. Stores minimum and maximum temperature readings. Has backlight for in-the-dark viewing, outdoor temperature sensor with ten foot cable.

Bright LED Clocks

MFJ-114B, $59.95. Bright, GIANT 1.75 inch red LEDs are the biggest and brightest we've ever seen! 24 or 12 hour time with *seconds* digits. Easily seen 50 feet away -- even in the dark! 110 VAC. Great on your desk or mounted on the wall! 12½Wx4½ in.

MFJ-116, $14.95. Big bright 5/8 inch LED digits. 24 or 12 hour, 9 min. ID timer, battery back up. Black. 110VAC.
MFJ-116DC, $19.95. 12 VDC, plugs in cigarette lighter. *Great for motorhomes and truckers!* 12 hour only.

Monster Display *Atomic Clock* with PinPointAccuracy™

MFJ-120, $69.95. 24/12 hour *Atomic Clock* automatically receives WWVB for millisecond accuracy. Monster 2 inch LCD characters. Reads relative humidity and temperature (F or C). Has alarm. Attractive metallic copper color. Use on desk or mount on wall. Giant 8x10½Wx¾D inch showpiece.

MFJ-388 **$29.95** **MFJ *CyberEAR*™**
Tiny powerful MFJ *CyberEar*™ plugs in and loops over ear -- captures and amplifies sounds by 12 dB! Extends your hearing range, helps you hear every word at hamfests and club talks -- even if you're on the back row! Great for eyeball QSOs. 30 day money back if not absolutely delighted. *Not a hearing aid.*

Band WeatherAlert

MFJ-8200 **$29.95** plus s&h

Receive continuous weather info/ arnings on all 7 weather channels: 62.4/.425/.45/.475/.5/.525/.55 Hz from 380 U.S. locations 24 ours/day. Also includes AM/FM dio, spotlight, siren, flashing light r emergencies. Water resistant binet. Shoulder strap. Great for mfests, DXpeditions, camping.

14-in-1 HamTool™

MFJ-7604 **$19.95** plus s&h **Ham** Radio's most versatile tool! This 14-in-1 tool pocket-size toolbox is all you need for putting up antennas or working on rigs. Includes needle-nose pliers with wire cutters and jaws for gripping. Has flathead and Phillips screw drivers, knife, ruler, file, punch, more! Stainless steel, belt carrying case.

HamGear™ Waistpak

MFJ-6200 **$15.95** plus s&h

MFJ's *Ham Gear™ WaistPak™* is the perfect hamfest, DXpedition or field day hands-free carry-all. Has amazing 9 spots to put your ham radio gear, tools, accessories and refreshments. Foam padded and comfortable. Made of heavy duty twill burlap for long life. Features tough webbed belting with solid plastic buckle.

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Tech Help: (662) 323-0549

CIRCLE 126 ON READER SERVICE CARD

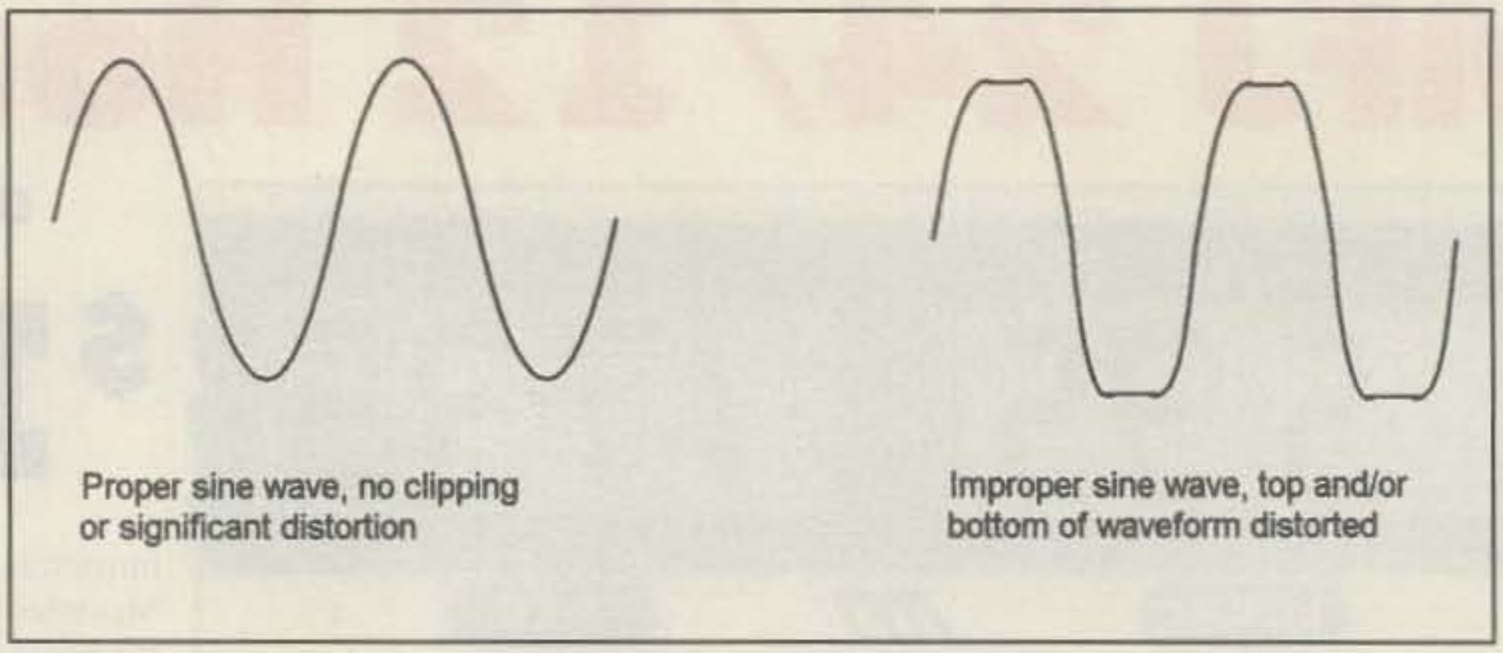


Fig. 4– Possible laser output waveforms.

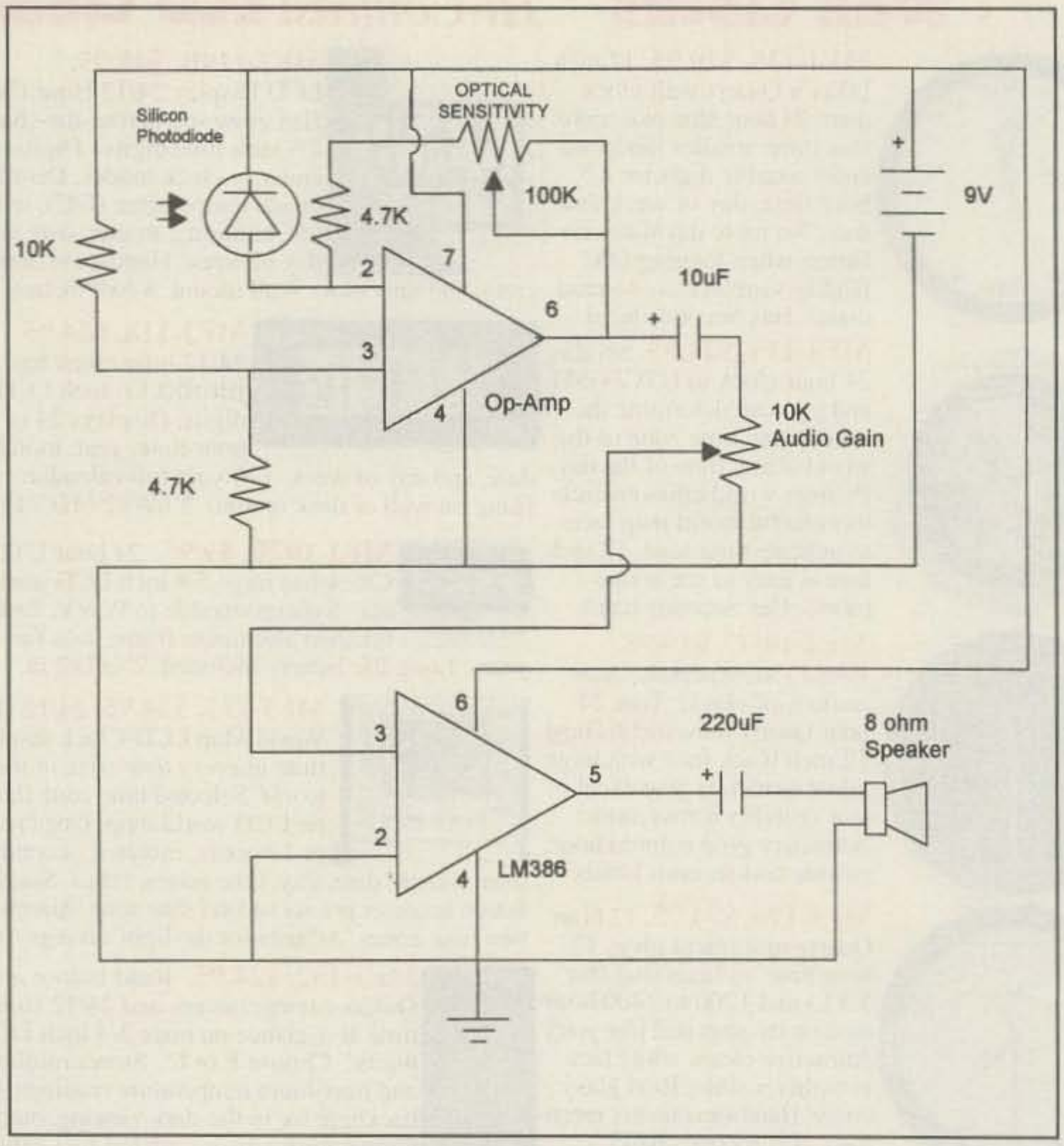


Fig. 5– Simple op-amp light receiver.

optical antennas, feel free to experiment with lenses at both the transmitting and receiving end. Even a small, inexpensive telescope often can be employed as a very high-gain optical antenna.

If you do build this circuit **use extreme caution when viewing the laser output beam. Never, never stare into the beam or into a direct reflection of the beam.** The output can be harmful to your eyes and can cause irreparable damage.

Whatever your results in building this circuit, please share them with us. I have a personal interest in optical communications and will be glad to relate your successes and failures in this endeavor.

73 and good luck, Irwin, WA2NDM

The Digital Dipole

BY KARL T. THURBER, JR., W8FX

From Software Through Antennas For The Shack

November Nocturne '99

How 1999 truly has flown by—or should I say, how the *century* has flown by! It's hard to believe that there is only one more column left for this year and for this century. In any case, we'll begin our fall excursion by setting our sights squarely on the antenna notebook.

Antenna Notes

WACOM Products, Inc. WACOM has designed and manufactured high-quality telecommunications products for a quarter century, stressing quality, service, and price. The company was founded in 1974 and still is under the direction of the original owners. WACOM is located in a 32,000 square foot manufacturing and engineering facility in Waco, Texas.

The company's products include duplexers, coaxial bandpass cavity filters, notch filters, ferrite isolators, tower-top amplifiers, transmitter combiners, receiver multicouplers, and related RF products. These products have compiled an impressive track record for both performance and reliability. The company also offers engineering support services for customers who need custom products to fit their specific requirements.

WACOM probably is best known in the amateur community for its line of station duplexers with patented BpBr Circuit® filters for superior performance when close frequency separation is involved. Available are various 4- to 12-cavity duplexers that handle power levels to 275 watts, with a variety of minimum frequency spacing and VHF/UHF band coverage parameters.

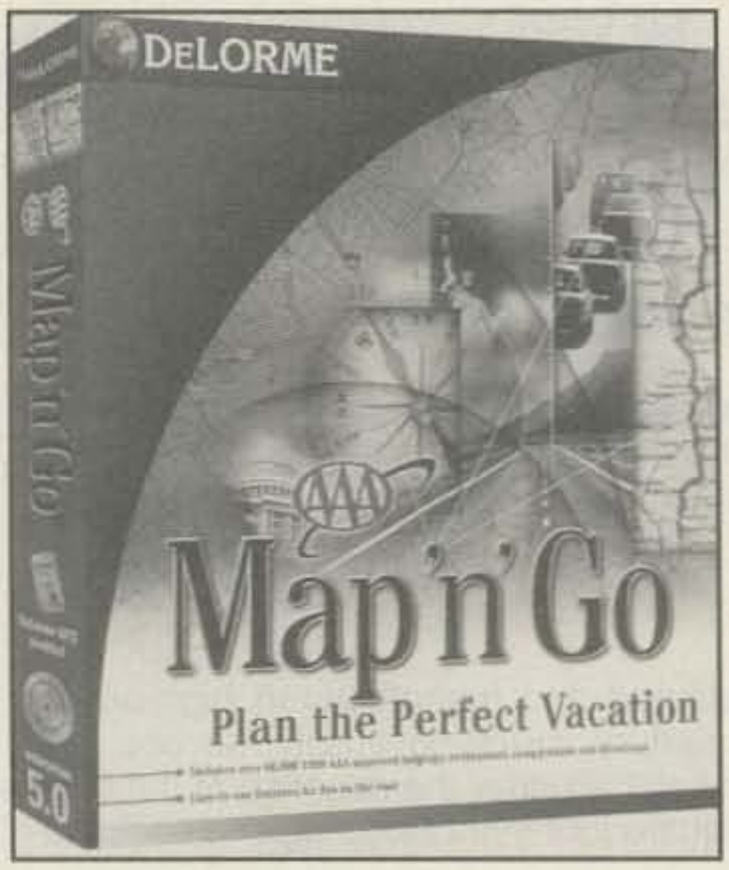
For more information, including product spec sheets and a price list, contact WACOM Products, Inc., P.O. Box 21145, Waco, TX 76702-1145 (254-848-4435; e-mail: <wacom@wacomprod.com>; web: <http://www.wacomprod.com>). Their website includes an online catalog and price list.

Palomar Engineers: Now on the Web; Catalog Changes. For about 20 years we have highlighted the many amateur radio and listener equipment and accessories offered by California-based Palomar Engineers. Under the long-time tutelage of Jack Althouse, K6NY, Palomar Engineers continues to offer a variety of accessories of special interest to readers of this column.

Some products, such as the LA-1 Amplified Loop Antenna System, have been dropped from production in the most recent catalog for various reasons. Some of the

289 Poplar Drive, Millbrook, AL 36054-1674

There's an inexpensive way to listen to longwave (LW). Among Palomar Engineers' more popular products are their VLF Converters, which let you receive LW for about $90; all you need is a communication receiver and an antenna. Covering 10 to 500 kHz, the model VLF-A converts VLF signals to the 80 meter amateur band, while the model VLF-S converts signals to 4010–4500 kHz for general-coverage radios. (Photo via Palomar Engineers)



DeLorme AAA Map'n'Go 5.0 is a fifth-generation travel planner package that covers the United States, Canada, and Mexico. The program offers comprehensive travel listings, detailed maps, easy route planning, and custom print output. Some very nice program "pluses" are that its files can be imported into ARRL TravelPlus for Repeaters, and telephone search results from DeLorme's Phone Search USA 4.5 can be displayed. (Photo courtesy DeLorme)

still-impressive list of RF products offered include the model AN-7 HF Mobile Antenna, a popular South African import; PT-340 Tuner-Tuner™, which lets you tune your antenna tuner without radiating a signal; PCM-1 RF Current Meter; MLB-1 Magnetic Longwire Balun™ for SWLs using longwire antennas; and VLF-A and VLF-S Converters for tuning to the LF and VLF bands (10–500 kHz) on an amateur band or shortwave receiver. Palomar Engineers also offers ferrite and iron-powder toroid cores, ferrite beads, and radio frequency interference (RFI) suppression and experimenter's kits.

Jack also has set up a basic website that describes the products currently offered. For a catalog and/or an RFI tip sheet, check the website, or contact Palomar Engineers, P.O. Box 462222, Escondido, CA 92046 (760-747-3343; e-mail: <Palomar@compuserve.com>; web: <http://www.palomar-engineers.com>.

Harbach Electronics Beam Antenna Components: Welcome to the Web. In September 1996 we profiled the precision, anti-corrosion parts and assemblies for the amateur Yagi beam-builder offered by Al Harbach, WA4DRU. As we pointed out then, Al sells hardware for a wide range of elements and boom diameters.

Al's stated philosophy involves the recognition that the amateur who wants to build his own custom "dream beam" generally must spend a great deal of time looking for parts from a variety of sources, including supply houses, junkyards, and catalogs—and the result often is still not exactly what was sought.

Al recognized this problem by offering a system of precision parts and assemblies designed for the amateur and made from high-quality, anti-corrosion materials. Among the items offered by Harbach Electronics are stainless-steel-element saddle clamps, aluminum alloy element-to-boom and boom-to-mast plates, and stainless element clamps; no plated steel is used. (Al's previously offered book, *Amateur Beam Design,* and the associated computer program mentioned then, no longer are available.)

Al also offers repair, retrofit, and upgrade items for the popular Heath SB-200 and SB-220 linear amplifiers. You have to be a licensed radio amateur to purchase amplifier repair items.

You can pull up Al's complete catalog at his new website, ordering by e-mail if you so choose. Something of a novelty, the site also has a section that points you to parts and services that Al *doesn't* offer.

For a printed flyer, contact Allen B. Harbach, WA4DRU, at Harbach Electronics, 2318 S. Country Club Road, Melbourne, FL 32901-5809 (407-723-7145; e-mail: <wa4dru@iu.net>; web: <http://www.harbach.com>).

New Traffie Technology Series I HEX-BEAM®. In January 1998 we profiled the HEX-BEAM offered by Traffie Technology of Ashby, Massachusetts. It's dubbed a "miniaturized controlled field antenna" that takes the form of a high-performance, hexagonal-shaped beam.

According to the firm, with this configuration antenna size is reduced by 50 percent when compared with conventional, "mainstream technology" beam antennas. In addition, it's claimed that the efficiency of full half-wave elements is retained, with good gain and directivity. The antenna is unique in that it has no boom, traps, or matching networks.

You may recall that two types of HEX-BEAMs are available. The Series I Fixed Station Arrays are light, durable arrays. They are built to order as mono- or multi-banders for 7–54 MHz; they're $89 to $849, depending on band configuration. Recently, a new Series I antenna was introduced. It's the HX-5B, a five-band, fixed-station HEX-BEAM that covers 20, 17, 15, 12, and 10 meters; it's $629. Like the other Series I arrays, the HX-5B breaks down to a maximum length of 5 1/2 ft. for airline and UPS handling.

The low-profile Series II Portable Arrays are designed for portability in emergency, DXpedition, and mountain-topping operation, although they are similar to the Series I antennas in performance. Lightweight and collapsible, they cover 6–20 meters in monoband configuration. The Series II arrays are priced from $389 to $799, depending on specific configuration. (A review of the Series II arrays by ARRL staffer Rick Lindquist, N1RL, appeared in March 1998 *QST.)*

For spec sheets that describe the HEX-BEAM arrays and their theory of operation, along with performance evaluation notes, contact Traffie Technology, 421 Jones Hill Road, Ashby, MA 01431-1801 (1-888-599-BEAM).

Pasternack Enterprises Update. In June 1997 we noted the 1997 Pasternack Enterprises catalog, which detailed the company's very extensive lines of coaxial-related products. Recently we received a copy of the firm's most recent catalog, which now, at 138 pages, is as thick as a small town's telephone book. Indeed, the catalog has grown considerably in scope since the company's founding in 1972. It now includes several thousand different coaxial-related products, along with essential technical information, such as connector identifier data, on many products.

The 8" × 11" format catalog shows a variety of adapters, amplifiers, attenuators, breakouts, coax and coax assemblies, connectors, switches, patch cords, power dividers, terminations, tools, twinax, directional couplers, DC blocks, and many other coaxial products and related items. It's easy to use the catalog to find components; it has a very comprehensive table of contents as well as an index arranged by model number. These are nice to have features often overlooked by catalog houses.

No one likes to get lost. One possible solution is to use DeLorme's excellent state atlases, which now are available for all 50 states. The DeLorme Atlas & Gazetteer series of state atlases contain very detailed maps of each state in a realistic, three-dimensional view, along with additional information. The atlases are $16.95 to $24.95, depending on state. (Photo courtesy DeLorme)

Contact Pasternack Enterprises, P.O. Box 16759, Irvine, CA 92623-6759 (949-261-1920; e-mail: <sales@pasternack.com>; web: <http://pasternack.com>). You can request a catalog and add to the company's mailing list at the website.

Soft Stuff

CQ WW CD-ROM. A few months ago we noted the specialty products for communications professionals and radio amateurs offered by Champion Radio Products. As we pointed out, some of the products offered include tower hardware and accessories; rigging gear; grounding products; safety equipment; lubricating and weatherproofing materials; rotators; UV-resistant Dacron® rope; mast, antenna, and rotator calculation software; county wind speed data; publications; and various other products of antenna- and tower-related interest.

Recently Champion Radio added a CD-ROM that should be of interest to the readers of *CQ*, *CQ*'s sister publication *CQ Contest,* and many other DX and contest-oriented publications. Billed as "a contester's dream," the new CQWW DX Contest Results 1948–97 CD-ROM actually includes several main programs and databases, plus other goodies. One database provides the results of all CQ World-Wide DX Contest results as published in *CQ* from 1948 to 1997 in the standard Adobe® Acrobat document format; another provides the *CQWW Handbook,* which contains searchable CQWW records for every country in the world; a third contains a CQ Zone map and country/Zone locations. The CD-ROM is $25 plus $4 s/h in the United States. Various DX, antenna, and contesting hardcopy publications also are available.

For a free sales flyer, contact Champion Radio Products, P.O. Box 2034, El Macero, CA 95618 (1-888-833-3104; e-mail: <sales @championradio.com>; web: <http://www.championradio. com>). You also may wish to access the CQ World-Wide DX Contest Official Page at <http://www.cqww.com>; the page has a link to Champion Radio and other pages of interest.

ARRL TravelPlus for Repeaters, 1999–2000 Edition. In the past few years the ARRL has digitized many of its publications and databases to make them more accessible and useful to radio amateurs. A particularly versatile League digital product is ARRL TravelPlus for Repeaters™, which we initially profiled in January 1998. With TravelPlus you can travel a route and find all repeaters within a range you specify on whatever bands you select, print map screens or repeater lists based on your travel route, customize the presentation of repeater information to meet your needs, and save route files and repeater list files to disk for reference.

While the original product was an excellent one, the new 1999–2000 edition has many new features. These include the ability to display repeater location icons on the maps, use the on-screen Compass Rose to scroll seamless maps in any direction, zoom between Interstate and state-route maps at any time, and display all grid-square boundaries simultaneously. The new edition includes the entire 1999/2000 ARRL VHF/UHF Repeater DataBase, as well as listings from *The ARRL Net Directory, 1999–2000 Edition.* You also can view extensive online help for all screens and features.

While the ARRL product doesn't pretend to be a comprehensive mapping and travel planning package to directly compete with DeLorme® and other mapping software, the new edition lets you import travel routes created by DeLorme's software. I tried it with success on both DeLorme Street Atlas USA 6.0® and AAA Map'n'Go 5.0® files. You also can launch mapping software or other software (such as radio programming applications) from

within the program. Finally, you can make TravelPlus into a real "ride-along" package by installing it on a laptop and using it with a mobile Global Positioning System (GPS) receiver for state-of-the-art traveling capabilities.

TravelPlus is priced at $39.95 plus $4 s/h; upgrades for previous edition owners are $19.95 plus $4 s/h. For more information, contact the American Radio Relay League (ARRL), 225 Main Street, Newington, CT 06111-1494 (1-888-277-5289; e-mail: <pubsales@arrl.org>; on the web: <http://www.arrl.org>).

DeLorme AAA Map'n'Go® 5.0 and Phone Search USA® 4.5. In several previous columns we highlighted various DeLorme CD-ROM based mapping products. In October 1998 we profiled AAA Map'n'Go 4.0, a very comprehensive family travel planning software package bearing the American Automobile Association's logo and including a massive amount of online AAA TourBook® data.

Now DeLorme has come up with AAA Map'n'Go 5.0 with a host of new features. We won't rehash our previous review other than to note that the program is indeed a comprehensive, do-it-all travel planner. It includes some 1 million miles of "routable roads" in the United States, Canada, and Mexico; over 240 detailed urban area maps; numerous recommended scenic drives; compatibility with the DeLorme GPS Tripmate™ receiver and improved GPS voice navigation; map customization tools; multiple printing options; sophisticated search capabilities; and considerably more.

The new version has an estimated $29 street price. Its many features now include 1999 AAA TourBook information, with over 66,000 AAA-rated facilities; multimedia display of over 1300 points of interest; a "via" feature that lets you choose specific roads you want to take during your trip; a travel time planner that helps you plan enroute stops; palm computing support; and integration with Delorme's Phone Search USA 4.5.

The companion software, the recently-updated Phone Search USA 4.5, also with an estimated $29 street price, lets you search and access over 101 million business and residential phone listings for the entire United States. You can find suppliers for goods and services, locate hotels and restaurants, save money on directory assistance charges, find and look up long-lost friends, and more. After doing these things, you can map the listings you find on either Street Atlas USA 6.0 or AAA Map'n'Go 5.0. The Phone Search program lets you conduct data searches by name, phone number, or the Standard Industrial Classification (SIC) business-type code; and filter them by name, street, city, state, telephone exchange, or ZipCode.

For additional information, contact DeLorme, Two DeLorme Drive, P.O. Box 298, Yarmouth, ME 04096 (1-800-452-5921; e-mail: <info@delorme.com>; web: <http://www.delorme.com>).

From the Bookshelf

DeLorme's Atlas & Gazetteer™ Series. No one likes to get lost, but it isn't always convenient or even possible to carry a portable PC, GPS receiver, and mapping software. One practical, lower-tech solution is to use DeLorme's excellent paper-based state atlases, which now are available for all 50 states.

The DeLorme *Atlas & Gazetteer* series of state atlases arguably are the most detailed on the market, and with the addition of features such as shaded relief in most of the atlases, they now convey more information than ever.

The Atlas sections contain very detailed maps of each state in a realistic, three-dimensional view. The maps feature extensive road coverage, including detailed highway and secondary state routes, plus thousands of named local roads, railroads, and trails. Rivers, streams, and creeks, complete with potential fishing areas, are indicated. A grid system in most of the atlases indicates latitude and longitude, letting you use them with GPS receivers. This can be great for, say, locating a super mountaintopping site or a secluded Field Day location.

The Gazetteer section complements the maps with information about national and state recreation areas, campgrounds, hiking and biking trails, hunting charts and fishing sites, historic sites, and unique attractions. The DeLorme state atlases are $16.95 to $24.95, depending on state.

Wrap-Up

That's all for this time, gang. Next time more "Digital Dipole" topics of current interest. See you then.

Overheard: Cell-phone users and mobile amateurs share at least one perception: The fastest way to get a red traffic light to turn green is to bend over to write something down.

73, Karl, W8FX

Packet User's Notebook

BY BUCK ROGERS, K4ABT

Connecting You And Packet Radio In The Real World

Antennas for Packet

For the past five or six months we've discussed means of enhancing our packet stations and networks. A few of the "Packet User's Notebook" columns covered the move to make our nodes reach farther by building 1200 baud node radios with more power, using commercial standard radios that are more immune to intermod, and choosing node sites that are within high RF environments.

In a couple of my most recent articles we discussed how to modify the high-power, 110 watt GE Delta S/SX and even the 40 watt GE Phoenix SX commercial standard radios to handle faster data rates for our 9600 baud backbone applications.

Adding higher power to our nodes is great, and it takes care of all of our coverage and backbone link problems—*I don't think so!!* There is one other *very, very* important item that must be considered. As a matter of fact, it is an absolute necessity for both the mountaintop node and the home packet station.

Antennas for Packet

This month we deal with the specifics of various types of antennas. However, we will look at a radically different approach to choosing one type of antenna over a other designs.

Before we go any further with this topic, though, let's clear the air. I'm not suggesting that the digital radio user should select one particular antenna over another. Use whatever you have, or choose the antenna that best favors your needs, requirements, and environment. I am simply relating some of my findings and experiences associated with various antenna designs and applications, *as related to packet.*

If the packet radio operator fails to provide the antenna that has the best radiating and capture effect, it will reflect on the system operator. In addition, if the antenna is not constructed and erected so as to provide good capture to signals and have the lowest noise component with respect to terrestrial noise, then no one is to blame except the operator who is in charge of the installation.

This is one of those times when a little knowledge of the radiating system can be a detriment. An operator more well-versed on the most important component of the packet radio station, the antenna, will definitely benefit.

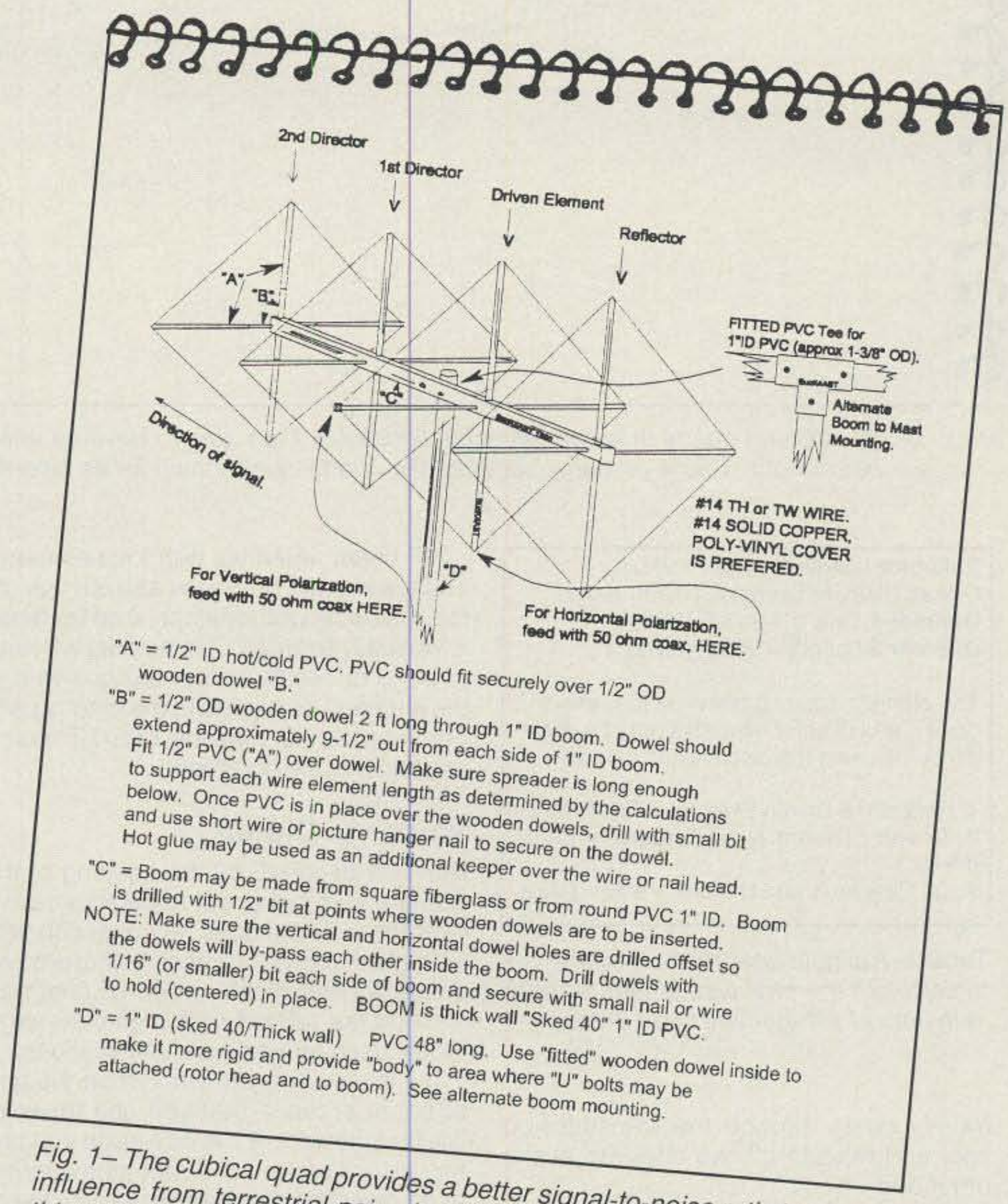


Fig. 1– The cubical quad provides a better signal-to-noise ratio because influence from terrestrial noise is greatly reduced when receiving with this type of antenna. This inherent rejection of terrestrial noise is one of the reasons why I consider the quad for use in a digital data medium.

A Doorway to the Digital World

The antenna for our packet station is about to become our doorway to the world. Anyone who has spent any time around me will affirm that I won't "cut corners" when it comes to my antenna.

I am very particular where my antennas are concerned. When I buy cable and connectors, I purchase the best available, specifying silver-flashed connectors and cable of the highest quality. That is the part of my station that will get the least attention after it is installed, so I want it to withstand the elements and provide dependable communications for a long time.

With over 50 years as an amateur radio operator and nearly 40 years as a Senior Telecommunications Engineer, I learned a very valuable lesson early on: Signal quality begins at the tip of the antenna,

115 Luenburg Drive, Evington, VA 24550
e-mail: <k4abt@PacketRadio.com>

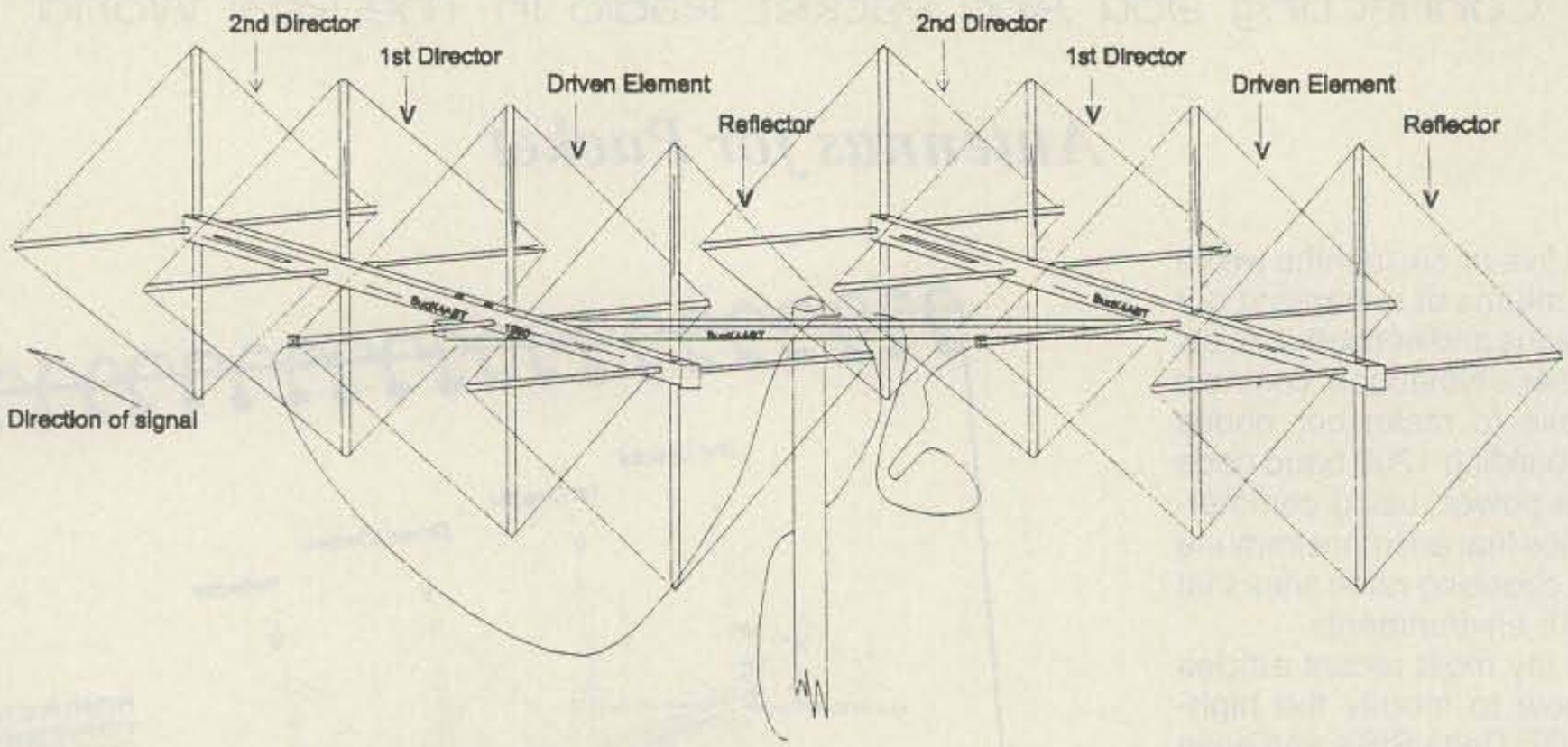


Fig. 2– By stacking quads in a horizontal configuration, I am able to develop another 3 dB of gain, while preserving the quad beamwidth. This is primarily because the quad is well known for its favorable gain/bandwidth characteristics.

Reflector Length = 1030/F (MHz)
Driven Element Length = 1005/F (MHz)
Director 1 Length = 975/F (MHz)
Director 2 Length = 960/F (MHz)

The element spacing between the reflector, driven, and director elements may be determined by using the calculations below.

1. Reflector & Driven Element = 730/F (MHz)
2. Driven Element & 1st Director = 600/F (MHz)
3. 1st Director & 2nd Director = 600/F (MHz)

Table I– A simple table that will enable you to calculate the total wire length for each element of a 4-element quad antenna.

travels down through the transmission line, and reflects off the operator at the other end.

Antennas can be constructed to radiate with directional, omni-directional, and bi-directional patterns. The kind of pattern desired depends on the coverage area requirements. Likewise, the type of antenna selected will determine the kind of pattern you have. Another major factor in antenna selection and installation is the distance above the ground at which the antenna is suspended.

Antenna theory as related to antennas suspended in free space states simply that the ground below will provide a reflection, or mirror, effect. This mirror effect gives an antenna the appearance of having greater gain when the antenna is mounted at distances that are "in phase," or a given wavelength above the earth. The greater the height, the greater the gain.

HF beam antennas with long elements and towers with guy wires affixed near the top don't work well together when the beam is vertically polarized. Something will have to bend or break—either the guy-wire or the element, as each is in the other's path. For this and other reasons, most HF beams are horizontally polarized.

Voice vs. Digital

Don't be deceived by the heading of this section. I am not about to begin a debate over these two modes. My intention is to look into the types of antennas that are best suited for the digital mode of communications, as related to the antenna commonly used for voice communications.

If it is distance you want, then the type of beam antenna that you use for voice will be sufficient. If it is coverage you prefer, again I prefer the beam-type antenna as a power booster. I tend to try for a happy medium with respect to the digital and/or packet modes. The Yagi-type antenna in a horizontal configuration is one way to go if you want both coverage and reduced wind resistance.

The "Happy Medium"

Now let's look at a happy medium, but with a flavor that leans toward the digital mode(s). My preference for digital, or more specifically packet radio, operation is the cubical quad (beam) antenna (see fig. 1 and Table I). If it is for 2 meters, I favor a maximum of 6 elements per boom because quads with more than 5 or 6 elements will perform like a rifle—with a very sharp beam. *Take note:* "The more elements you add to the quad, the sharper the beam," and thus the level of difficulty when trying to center (point) the quad on a distant (target) station or node.

If I opt for a stacked set of quads on 2 meters (see fig. 2), I stack them side by side. I do not stack them vertically—one over the other. Again, it has to do with the beamwidth of the radiated signal from the dual, or "stacked," quads. In the horizontal configuration I am able to develop another 3 dB of gain while preserving the quad beamwidth. This primarily is because the quad is well known for its favorable gain/bandwidth characteristics.

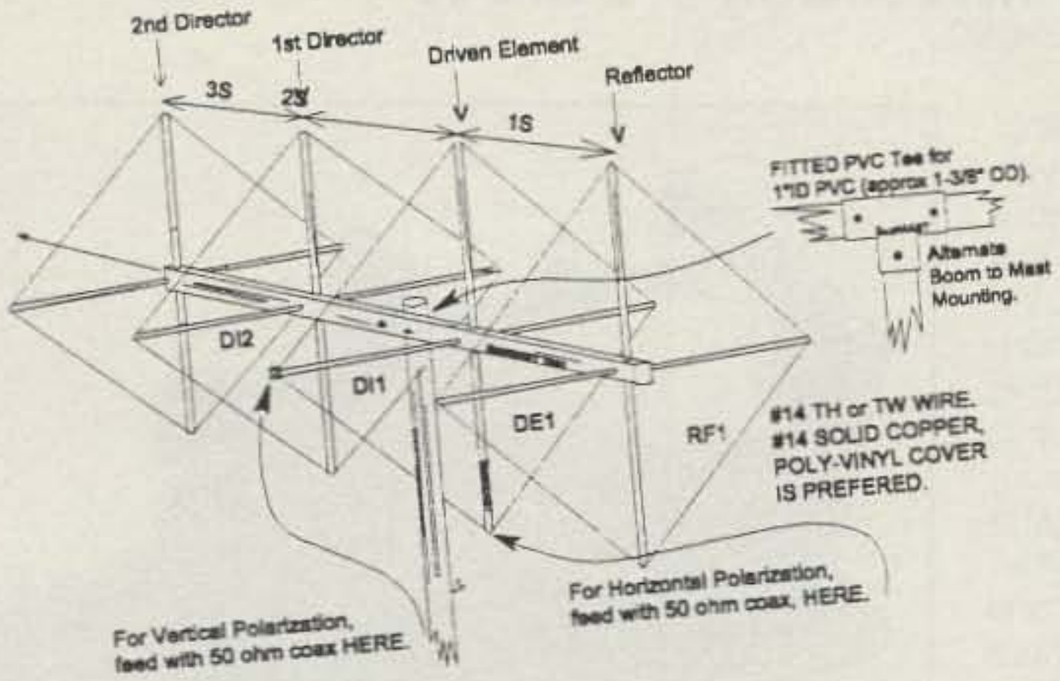
The Quad's Important Role in Digital Communications

There is a second, and more important reason why I chose the cubical quad over the conventional Yagi. The cubical quad provides a better signal-to-noise ratio because influence from terrestrial noise is greatly reduced when receiving with a cubical quad antenna. This inherent rejection of terrestrial noise is one of the reasons why I consider the quad for use in a digital data medium.

For the 6 meter buff, fig. 3 is a drawing and the dimensions to help with the construction of a dual quad assembly for 6 meters. Note that the quads may be fed in either plane, vertical or horizontal.

Another Key "Element"

The antenna for digital communications, as well as any other modes of communication, is only as good as the transmission line that feeds the antenna. Consult the handbooks and catalogs for the latest, best coax or transmission line. Look at the



AN EXAMPLE OF A 4 ELEMENT, SIX METER QUAD

TOTAL ELEMENT WIRE LENGTHS	LENGTH OF ONE SIDE
RF1 = 241-3/4 INCHES	60-1/2 INCHES
DE1 = 236-0"	59-.0"
DI1 = 229-.0"	57-1/4"
DI2 = 225-.0"	56-1/4"

ELEMENT SPACING
1S RF1 to DE1 = 43 INCHES
2S DE1 to DI1 = 34 INCHES
3S DI1 to DI2 = 34 INCHES
ADD 2 INCHES AT EACH END
TOTAL BOOM LENGTH = 115 INCHES

When stacking two of these quads, use 44 inch lengths of 75 OHM cable from Coax "TEE" connector to each Quad. Coax from transmitter to "Tee" is 50 ohm coax. As viewed above, for vertical polarization, feed both quads as shown (left side). For Horizontal polarization, feed both quads at bottom of the driven element (as indicated).

Fig. 3– The illustration above gives the approximate dimensions to help the "do-it-yourselfer" construct a dual quad assembly for 6 meters. Note that quads may be fed in either plane, vertical or horizontal. With a little thought, this feed method provides us with an easy means of changing from horizontal to vertical polarization.

manufacturer's printed specifications for a given type of feedline or coax. When the (VHF/UHF) coaxial cable runs are less than 200 feet, I spec for Belden 9913 hardline. When the VHF/UHF cable runs require *more* than 200 feet, I spec for Andrew LDF-4-50 or larger "heliax™" hardline.

The main points of interest are the specs regarding the loss factor (expressed in dB) per hundred feet, the velocity factor, and the frequency at which the measurement was taken. Over the long haul, the "hardlines" or multiple shielded coax cables will prove to be the better value.

The coax cable or the transmission line plays a major role in the antenna performance. The coax is a very vital part of the overall antenna system, but the coax has a personality of its own and it can wreak havoc if it is not cut to or "tuned" for optimum performance along with the antenna. Even more important, the antenna performance will depend on the behavior of the transmission line at the time of antenna tuning or setup. In other words, if the coax is not prepared before the antenna is tuned, then tuning of the antenna will not render optimum performance.

The coax is the "life line" that delivers the energy to the antenna. Since the energy is handled by the coax, this means that the coax is either an external extension of the "tank circuit" or it is part of the antenna. Which is true? This is not a trick question, but a way to make a statement that can easily be remembered. The antenna feedline is *both*, because the complete antenna system *is* part of the tank circuit.

For Omni Operation . . .

If your quest is for local or "omni"-directional packet radio operation, then you might consider an easy to set up and install antenna such as the "Arrow" ground planes or the Arrow A-Pole. The latter is a different approach to the J-pole. I use the GP-146 Arrow ground plane on some 2 meter nodes and the GP-52 for the 6 meter backbone nodes. These two models of Arrow ground planes are made of highly durable, hard-drawn, *solid* aluminum material. All three models come with all hardware, including a well-made mounting bracket.

Contact Allen Lowe, NØIMW, Arrow Antenna, 1803 S. Greeley Highway, #B, Cheyenne, WY 82007 (phone 307-638-2369; fax 307-638-3521).

Now we are having more fun "digitally." Visit the packet radio web pages at <www.PacketRadio.com>. And remember: All text and illustrations found in the "Packet User's Notebook" column are Y2K compliant and will continue to be visible after January 2000!

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World Of Ideas

BY DAVE INGRAM, K4TWJ

A Look At The World Around Us

Crystal Set Resurrection—Part II

Say last month's column piqued your interest in collecting, homebrewing, and experimenting with crystal sets of various types? Anxious to see more views and study more circuits of the little critters? As I stated in Part I last month, it is difficult to stop the dinking with just one quick-assembled crystal set—especially with uncertainties of Y2K looming on the horizon. Yes, and some real "free play" treats capable of outlasting the Energizer bunny are lined up for sharing with you here in Part II. Hopefully, you will also share the pleasures of homebrewing one or two of these delights with that special youngster or relative in your family. Remember, too, that every home-assembled crystal set should be accompanied by at least one true tale of use from eras past. What kind of tale, you ask? There are no specific guidelines here, so just "do your own thing."

One "first in mind" example I visualize relates to the *Titanic*'s famous SOS in 1912 being received by radio amateurs from Maine to Virginia—all using homebrewed crystal sets. Now that's factual proof that these "simple-ceivers" really work! I also understand many radio operators aboard ships in those early times could blow away some modern-day radio amateurs with their Morse copying ability.

Typically, a ship's radio room lacked windows for viewing the outside world. While in port and exchanging messages with shore-based stations, the operator on another ship passing nearby could begin transmitting with ultra-high power—and without any warning. Our hero would be temporarily deafened from rattled earphones, and his crystal's point of signal detection would be cremated. In a single and almost involuntary movement, however, he could chock up a fresh galena crystal in the detector's holder, reset the catwhisker, and continue right on without missing two or three words of copy. No AGC, no sharp CW filters, no DSP—just flat out gusto operating! Tell that story to your grandkids and urge them to tell it to their grandkids 50 years hence! Okay, it's now showtime, so let's "bring on the stars"!

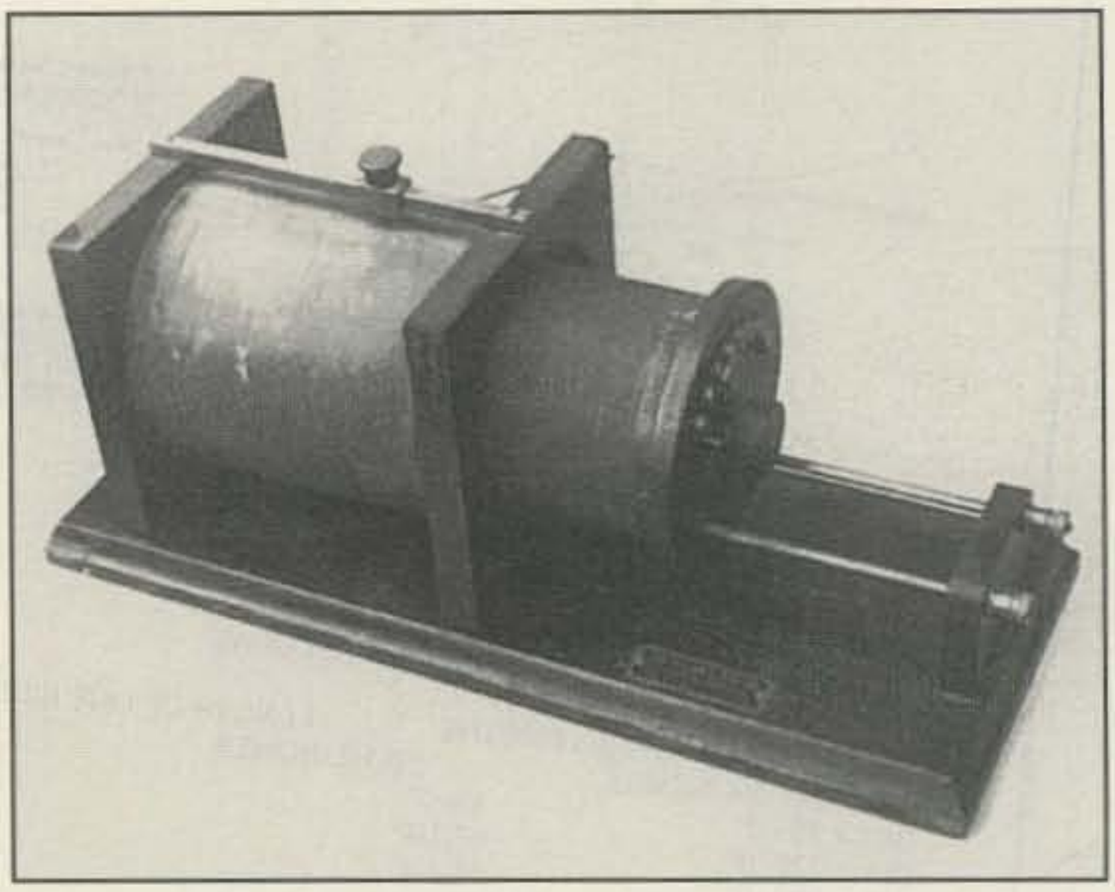

Photo 1– This captivating piece of radio history is a William B. Duck loose coupler like that used with crystal sets of the early 1900s. The coil on the right adjusts within the coil on the left to vary coupling while the slider and switch taps (eight total) select wavelengths. Housing is 5 1/4" × 5 3/8". Wood base is 15" × 6" × 3/4". (Photo courtesy M. L. Sievers and Sonoran Publishing)

More Neat Crystal Sets

No doubt about it, friends: Crystal sets stand tall as some of the most impressionable forms of early radio receivers—especially those used during the heyday of spark and dawn of AM broadcasting. Yes, and the good news is you can build authentic, working replicas of these timeless classics right in your own home. All you need is one or two photos for guidance and a couple of circuit diagrams to duplicate.

Let's continue that line of thinking by including a "back in time" theme in our opening views (photos 1 and 2). These pictures, incidentally, are from Dr. Maurice L. Siever's new book *Crystal Clear, Volume II* shown in photo 3 and available from Sonoran Publishing LLC, 116 N. Roosevelt, Suite 121, Chandler, AZ 85226 (telephone 602-961-5176). This book continues where Volume I (highlighted last month) left off and contains photos plus information on more than 170 additional crystal sets, 91 types of adjustable crystal detectors, and a large number of crystals and galenas. Overall that equates to approximately 350 more photos and 160 more product advertisements.

The crystal set market was vast, and these two books document it like nothing else I have ever seen. Either (or both!) books would definitely make a most unforgettable (awesome!) holiday

Photo 2– You have heard tales about them from old pros for many years. Now here they are posing in a family portrait: the famous Mothers Crush Oats and original Quaker Oats Crystal sets. Look closely and you will notice the box labels wrap over the coils on these promotional items of the 1920s, whereas the coils are wrapped over labels on the homebrewed version. Quaker Oats boxes are as synonymous with crystal sets as Altoids tins are with QRP. (Photo courtesy M. L. Sievers and Sonoran Publishing)

4941 Scenic View Drive, Birmingham, AL 35210

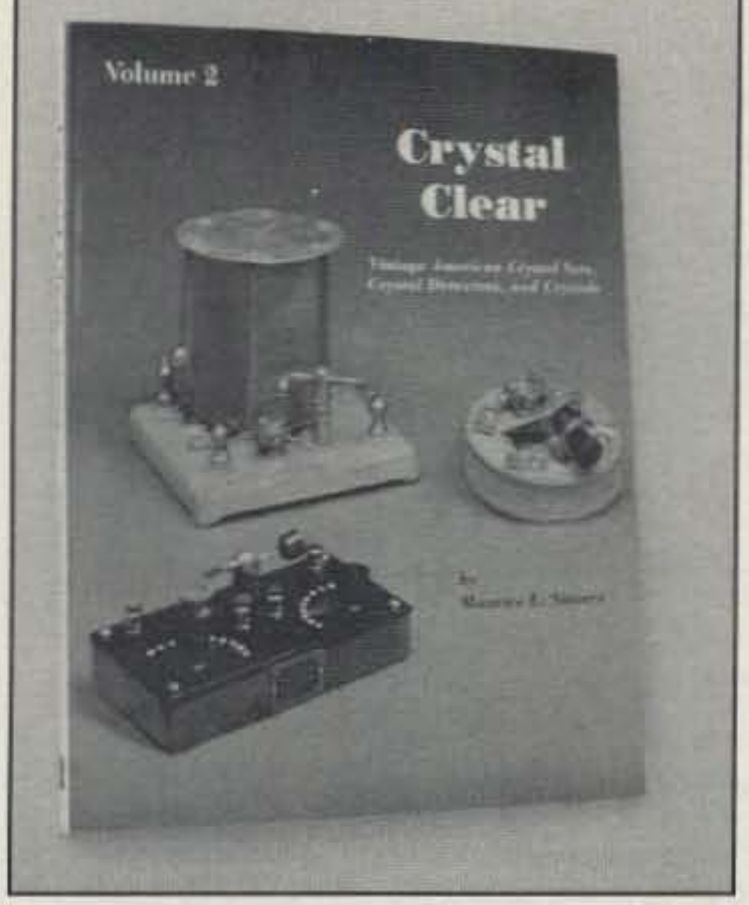

Photo 3– Dr. Maurice L. Sievers' second book, Crystal Clear, Volume II, *continues where his Volume I leaves off, and it too captures the glamour of crystal sets like nothing else on the subject.*

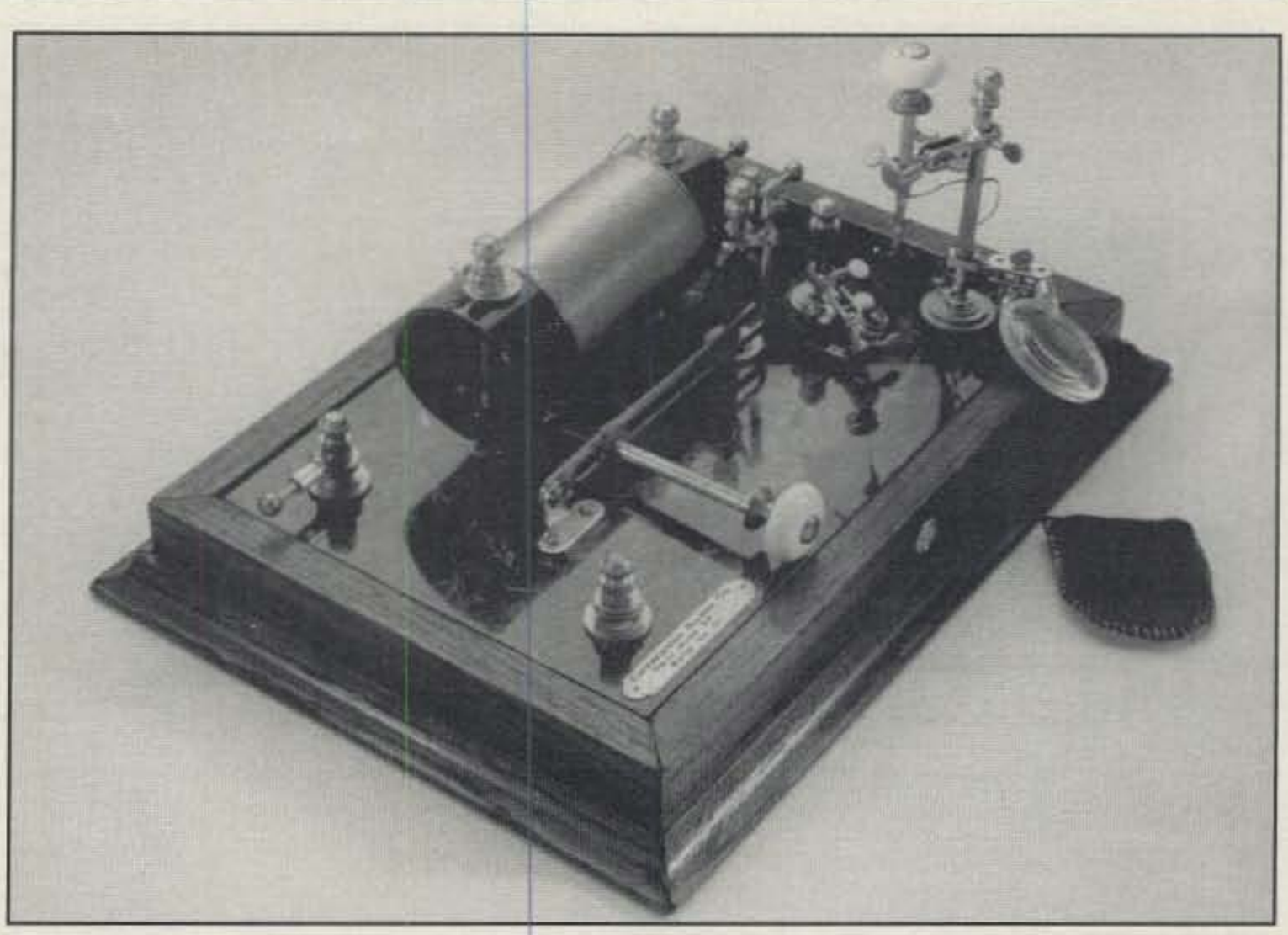

Photo 4– This modern crystal set presently is made by the Tippecanoe Radio Company of Ohio, and it is a real showpiece. The item sports green marble and red oak wood base, polished brass hardware, and even a gimble-mounted magnifying glass for studying different galenas. (Details in text.)

present for that special person on your list. Now let's peek at some of Volume II's "exotic sets."

The item shown in photo 1 is a loose coupler made by the William T. Duck Company of Toledo, Ohio in 1915. It was typically used with an adjustable catwhisker and galena-type crystal detector to produce an open-air or "component type" crystal set. The loose coupler consists of "two coils"—a stationary primary coil and a secondary coil mounted on rods so it can be moved within the primary coil to vary coupling. Switch-selectable taps or a sliding contact on primary and secondary coils allows an operator to change turns/counts and thus tune different wavelengths.

Loose couplers, incidentally, fall into two general categories: the Navy type which utilizes tapped coils and multi-position switches, and the Arlington type which utilizes a sliding contact. Our highlighted William B. Duck coupler is particularly interesting, as it utilizes a combination switch and slider arrangement in its design. A quite similar type of loose coupler used during the same era (and afterwards) was the slide tuner. It consisted of a single coil like the left, or primary, coil in photo 1 and had one, two, or even three sliding contacts. By varying the antenna, ground, and crystal detector's points of connection to the coil, different frequencies can be selected and signals peaked. Big time radio for sure!

Next up are two special treats as synonymous with crystal sets as Altoids tins are with QRP: the Quaker Oats and Mothers Crushed Oats box receivers shown in photo 2. These particular ones are more than legendary homebrew types like our forefathers used as kids, incidentally. These are special premiums made by The Marquette Radio Company and offered by Quaker Oats and its sister company, Mothers Crush Oats, between 1921 and 1924. They were available by mail order for two boxtops and $1.00, and a mating pair of Trimm earphones was also available for two or more boxtops plus $3.00. During the mid 1970s Quaker also offered a miniature transistor radio version of this famous crystal set for $10. Needless to say, they quickly sold out.

So what is the difference between the promotional crystal sets shown in photo 2 and homemade versions? Most obvious is home-rolled types *(sic)* sport coils wound over the box label, whereas Quaker's promotional versions have their box label over the coil. A cutout in the label allows adjustment of the slide tuner to receive different stations. Look closely at photo 2 and you will also see the "Mothers" version has an adjustable catwhisker and galena holder-type crystal detector, while the "Quaker" version has a cartridge-type fixed-point crystal detector. Some notes

Photo 5– The Vectronics quick-brew crystal set. The item is easy to assemble, low in cost, and available from amateur radio dealers nationwide. (Details in text.)

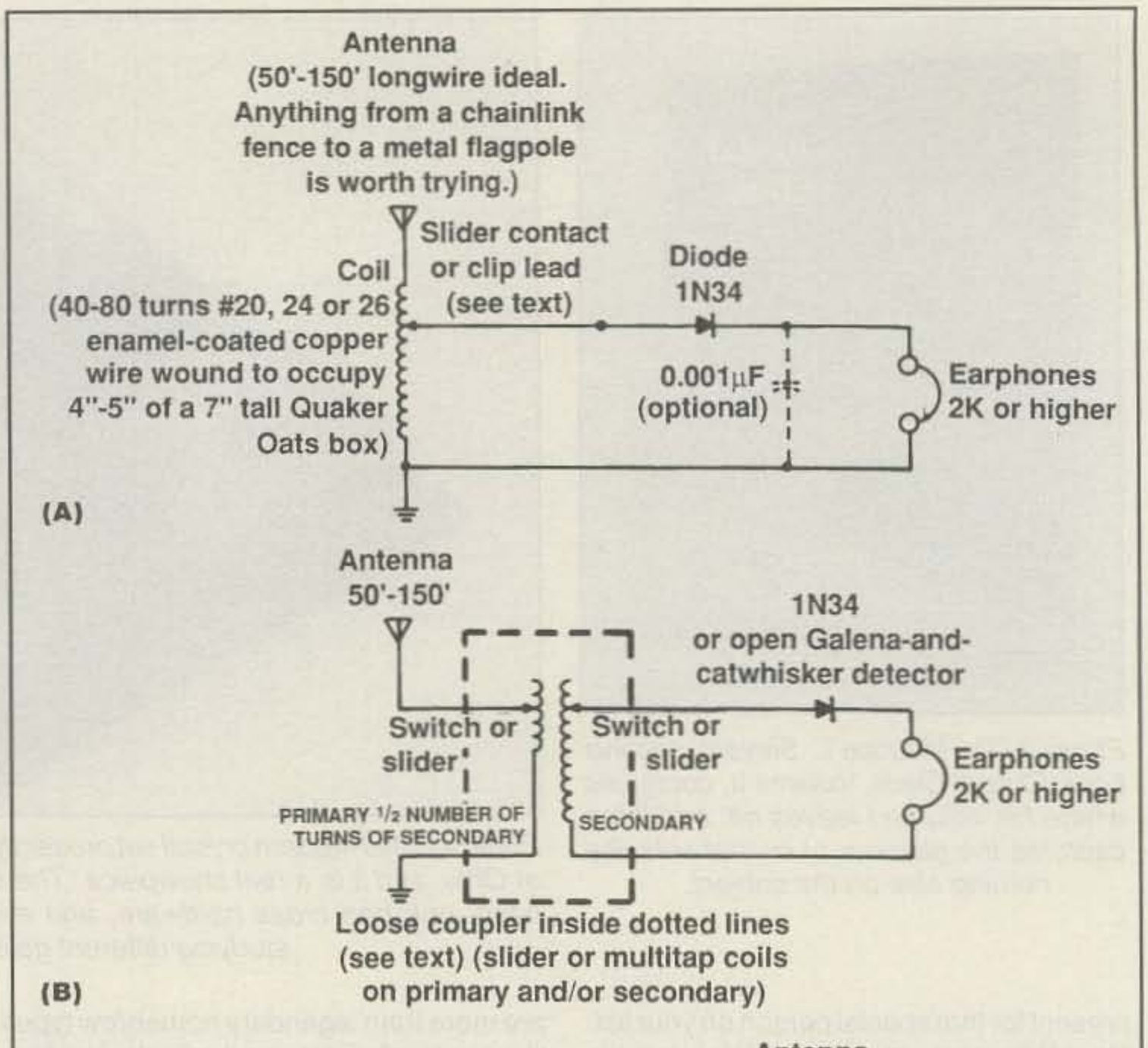

Fig. 1– Here are three tried-and-proven, successful circuits for homebrewing a high-performance crystal set. "A" represents a classic Quaker Oats box receiver, "B" symbolizes a loose coupler-type set, and "C" is my own "crazy, mixed up crystal set." (See text for details.)

and circuits for homebrewing your own Quaker Oats box crystal set are forthcoming, but first let's check out the unusual "high end" set shown in photo 4.

This showpiece is presently available from the Tippecanoe Radio Company, and it is surely the most lavish crystal set anyone has ever offered for sale. It is built on an emerald green marble base with red oak frame and uses small-diameter copper tubing with 24kt. gold end connectors for underside wiring. Now that's what I call Y2K-ready for sure! Looking more closely, we see various parts are mounted with polished brass hardware, and the tuning rod is supported by a spring-loaded mechanism that selects turns on the coil's bottom rather than its top area. The crystal holder, catwhisker arm, and magnifying glass (for studying various minerals and comparing their signal detecting abilities) swivel in any direction for adjustment. Overall, it's one fancy item! If you would like more details or wish to order this beauty, contact Jeff Pipenur of the Tippecanoe Radio Co., P.O. Box 321, Tipp City, OH 45371 (telephone 937-667-9399). While talking with Jeff, also ask about his fancy ZK-1 hand key that we will be featuring in an upcoming column. It is awesome!

Moving on down the scale, so to speak, we have the Crystal Set Society's neat, economical receiver kits featured in last month's column and the Vectronics crystal set kit shown in photo 5. This is a low-cost, well-documented kit, and it makes a good adult-and-youngster project for spicing up a dull weekend. The receiver is mounted on a clean pine board, uses a miniature 365 pFd variable capacitor for tuning, and typically picks up two or three AM broadcast stations in a medium-size city. The kit is available from amateur radio dealers nationwide, or you can order it directly from Vectronics at 300 Industrial Park Road, Starkville, MS 39759 (telephone 1-800-363-2922).

More Circuits and Notes

As you have probably surmised, our main attractions this month are the Quaker Oats box and the loose coupler types of crystal sets. They both make terrific easy to homebrew projects with real classic radio glamour everyone can appreciate. Most of our notes this time will be combined with circuit discussions. However, a couple of special points warrant mention before getting started.

First, I must again emphasize crystal sets are good for more than just AM broadcast band reception. When tapped or slider-adjusted so only a few coil turns are used, they can tune in nearby AMers on 160 meters, international broadcast stations on shortwave broadcast bands, and some immediate-vicinity CB stations (a neat road monitor when traveling). The keynote here is experimenting with coil sizes and turns to get the desired frequency coverage. You can check that range by transmitting a scant 5 watt AM signal into a dummy load and then tuning it in on your crystal set. Try it! Now let's focus on some hookups!

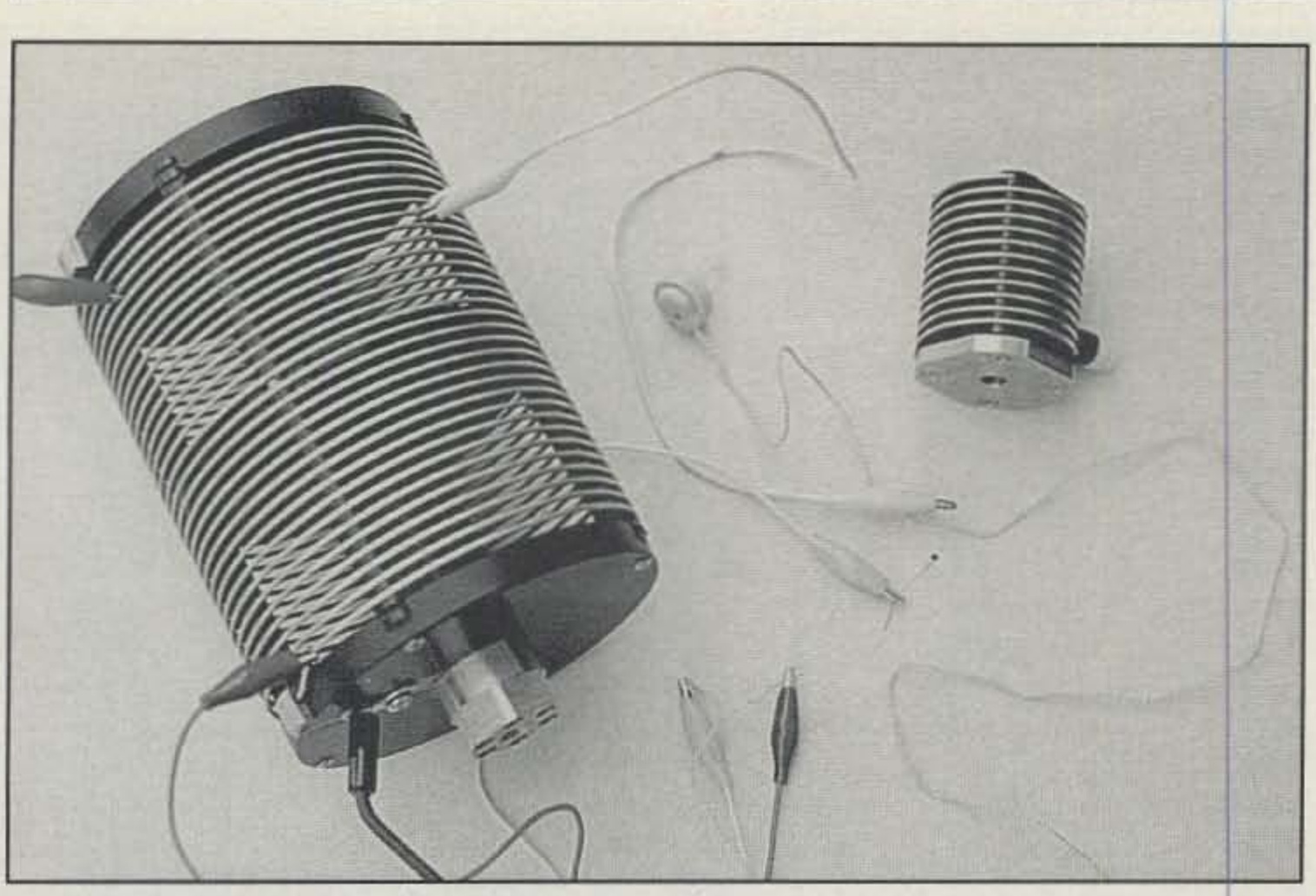

Photo 6– My "instant dink" kit for experimenting with different circuits and coils in crystal sets. Collection of parts includes large Fortex "Stealth" mobile antenna loading coil, smaller base matching coil, 1N34 crystal diode, high-impedance earphone, and a handful of clip leads.

The circuit diagram of a typical Quaker Oats box-type crystal set is shown in fig. 1A. Its coil consists of 40 to 80 turns of number 20, 24, or 26 enamel-coated copper wire with turns filling 4 to 5 inches of the box's 7 inch height. A 50 foot roll of wire should work fine for winding this coil. Small screws, washers, and double nuts can be used to secure coil ends and double as feel-through connectors so circuit wires can be routed inside the box. The crystal detector and earphone terminals can then be mounted on the box lid. Remember to sand off enamel insulation along a vertical strip of coil where the slider moves for tuning. I will leave final design of that slider to your creative ingenuity. (That could become the topic of another month's column if sufficient interest is revealed. Opinion?)

Say your time for experimenting with crystal sets is limited? Me too. I took a shortcut you also might find handy. I used a handful of clip leads, a 1N34 diode, and the large (5 1/2 inch diameter, 8 inch tall and 30 turns) loading coil from my big Fortex "Stealth" mobile antenna to snap together a half dozen circuits in a few minutes (photo 6). That "big coil" set (comparable to a Quaker Oats receiver) was the most selective and almost tuned like a regular AM radio, but the performance dropped off around 8 or 9 MHz. Substituting my antenna's smaller base matching coil (9 1/2 turns, 2 1/2 inches diameter, 3 inches tall) improved reception up to near 28 MHz. Maybe a popsicle-stick-wound coil would work even better for 10 meters.

Are you getting the idea, friends? Good! Start dinking! Who knows what amazing results await you! Although it's an unconfirmed rumor, a couple of chaps reported using an old stored-and-forgotten Quaker Oats box for their sets and playing big

band music from the 1930s right off the bat. Another fellow said he used a Japanese-made crystal detector in his set, and it picked up an original Tokyo Rose broadcast. The mystery and magic in crystal sets is truly amazing!

If you prefer building a loose-coupler-type receiver, incidentally, check out fig. 1(B). Study the William B. Duck unit shown in photo 1 for mechanical details, include some classy woodworking plus colorful wire, and you can emerge with a real showpiece worthy of handing down to future generations.

Space is now tight, but the notes and circuits just keep on coming! Remember last month I mentioned crystal sets were surprisingly forgiving of minor wiring errors? Well, friends, one true-life example of that fact is illustrated in fig. 1(C). As a young grade-schooler, I simplified crystal sets for easy assembly and quick hookup by clipping an antenna lead to one earphone wire and just holding the other earphone wire in my hand to simulate ground. It worked so well that I never paid attention to the fact that the antenna was

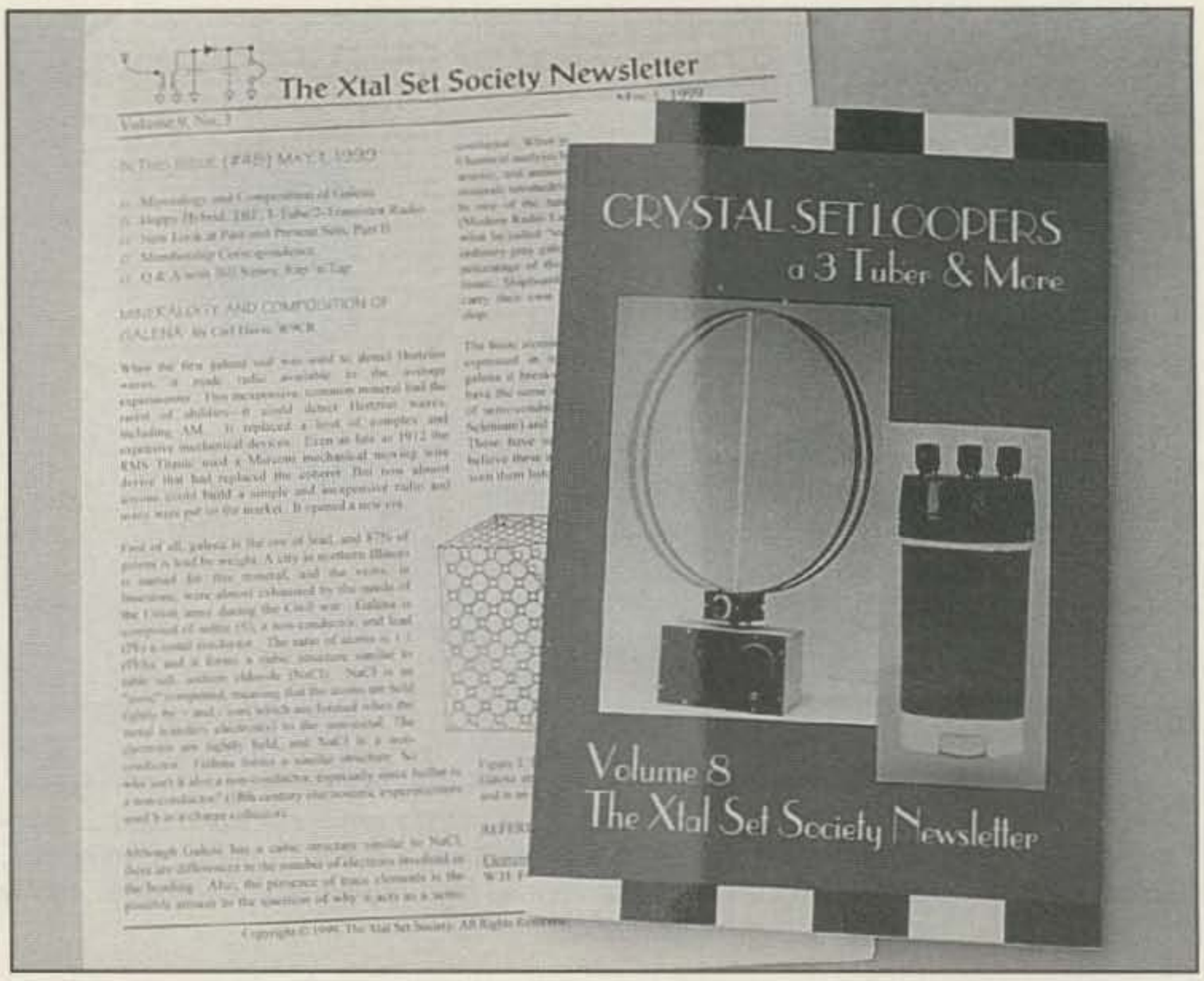

Photo 7– The Crystal Set Society just keeps on pumping out fascinating newsletters and books on crystal radios, and hot items of the day are big loopers for shortwave reception. They are gems!

connected to the wrong side of the diode. Try my "crazy mixed up circuit." It's neat!

Conclusion

Just as I began wrapping up this month's column, yet another newsletter and announcement of a new book arrived from the Crystal Set Society (photo 7). This one is also filled with irresistible ideas for crystal sets. (I am hooked on these critters, and love it. You will be, too!) One example that captured my interest is the shortwave "looper" crystal set designed by Mark Karney, N9JWF, and shown in fig. 2. What an art form! Would this not look great hanging on a foyer wall? Wow! No column space is left for details, so just join "XSS" and order the "Loopers" book from the Crystal Set Society, P.O. Box 3026, St. Louis, MO 63130 (1-800-927-1771).

This two-part series presented a sort of "Whitman's Sampler" on crystal sets—amateur radio's original and first receivers. Now it's your turn to tell us if you want to see more of them and maybe share views of your own crystal sets. Quick "no reply necessary" notes are welcome at K4TWJ@cq-vhf.com, or write to me directly and include an SASE for a reply. Alternately, I frequent 30 CW weeknights and 20 SSB weekends.

73, Dave, K4TWJ

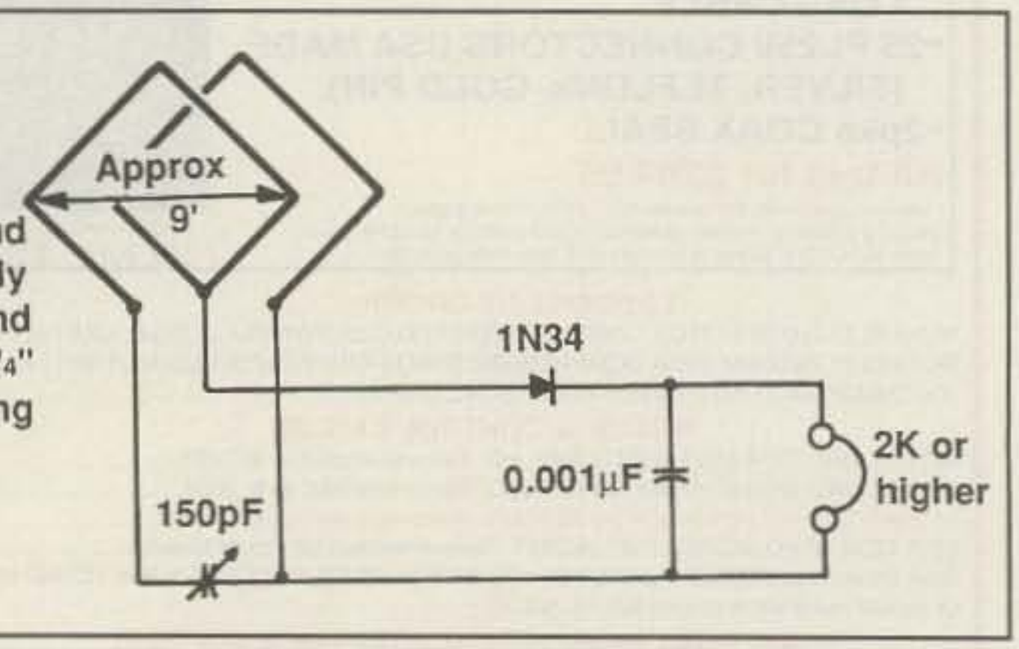

Fig. 2– Outline of a "looper" crystal set covering approximately 550 kHz to 10 MHz, thanks to Mark Karney, N9JWF, and the Crystal Set Society. Every amateur needs one of these big coil sets on their den or garage wall!

VHF Plus

BY JOE LYNCH, N6CL

All About The World Above HF

1999 Leonids: Storm or No Storm?

Last year due to much worldwide publicity, hams who regularly work the meteors were expecting a storm. What happened was that a major peak did occur but was not at storm proportions, and it was much earlier than predicted. Unfortunately, many who set their clocks by predictions were caught off guard and missed it.

What about this year? Will there be a storm? According to Joe Rao, who wrote an article which appeared in March 1999 *Sky and Telescope,* we can expect the possibility of a storm this year. Rao explains that last year's less-than-storm-level activity can be explained by looking at the past seven peaks of the *Leonid* meteor stream. He points out that " . . . no storm ever occurred less than 299.4 days after the comet passed by Earth's orbit. In 1998 Earth followed the comet to its descending node (the orbit-crossing point) by only 257 days. With a peak zenithal hourly rate of about 250 meteors per hour, the 1998 maximum was far below what could be considered storm-level activity."

In non-astronomic language, Rao means that we were too early into the crossing of the meteor stream proceeding from the comet to affect a major storm. He also uses this data to conclude that because these previous predictions indicated peaks that proved inaccurate, occurring between 8 and 24 hours earlier, the 1998 peak occurred 11 hours earlier than expected.

Even so, ever the optimist, Rao ventures a prediction: "If a meteor storm is to take place at all, 1999 would appear to be the most likely year for it to happen. But even if this year's *Leonids* are richer in number, observers should not expect the same high proportion of fireballs that were seen in 1998. Instead, a more even mix of bright and faint meteors is likely."

Rao further wrote: "During the seven most recent *Leonid* storms that occurred with Earth following Comet Tempel-Tuttle to its descending node, the average distance between the comet and Earth was 0.0068 astronomical unit. The average number of days that Earth followed the comet to the node was 602.8 days. With the 1999 values of 0.0080 a.u. and 622.5 days, we ought to be in a prime position to see significant, if not storm-level, activity."

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(phone 918-627-6625; fax 918-835-9785)
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VHF Plus Calendar

Nov. 7	New Moon. Poor EME conditions.
Nov. 12	Moon apogee and lowest Moon declination.
Nov. 14	Very poor EME conditions.
Nov. 16	First quarter Moon.
Nov. 18	*Leonids* meteor shower predicted peak. *(See text for details.)*
Nov. 21	Good EME conditions.
Nov. 23	Full Moon.
Nov. 24	Moon perigee.
Nov. 25	Highest Moon declination.
Nov. 27–28	ARRL EME contest. *(See text for details.)*
Nov. 28	Excellent EME conditions.
Nov. 29	Last quarter Moon.

—EME conditions courtesy W5LUU.

While Rao is in the minority in his view that this is the year of the *Leonids* storm, most predictors do agree that the stream will be exceptionally large. Just when and where it will occur is again subject to some amount of speculation.

Even with the above in mind, the International Meteor Organization feels fairly confident about their prediction. Accordingly, on their home page <www.imo.net> they state the following: "The precise knowledge of the 1998 *Leonid* activity profile and the records of past Leonid epochs permitted a very fine-tuned adaptation of models of the *Leonid* meteoroid stream. The continuation of model calculations to 1999 provides us with a predicted peak time on November 18th, 2h 08m UT. This time favors observing sites in western Asia, Europe, and Africa."

Again, in non-astronomic language, the IMO predicts that based on past performance of the *Leonids,* in particular what happened last year, we can expect a peak around 0208 UTC occurring in eastern Europe, northern Africa, and western Asia.

Unfortunately for us in the U.S., that puts us out of the peak, as it appears to favor eastern Europe and northern Africa. However, Rao wants us not to jump so quickly on any sound prediction. He wants us to remember that " . . . not all *Leonid* storms have shown up on schedule. . . . " He reminds his readers that the 1900 display was nearly 12 hours earlier than predicted, and the 1901 display was about 14 hours later than predicted.

The IMO does conclude, though, that a " . . . background level of about ZHR = 100 lasting several hours is quite certain. . . . " Therefore, it is quite possible for us here in the U.S. to enjoy several hours of good meteor-shower-caused QSOs.

Seemingly in agreement with this unpredictability of when the peak will occur, and with his characteristic aplomb, Rao concludes: "[This month] all of us will be entered in a '*Leonid* lottery.' And since nobody can say with certainty where, when, and what will happen, it appears that observers worldwide all have a shot at hitting the meteor jackpot."

For the latest predictions, check these URLs: <www.skypub.com>; <www.nasa.gov>; and <www.imo.net>. Both NASA and the IMO have interests peculiar to their organizations and have garnered several different prediction summaries on their home pages.

NASA is particularly interested in the most accurate information because of the effects a storm could have on orbiting satellites. In particular, the *Leonid* stream bears much watching because of the storm possibilities, but also because of its intensity. Its meteor stream is both a high angle and high velocity. Meteor burns occur as high as 140 km (approximately 85 miles) above the Earth's surface, as compared to an average of around 100–120 km (approximately 60–70 miles) above the Earth's surface.

Why Do Meteors Allow Us to Communicate?

Meteor showers principally are caused by debris discharged from comets as they make their way around their orbit. Most of the debris, consisting of sand and small pebbles, is expelled when the comet grows a tail as it moves to its closest point to the sun. That is called the *perihelion.*

This debris tends to travel in orbit both ahead of and behind the comet. When the Earth travels close to the orbit of a comet, it can run into or cross through this debris, thereby creating a meteor shower as the debris enters the Earth's atmosphere. A meteoroid is that grain of sand which hasn't yet made its spectacular entrance into the Earth's atmosphere. When it does, at around 60–70 miles (96–112 km), it is speeding into it at around 160,000 mph (260,000 km per hour).

All that speed strips away electrons both from the grain of sand and the ionosphere. The result is ionization. And, depending upon what makes up the grain of sand, the ionization takes on a particular

color. For example, silicon appears red, magnesium appears blue-green, calcium appears violet, iron appears yellow, and sodium appears orange-yellow.

In their wake, an ionization trail appears, like a cloud. This ionization is either overdense or underdense, with the overdense area being in the central part of the cloud. Also, it is frequency sensitive. As the ionization decays, the underdense area expands at the expense of the overdense area. During this ionization, signals hitting the underdense area pass through it. However, signals are refracted off the overdense areas.

Depending on the denseness of this area, higher and higher frequency signals are refracted. Yet, as this overdense area is disappearing, the maximum usable frequency (MUF) of the ionized cloud is falling. Eventually, the MUF falls out altogether as the ionosphere returns to its preionized state. And because of the recombination of the electrons with atoms, the ionization disappears.

It is during this brief moment of ionization that we get our adrenaline rush while we complete the previously impossible QSO. It is important to note that the denseness is frequency sensitive. What may be underdense at one frequency, may also be overdense at a lower frequency.

Meteors are usually harmless—unless they are large enough to make it to the surface of the Earth. Then they become known as meteorites. Every once in a while there is a news report of a meteorite that crashes through someone's roof. However, most of the time meteorites are harmless grains of sand which hit the Earth's surface without notice.

Sometimes a meteor can explode. When it does, it can appear to be a fireball. This can happen as a normal course of it flying through the ionosphere and breaking apart, or it can happen if an upward bolt of lightning strikes it. The propagation caused by that phenomenon is usually much longer and more intense.

Some people have reported to me that they have "heard" the meteors. What they report is a hissing sound. If a meteor explodes, they report the sound of its explosion. Some say that the hissing sound has to do with low-frequency radiation intermingling with the atmosphere causing a sort of audio rectification of the signal.

In the case of the fireball, it may sound like rumbling, rather like thunder. If you are hearing that sound, it is because the shock wave has penetrated all the way through the atmosphere to within your hearing distance.

What band conditions can you expect during meteor showers? Unfortunately, it's not entirely possible to predict band conditions with certainty, especially considering what propagation modes may be present at that time (sporadic-*E*, tropo, *F*-layer ionization, etc.). However, some generalizations can be made based on past experiences.

On 12 meters it will seem as if the band is open everywhere (on short skip) during the peak. On 10 meters conditions will be much the same. If there is a storm and it is very intense, the same conditions that exist on 10 meters may also be present on 6 meters. On 2 meters stations may have propagation over a given path for up to a minute or so. On 135 cm propagation may exist for up to 5 seconds or more. Propagation on 70 cm may exist for a fraction of a second to a couple of seconds.

How Do You Make QSOs?

There are two ways to complete contacts via meteor scatter. You can either contact people randomly or via prearranged schedules. If you attempt to complete random contacts, bear this in mind: If you park on the calling frequency expecting to make randoms by way of your being there, you can fairly well forget it. The big guns will be there in force. With all this probable QRM, it is unlikely that many, including the big guns, will make much headway.

It is much better to spread out off the calling frequency. I would suggest on 2 meters spreading out at least 50 kHz above and below 144.200 MHz. If you are a big gun, find a frequency sufficiently off the calling frequency and call and call and call. I guarantee that others will find you. Your QSO rate will be much higher and more free of QRM than if you try to compete with your fellow big guns on the calling frequency.

Making contacts via prearranged schedules is much more predictable, but much slower than via randoms. In particular, during a storm you would want to make use of the intensity of the situation during the peak to complete as many contacts as possible. Because most scheduled contacts take upwards of a half hour to complete, should a peak last only an hour, you have the ability to make two really good contacts via scheduling.

Via randoms, however, you have the ability to make as many contacts as the momentary conditions will allow. Even so, during the time of the run up to the peak and the aftermath, there are plenty of opportunities to make scheduled contacts. Furthermore, while for the beginner mastering the sequencing of a QSO may seem a bit challenging at first, it is not that unfeasible once you get the hang of it.

It really is rather simple. A structured schedule is set between two stations who wish to talk to each other. If you set such a schedule, you'll probably run for half an hour. You'll transmit for 15 seconds and listen for 15 seconds. The westward station transmits first. Some operators break at the end of 7 seconds and listen briefly for the other station. Be sure to clarify operating procedures with the other station before beginning your sked. The initial exchange includes the other station's callsign and your callsign, without either of you saying "this is."

For example, if I, in Oklahoma, grid locator EM26, were running with Gordon West, WB6NOA, in DM13, I would wait for Gordon to do his sequence first because I am the eastern station. When it is my turn, I would say "WB6NOA N6CL" over and over again for 15 seconds. I would then listen for Gordon to repeat "N6CL WB6NOA" over and over again during his 15 seconds of transmission time.

After one of us has heard "complete callsigns," the receiving station starts transmitting a signal report. When I have heard both my call and Gordon's call (in no particular order), I start repeating "S-2" during my 15 second segment, interspersing our callsigns just in case Gordon has yet to hear complete callsigns.

The signal report of "S-2," rather than the traditional "59," is a way of telling the listener the length of the burns being heard. The letter "S" stands for the word "signal" and the number 1, 2, or 3, stands for the length of the burn. Number 1 stands for "pings"; number 2 stands for burns long enough to make a contact; and number 3 stands for very long burns—at least 15 to 30 seconds in length. Therefore, a signal report of "S-2" means that the sending station is hearing the receiving station on burns long enough to make a contact. As a matter of convenience, most operators stick with "S-2," much like HF operators stick with "59."

Assuming Gordon has heard both calls and the signal report "S-2," he'll start saying "Roger, S-2" over and over again during his 15 seconds. Once I have heard "Roger, S-2" I reply with "Roger" over and over again. Once Gordon has heard my "Rogers," the QSO is considered complete. As an option, Gordon can come back and say "Roger, 73" repeatedly during his sequence. However, it's not necessary for a valid contact.

Current Contest

The second weekend of the ARRL EME contest is November 27–28. A summary of the rules appeared in last month's column. EME activity can be quite fun, and contests provide excellent opportunities for increased activities via this mode. If you would like to experience it, find someone local to visit during the contest. For my wife, Carol, W6CL, her first EME QSO was during an ARRL contest. To this day she remarks about what a thrill it was to talk to someone in France via 1296 MHz EME. Tommy Henderson, WD5AGO, who invited us to his house for the contest weekend, made this first EME QSO possible for Carol.

If you are a big gun, then maybe you

might make it possible for a new ham or someone like Carol who is a long-time ham but who was new to VHF weak-signal communications to make a first-time EME QSO. Look around your area and see if there is someone you know who might be interested in learning more about this mode of exotic communications. Invite him or her over and let them learn like Carol did—by operating your station.

Integrity and Amateur Radio Communications

Both meteor scatter and EME contacts rely upon trust and integrity. Both modes of communications demand that each participant have the integrity to say whether or not he or she has heard the other person. Without that, we cannot trust that these marginal types of communications actually took place.

I guess this old-fashioned integrity is what has drawn me to the VHF bands. There is little cheating going on within this arena. If it occurs, the person involved is discovered quickly. Once one's lack of integrity is exposed, then contacts with the offending individual seem to disappear. Eventually, so does this individual. Truly, within the weak-signal VHF+ community integrity based on self-policing and self-discipline continues to work to make this a better hobby for all of us.

FCC Relaxes Rules For Spread Spectrum

The following is from the "ARRL Letter":

The FCC has relaxed rules governing the use of spread-spectrum techniques by radio amateurs and opened the door to the possibility of international spread- spectrum communication. The Report and Order in WT Docket 97-12 adopted August 31 concludes a proceeding that originated with an ARRL petition in December 1995 and has been pending since 1997.

The FCC adopted rules that will allow Amateur Radio stations to transmit additional spread-spectrum emission types. Once the new rules become effective November 1, hams will be able to use techniques other than frequency hopping and direct sequence spreading. In addition, the new FCC rules will permit US hams to use spread-spectrum techniques to communicate with amateurs in other countries that permit SS. Spread-spectrum communication has been limited to stations within FCC jurisdiction.

The new rules require that spread spectrum stations running more than 1 W incorporate automatic transmitter power control. Amateur stations using SS are restricted to a maximum power of 100 W.

The Commission also amended the rules to eliminate what it called 'now-unnecessary record keeping and station identification requirements' that apply only to stations using spread spectrum. The FCC agreed to let SS stations identify themselves using conventions developed by the Amateur Radio community.

Stations employing spread-spectrum techniques will remain secondary to—and must accept all interference from—stations employing other authorized modes. The FCC declined to authorize the use of spread-spectrum techniques on additional bands or frequencies.

And Finally . . .

It's been a few years since I published this following parable. I have had several requests for reprints and for publishing it again. In light of the discussions concerning the recent Central States VHF Society proposal and the backwash from it, I believe that now is a good time to take another look at my story.

One of my favorite reading pleasures used to be the stories invented by Hugh Cassady, WA6AUD. Hugh published "The West Coast DX Bulletin" for a number of years and then retired from that endeavor, only later to take up, for a time, the editorship of *CQ*'s DX column. I often thought that someday I, too, could invent bits of wisdom neatly wrapped in a story.

With this parable below, I am going to make an attempt.

Recent postings on the VHF reflector on the Internet tend to have just a little bit of anti-FM undertone. With that in mind, I want to present the following story:

It seems that there was a wise old ham who occasionally was visited by newer, younger hams and asked for advice. On one occasion he was asked, "What are the characteristics of the true ham?" He told this story, which had its origins in southern California:

One day there was a tremendous racket on 144.200 MHz. This racket occurred at different times during this particular day. It just happened one day and then it went away. Those listening on SSB knew right away what caused the sound. It was one of those FMers transmitting FM on the SSB calling frequency.

There were three or four hams in particular who responded to the sound, all of whom thought they were the ones who caused the problem to go away.

The first ham was an Extra class. He had a powerful station with big beam antennas. He decided to find the location of the offending sound by pointing his big antennas in the direction of it. When he found it, he turned on his linear and let the offender have it. After doing this about three or four times during the day, he noticed that the sound had gone away.

The second to respond was a group of hams who were just an ordinary bunch. They gathered on the calling frequency and chatted endlessly about nothing in particular. When the offending sound came on, they kept right on talking. Maybe someone commented about the FMer, but generally they ignored the sound and pretended that it wasn't there. Finally, at the end of the day they noticed that it was gone. They reasoned that they were the ones who had gotten rid of the sound simply by ignoring it.

The final person to respond was a relatively new ham. He had one of those licenses that so many people criticize—a code-free Technician. He had just bought a multi-mode radio. On this particular day he heard the same racket that everyone else did while he was listening to SSB on 144.200 MHz. However, he decided to do something different.

He switched his multi-mode radio to FM and listened. What he heard was a brand-new ham calling CQ. Well, this Technician realized immediately that the new ham had a problem. No one was going to answer him on FM on the SSB calling frequency.

He thought about answering him, but decided against it because he figured he would only compound the problem. He did something else.

This Technician turned on his computer, checked into the World Wide Web, and looked up the callsign of the new ham. When he found the ham's address, he decided to get in his car and pay him a visit.

When he arrived at the new ham's home, he knocked on the door and it was opened to him. After identifying himself to the new ham, he was invited in.

Both hams found friendship instantly. After a time the Technician asked to see the new ham's radio. The new ham brought out the radio, adding that he had purchased it at a swapmeet the weekend before he received notice of his license.

Upon examination, the Technician realized that this was a radio that was a few years older than what was currently on the market. He then remembered that another southern California ham once wrote a review about the radio. In that review, the southern California ham chided the manufacturer of the radio for a flaw that caused the radio to default to 144.200 MHz upon initial power-up.

The Technician told the new ham about this radio flaw, adding that he had heard him during the day calling CQ with no results. After spending some time with the new ham explaining the FM frequencies and repeaters and reprogramming the new ham's radio, the Technician left.

On the way back to his home, the Technician had a QSO with the new ham on one of the local repeaters. During the QSO he promised the new ham that he would be back to help him with other aspects of the hobby, such as finding a local club, setting up a fixed station, etc.

The wise old ham concluded his story by asking the question, "Which one of the three would be considered the true ham?" Those listening to him responded by saying that it was the Technician, to which the old man replied, "Go and do likewise."

If you have a tale of your accomplishments to tell me , please let me hear from you. You can contact me via the usual routes. My new fax number is 918-835-9785. My new voice line is 918-627-6625. My e-mail address is <n6cl@fuller.edu>. I look forward to hearing from you with material for this, your column.

Until next month . . .

73, Joe, N6CL

Contest Calendar

BY JOHN DORR, K1AR

News/Views Of On-The-Air Competition

1999 CQ Contest Survey Results—Technology in Contesting

November's Contest Tip of the Month

If the station you call goes back to someone else, listen to his exchange. If you get through to him the next time, you will already know what exchange information to expect. In case of QRM or QSB, you won't have to spend time asking for a repeat. This is especially valuable in contests with a number exchange, such as WPX. Enter the number on your screen that was sent to the other station, but increase it by one on the assumption that you will be the next QSO. If you have to call several times to get through, keep increasing the number by one. *(Tnx G3SXW)*

Well, it's that time of year when I have the pleasure of presenting the results of *CQ*'s annual contest survey. As is always the case, it's significantly easier to ask the questions than it is to tabulate the results, so I appreciate your patience, as I've been busily working behind the scenes.

This year we had a special treat by being able to submit results electronically on the well-known contester's Web site, <www.contesting.com>. For that reason, I received nearly twice the usual number of responses from 41 countries! Thanks to Bill Fisher, W4AN, for his support.

For the first time since I started running these surveys, I saw a downtrend in the average age of the respondents, with last year peaking at 45.3 years. This year the average dropped significantly to 43.1 years. It's probably premature to say we've seen a turnaround and younger hams are entering the hobby, but it was an encouraging trend to see, at the least. An interesting aside is the average level of contesting experience was 17.6 years.

I was also encouraged to see that contesters are in fact thinking about technology. In most cases, they are using lots of it. Perhaps the most amazing statistic in the entire survey was the number of you who are using dedicated PCs in your shacks (95%), with a good deal of those connected to the Internet. That should be a news flash to manufacturers and other businesses in our hobby that this resource is waiting for products that can leverage this environment. More effective use of the Internet will benefit everyone.

2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

Calendar of Events

Oct. 30-31	**CQ WW SSB DX Contest**
Nov. 6-8	ARRL CW Sweepstakes
Nov. 12-14	Japan Int. DX Phone Contest
Nov. 13	ALARA Contest
Nov. 13-14	WAE RTTY Contest
Nov. 13-14	OK/OM DX Contest
Nov. 20-21	LZ DX Contest
Nov. 20-21	RSGB 1.8 MHz Contest
Nov. 20-22	ARRL SSB Sweepstakes
Nov. 27-28	**CQ WW CW DX Contest**
Dec. 3-5	ARRL 160 Meter Contest
Dec. 11-12	ARRL 10 Meter Contest
Dec. 18	OK/OM DX RTTY Contest
Dec. 18-19	Stew Perry Contest
Dec. 18-19	Croatian CW Contest
Dec. 19	RAC Canada Winter Contest
Jan. 1	ARRL Straight Key Night
Jan. 8-9	ARRL RTTY Round-Up

With the above being said, let's move right into the results.

Final Results

Question #1: Do you believe that contesters who possess advanced technical expertise have a competitive advantage over those that lack this experience?

Yes – 327/80.9%
No – 76/19.1%

This question produced an interesting response. The vast majority of you definitely feel that technology expertise offers a significant competitive advantage. What is interesting is that several of you indicated that this has been the case for decades; it just seems more apparent now that computers are so pervasive in our hobby (see Question 2). Can you compete with a low-technology setup? The answer is probably, but most of you feel it certainly will be a lot harder!

Question #2: Do you have a dedicated personal computer in your shack?

Yes – 382/94.6
No – 22/5.4

There's not much to add here. The bottom line is that essentially everyone uses a computer these days in the shack. For those of you who don't share that benefit, take another look at PC prices; a used, low-end Pentium can be snatched up for a few hundred bucks these days.

Question #3: If yes to #2, please answer the following:

What year did you install your first PC in your shack? Average 1990

This is about what I expected, given the trends in personal computing over the past ten years. A special prize needs to be given to S58A, who installed his first computer in his shack in 1970!

What size processor? Range Z80 to high-end Pentium

These responses covered the gambit of possibilities, with over 50% of you using Pentium-level machines. However, there were a surprising number of 286 machines still in use (21 units).

Internet accessible?
Yes – 283/70.0%
No – 121/30.0%

The number of Internet users surprised me somewhat. However, the more I thought about it, the actual number is probably even higher, if you consider that many users have limited access to the Internet because of logistic issues such as phone lines and the like. This should be a wake-up call to the ham industry; the Web is here, waiting to facilitate your business with contesters.

What primary applications do you use?

As you might imagine, the answers to this one were all over the map. Here are a few interesting tidbits.

Naturally, most responses included contest logging software. However, nearly 25% of the respondents indicated that they used more than one logging product, depending on the contest.

There are lots of other amateur radio applications being used, and they range from antenna modeling, to daily logging, office programs, programming tools, etc.

Question #4: Do you have access to PacketCluster in your shack for DX spotting?

Yes – 282/69.8%
No – 122/30.2%

This one surprised me by the significant number of you who *do not* have access to DX spotting services. However, to put it in perspective, a reasonable percentage of the negative responses came from DX stations that have no geographic access to this technology. Put another way, there were few responses that indicated the

US	# Responses	DX	# Responses
WØ	22	4F/DU	2
W1	38	5B4	1
W2	29	8P6	2
W3	31	9A	3
W4	34	CT	1
W5	32	CX	1
W6	28	DL	5
W7	23	EA	1
W8	14	EI	1
W9	25	F	1
VE	16	G	2
		GI	1
		GM	2
		HA	1
		HB9	1
		HK	2
		I	6
		IT9	2
		JA	5
		JY	1
		KH6	2
		KL7	1
		LU	2
		LY	1
		OH	6
		OK	3
		OM	1
		ON	1
		OZ	2
		PA	4
		PY	1
		UA	4
		S5	3
		SM	5
		VK	4
		VR	1
		XE	1
		YU	1
		ZF	1

USA/Canada responses: 276
DX responses: 86 (39 countries)
None indicated: 42
Total responses: 404

Table I– Geographic response analysis.

respondent could use packet radio, but chose not to for other reasons.

Question #5: In general terms, do you feel that technology has overtaken the sport of operating so that stations with the most gadgets enjoy a significant competitive advantage?

Yes – 171/42.3%
No – 233/57.7%

This question showed where we are most split on the subject of technology in contesting. While you overwhelmingly felt that technology expertise affords strategic advantage, you are not as sure that it is taking over the sport to the point where operating skill doesn't prevail as the leading differentiator. A significant number of you indicated that a quality radio, amplifier, antenna combination with experience and skill still gets it done in contesting. Good for you! Keep up that enthusiasm.

Question #6: Do you feel that you have the technical expertise to maintain your own equipment (excluding simple problems)?

Yes – 275/68.1%
No – 129/31.9%

Well, there are a few of us who still know how to fix things in our shacks according to this response. This supports the commonly accepted thinking that contesters tend to be more hands-on hams compared to the general population. Maybe one year we'll have to ask: How many of you have popped open the cover of your transceiver in the past 12 months?

Question #7: Should multi-op stations be allowed to use the Internet to access other spotting nodes outside local area (i.e., via TELNET access)?

Yes – 284/70.3%
No – 120/29.7%

This was the most controversial question in the survey, because the responses came back with the strongest opinions. For the majority of you, if TELNET services are supported, you *really* support them (and vice versa). The debate of DX spotting will rage on through time.

Question #8: What one or two technological advances do you see emerging in contesting that don't exist today (or at least are not widely adopted)?

Based on the answers to this question, it's clear that very few of us see any major technological movements by manufacturers in the short-term. In fact, 38% of you didn't even answer the question. Here are some of the highlights:

Improved DSP/filtering technology.

More pervasive robot operation/remote control.

Adaptive antenna technology that can adjust to signal angles, etc.

Tighter integration of the Internet and amateur radio products; integration between station tranceivers and computers (hardware and software).

Speech recognition/Morse decoding.

More real-time products (i.e., propagation tools).

Question #9: Do you feel that contesters are leaders in technological advancement within our hobby?

Yes – 320/79.2%
No – 84/20.8%

Of course I'm biased, but it's hard to debate the results of this question. Contesters have been involved in nearly every aspect of technology in amateur radio, leading the charge in many areas ranging from antenna design/techniques to computer applications. With 21% of you disagreeing, however, we should be aware

Question	Total Responses	Yes	No	%Yes	%No
1	403	327	76	80.9	19.1
2	404	382	22	94.6	5.4
3	N/A				
4	404	282	122	69.8	30.2
5	404	171	233	42.3	57.7
6	404	275	129	68.1	31.9
7	404	284	120	70.3	29.7
8	N/A				
9	404	320	120	79.2	20.8
10	N/A				
11	404	132	132	32.7	67.3

Table II– Summary of results.

that we can't sit on our laurels. Innovation needs to continue, and we need to push the envelope, as we've done so often in the past.

Question #10: Rate the importance (1 to 6) of the following technologies in your shack from a contest perspective?

Computerized contest logging: Average – 1.658

DX Spotting: Average – 3.718

Automatic band/antenna switching: Average – 3.572

External digital signal processing/ bandpass filtering: Average – 3.881

Automatic amplifier tuning on band changes: Average - 4.158

I was surprised that computer logging didn't achieve a higher average rating. From my perspective, I would much rather use a logging program over automatic amplifier tuning, but maybe I'm unique in that regard. Judging by the number of you who had logging programs vs. automatic amplifier tuning, these answers may simply reflect wishful thinking more than what we have in our shacks today. Comments?

Question #11: In general, do contest rules adequately address the use (or potential abuse) of technology in contest operating?

Yes – 272/32.7%
No – 132/67.3%

There was a strong negative response to this question, but few of you indicated your reasons. I'd like to hear more from you on this one. The business of rules management is a tough one. From one perspective, you don't want to create rules that require a visit to your family lawyer before submitting a log. On the other hand, you want to make sure there's a fair playing field in a contest and that no room for ambiguity has been left in. With this response you have sent a message to contest adjudicators that will be heard.

Final Comments

Again, thank you for your commitment to the survey being reported on this month. I especially appreciate your patience as I got the results together. We'll be running another version in the months to come. If you have ideas for a theme, I'd like to hear from you.

That's it for this month. As always, remember to send your Contest Calendar submissions to me for the February issue no later than December 1st.

73 John, K1AR

ARRL Sweepstakes

CW: Nov. 6–8 Phone: Nov. 20–22
2100Z Sat., to 0300Z Mon.

This is the 66th Sweepstakes, making it the oldest domestic competition going. It really stirs up a lot of activity.

Operation is limited to stations in ARRL sections. Operating periods are restricted to a maximum of 24 out of the 30 hour contest period. Times off may not be less than 30 minutes and must be clearly indicated in your log.

In order to minimize QRM to non-contesters it is recommended that operation be confirmed to certain portions of the bands. Check out the complete rules on the ARRL Web site.

Exchange: QSO number, power class, call, last two digits of year first licensed, and your ARRL section. Stations using 150 watts or less are class "A," over 150 watts "B," and QRP "Q." The same station may be worked only once regardless of the band.

Scoring: Each completed QSO is worth 2 points. The multiplier is derived from the number of ARRL sections.

Awards: The usual certificates in each class and mode for single operator stations in each section and multi-operator stations in each division.

Last year's trophy program has been expanded. In addition, taking off on last year's highly successful program, the ARRL will be offering SS pins to participants with 100 QSOs or more (check with ARRL for current charges). In addition, SS coffee mugs will be made available to participants who achieve a "clean sweep"

(check with ARRL for current charges).

Logs must be postmarked no later than 30 days after the contest and go to: ARRL Communications Dept., 225 Main Street, Newington, CT 06111.

Japan Int'l DX SSB Contest
2300Z Fri. to 2300Z Sun., Nov. 12–14

The object for this one is for amateurs around the world to work as many JA stations in as many JA prefectures as possible. It is sponsored by *Five-Nine* magazine. The maximum operating period is 30 hours (except for JAs, who can use the full 48 hour period) with off periods longer than 60 minutes. This is the all-band edition (others in subsequent months).

Classes: Single Operator high power/low power/all band/single band, Multi-Operator, Marine Mobile.

Exchange: JA, RST and prefecture number (1–50). Others, RST and CQ Zone.

Scoring: 40, 20, and 15 meters—1 point per QSO; 10 and 80 meters—2 points; 160 meters—4 points. Multipliers are total prefectures worked per band (DXCC countries for JA). Final score is total QSO points times multiplier.

Awards: Plaques and awards will be sent to the winners in each class around the world. A special contest award will be offered to anyone working all Japanese prefectures during the contest period.

All logs must be postmarked no later than December 31st and should be sent to: JIDX Contest, c/o *Five-Nine* magazine, P.O. Box 59, Kamata, Tokyo, 144 Japan. Logs are accepted via e-mail. You'll be able to get the *electronic log* instructions by sending an e-mail to: <jidx-info@ne.nal.go.jp> (This address is only for information request.) with the following command in the body of the message: #get jidxelog.eng *or* #get jidxelog.jpn (all commands must start without space/tabs but with "#"). For more information, check out <http://jzap.com/je1cka/jidx/>. Contest results will be sent to anyone including one IRC and an SAE.

OK/OM DX Contest
1200Z Sat. to 1200Z Sun., Nov. 13–14

This one is sponsored by the very active Czech Radio Club and is a great event to try out. Operation is limited to CW only on 160 through 10 meters. QSOs are only valid between OK/OL/OM stations and the rest of the world.

Classes: Single Operator, All Band/Single Band; Multi-Operator/Single Transmitter (using standard 10-minute rule), QRP, and SWL.

Exchange: OK/OL/OM—RS(T) plus three-letter county abbreviation; outside OK/OL/OM—RS(T) + serial number.

Scoring: OK/OL/OM—QSOs with European stations (outside OK/OL/OM) are worth 1 point; other continent are 3 points. Stations outside OK/OL/OM—For Europe, QSOs with OK/OL/OM are worth 1 point. Stations outside Europe QSOs with OK/OL/OM are 3 points. Multipliers are as follows: OK/OL/OM—prefixes by WPX regardless band (once per whole contest); outside OK/OL/OM—OK/OL/OM counties on each band. Final score is the sum of points multiplied by multiplier total.

Awards: There are a number of great awards for this one, including trophies to world winners in each major category, and awards for the top stations in each category and DXCC/WAE country. In addition, there are special four-color awards: an OKDX Award for QSOs with at least 40 OK/OL counties, and a special QSL with final results for all participants.

The deadline for logs is December 15th. Send your entries to: OK2FD, Karel Karmasin, gen.Svobody 636, 674 01 Trebic, Czech Republic. Logs can be e-mailed to <ok2fd@contesting.com>. For more information about this event I encourage you to check out the Czech Radio Club's very cool Web site at <http://crk.mlp.cz/ENG/MainPageENG.HTM>.

European RTTY Contest
0000Z Sat. to 2400Z Sun., Nov. 13–14

Rules for the WAEDC RTTY contest are mostly the same as for the CW and phone sections held in August and September. There is one main difference, however. To generate more activity and increase the QSO points, contacts with stations worldwide are permitted. QTC traffic, however, is not permitted within your own continent. Only 36 hours of operating time (out of 48 possible hours) are permitted for single operator stations. Off-times may be taken in one, but not more than three, periods at any time during the contest and must be clearly noted in the log.

Exchange: RST plus a progressive QSO number.

Points: Each QSO and each QTC exchanged is worth one point. QTCs may be sent/received worldwide between continents (limit of ten).

Multiplier: Multipliers are determined by the DXCC list.

Bonus Multiplier: Multiply your multi-

plier on 80 meters by 4, on 40 meters by 3, and on 10/15/20 meters by 2.

Awards: Certificates will be awarded to the highest scorers in each country with a reasonable score. Continental leaders will receive a plaque. Certificates will also be awarded to stations with at least half the score of the continental leader.

It is suggested that you use the official DARC log forms. A large SASE (IRCs) to the address below will get you a supply.

Mailing deadline for all entries is December 15th to: WAEDC Contest Committee, Durerring 7, Postbox 1126, D-74370 Sersheim, Germany, or via e-mail to <waedc@darc.de>. Note that there is a new rule that requires stations using computer-logging programs to send their logs via e-mail or on diskette.

LZ DX Contest

1200Z Sat. to 1200Z Sun., Nov. 20–21

The Bulgarian Federation of Radio Amateurs invites amateurs from all over the world to participate in the LZ DX Contest. Operation is permitted on 80–10 meters, CW only.

Classes: Single Operator Multi-Band (SOMB), Single Operator Single Band (SOSB), Multi-Operator Multi-Band Single Transmitter (MOMB), and SWL.

Exchange: RST + ITU zone.

Scoring: Credit 6 points for each valid QSO with a LZ station, 3 points for each QSO with other continents, and 1 point for each QSO within the same continent. SWL points: 3 points for two calsigns and two ,and 1 point for two callsigns and one number. Multipliers are the sum of ITU zones on each band. Final score is the sum of QSO points multiplied by total multiplier.

Send your log no later than 30 days after the contest to: BFRA, P.O. Box 830, 1000 Sofia, Bulgaria or via e-mail to <lz1bj@yahoo.com>. For more information check out BFRA's Web site at <http://mtt.bg/radio/> or the LZ1FW Web site at <http://www.qsl.net/lz1fw/contest/>.

CQ WW DX CW Contest

0000Z Sat. to 2400Z Sun., Nov. 27–28

Just a reminder that the CW section of the CQ WW DX Contest is coming up the last weekend of this month. Complete rules were published in the September issue. The contest trophy list has been updated and is well covered in the rules.

All logs, both Phone and CW, must be sent to the CQ offices: CQ World-Wide DX Contest, 25 Newbridge Road, Hicksville, NY 11801 USA. Deadline for logs for the Phone section is December 1st, January 15th for the upcoming CW section. **Be sure to indicate Phone or CW on your envelope.**

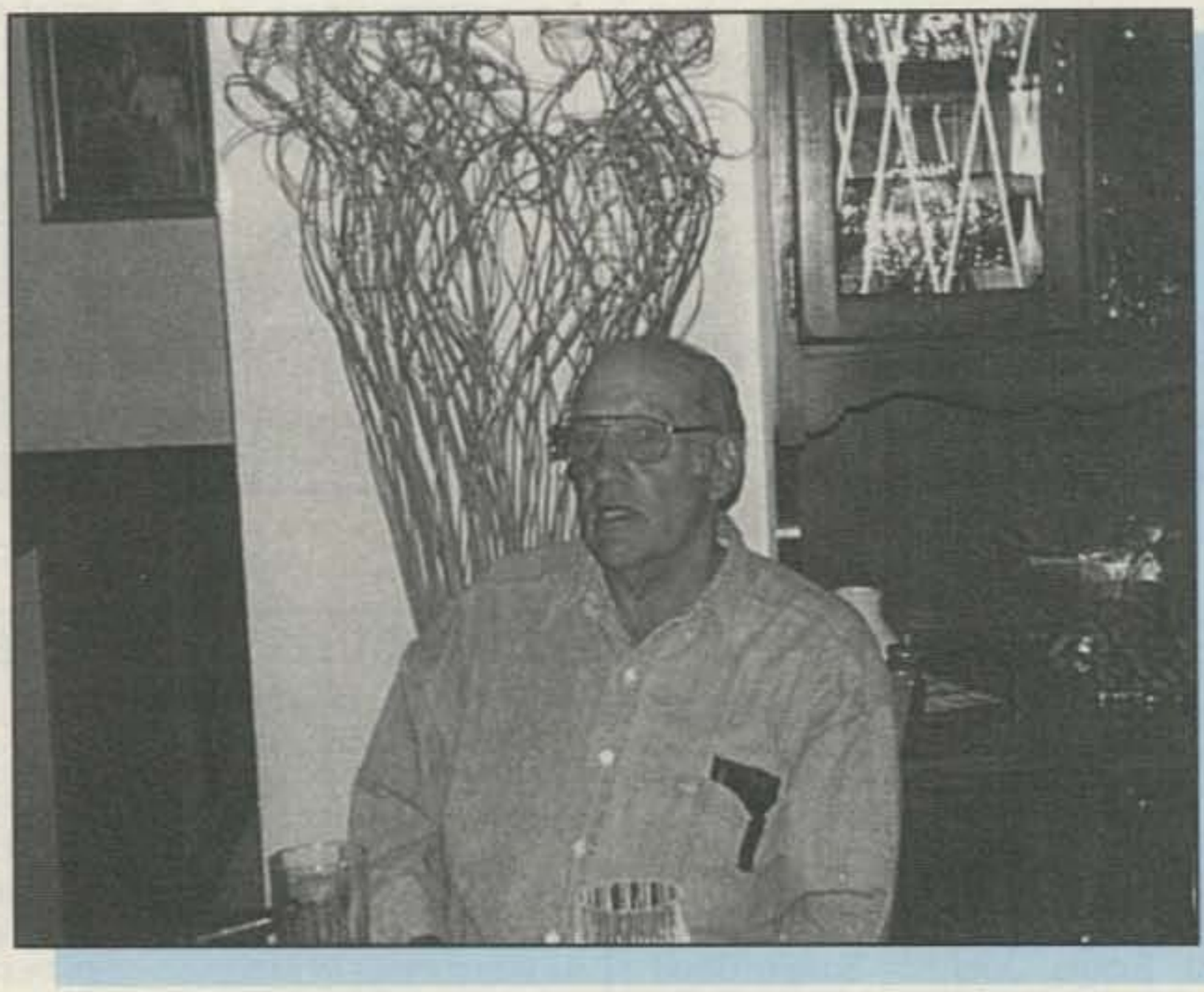
Awards

BY TED MELINOSKY, K1BV

News Of Certificate And Award Collecting

Recently, we have received several inquiries about the meaning of the term "GCR." There are several terms used in award hunting which are unique to this part of amateur radio, and GCR is one of them. It stands for "General Certification Rule," which means that the award sponsor will accept the certified and signed statement of two fellow amateurs that they have seen the cards listed in your application and they are just what you've claimed.

Only a very few awards, such as 5 Band WAZ and DXCC, require the actual cards be submitted or viewed in person by a designated representative. These awards carry a great deal of prestige, and it is possible that without such safeguards (and even with them) cheating would be a problem. However, the average award sponsor, certainly clubs and individuals, does not want the problem of handling your cards and returning them. Whenever you see the statement "GCR OK," you are assured that a witnessed statement on your application is all that is needed.



Arden Fonda, AAØIP, USA-CA #975.

Tech Plus on 14336

Sometimes a new mobile station will be invited to offer his or her county on the 20 meter net. There are a few who will look up the call on one of the CD-ROM programs or via the Internet to prepare a card for this new county. What should be done if the database entry shows "Technician," a class which may not operate on 20 meters? And what is the answer especially if the station is not identifying with an upgrade identifier?

There are three possible answers:

1. They forgot to identify as such.
2. They've upgraded and your information is out of date.
3. They are in violation of their operating rights.

I'd suggest that in order to reduce the chance of making invalid contacts, the one discovering the situation should just ask if the station has recently upgraded or not. If it is determined that the station is in violation of their operating privileges, then the contacts really should not count.

How much of an effort should be made to publicize the occurrence? This is a fairly rare event, and other than an announcement by the net control, I don't think that any special effort should be made.

USA-CA Special Honor Roll

Arthur K. Garrett, W4GFN
USA-CA All Counties #977
August 4, 1999

Robert A. Payne, N5KUC
USA-CA All Counties #978
August 10, 1999

Robert E. Aldrich, WD8OWA
USA-CA All Counties #979
August 13, 1999

Portage A.R.C., KJ9ED
USA-CA All Counties #980
August 18, 1999

Roland F. Spooner, WB4NWG
USA-CA All Counties #981
August 25, 1999

65 Glebe Road, Spofford, NH 03462-4411
e-mail: <k1bv@monad.net>

Arden Fonda, AAØIP USA-CA #975

From AAØIP comes the following story:

"About a year after my retirement from the Denver & Rio Grande Western Railroad, my nephew, Charlie, KA2STI, from upstate New York, was visiting us in Colorado. He had his 2 meter rig with him. When we were headed for our campsite at Blue Mesa Lake, west of Gunnison, Charlie made a contact with a ham on one of the repeaters as we topped Monarch Pass. That is when I decided to become an amateur radio operator.

"Jon, WBØYES, who became my Elmer, informed me of the regular test sessions. With some code tapes and the book *Tune in the World*, I was on my way to one of the most enjoyable ventures in which I have ever been involved.

"I hadn't pursued this great hobby in the late 1960s because of the code. I didn't think I'd ever get the hang of it. That was one of the big mistakes I have made in my life. I heard plenty of it being sent and received down at the railroad depot, but at the time I was glad it wasn't me who had to decipher it.

"Although neither Charlie nor Jon are county hunters, without them I probably would not have been either. My county hunting started in 1992 when I met Graham Smith, VK5AQZ, two years after we had our first QSO on 15 meters. Graham and Heather, who were visiting their friends Skip, W9GYA, and Cathy, KAØSNF, in Salida, Colorado, invited Betty and me to spend the day with them. In turn, they spent a couple of days with us, and of course Graham made a few SSB contacts from our QTH.

The RAEM award is issued in memory of Dr. Ernst Krenkel, pioneering polar explorer, amateur radio operator, a hero of the Soviet Union, and founding president of the Radio Sport Federation.

The 5 Band W-100-O award is also issued by the Krenkel Central Radio Club of the Russian Federation.

operator, hero of the Soviet Union, and founding president of the Radio Sport Federation of Russia. He was given the privilege of using this special callsign in honor of his contributions in the exploration of Arctic territories. The award is issued for CW QSOs with amateur radio stations operating from within the north and south polar circles. To earn the award, 68 points are required. Points are calculated as follows: 15 points for QSO with RAEM, 10 points for QSOs with radio stations operating in the Arctic or Antarctic, 5 points for QSOs with radio stations on Arctic islands, 2 points for QSOs with stations located within the north or south polar circles. Contacts must have been made on or after December 24, 1972, except for those made with RAEM while he was still alive.

P-100-O (Worked 100 Oblasts). This award is issued for verified QSOs with stations in 100 different regions (oblasts) of the former USSR. Contacts made between January 1, 1957 and December 31, 1991 are valid. There are three classes: (1) all QSOs made on the 1.8 or 3.5 MHz bands; (2) all QSOs on the 7 MHz band; (3) QSOs on any bands. Special stickers are issued for QSOs with 150 different regions of the former USSR. Since December 30, 1991 the P-100-O has been modified and will be issued for QSOs with 50 different regions (oblasts) of Russia on two different bands using any mode.

5 Band W-100-O. This award is issued for verified QSOs with stations operating in 100 different regions (oblasts) of the former USSR on each of five (1.8, 3.5, 7, 14, 21, and 28 MHz) bands. QSOs must have been made between January 1, 1968 and December 30, 1991. Since December 30, 1991, 5Band W-100-O has been modified and will be issued for QSOs with 50 different regions (oblasts) of Russia on each of five amateur radio bands.

P-15-P (Worked 15 Republics). This award is issued for QSOs with all 15 Union Republics of the former USSR. Verified contacts made between July 1, 1958 and September 6, 1991 count for this award.

Internet Site of the Month

The Krenkel Central Radio Club site is located at: <http://www.mai.ru/~crc>. A set of pages is provided in the English language which includes the award rules listed above plus some very interesting sections on Russian amateur activity.

I'm still looking for you to supply rules and samples of your club's certificate or award. How about it?

73, Ted, K1BV

"I worked counties on SSB for about three months. Then I read an article about Ed Sanders, WA6VJP. After listening to his FB code and running the CHN on CW, I knew that is where I would spend my time chasing counties. Ed helped me as much as anyone to achieve my goal of working all US counties on CW.

"Betty and I have made many new friends from my being involved in county hunting. They include Red, N5QLZ, and Elsie, N5SRZ; Mike, WU3H, and Sue; Jeff, W9MSE; Norm, W3DYA, and Karen; Howard, K6QWH, and Grace; George, KD8HA, and Joyce, KD8HB. Joyce gave me my very last county for all 3076 and signed the MRC. It doesn't get any better than that!

"I want to thank all county hunters, and especially the CW operators, for helping me achieve my goal. It seems I know you all, and maybe someday this will happen. This is not about what I have done, but it is with great and sincere appreciation for all you have done for me. —73, AAØIP"

Central Radio Club Awards

Yes, the Krenkel Central Radio Club of the Russian Federation awards series is still available. Thanks to the efforts of Dmitri Bagno, RW3FO, I've received a complete set of samples, and the current rules, which we will run over the next several months in this column.

General Requirements: This series of awards is available to all licensed radio amateurs and SWLs worldwide. All contacts should be made from the same country according to their official "P-150-C" countries list (SASE for list). All of the contacts should be verified with QSL cards in your possession. All of the awards are issued for QSOs on any band or mode as specified below under requirements for each individual award. Accepted is a GCR list signed by a national society awards manager or two other licensed amateurs. In some cases, as noted, the cards will be required. Fee for each award is 10 IRCs (or U.S. dollar equivalent) and it should be sent to: Box 88, Moscow, Russia.

P-150-C (Worked 150 countries). This award was introduced in 1957 and its aim is to further develop friendly relations between radio amateurs throughout the world. The award is issued for QSOs made with 150 different radio stations located in different countries (territories) of the world. Eligible QSOs are those made on or after June 1, 1956 in accordance with the P-150-C countries list. Endorsement stickers are issued for confirmed QSOs with 200, 250, 300, and 325 countries (territories) of the world.

P-150-C Honor Roll Trophy. This award was introduced to commemorate 50 years of the Krenkel CRC. To obtain the award, every country of the current "P-150-C" countries list must be worked. All QSOs must be confirmed by QSL cards. All QSOs must be made using the same license. Contacts must be on or after June 1, 1956. Applications must include sufficient funds to cover the cost of returning all cards and the trophy that will be prepared for you. Funds must be in U.S. dollars. Foreign stations will be charged $US25 plus the cost of returning all the QSL cards.

RAEM. This award is issued in memory of Dr. Ernst Krenkel, RAEM (SK), the pioneering polar explorer, amateur radio

USA-CA Honor Roll

500		2000	
DU1SAN	3086	W4GFN	1166
W4GFN	3087	WD8OWA	1167
KJ9ED	3088	KJ9ED	1168
WB4NWG	3089	WB4NWG	1169
1000		**2500**	
IK1GPG	1520	DJ4GJ	1090
W4GFN	1521	W4GFN	1091
WD8OWA	1522	WD8OWA	1092
KJ9ED	1523	KJ9ED	1093
WB4NWG	1524	WB4NWG	1094
1500		**3000**	
W4GFN	1266	KWØU	994
WD8OWA	1267	W4GFN	995
KJ9ED	1268	WD8OWA	996
WB4NWG	1269	KJ9ED	997
		WB4NWG	998

The total number of counties for credit for the United States of America Counties Award is 3076. The basic award fee for subscribers is $4.00. For nonsubscribers it is $10.00. 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 March 1, 1997. 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.

The P-150-C worked 150 countries award issued by the Krenkel Central Radio Club.

DX

BY CHOD HARRIS, VP2ML

News Of Communication Around The World

The 1999 New Orleans International DX Convention

The New Orleans International DX Convention attracted a host of DXers to the Royal Sonesta Hotel on famed Bourbon Street in the historic French Quarter of New Orleans the second weekend in August. While August may not be the month your travel agent might suggest to visit New Orleans, the super room rate and extensive air conditioning more than compensated for the warm (hot), moist (wet) days. Here are some of the highlights of the convention.

The New Orleans International DX Convention began after lunch on Friday, with DXCC QSL card checking and DXpedition videos. Following dinner on your own (Several world-class restaurants are within a short walk of the Royal Sonesta; the real difficulty is picking only one.), Carl Smith, N4AA, of DX Publications sponsored a Hospitality Suite on a balcony overlooking Bourbon Street. You will have to attend yourself to learn the significance of the beads and laser pointers.

The formal program kicked off on Saturday morning with a DXCC update from Bill Moore, NC1L, manager of the DXCC desk. Bill said that a new 20 meter DXCC award will be available soon. This award will count current DXCC entities only and will be dated but not numbered. The "Millennium" DXCC award will be available for DXers contacting 100 or more current DXCC entities during the calendar year 2000. This will be handled in a manner similar to the 1987 Golden Jubilee DXCC award. That is, this award will be on the honor system, with applicants submitting a list of the 100+ contacts, but no QSL cards. As such, none of the contacts for the Millennium DXCC will be credited to a DXer's DXCC record. For such credit a DXer must go through the usual route of QSL card approval.

On the DXCC desk wish list is the ability of members of the DXCC program to scan their own DXCC records on line. Sometime in the next few months Bill expects such capabilities, through the ARRL Members Only system.

Following DX presentations on Wake Island and 6 meters, Paul Pai, BV4FH, provided a detailed look at Pratas Island, BQ9P. It was thanks to Paul's military connections that amateurs obtained permission to stay on and operate from Pratas. The local military commander provided living quarters, operating space, and logistical support. Nellie, XE1CI, was not only the first YL to operate a radio from Pratas, but she was also the first YL to stay overnight on the military base.

QCWA member Sarah Shull, KA4DQZ, won the grand prize at the New Orleans International DX Convention at the tender age of 30.

The BQ9P statistics show some 36,000 contacts with 15,000 unique callsigns. At least one band was open to Japan at any given time, and 32% of the QSOs were with that one country. Another 32% were with stations in Europe, although the lack of DX discipline in Europe severely compromised the rate. Twenty-five percent of the contacts were with stations in North America, especially W6, W7, and W5. The bread-and-butter bands were 15 meters (32%) and 20 meters (29%), followed by 10 and 40 meters.

Despite the growing tensions between mainland China and Taiwan, the Taiwanese amateurs will try another BQ9P operation at the end of this year or early in 2000. Among the precautions the DXpeditioners will have to take is to notify mainland China about a flight to Pratas, *before* the plane takes off from Taiwan. The BY military has orders to shoot down any plane without prior notification. Now that's a new twist to the perils of DXpeditioning.

The rest of Saturday saw several more interesting DXpedition reports, including V7/N4XP Marshall Islands, E30GA Eritrea, and 3B9R Rodrigues. Other programs included Islands On The Air, 160 meters, and the beginning of an extended discussion on how to reduce the costs of DXCC (more on this in a future column).

Following a break to hit the hotel swimming pool and to get cleaned up for the formal banquet, DXers, spouses, and friends collected outside the magnificent banquet hall. This is one DX dinner for which everyone dresses up. This adds a real sense of class to the entire weekend.

The banquet dinner has to be experienced to be believed. Here, surrounded by some of the finest eating establishments in the country, we got our best meal in New Orleans at the DX dinner. This is no rubber chicken, but the finest New Orleans can put on a plate. Dessert is always a real treat. One year flaming Bananas Foster capped the meal. They dimmed the lights in the banquet hall, making the trays of flaming desserts appear to float into the room by themselves. This year Baked Alaska (KL7) was the dessert, similarly presented.

Frank Smith, AHØW, gave the banquet presentation on the XU1A 1998 operation from Cambodia. Frank was the New Orleans International DX Convention DXer of the Year last year. Bill Tippett, W4XB, easily won the DXCC countdown with the astonishing total of 373 DXCC entities. One of the few sour notes of the weekend was the news about Zorro, JH1AJT, previously named New Orleans International DX Convention DXer of the year. After this honor was announced, a controversy

Nellie, XE1CI, operated from Pratas Island BQ9P, thanks to the help of Paul Pai, BV4FH.

P.O. Box 50, Fulton, CA 95439
e-mail: <chod@compuserve.com>

The WPX Program

SSB

2716.....KU4BP

CW

3017.....JA3KE 3019.....CT4NH
3018.....HL5AEX

Mixed

1840.....K9FZ

Award of Excellence: RAØFU, CT4NH
160 Meter Bar: RAØFU, CT4NH, UAØFZ

CW: 350 JA3KE, G3TVI, CT4NH. 400 JA3KE, G3TVI, CT4NH. 450 JA3KE, G3TVI. 500 JA3KE, G3TVI. 550 JA3KE. 600 JA3KE. 2150 KS3F. 3950 N6JV.
SSB: 550 RAØFU. 600 RAØFU. 650 RAØFU. 700 RAØFU. 750 RAØFU. 800 RAØFU. 850 RAØFU. 900 RAØFU. 950 RAØFU K9GWH. 1000 RAØFU, K9GWH. 1050 K9GWH. 1100 K9GWH. 1900 WA1JMP. 1950 WA1JMP.
MIXED: 450 K9FZ. 500 W1LIC, K9FZ. 550 K9FZ. 600 K9FZ. 650 K9FZ. 900 WZ4P. 950 K9GWH. 100 0 K9GWH. 1050 K9GWH. 1100 K9GWH. 1250 K2YJL. 1300 K2YJL. 3300 WB2YQH.
10 meters: JN3SAC
15 meters: K2YJL
160 meters: UAØFZ, CT4NH

Asia: HL5AEX
Africa: CT4NH
No. AmericaA: JN3SAC
So. America: CT4NH
Oceania: CT4NH

Award of Excellence Plaque 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, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, ABØP, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV. W2HG, ONL-4ØØ3, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, IQWXY, 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, S5ØA, 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.

Award of Excellence Plaque Holders with 160 Meter Endorsement: K6JG, N4MM, W4CRW, N5UR, VE3XN, DL3RK, OKMP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, G4BU, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, 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-4ØØ3, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S5ØA, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U.

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.

arose between the Japanese government and Zorro. By mutual agreement between JH1AJT and the International DX Convention, Zorro asked that his application for DXer of the Year be withdrawn. There was no DXer of the Year named in 1999.

The awarding of prizes was the last official activity of the convention. Before heading for the Hospitality Suite above Bourbon Street, the attendees anxiously awaited the pulling of the ticket for the Grand Prize. In keeping with the concept of inviting spouses to the convention, as well as DXers, the grand prize is cash, $500 to be more specific. The happy winner was Sarah Shull, KA4DQZ, who is a story in herself.

Sarah had attended several previous New Orleans International DX Conventions with her family, but this was her first solo effort. She was very proud that she had just joined QCWA, and this was her first formal amateur activity as a QCWA member. By winning the grand prize, she paid for her QCWA dues for life. However, the really interesting part of this story is that Sarah is 30 years old. For those of you having trouble with the math, that means that Sarah was first licensed when she was *five years old.* She certainly makes me feel like an Old Man.

This wraps up the Eighth Annual New

Master of Ceremonies Rick Roderick, K5UR, introduced the New Orleans International DX Convention banquet speaker, 1998 DXer of the Year Frank Smith, AHØW.

The WAZ Program

Single Band WAZ

12 Meter SSB

12 .....K5OVC

15 Meter SSB

527 .....JH6QFJ

20 Meter SSB

1050 .....BV4OQ 1051 .....PY2BW

20 Meter CW

500 .....EW3CW 502 .....PY2BW
501 .....N4CH

40 Meter SSB

91 .....PY2BW

40 Meter CW

203 .....PY2BW

80 Meter SSB

73 .....K4ESE

80 Meter CW

53 .....N7RT

160 Meter WAZ

141 .....N7RT (31 zones) 126 ...DK5PR (40 zones)

All CW

139 .....N5TK 140 .....N3NN

All Band WAZ

SSB

4508 .....AA8FY 4511 .....IV3TOU
4509 .....UA6LLD 4512 .....N2HYD
4510 .....HK3LGO

All CW

141 .....KK4KL 143 .....DL3BBY
142 .....WA9WKK

CW/Phone

7813 .....W4JOB (All CW, 6-17-98)
7878 .....JH5OXF 7882 .....JJ2BLV
7879 .....N4PI 7883 .....W2GE
7880 .....JN3QVC 7884 .....LA2RE
7881 .....KØMP 7885 .....W6YJ/QRP

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 Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all *CQ* awards is $4.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

5 Band WAZ

As of August 30, 1999, 495 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

EA4KD

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 40)
K1ST, 199 (26)
ABØP, 199 (23)
KL7Y, 199 (34)
NN7X, 199 (34)
OE6MKG, 199 (31)
HA8IB, 199 (2 on 15)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (1)
W6SR, 199 (37)
W3UR, 199 (23)
KC7V, 199 (34)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
N4CH, 199 (18 on 10)
OE1ZL, 199 (1)
W6DN, 199 (17)
W3NO, 199 (26)
K4UTE, 199 (18)
K5RT, 199 (23)
UT5UGR, 199 (10)
K4PI, 199 (23)
HB9DDZ, 199 (31)
N3UN, 199 (18)
UA3AGW, 198 (1, 12)
EA5BCK, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
DKØEE, 198 (19,31)
KØSR, 198 (22, 23)
K3NW, 198 (23, 26)
UA4PO, 198 (1, 2)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K4ZW, 198 (18, 23)
OH2VZ, 198 (1, 31)
RAØFA, 198 (2 on10,15)
LA7FD, 198 (3, 4)
K5PC, 198 (18, 23)
NT5C, 198 (18, 23 on 40)
VE3XO, 198(23, 23on40)
K4CN, 198 (23, 26)
KF2O, 198 (24, 26)

The following have qualified for the basic 5 Band WAZ Award:

None

Endorsements:

HA9RT, 187 zones
EA4KD, 200 zones
PY2BW, 179 zones

1096 Stations have attained the 150 Zone level as of August 30, 1999.

****PLEASE NOTE: Due to supplier increases, effective September 1, 1998 cost of the 5 Band WAZ Plaque is now $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 Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all *CQ* awards is $4.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

Orleans International DX Convention. The New Orleans location is excellent and a lot easier to get to than either Dayton or Visalia. The hotel is top notch, with good service and facilities. New Orleans offers a wide variety of non-amateur activities, from swamp and cemetery tours to riverboat gambling. The food is great both inside the hotel and at any number of nearby restaurants. The convention itself is very well organized and smoothly run, with the best program of any DX convention. My only question is why more DXers and their families don't attend this first-class convention. Make a New Year's resolution to attend the Ninth New Orleans International DX Convention in 2000.

Clipperton 2000

A group of experienced DXpeditioners are finalizing plans for an assault on Clipperton Island FO next March. If successful, this will be the first Clipperton operation in eight years. They plan to sail from San Diego and set up two operating locations of three stations each. Emphasis will be on those areas where Clipperton is Most Wanted, especially Europe. With sufficient backing, they'll include RTTY, satellite, 6 meter, and 160 meter capabilities.

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 330 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 330	YU1HA 330	SM6CST 327	NC9T 326	W8XD 324	N4CH 320	WB4UBD 313	HB9DDZ 307	LU3DSI 295
K2FL 330	EA2IA 329	W2FXA 327	IT9TQH 326	K8LJG 324	IT9ZGY 320	N1HN 313	WG5G/QRPp 307	WG7A 295
K6JG 330	K2JLA 329	N4KG 327	WA4IUM 326	DL3DXX 324	HA5NK 319	YU1AB 312	W4UW 307	G4MVA 294
K2OWE 330	W7OM 329	K8PV 327	4N7ZZ 326	N6AR 324	K2JF 319	K9DDO 312	W7IIT 305	F6HMJ 292
N4JF 330	KZ4V 329	W4QB 327	DJ2PJ 326	IT9VDQ 324	VE7DX 318	W3II 312	CT1YH 305	KB8O 292
K9BWQ 330	WØHZ 329	K9MM 327	W4LI 325	W6SR 323	N6AV 318	YU1AB 312	KE5PO 304	DJ1YH 288
K1MEM 330	K4CEB 329	F3AT 327	K9IW 325	IT9QDS 323	VE7DX 318	K1VHS 311	G2FFO 303	YU7FW 286
K2ENT 330	W4OEL 329	I1JQJ 327	I5XIM 325	K5UO 322	I2EOW 318	K7JS 311	IKØADY 302	EA3BHK 282
K6LEB 330	N7RO 329	W7CNL 327	WA8DXA 325	N4AH 322	G3KMQ 317	WA8YTM 311	N4OT 301	YC2OK 280
W2UE 330	K4CN 329	I4LCK 327	N5FW 325	KUØS 322	NØFW 317	N6AW 311	W6YQ 300	EA2CIN 278
W6DN 330	F3TH 328	N5FG 327	IK2ILH 325	ON4QX 321	LA7JO 316	K1FK 311	KH6CF 300	KF8UN 276
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KZ2P 330	VE2PJ 328	KA3HXO 325	IKØIOL 325	TI2JJP 321	I8IYW 318	EA5KY 308	YT1AT 294	KC6AWX 276
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ZL3NS 330	VE7DX 327	YV5AIP 325	W5RUK 325	W6MFC 321	CE1YI 318	EA3BHK 307	KJ5LJ 293	W6UPI 276
OE3WWB 330	AA6BB 327	K9IW 325	N6AR 324	EA8TE 321	K4JDJ 318	VE3CKP 307	**K2EEK 293**	F5NBX 275
XE1VIC 330	SM6CST 327	WA4JTI 325	I8LEL 324	W5XQ 320	ZL1BOQ 318	N6AV 306	W6WL 291	VE2AJT 275
K9FYZ 330	W3GG 327	YV1AJ 325	IT9ZGY 324	KA5TQF 320	K9QVB 318	TI2TEB 306	YB1RED 291	US1IDX 275
VE3XN 330	I4EAT 327	YV1KZ 325	K6LEB 324	W7ULC 320	WA6DTG 317	VE3DLR 306	DJ2UU 291	Z31JA 275
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RTTY

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The logistics of a Clipperton operation make it very expensive. Clipperton lies almost 2000 miles south of San Diego, necessitating a substantial vessel for transit. The charter costs alone are $75,000, not counting the costs of obtaining radio equipment, antennas, tents, generators, fuel, supplies, and more. Each participant has committed $5000 for the privilege of spending time seasick or stuck on an atoll that is better known for its aggressive crabs and unexploded ordinance than for its beaches.

Whether this operation will sail on time, or even sail at all, depends to a considerable extent on the support of the DX community. The Northern California DX Foundation has already pledged its support. The group continues to solicit contributions via the N7CQQ Amateur Radio Club, P.O. Box 81, Searchlight NV 89046, or direct to account 4961527327 at the Bank of America. Major contributors will be identified on the web site and QSL card.

East Timor

This half of an island recently voted overwhelmingly in favor or forming an independent state. In previous years, such a vote would have set off a flurry of speculation as to when East Timor might count as a separate DXCC country. Today, however, thanks to the reforms of DXCC 2000, we don't have to worry about some DXer heading into the middle of a war zone to activate a potential "New One."

The criteria for an additional DXCC entity based on government have been modified to take this decision out of the hands of the ARRL and DXAC. There are exactly three possible routes to a separate DXCC entity by government: (1) be a member state of the United Nations (UN); (2) have its own International Amateur Radio Union (IARU) member society; or (3) have a unique callsign block assigned by the International Telecommunications Union (ITU). Anyone who seeks to strong-arm or intimidate their way into a new DXCC entity by government will have to

Entered 11/8/99 AWT

QSL Information

2SØF to GMØF
3A/IK1YLL to IK1YLL
3AØEF to F9RM
3A6E to F9RM
3CØR to EA5FVY
3C1AG to SMØAGD
3C1AGD to SMØAGD
3D2DM to AE6C
3W6HM to JF1OCQ
4X4BL to WA2KNC
4X4UO to WB3CQN
5H2MS to AA5ID
5H8TL to W7RNF
5NØZKD to OK1KN
6MØHZ/2 to HL1IWD
7J1AUO to KD5YG
7O8AA to F6EXV
7S3HK to SM3CER
8Q7AN to OZ1EEZ
8Q7TB to G3TBK
8S3BG to SM3CER
9H8/9H3GI to DL2GWL
9J2AM to JAØJHA
9V1XE to DL4DBR
9V9HQ to AA5BT
AM6JMU to EA6URP
AP2JZB to K2EWB
BG4RAW to BY4RSA
BG4RBS to BY4RSA
BG4RBY to BY4RSA
BG4RCO to BY4RSA
BG4RDE to BY4RSA
BG4RDN to BY4RSA
BG4RUM to BY4RSA
BG4RUP to BY4RSA
BG4RUR to BY4RSA
BG4RUT to BY4RSA
BI4Q to BA4TA
BPØRIW to JA1JKG
BV/JP1RIW to JA1JKG
BXØQSL to JA1JKG
C6AJZ to WI9WI
CEØ/LU3HAK to LU3HAK
CEØAOF to SMØAGD
CEØICD to CE3ESS
CO8LY to EA7ADH
CQ1C to CT1GFK
CV5H to CX2ABC
DJØUF to SMØAGD
EA9/HB9JBV to HB9JBV
ED2RC to EA2ABM
ED2RCA to EA2ABM
EL2U to OH2BN
EL7U to OH2BN
EU5O to IK5BHN
EV5A to EU1AO
FI9R to F9RM
FL9R to F9RM
FM5DN to KU9C
FOØMOD to AE6C
FS/FGØDWT to F6EXV
FS/FGØDXS to F6EXV
FS/FGØEUU to F6EXV
FT5XL to F5NZO
FU9R to F9RM
FWØAG to SMØAGD
FZ9R to F9RM
G6G to GØLII
G7Q to GØPSW
G8G to GØLII
GBØSM to G3WNI
GU7D to G3LZQ
H44PT to G8BCG
HH2/AA4NC to AA4NC
HH2/N2APL to N2APL
HI8HS to HI8HS
HKØ/SM2AGD to SMØAGD
HK3JBR/1 to F6AJA
HP3X to W4WX
HSØAC/2 to HSØ/G3NOM
HS2AC to HSØ/G3NOM
ISØ/IK2OCP to IK2OCP
IT9/G3NYY to G3NYY
J3/GØSTR to GØSTR
J49WI to I2WIJ
J52AG to SMØAGD
J5AG to SMØAGD
JW/DF6VI to DF6VI
JW/DL4OCM to DL4OCM
KG4CQ to W4WX
KG8XV/VP9 to JH1ROJ
KHØHX to JH7WKQ
KH2/N4GFO to KB5IPQ
KH3/NH6D to N6FF
KP4/KQ4GC to W4WX
L27EE to LU7EE
MXØADU to GØLII
N2NL/KH2 to W2YC
N4UQM/KH2 to WB4UBS
NH6D/KH3 to N6FF
NN2W to NN2W
OD50PL to HB9CRV
OHØ/DJ7ST to DJ7ST
ON7SUN to ON4LCV
OY4TN to OY6FRA
OZ5L to KP3YL
P43W to P43ARC
PA6TEX to ON4ALW
PYØFA to PY4KL
R1MV to OH2BR
RF1P to UA1RJ
RZ1OA/A to RA1OA
S2AGD to SMØAGD
SM7DLZ to SM6CVE
T2AGD to SMØAGD
T30GD to SMØAGD
T30NAS to 3D2SJ
T33VU to DL2MDZ
T3OJH to VK2GJH
T88KS to JA3AQM
T9DX to T93Y
TA2RR – Pirate
TF7RX to K1WY
TG9ANG – Pirate
TK/F6AUS to F6AUS
TK9RM to F9RM
UAØFO to WA6ZEF
UAØZY/P to 4Z5AV
UE1CIG to RN1AW
UE6AAF to UA6AF
UR3IWA to KI6T
UT5RP to W4SMG
V73RX to W6WRX
V85HY to JA1WTR
VK6DDU to F5VCR
VO2AC to VE3FU
VP2ERM to N2TV
VP2MDD to MØAEP
VP5/K4CN to K4CN
VP5CW to K4LT
VP5T to N2VW
VP8NI to SMØAGD
VQ9DJ to AB7JN
VQ9JT to K5DIY
WP2/WI9WI to WI9WI
XQØK to CE1RYJ
YBØDX to W3HNK
YCØLBK to W4JS
YL/OH1NOA to OH1NOA
Z31JA to NN6C
ZA1ZMX to F6EXV
ZA1ZXV to F6EXV
ZK1/JJ8DEN to JJ8DEN
ZS6/DL7DST to DL7DST
ZWØSP to PT7AA
ZXØSK to PS7KM
ZYØZGD to SMØAGD
ZYØZGD/F to SMØAGD
5H3/IK2GZU to Maurizio Buffoli, Via Degli Angeli, 9, I-25033 Cologne (BR), Italy
BD3SE to Sun-Wei Dong, P.O. Box 17, Jiangxian, Shanxi 043607, China
BG4AGN to Meng, Room 403, No. 35, 14 Village of Tianlin, Xuhui, Shanghai 200233, China
BV2DP to Richard W. S. Lu, P.O. Box 32-144, Taipei, Taiwan
BV2TL to Chen, P.O. Box 542, Sanchung 241, Taiwan
BV4NF to Hiro, P.O. Box 9, Sanyi, Miaoli, Taiwan
C31US to Joan Sauri, P.O. Box 1092, Andorra la Vella, Andorra
CS3MAD to P.O. Box 4694, P-9001-001 Funchal, Madeira, Portugal
DS2OAJ to Chung Hye-Sun, 726-902, Daerim Apartment, Sanbon-Dong, Kunpo-City, Kyounggi-Do 435-040, Korea
DS4BGR to Kim Kyoung Jin, 197-6, Naebang-dong, Seogu, Kwangju 502-250, Korea
DS4BOH to Lim Jae Suk, 197-6, Naebang-dong, Seogu, Kwangju 502-250, Korea
DS4BOI to Kim Soo Youn, 197-6, Naebang-dong, Seogu, Kwangju 502-250, Korea
DS4CCL to Kim Ho Young, 197-6, Naebang-dong, Seogu, Kwangju 502-250, Korea
DS4NPL to Park Yong Wu, 744-146, 3-GA, Wooa-Dong, Duckjin-Gu, Jeon Ju 561-220, Korea
DS4OJX to Song Suk Young, 744-146, 3-GA, Wooa-Dong, Duckjin-Gu, Jeon Ju 561-220, Korea
DU1SAN to S. A. Nepomuceno, P.O. Box 3000 QCCPO, 1170 Quezon City, MM, Philippines
FS/K8HTP to Jon Lusk, 1111 W. Clark Road, Ypsilanti, MI 48198
HH2JOE to Jose Forero, B. P. 1602, Port au Prince, Haiti
HL4CFN to Choi Hyeong-Moon, P.O. Box 59, Hwasun 519-800, Korea
HL5FBT to Kim Keum-Cheol, P.O. Box 34, Namdaegu 705-600, Korea
KHØ/JK3HLP to Takafumi Ueda, 2-35-3 Mitsuishidai, Hashimoto City, Wakayama 648-0094, Japan
KHØ/JJ2NYT to Tsuyoshi Nakanishi, 1013 Oyama-cho, Yokkaichi City, Mie 512-1101, Japan
LX1CA to Eugene Thiwa, 22 Cite Bourschterbach, L-9029 Warken, Luxembourg
OD5KB to Sami G. Maalouf, P.O. Box 70364, Antelias, Lebanon
OD5MM to Irma Mishellany, P.O. Box 184, Jounieh, Lebanon
SV1EPI to John Vrellos, 64 S. Karageorga St., GR-166 75 Glyfada, Athens, Greece
SV7DLF to Ilias Stathopoulos, P.O. Box 58, GR-681 00 Alexandrupoli, Greece
VU3TOM to Tom Davis, U. S. Embassy - New Delhi, Department of State, Washington, D. C. 20521-9000
YBØZDD to Club Station Orari Lokal Pasar Minggu, P.O. Box 7257/JKSPM, Jakarta 12072, Indonesia.
YCØMZI to Muhamad Zaina, P.O. Box 7257/JKSPM, Jakarta 12072, Indonesia.

The table of QSL managers is courtesy of John Shelton, K1XN, editor of The Golist, P.O. Box 3071, Paris, TN 38242, (phone 901-641-0109; e-mail: <golist@wk.net>).

convince the UN, ITU, or IARU first.

So where does this leave East Timor? First, the fighting must stop. Then the territory has to set up a government before it can even apply for membership in the UN. Further, the UN moves deliberately in such matters. Don't look for UN membership soon. Note that Palestine, for example, is a current DXCC entity, but years (if ever) from becoming a member state of the UN. Nor is the IARU likely to be a pushover when it comes to approving a new member society. The IARU delegates are not stupid; many are DXers. They fully understand the consequences of their decision and won't go along with a figurehead society just for the purpose of adding a new entity to the DXCC list. The impetus for such a society will have to come from within East Timor itself, and it's hard to imagine amateur radio being much of a priority in what may be the world's poorest country.

That leaves the ITU as our best bet for a New One. The latest entity added to the DXCC list did so thanks to the assignment of the E4 prefix to Palestine by the ITU. Palestine was added to the list of current DXCC entities the day the ITU announced the prefix assignment. However, remember how long the "peace process" has been going on in that region, and you'll realize that we shouldn't stay up at night waiting for the new prefix. It could easily be months or years before the fledgling country even applies for a unique prefix.

East, or Portuguese, Timor was a separate DXCC "country" until 1976. Portuguese traders began their relationship with the natives on the island in 1520. The eastern half of the island of Timor was separated from the western, Dutch, half in 1860, reinforced by additional treaties in 1914. The western half of Timor joined Indonesia in 1950, but the Portuguese hung

on to their half of the island until they felt they could no longer protect East Timor from the Indonesian troops just across the western border. The Portuguese pulled out, the Indonesian troops moved in, and a year later, East Timor became the 27th province of Indonesia, Loro Sae. At this point, East Timor no longer qualified as a separate DXCC "country," and CR8, CR10 was deleted from the DXCC list September 14, 1976.

Campbell Island Correction

Digging up information about Campbell Island proved very difficult for us DX editors. It turns out that we all used the same source material for our ZL9CI articles. The problem is that source omitted some visits to the island in the 1960s. Here's the straight scoop directly from someone who was actually there, Gene Spinelli, K5GS:

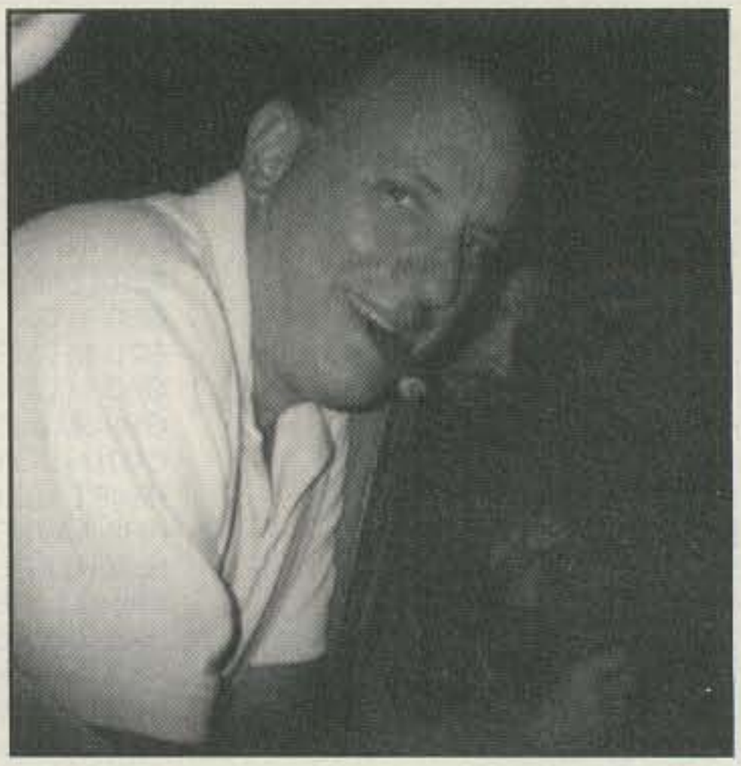
"In the 1960s I visited Campbell Island a number of times, and also Auckland Island once. Your article indicates that 'the last time Campbell had a resident human population' was 1931. . . . That's not correct, as there was a contingent of New Zealand meteorologists living on Campbell in the 1960s. I have pictures of the island, the lounge on Campbell, the sign at the wharf welcoming us to the island, and some other photos. I also have a newspaper article from the *Otago Daily Times* (Dunedin, NZ) written in December 1965 and published in January 1966, when we returned to Dunedin. We took a reporter from the newspaper to Antarctica with us and stopped at Campbell. He toured the island and the residents' living quarters, and then he wrote about the experience in a multi-part article, took pictures, etc. . . .

"I think I first read this error on a web site, and it seems to have survived reality. . . . I'm sure there aren't many people who would know about this, as most people have never heard of Campbell Island. I sure didn't know about it as a 19-year-old sailor. My first trip there was in September 1965, and the last trip was in March 1967 (the manned station was still operating in 1967).

"The last US Navy ship to regularly visit Campbell was the *USS Calcaterra,* DER-390, which concluded the Operation Deep Freeze weather picket operations of the 1960s in February or March 1968. I had left the Navy by then and didn't learn until a few weeks ago that the *Calcaterra* was the last ship there. A shipmate from my trips there on the *USS Thomas J. Gary,* DER-326 (September 1966 to March 1967) transferred to the *Calcaterra* to make the last cruise, 1967–68 . . . ."

Upcoming DX Activities

Many of the individuals and groups who participated in the CQ WW SSB at the end of October will be staying over in their DX locations into November. For example, Jim Neiger, N6TJ, arrives on his favorite island of Ascension October 26 and plans a 10 meter single-op entry in the SSB test October 30–31 as **ZD8Z**. He remains on Ascension until Nov. 13. QSL via VE3HO (US stamps okay). Doc, W9NY, will once again operate from Nevis as **V47NS** October 28–November 2 as a single op, single band. QSL to W9NY. And Heinz, HB9KOC, and Mike, DH3MIT, plan an operation from the Maldives as **8Q7IT** in the SSB test. Outside the test, they'll be available October 26–November 2. QSL via DH3MIT.



Leaning over the New Orleans Bourbon Street balcony, enjoying the view from the hospitality suite.

N2VW, WA2VYA, and K2WB will operate as **VP5T** from Providenciales Island (NA-002) October 26–November 2, including a multi-multi entry in the SSB contest. They will pay particular attention to CW and the new bands outside the contest. QSL VP5T direct or via the W2 bureau to N2VW. QSL VP5/ portable calls to the home callsign.

There will be many more such DX opportunities this contest season. Check with the various sources of current DX information, such as the contest reflector, to find out the up-to-date status of these and other contest DXpeditions.

PS400NAT marks the 400th anniversary of the city of Natal in Brazil. The station will be on 20 meter SSB only. QSL via the Brazil bureau or direct to Rony Reis, PS7AB, P.O. Box 2021, Natal/RN, 59094-970, Brazil.

Dick Phelps, N4RP, will operate as **C6AKP** November 19–December 1, from South Bimini (NA-048). QSL via home address: 2805 Casita Way, Apt. 115, Delray Beach, FL 33445. Dick will be on all bands, including the new ones.

Uwe, **DL2YAK**, plans low-band activity

CQ DX Awards Program

SSB

2283 .....CE3HD
2284 .....EA6BE
2285 .....OK1DWC

CW

993 .....OK1DWC

SSB Endorsements

320 .....W6BCQ/330
320 .....VK4LC/330
320 .....YV5IVB/330
320 .....K6BZ/323
320 .....VE4ROY/322
150 .....EA6BE/155
28 MHz.....EA6BE

CW Endorsements

320 .....YU1HA/330
320 .....KA7T/325
320 .....N4AH/322
150 .....UA9SG/154
3.5/7 MHz.....RW9SG

The basic award fee for subscribers to *CQ* is $4. For non-subscribers, it is $10. 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 330 active countries. Please make all checks payable to the award manager.

from Ecuador October 21–November 27.

Jim Neiger, N6TJ, will operate the CQ WW CW Contest from Brazil as **ZX5J** on 10 meters. QSL VE3HO.

Much of the above DX news is thanks to The Daily DX, a daily electronic DX news source. For more information, contact The Daily DX at 3025 Hobbs Road, Glenwood, MD 21738 (fax 301-854-5105, <http://www.dailyDX.com>).

QSL News

QSL Arbab Muhammad Amir, **AP2AMR**, via H. No. 1 St., No. 40, Sector G-10/4, Islamabad 44000, Pakistan.

Z31RC is the new call of V. Gerasimov ex-Z32RC. QSL to P.O. Box 60, 92000 Stip, Republic of Macedonia.

QSL young Philippine DXer Brian Santos, **DU1SUN**, at P.O. Box 8053, Paranaque, Philippines 1700.

QSL **YV5A** via Olli Rissanen, OHØXX, Suite 599, 1313 S. Military Trail, Deerfield Beach, FL 33442.

Mike Manafo, K3UOC, is back in the States, and will be handling cards from his previous operations. He uses the address of the Harvard Wireless Club station, W1AF, 6 Linden St., Cambridge, MA 02138. Mike's operations include **7Z5OO, PJ5AA, PJ8H, 4M5V, PJ1A, US1A, 4M4A, P46S,** and a host of portable operations. DXers can do a log search at <qsl.net/n6ed/7z5oo>.

The Golist has a new web site and new features. Visit it at <www.itis.net/golist/>.

73, Chod, VP2ML

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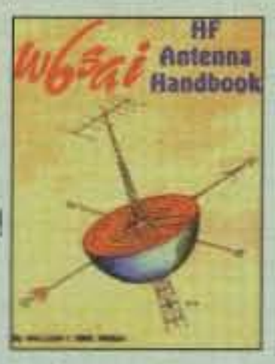

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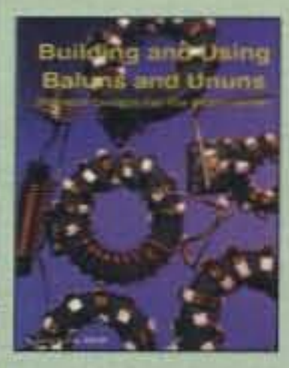

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Washington Readout

Regulatory News In The World Of Amateur Radio

BY FREDERICK O. MAIA, W5YI

Special Report: The State of Amateur Radio Around the World—Part I

Amateur radio is a global hobby and exists in nearly every country. Have you ever wondered how our Amateur Service compares with those of other countries? In order to find out, we wrote to the national societies of more than 100 different countries. We asked each to tell us how many licensed amateurs they have and what the various license examination requirements are. We also wanted to know if their Amateur Service is growing and what their feelings are regarding the international Morse code requirement.

The responses are still coming in, but here is Part I of what we have found out so far. Keep in mind that our inquiry was directed to national amateur radio organizations, the memberships of which historically consist of long-term, Morse-proficient radio amateurs.

Aruba: Has 80 licensed radio amateurs, but only about 40 own ham equipment. "It is estimated that about 35 go on the air." There are three license classes: Class A (13 wpm code exam) permits all privileges; Class B (8 wpm code) is CW only on portions of certain HF bands; and Class C which yields all modes above 50 MHz. The national society, the Aruba Amateur Radio Club, has proposed to eliminate the 8 wpm class and reduce the 13 wpm to 12 wpm. In Aruba the amateur examinations are administered verbally twice a year, in April and November.

"The AARC and its members feel that Morse code should be eliminated as a requirement for HF privileges, but kept as an optional mode. We feel that core issues such as CW should be surveyed by the IARU. This subject is kept under a tight lid by the IARU and away from discussion. It is like the IARU does not have a vision/mission to lead the future of the Amateur Radio Service. It is about time that all member societies are surveyed in an unbiased manner in order to determine what really lives under all international societies." *(Submitted by Anthony Thiel, P43T, IARU Liaison for AARC.)*

Austria: There are about 6000 amateur radio operators in Austria and three license classes: Class 1 (CEPT 1, all privileges); Class 2 (CEPT 2, all bands above 30 MHz, = VHF license); and Class 3 (a national license for newcomers and restricted to 430–440 MHz, 100 watts).

"We have no written examination. Examination is by [the] communications authority and includes one radio amateur. Questions concern law and regulations, technical, operation, and propagation.

"The code speed is 12 wpm, 3 minutes receiving and sending radio amateur text. We will retain 12 wpm in accordance with the other CEPT countries until the final decision at WARC 2002. We think that the WARC 2002 will be the end of Morse examinations. However, Morse will remain one of the most effective modes also for the future regarding bandwidth, language, and technical requirements. There are several propagation modes which cannot be used without Morse.

"I have a feeling that the number of radio amateurs is decreasing, leaving only those who are interested in radio and radio techniques. For 'communicators' only, the Internet offers some features without examination and a minimum of learning . . .

"We must keep things off amateur radio which look good for the first moment (e.g., direct connection with the Internet) but which might kill our service/hobby on a long-term basis. We should keep amateur radio as a pure radio service on radio amateur bands." *(Submitted by Dr. Ronald Eisenwagner, President of OEVSV)*

Bangladesh: Nizam, S21B, writes that there are 30 licensed amateur radio operators in Bangladesh at present. There is only one license class conferred by passing an examination on electronics, operating procedures, and regulations. The required code speed is 20 wpm, but the examinations are " . . . a bit liberal in practice."

He believes that the future need for Morse code should be at the option of the local (country) administration. "Amateur radio is growing very slowly in Bangladesh. Youngsters [are] more interested in Internet/computers, [and the] cost of rigs is another hindrance. Bangladesh plans to set more club stations in remote areas in hopes of increasing the amateur population." *(Submitted by Nizam Chowdhury, S21B, Vice President, Bangladesh Amateur Radio League)*

Barbados: With a population of 260,000, Barbados has approximately 300 licensed amateur radio operators, of which about 75 are members of the ARSB. "We have two license classes. One is CW only (not very popular) and the other is an all mode one. The only difference between the two is the mode. The local exam is based on the English City & Guilds Radio Amateurs Exam (RAE). Candidates may opt to do the RAE instead of the local exam. The Morse exam is 12 wpm plain text and 5 figure number groups. There are no plans to change it. The hobby is growing but very slowly.

"I personally do not use CW on the ham bands, but I feel that some knowledge of the code is important. I also do not feel that CW is dying. Just look at the CQ WW DX CW Contest scores.

"Most hams in Barbados are not very interested or know about developments in the international scene." *(Submitted by Stephen Thompson, 8P6CV)*

Belgium: There are about 5600 amateur radio operators in Belgium. Their Novice class (ON2) may use (AM, SSB, NBFM) phone modes on 2 meters with a maximum power of 15 watts. ON1's may use all modes (except CW) on all amateur bands above 30 MHz. The ON4 class has access to all modes on all amateur bands. The maximum power level for the ON1 and ON4 classes is 150 watts.

The ON1 and ON4 examination meets the HAREC (Harmonized Amateur Radio Certificate) standards. "The ON2 examination is similar to the ON1 but easier. All examinations are multiple choice. ON1 questions have four possible answers, and for ON2 (novice) there are only three possibilities. To pass, the examinee must have two thirds of the points . . . " The CW exam consists of passing 10 wpm during a 5 minute exam with a maximum of 10 errors.

The number of radio amateurs in Belgium is decreasing. "Most hams wish to keep a certain level of [CW] knowledge to have access to the HF (0–30 MHz) bands. Nevertheless, the European countries must follow the CEPT recommendation. And CEPT looks to the IARU Region One for advice." *(Submitted by Pierre Cornelis, ON7PC. Pierre also holds a U.S. Advanced class FCC license with the call KN4MW.)*

Canada: Has about 48,000 amateur station licensees. That includes multiple callsigns, club stations, repeaters, and so forth. The best guess of RAC (Radioamateurs of Canada, their national society) is that the number of individual amateurs is around 42,000. "An unknown percentage of these is inactive."

Since 1990 there are four certificate "Qualifications" available. Passing the "basic" written examination allows a maximum of 200 watts PEP above 30 MHz. It is necessary to pass the "Advanced" theory examination to homebrew transmitters and amplifiers or to sponsor a voice repeater or club station.

The current CW exam requirement in Canada is 5 wpm. This permits all-mode operation on 160 and 80 meters, but "Industry Canada is expected to add 10 meter privileges late in 1999. Passing 12 wpm yields all-band, all-mode privileges.

"Radio Amateurs of Canada took the position that we would not oppose the removal of Morse code proficiency as a treaty requirement by ITU. We have not considered the advisability of retention or removal of Morse code as a technical proficiency requirement by the national regulator—Industry Canada.

"The total number of licenses has been fairly constant over the last two or three years. Industry Canada is in the process of streamlining the administration and now has a single centralized office issuing certificates and callsigns." *(Submitted by Doug Leach, VE3XK)*

China: "At present CRSA has about 900

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amateur radio operators and four license classes. Class 1 is the highest; Class 4 is the beginning class. The content of the Class 4 written examination is different from Class 1 to 3. It consists mainly of two parts: amateur radio regulations in China and worldwide and amateur radio theory and practice.

"Morse code is required for Class 1 to 3. The requirement is Class 3—40 cpm (characters per minute; 8 wpm); Class 2—50 cpm (10 wpm); and Class 1—70 cpm(14 wpm)/receive and 60 cpm(12 wpm)/transmit. As a traditional radio contact method, especially in China, manual Morse code will be needed for a long time. Therefore, we still encourage our members to improve their skill. But we are considering not asking the young student to take the Morse code exam, but give them a chance to practice and let them become interested in it.

"The amateur service in China is growing. As private computer [use is] growing faster in China, we are now combining SSTV in amateur radio, especially among our club stations." *(Submitted by Han Zhaofang, BG1HZF)*

Costa Rica: "There are currently 2416 registered stations in the National Radio Control database. The database is slightly out of date, so we could estimate 2500 stations, covering all modes from HF to SHF."

There are three license classes in Costa Rica: A, B, and C. A standard written examination covering electronics, procedures, and regulations is administered, but "Currently there are no Morse requirements. The next law regarding amateur radio stations will include Morse requirements for Superior (A) and Intermediate (B) classes, as well as basic receive capability for the Beginner class (C).

"Personally, I do not consider it a bare necessity for radio amateurs to be Morse proficient. I consider Morse to be an obsolete technology, dating back to the birth of the telecommunications era. Currently developments in repeating technologies and radio equipment in general make it very difficult to have a situation where voice or data communication cannot be readily established and where the only viable alternative is Morse code."

"This does not discredit Morse code as a very interesting field in amateur communications. Morse code is entertaining and helps develop memory and coordination skills. It is a mode worth experimenting with and experiencing, but should not be forced on any radio amateur who does not wish to be involved with it."

"The above is my personal opinion and should not be extrapolated to TIRC. The Radio Club of Costa Rica will continue to support those who wish to learn Morse code, as it always has, with Morse training sessions and courses whenever necessary. We consider it important that future generations of amateurs have the opportunity to experiment, not only with current modes of operation, but with modes which may have existed and which gave birth to amateur radio as we know it." *(Submitted by Mario Melendez, TI2DLL)*

Cuba: "According June 1999 numbers, we have 2,188 hams all over the country. We have three classes: Third Class = CL, Second Class = CM, and First Class = CO.

"Four basic subjects are examined: CW (words per minute rate change in each category—for CL Class [5 wpm], for CM Class [10 wpm], for CO Class [15 wpm]); Rules and Regulations; Electronics; and Communication Theory and Operating practices. The exams are organized by the Radio Administration and the FRC and are made by hams.

"We had our fifth Congress last March with the participation of more that 100 delegates from all our radio clubs. In some of the committees the code matter was discussed, and we decided there to discuss with the Radio Administration the possibility of having some kind of no-code license for little segments of some HF bands. But we agreed to maintain the CW as a requirement for most of the ham licenses.

"In 1993 there were 1139 hams in Cuba; now there are 2188. That's more than 1000 new hams in 6 years, most of them young men and women." *(Submitted by Oscar Morales, Jr., CO2OJ)*

Cyprus: "About 900 licenses have been issued in total. But I think that only about 200 renew their license every year, and from those only 90 or so have some form of involvement in amateur radio.

"Two license classes are conferred by a CEPT-based exam. The Morse code requirement is 12 wpm. There are no plans to lower the code speed, but if CEPT agrees on a lower speed, we will definitely adopt it.

"We would prefer to abolish the code for a new entry-level license that gives access to the amateur bands. Code could be used for more privileges for a new higher class. Keep in mind that in a small place like Cyprus, there are other practical difficulties with the Morse test. The only official government Morse code examination center has been closed, and the Ministry of Communications cannot currently administer a Morse test. Therefore, currently no new HF licenses can be issued. In fact, the only new licenses issued during the last two to three years have been to foreign licensed amateurs who became permanent residents of Cyprus. We are working with the ministry in order to establish some kind of volunteer examiner procedure so that some of our more proficient members can administer the exam.

"Amateur radio in Cyprus is shrinking. We hope we will have a written exam test at the end of September so that at least some VHF licenses (5B8) can be issued. We are currently carrying out big re-organization efforts in Cyprus, as the last few years we have been losing our members to the Internet and other hobbies." *(Submitted by Spyros Stavrinides, 5B4MF)*

Czech Republic: "We have about 7000 amateur radio operators. There are four classes: D—without Morse code examination for 144 MHz and up; C—restricted (only 8 wpm) and part of 160, 80, 30, 15 and 10 meters and 144 MHz and up, 100 watts out; B—6 wpm, 300 watts out; and A—after two years in Class B and 3000 QSOs, 750 watts out.

"The requirements are in accordance with CEPT Rec. T/R 61-02. We don't plan to reduce the Morse code examination requirements, but my opinion is that in [the] future [it] will be necessary to find supplementary requirements to prevent the amateur bands [from] being CB!

"Amateur Radio Service is expanding in [the] Czech Rep. Most of interest is for Class D, without Morse code, to be mostly active on repeaters or packet. We are also looking to go down with age limit (15 years for Classes D and C) but there is no support from government authorities." *(Submitted by Milos Prostecky, OK1MP, President Czech Radio Club)*

Egypt: There are 42 radio amateurs in Egypt and three license classes—Third Class (30

watts), Second Class (50 watts), and First Class (up to 250 watts). There are two code speeds: Third Class 5 wpm and First Class 18 wpm. "Most [amateurs] like CW but believe it should be optional and not be an examination requirement." Amateur radio is not growing in Egypt as " . . . it is very costly to get radio sets. We have no place to buy [them]. We try to collect from abroad, especially the states with friends coming to SU-land." *(Submitted by Ezzat Sayed Ramadan, SU1ER)*

Estonia: "There are 624 valid licenses, including seven club stations. There are four license classes: A, B, C, and T. A and B correspond to CEPT1; C and T correspond to CEPT2. Our examinations are in accordance with HAREC [European standard]. Morse code exam speeds: Class A 16 wpm, Class B 12 wpm, Class C 8 wpm, Class T none (VHF only). Our ministry plans to reduce the code requirements to Class A 12 wpm, and Class B and C 5 wpm. We believe Morse code examinations are absolutely necessary. Our Amateur Service is growing slowly." *(Submitted by Tiit Praks, ES7RE)*

Fiji: There are about 13 licensed amateur radio operators in Fiji. "We have a lot of temporary operators who come in on holiday, stay for about three weeks, and then go home. We do not count them. In fact, we seldom know whether they operate or not."

Fiji recognizes the amateur examination overseen by the UK's London City and Guilds. "We tried for a number of years to get the authority to set up our own examinations, but this has never been done. Most persons who get a license here in Fiji come in with an overseas call and are given a 3D2 call on payment of a fee." *(Submitted by 3D2CM)*

Finland: "There are about 6000 licensed amateur radio operators in Finland, about 5100 of which belong to the national league, SRAL. There are four license classes. The General Class is similar to our Extra Class—i.e., all bands and all privileges. Elementary Class permits 100 watts on most HF/VHF bands. Technical Class is VHF only on all VHF bands and higher power. Telecommunication class offers only 2 meters and 70 cm at low power.

"The CW requirement for the Elementary Class is 8 wpm; for the General class it is 12 wpm. There are no plans in Finland to reduce these requirements. There is a very slight decrease in amateur radio popularity in Finland which is being responded to with 'campaigns.'" *(Submitted by Jari, OH2BU)*

Germany: "There are about 80,336 amateur radio licensees issued in Germany; 55,555 are members of the German Amateur Radio Club (DARC). We have three license classes in Germany—Classes 1, 2, and 3. The Morse code examination requirement for amateur radio licenses in Class 1 is 60 characters per minute (12 wpm). There are no Morse code requirements for Classes 2 and 3.

"The number of issued amateur radio licenses has been quite stable in recent years. The German Ministry of Communication issued the new Amateur Radio Class 3, which is a class limited to 2 meters and 70 cm with a maximum output of 10 watts EIRP to get especially young children into the hobby of amateur radio. *(Submitted by Stefan Bauer, DL1FDF)*

Gibraltar: Has 15 licensed ham operators. There are two license classes: A and B. Class B allows operation on VHF and higher frequencies only with a callsign prefix of ZB. Class A allows access to both HF and VHF higher frequency bands with a prefix of ZB2.

Like the United Kingdom, Gibraltar will shortly be introducing a new kind of license called the A/B with a Morse code requirement of 5 words per minute. "We think that Morse should be taken out completely.

"Amateur radio is not growing in Gibraltar. Like all other societies, we are not getting any new operators into the hobby. Hopefully, with this new license we shall see a few of the B Class upgrade and make it more accessible to newcomers. We think that the hobby has suffered tremendously due to the home PC, especially with e-mail. We sincerely hope that the Morse code will soon no longer be a requirement in obtaining a license and look forward to the near future when this becomes a reality. There is really no need for Morse today. It has become a mode of transmission like any other. We urgently need new operators or we fear that we shall soon lose some of the bandwidth through this." *(Submitted by Wilfred Guerrero, ZB2IB)*

Greece: Has about 5000 ham operators and three license classes: A, B, and C (C being the entry level). "The code requirement at the entry level is 8 wpm. Written examinations are on basic electronics and telecommunication rules. There is no indication about reducing the code speed. We consider Morse code as a useful knowledge. The Amateur Service in Greece is growing at about 250 licensees yearly." *(Submitted by Manos G. Darkadakis, SV1IW)*

Hong Kong: "There are approximately 1560

licensed operators in Hong Kong at present and two license classes, Full and Restricted (VHF only). As of July 1998 there were 333 Full Class licensed operators and 1175 Restricted Class operators.

"A single written examination covers all aspects of radio theory, regulations, and operation which is based on the British RAE. There is a single 12 wpm receiving and sending test required for Full Class licensees. The test is offered once a month by Hong Kong's Telecommunications Authority.

"Our HARTS committee has not discussed the future need for manual Morse code proficiency, and there have been no suggestions from the membership. The primary reason for this is that the Telecommunications Authority (OFTA) in Hong Kong has promised to meet and discuss such issues with the HARTS committee, but they have refused to set a date and actually meet for the past four years.

"The Amateur Service is growing very slowly, about 50 per year (just over 3%). Until HARTS can forge a good working relationship with OFTA, there is little expectation of change. At present HK hams do not have full access to several VHF/UHF bands, so Restricted Class licensees are truly restricted in what they can do, especially in regard to satellites." *(Submitted by Jim Nelson, VR2JA, and Steven Cheng, VR2YFF)*

Hungary: "In October a departmental order on amateur radio regulation will be issued. It will be the first self-contained ministry decree in Hungary regulating exclusively the amateur radio service.

"There are about 8500 licensed radio amateurs in Hungary. If we add amateurs operating at club stations, but having no license, the number is about 9000. There are two license classes: CEPT A and CEPT B in accordance with CEPT Recommendation TR 61-01. Each class has three license categories: A (similar to your Novice), B (similar to your General/Advanced), and C (similar to your Extra). The basic difference between the classes is that CEPT B license holders are entitled to operate only above 30 MHz [and] don't have to pass Morse code.

"The A license requires 6 wpm code, B license 12 wpm, and C license 16 wpm (reduced from 18 wpm). We are staunch advocates of the need for manual Morse code proficiency to obtain shortwave (below 30 MHz) licenses.

"As for the technical/operational level, amateur radio is growing in Hungary. As to the number of radio amateurs, it is sort of stagnant. At present we don't have a real good idea how to solve this problem. It is too complex [with the] end of previous government subsidies, a wide variety of competitive other hobbies for youngsters, EMC problems, accelerated lifestyles, increased work duties, disinterest of media, practically no chance to compete with industry either in equipment construction or in the invention of striking new techniques, etc. The most important thing is to find a way and language of propaganda to approach and attract to our ranks the young population." *(Submitted by Laszlo Berzsenyi, HA5EA)*

Iceland: "There are about 120 amateur radio operators in Iceland; maybe 60 are active. We have five license classes: Novice (QRP CW only), Class A (CW only, limited power), Class B (CW/Phone, more power), Class C (all modes, still more power), and Class T (VHF and up, limited power).

"A 40 percent pass gives N rights; 60% gives the A or T. There is a special exam for C, 50% pass. Morse code: 5 wpm for Novice, 13 wpm for A, and 18 wpm for C. Test is sent for 5 minutes, hand written, eight errors allowed in reception, no error in transmission. Text sent is random character groups of 5, letters and numbers not mixed.

"We are proposing reduced code speed and also fewer license classes. What is talked about now is to implement the Farnsworth method. General class would be about 4–5 wpm with character speed of perhaps 20–25 wpm.

"Our views on the need for manual Morse code proficiency and examinations are very mixed indeed, but the majority seems to want some low speed test.

"Amateur radio is growing in Iceland. By offering attractive courses, group activity, and club activity we seem to attract newcomers to hamming." *(Submitted by Vilhjálmur Í. Sigurjónsson, TF3VS)*

Indonesia: Has a very sophisticated licensing arrangement. According to YBØEBS, "The total amount of active amateur radio in Indonesia is decreasing very rapidly. Latest number registered is not more than 90,000. Basic reason for the decrease is the present monetary and economic crisis of the country.

"There are four ham classes in Indonesia: VHF, Novice, General, and Advanced. The minimum age is 14 years, and all applicants must be in possession of a certificate of good conduct issued by the police department. The YH prefixed (No Code) Class (one year license) permits VHF and higher frequency operation. The YD and YG Novice Class permits CW operation on 20 meters and phone on 80 meters with 10 watt power. Passing a 5 wpm Morse exam is required. This is a three-year license. Only domestic communications are permitted to the YD, YG, or YH class.

"The YC and YF General Class (a five-year license) may operate on all bands except 20 meters with a 25 watt power level (8 wpm code requirement). The YB and YE Advanced Class has all amateur radio privileges with a 500 watt permissible output (12 wpm code requirement). International communications are permitted by YB, YC, YE, and YF holders.

"I am myself an old-timer keyer and enjoy very much Morse code communications. I believe with simple homebrewed transceivers the code utilization in Indonesia will be much more practical and economical to most of the amateur radio in this country. Personally I do not know how long this country will be able to overcome the economic and monetary crisis to enable most of the amateurs to get sophisticated gear." *(Submitted by Ben Samsu, YBØEBS)*

Israel: "Depending how you look at it, on the Ministry's files more than 1600 hams are registered. But that includes all calls that have been given and does not take into consideration persons that have passed away or left the hobby in any other way (750 are registered as being a member of our amateur radio club).

"We have four license classes: A, Advanced/Extra (18 wpm code), G, General (12 wpm code), N, Novice (6 wpm code), and T, Technical (no code). The written examination syllabus follows the CEPT requirements. Our ministry will decide the future of the CW requirements. We have heated discussions among the radio amateurs [and] the consensus is to keep the requirements as is. We are also waiting the outcome of the IARU and WRC decisions.

"Amateur radio growth remains static at best. We are trying to promote it in schools and community centers. Shalom from Israel." *(Submitted by Joseph Obstfeld, 4X4KJ)*

Italy: There are between 23 and 25 thousand radioamateurs in Italy. "We have two classes: first class full license HF and VHF and up, and second class license only VHF and up." The " . . . quiz examination is based on electronics and regulations. It consists of 15 questions and you must reply correctly to at least 12 of them."

The Morse examination is " . . . eight groups of five characters per minute for a period of 6 minutes. Maximum number of mistakes is five. A complete group that is not copied is considered as two mistakes" (40 characters in one minute would be 8 words-per-minute). There are no plans to change or reduce the examination requirements.

The Amateur Service is not growing in Italy. "We have been losing about 3 to 4% a year over the past three years. A program is underway to give presentations and examples of radio operations in schools, exhibitions, fairs, and so on. We are trying to have more space in the national press.

"[The] Internet, cellular phones, and satellite TV are making our hobby less interesting from a technical point of view. Getting on the web is very easy, not expensive, and can be done without any examination. Calling the other side of the world by phone is done by everybody without any problem. Satellite TV gives you access to all the world.

"Thirty years ago my friends were impressed by the fact that I was talking daily to Russia and

America. Today they could not care less." *(Submitted by Mario, I2MQP)*

Japan: "As of 1999 there are 3,049,336 licensed amateur radio operators in Japan. [Operators and stations are licensed separately in Japan.] We have four license classes: First, Second, Third, and Fourth Class. All require a written examination on radio technology, laws, and regulations.

"Morse code: First Class receiving correctly by ear for three minutes of a European plain language text at a speed of 60 characters a minute (12 wpm); Second Class 45 characters a minute (9 wpm) for two minutes; Third Class 25 characters a minute (5 wpm) for two minutes; Fourth Class no code. [Fourth Class offers some low-power HF privileges.]

"The Ministry of Posts and Telecommunications determines the speed and has not changed lately. JARL [Japan Amateur Radio League] is not requesting—nor is planning to request—MPT to reduce the speed.

"JARL regards the International Radio Regulations requirements of Morse code as very important, and considers that Morse code should be preserved, as it is a helpful and useful way of amateur radio communication.

"The number of amateur radio stations started decreasing in 1996. In 1997 there were 1,219,907 stations. 1998 figures are not yet available. JARL is collaborating with the Japan Amateur Radio Industries Association and others in conducting various campaigns to promote enthusiasm for amateur radio. JARL emphasizes how important a role amateur radio plays under emergency situations, as many people suffer great damage from natural disasters every year." *(Submitted by Mitsu Sugawara, JN1LQH)*

Amateur Radio At the Crossroads

This wraps up the first half of our end of the millennium survey of where amateur radio stands around the world. The conclusion will be presented next month. Here is what we have learned so far.

We must find the answers to four trouble spots if amateur radio is to prosper, or even be around, in the next millennium. We can categorize them as (1) competitive, (2) financial, (3) regulatory, and (4) "attitude" dilemmas.

In the 1970s amateur radio operators used mobile communications technology of which the masses had only dreamed. A telephone in the car, or crystal-clear mobile communications, was basically unavailable to the public until cellular systems made their appearance in the mid-1980s. Only 300,000 people owned cellular telephones in 1985, and most units were large, expensive, and cumbersome.

After more than a decade of technological improvements and drastic reductions in price, wireless telephones have become an integral part of American life. Some 60 million people in the United States now own relatively inexpensive cellular telephones. Many are given away if you subscribe to the service. Approximately 80 million people will own wireless telephones by the year 2000.

The ability to communicate across the world has always been the foundation of amateur radio. Sky-wave communication was not always predictable, but it sure was fun. In the early 1980s the Internet's domain-name-system (DNS) was developed, and by 1984, 1000 web hosts were on-line. The National Science Foundation began development of the major backbone communication service for the Internet in 1986. In late 1991 a computer scientist from CERN, a Swiss physics laboratory, invented the World Wide Web protocol. However, it really did not get going until 1993.

Today there is no telling how many people access the Web's millions of pages of information. The best guess is 100 million people are now on-line accessing 10 million host computer servers. Their favorite way to get traffic handled is certainly not amateur radio. It's e-mail. Anyone can use wireless telephones, e-mail, and the World Wide Web. There are no examinations, no regulations, and no licenses.

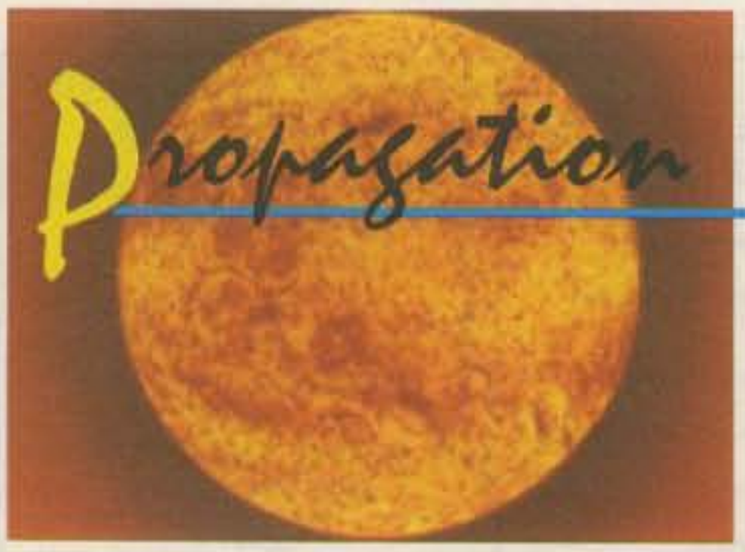
Amateur radio would benefit many developing countries—especially those in remote areas—since their communication systems are lacking, or even nonexistent. However, equipment, as many respondents pointed out, is not available or is too expensive for the average person. Those fancy, new HF rigs with all the bells and whistles are great for amateurs in developed nations, but they are totally beyond the reach of amateurs in Third World countries. Even club stations can't afford them. What the hobby needs is a bare-bones HF SSB rig at minimum cost. They are not even available here in the U.S. It is a chicken-and-egg situation. Low-priced equipment is not widely available because there is no mass market.

Amateur radio is lacking, or unavailable, in many countries because foreign telecom agencies simply do not have the ability or personnel to administer the hobby. Many amateurs get licensed in remote nations because they already have obtained a ticket in another country. Ham radio is simply not a high priority item in developing countries where the masses don't even have a telephone. And then there is the problem of national security. Radios have long been associated with spies and espionage. Some countries make it extremely difficult for its citizens to get licensed. And developed countries need ham radio spectrum to provide still more technological advances for their citizens. The "regulatory crisis" is very real.

Finally, the amateurs of developed nations want to control totally the future of international amateur radio. They seem to base their beliefs on their operating activities rather than what is best for the hobby. Most amateurs are totally unaware of the quandary that is facing the hobby.

The Morse code issue is not the most important predicament facing amateur radio. "Survival" of the hobby itself is far more important. If it is to continue well into the next millennium, we need to determine what it is going to take to increase participation. Times have changed and will continue to change. We must change with the times or face extinction. Remember there was no Internet, no e-mail, and no cellular a decade or so ago. I will talk about that in my next installment.

(To Be Continued)



BY GEORGE JACOBS, W3ASK

The Science Of Predicting Radio Conditions

CQ WW CW Contest Weekend Mostly Low Normal

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for November 1999

Propagation Index	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 3, 10, 25-26, 30	A	A	B	C
High Normal: 1, 14, 17, 23-24, 27	A	B	C	C-D
Low Normal: 2, 4, 8-9, 13, 15-16, 18, 20-23, 28-29	B	C-B	C-D	D-E
Below Normal: 5, 7, 12, 19	C	C-D	D-E	E
Disturbed: 6, 11	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be good (b) on Nov. 1st, fair-to-good (C-B) on the 2nd, excellent (A) on the 3rd, fair-to-good (C-B) on the 4th, fair-to-poor (C-D) on the 5th. Good conditions (B) are expected during the CQ WW DX CW Contest period of Nov. 27 and fair-to-good (C-B) on the 28th.

The CW weekend of the 1999 CQ World-Wide DX Contest will take place on November 27–28. This year's contest is being held during a period of rapidly rising solar activity. Based on a long-range forecast made at the time of writing this column, we are expecting mainly High Normal conditions on November 27, with Above Normal likely towards the middle and low latitudes. Generally Low Normal, but variable conditions are expected on November 28.

Some radio storminess looks possible towards the end of the contest weekend, with conditions likely to drop to Below Normal for paths passing through the Earth's auroral zones. Daily solar flux levels in excess of 150 and corresponding sunspot counts in excess of 110 are expected during the CW contest weekend.

We will have a more up-to-date forecast as a bulletin at the beginning of next month's column. For a more probable recurrence pattern, check on-the-air conditions on October 31 and November 1, which would be just one 27-day cycle prior to the CW contest weekend. For day-to-day conditions expected throughout the entire month of November, look at the Last-Minute Forecast on this page.

Special DX Propagation Charts for use during the CW weekend of the contest appeared in last month's column, along with valuable tips and suggestions for increasing scores. Be sure to refer to last month's column if you plan to participate in the CW contest weekend. Additional tips are discussed in this month's column.

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Sunspot Cycle Progress

Dr. Pierre Cugnon of the Royal Observatory of Belgium, the world's official keeper of sunspot indices, reports a monthly mean sunspot number of 114 for July 1999. This results in a 12-month running smoothed sunspot number, upon which the cycle is based, of 78 centered on January 1999. This is an increase of 5 since the previous month, as Cycle 23 begins to rise at a faster rate. The highest daily value of sunspot count during July was recorded on the 30th with a count of 165. A low daily count of 77 was recorded on July 16 and 20. A smoothed sunspot count of 114 is forecast for November 1999 by the National Geophysical Data Center at Boulder. A corresponding 10.7 cm monthly mean solar flux index of 166 was reported for July by the Dominion Radio Astrophysical Observatory at Penticton, B.C. This results in a smoothed solar flux value of 141 centered on January 1999. A smoothed level in the mid-150s is expected this November.

Updated Propagation Data

Last month's column contained a review of sources of updated and real-time ionospheric, solar, geomagnetic, and propagation information that could prove to be invaluable during the WW DX Contest. As a convenience, the following single web site, <http://www.gjainc.com>, has links to the NOAA, the Solar Terrestrial Dispatch, the Australian IPS, the Royal Observatory of Belgium, the DX Listeners Club, and the very informative N6RT sites.

CQ WW DX SSB Contest *Looks Good!*

Since this issue of *CQ* should reach most subscribers prior to the start of the CQ World-Wide SSB DX Contest weekend of October 30–31, here is an updated forecast made at press time for the general propagation conditions expected during the SSB contest weekend. Based on the 27- and 54-day recurrence tendencies of solar and geomagnetic conditions, it continues to look as if there will be High Normal HF conditions during most of the contest weekend, rising at times to Above Normal over paths to lower and equatorial latitudes. There could be periods of minor radio storminess, dropping conditions to Low Normal on circuits passing through the auroral and the polar regions.

Daily 10.7 cm solar flux levels are expected to soar well above the 150 mark during the contest weekend, with corresponding sunspot counts likely to exceed 110. The geomagnetic planetary A-index is expected to remain below 16 for most of the time during both days of the SSB contest period.

Barring any sudden solar flares or radio storms, the 1999 WW DX SSB Contest weekend very well could be the best experienced over the past eight years, particularly on the 20, 15, and 10 meter bands.

To maximize scores be sure to check the DX Propagation Charts that were presented last month.

CW Contest Work Plan

Table I is an example of a multi-band contest plan for an eastern USA QTH (EST) which has been devised from the DX Propagation Charts that appeared in last month's column. For each two hour period throughout the day it shows the areas of the world and the amateur band in which propagation is expected to be optimum. Similar plans can be made for other time zones and for selected single bands.

CW Contest Tips

Look for excellent DX conditions on 10, 15, and 20 meters during most of the daylight hours from shortly after sunrise until sunset.

From sundown to midnight DX honors should be shared between 20 meters, for openings towards the south and west, and 40 meters, for openings towards the east, north, and south. Good DX openings to the same areas of the world as 40 meter openings should also be possible on 80 and 160 meters during this period.

Time EST	Optimum Band (meters)	Areas To Which Band Is To Be Open
00–02	40	Most of Europe, Eastern Mediterranean, and Middle East. Most of Central and South America. A few African areas and possibly Antarctica.
02–04	20	Some South Pacific, New Zealand, and Australasia. A few Far East and Asian areas. Some South America and Antarctica.
04–06	40	South Pacific, New Zealand, Australasia. Many South American areas. A few Far Eastern and Asian areas. Possibly Antarctica.
06–08	20	Most of Europe, South Pacific, New Zealand, and Australasia Most of Central and South America. A few African areas. Some Far East and Asian areas.
08–10	15	All of Europe, Eastern Mediterranean, and Middle East. Some of Africa. Most of Central and South America. South Pacific, New Zealand, and Australasia. A few Asian areas.
10–12	10	Most of Europe and Africa. Most of Central and South America. A few Asian areas, New Zealand, South Pacific, and Australasia.
12–14	15	Some of Europe and most of Africa. Most of Central and South America. A few areas of South Pacific, New Zealand, and Australasia.
14–16	15	Most of Africa, and Central and South America. Some of South Pacific, New Zealand, and Australasia. A few Asian areas.
16–18	20	Most of Europe, Eastern Mediterranean, and Middle East. All of Africa, and Central and South America. A few Australasian areas.
18–20	15	Lots of South Pacific, New Zealand, and Australasia. Some of Far East and Asia. Most of Central and South America. Possibly Antarctica.
20–22	20	Most of Africa, Far East, South Pacific, New Zealand, Australasia, Central and South America. A few European areas and Middle East. Some Antarctica.
22–00	20	Lots of Far East, South Pacific, New Zealand, Australasia, Central and South America. A few African and Asian areas. Antarctica.

**Similar work plans can be devised for single-band operation or for openings to specific DX areas.*

Table I– Sample multiband work plan for eastern USA QTH.

Between midnight and sunrise the best DX band should be 40 meters, with 80 meters not far behind. Openings on both bands should be possible to most areas of the world, with conditions peaking towards the south and west. Some fairly good 20 meter openings are also expected during this period, mainly towards the south and west. Be sure also to check the 160 meter band for DX openings. Propagation patterns should be similar to those observed on 80 meters, but with somewhat weaker signals and higher noise levels.

The best propagation aid for expected 160 meter DX openings (and for 80 and 40 meters as well) is a set of sunrise and sunset curves, since DX signals tend to peak when it is local sunrise at the easterly end of the path.

For up-to-the-minute information on Topband propagation and DX, check the web site <http://solar.uleth.ca/solar/www/160pred.html>. For a grayline sunrise-sunset map check <http://solar.uleth.ca/solar/www/160gray.html>.

Solar Eclipse Observations

Many interesting HF radio observations were made by radio amateurs along the path of the August 11 solar eclipse of the sun. Along or near the path of totality, daytime was plunged into an eery darkness, and nighttime propagation conditions returned to the HF bands for upwards of an hour or so.

Fig. 1 is a plot of relative signal strength recorded on the 1.8 and 3.5 MHz transmissions from the Belgium beacon ON4UBA by Andrew Talbot, G4JNT, on the south coast of England at a distance of approximately 300 miles. Both locations were on the path of totality, which occurred at 10:15 UT (11:15 BST).

Note that the 1.8 MHz signal increased by up to 37 dB during the period of the eclipse, peaking just after totality. The increase in the 3.5 MHz signal was on the order of 21 dB. G4JNT made similar observations on the 7 MHz band. Additional information and a description of the equipment used for the observations can be obtained directly by e-mail from Andrew Talbot at <actalbot@dera.gov.uk>.

Renzo Chiereghin, IK4QJM, sent in the following e-mail observation, which is typical of the many received.

"During the day of the eclipse I was on holiday in a place called Scardovari, which is a small village on the Adriatic island of

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. In 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 Charts
November & December 1999
Local Standard Time at Path Mid-Point
(24-Hour Time System)

Band (meters)	Distance From Transmitter (miles)			
	50-250	250-750	750-1300	1300-2300
10	*Nil*	*Nil*	07-09 (0-1) 09-11 (0-2) 11-15 (0-3) 15-16 (0-2) 16-18 (0-1)	07-08 (1) 08-09 (1-2) 09-11 (2-3) 11-15 (3-4) 15-16 (2-4) 16-18 (1-4) 18-19 (0-3) 19-20 (0-2) 20-21 (0-1)
15	*Nil*	08-10 (0-1) 10-16 (0-3) 16-17 (0-2) 17-18 (0-1)	07-08 (0-1) 08-09 (1-3) 09-10 (1-4) 10-16 (3-4) 16-17 (2-4) 17-19 (1-4) 19-20 (0-3) 20-21 (0-1)	07-08 (1) 08-09 (3-2) 09-19 (4) 19-20 (3) 20-21 (1-2) 21-00 (0-1)
20	09-11 (0-1) 11-15 (1-2) 15-17 (0-1)	07-09 (0-2) 09-11 (1-4) 11-15 (2-4) 15-17 (1-4) 17-18 (0-4) 18-19 (0-3) 19-20 (0-2) 20-07 (0-1)	07-09 (2-3) 09-18 (4) 18-19 (3-4) 19-20 (2-4) 20-21 (1-4) 21-23 (1-3) 23-02 (1-2) 02-07 (1)	07-09 (3) 09-12 (4) 12-15 (4-3) 15-21 (4) 21-23 (3-4) 23-02 (2-3) 02-06 (1-2) 06-07 (1)
40	07-08 (0-2) 08-09 (1-3) 09-19 (4) 19-21 (2-3) 21-00 (1-2) 00-07 (0-1)	07-08 (2-4) 08-09 (3) 09-15 (4-3) 15-19 (4) 19-21 (3-4) 21-00 (2-4) 00-02 (1-3) 02-06 (1-2) 06-07 (1-3)	07-08 (4) 08-09 (3-2) 09-15 (3-1) 15-17 (4-2) 17-00 (4) 00-02 (3-4) 02-06 (2-4) 06-07 (3-4)	06-07 (4-3) 07-08 (4-2) 08-09 (2-1) 09-15 (1-0) 15-17 (2-0) 17-19 (4-3) 19-06 (4)
80	08-15 (4-3) 15-02 (4) 02-04 (3-4) 04-07 (2-3) 07-08 (3-4)	08-09 (3-2) 09-15 (3-1) 15-18 (4-3) 18-04 (4) 04-07 (3-4) 07-08 (4-3)	08-09 (2-1) 09-15 (1-0) 15-18 (3-1) 18-06 (4) 06-07 (4-3) 07-08 (3-1)	08-09 (1-0) 09-15 (0) 15-18 (1-0) 18-20 (4-1) 20-05 (4) 05-06 (4-3) 06-07 (3-1) 07-08 (1)
160	07-09 (3-2) 09-11 (2-0) 11-17 (1-0)	07-09 (2-1) 09-17 (0) 17-19 (2-1)	07-09 (1-0) 09-17 (0) 17-19 (1-0)	07-19 (0) 19-21 (2-1) 21-04 (4-3) 17-19 (3-2) 19-07 (4)	19-04 (4) 04-07 (3-2)	19-21 (4-2) 21-04 (4) 04-06 (2) 06-07 (2-1)	04-06 (2-1) 06-07 (1-0)

ALASKA
November & December 1999
Opening Given in GMT

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	17-18 (1) 18-20 (2) 20-22 (3) 22-00 (2) 00-01 (1)	15-16 (1) 16-17 (2) 17-21 (3) 21-23 (4) 23-00 (3) 00-01 (2)	12-16 (1) 16-18 (2) 18-21 (1) 21-23 (2) 23-02 (3) 02-03 (2) 03-05 (1)	06-12 (1) 07-11 (1)*
Central USA	17-18 (1) 18-20 (2) 20-00 (3) 00-01 (2) 01-02 (1)	15-16 (1) 16-17 (2) 17-20 (3) 20-23 (4) 23-01 (3) 01-02 (2) 02-03 (1)	12-16 (1) 16-18 (2) 18-20 (1) 20-22 (2) 22-00 (3) 00-02 (4) 02-03 (3) 03-04 (2) 04-06 (1)	06-08 (1) 08-13 (2) 13-14 (1) 07-12 (1)*
Western USA	18-19 (1) 19-20 (2) 20-21 (3) 21-23 (4) 23-00 (3) 00-01 (2) 01-02 (1)	16-17 (1) 17-18 (2) 18-20 (3) 20-01 (4) 01-02 (3) 02-03 (2) 03-04 (1)	12-16 (1) 16-18 (2) 18-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-07 (1)	02-03 (1) 03-05 (2) 05-14 (3) 14-15 (2) 15-16 (1) 04-06 (1)* 06-14 (2)* 14-16 (1)*

HAWAII
November & December 1999
Openings Given in Hawaiian Standard Time#

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	06-07 (1) 07-08 (2) 08-13 (4) 13-14 (3) 14-15 (2) 15-16 (1)	06-07 (1) 07-09 (4) 09-12 (3) 12-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	12-14 (2) 14-17 (4) 17-21 (3) 21-00 (2) 00-06 (1) 06-08 (3) 08-09 (2) 09-12 (1)	17-18 (1) 18-20 (2) 20-02 (3) 02-03 (2) 03-04 (1) 19-20 (1)* 20-01 (2)* 01-03 (1)*
Central USA	06-07 (1) 07-08 (3) 08-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (4) 09-13 (3) 13-17 (4) 17-19 (3) 19-20 (2) 20-21 (1)	08-13 (2) 13-14 (3) 14-20 (4) 20-00 (3) 00-02 (2) 02-05 (1) 05-06 (2) 06-08 (3)	17-18 (1) 18-20 (2) 20-21 (3) 21-01 (4) 01-03 (3) 03-04 (2) 04-05 (1) 19-20 (1)* 20-22 (2)* 22-01 (3)* 01-03 (2)* 03-04 (1)*
Western USA	07-08 (1) 08-09 (2) 09-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (2) 08-12 (3) 12-18 (4) 18-20 (3) 20-21 (2) 21-22 (1)	08-10 (4) 10-15 (3) 15-22 (4) 22-01 (3) 01-04 (2) 04-06 (1) 06-08 (3)	17-18 (1) 18-19 (2) 19-20 (3) 20-03 (4) 03-05 (3) 05-06 (2) 06-07 (1) 19-20 (1)* 20-21 (2)* 21-04 (3)* 04-05 (2)* 05-06 (1)*

#See explanation in "How To Use Short-Skip Charts" in the box at the beginning of this column.
*Indicates best time 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 20 and 40 meter openings.
Note: The Alaska and Hawaii Propagation Charts are intended for distances *greater* than 1300 miles. For shorter distances use the preceding Short-Skip Chart.

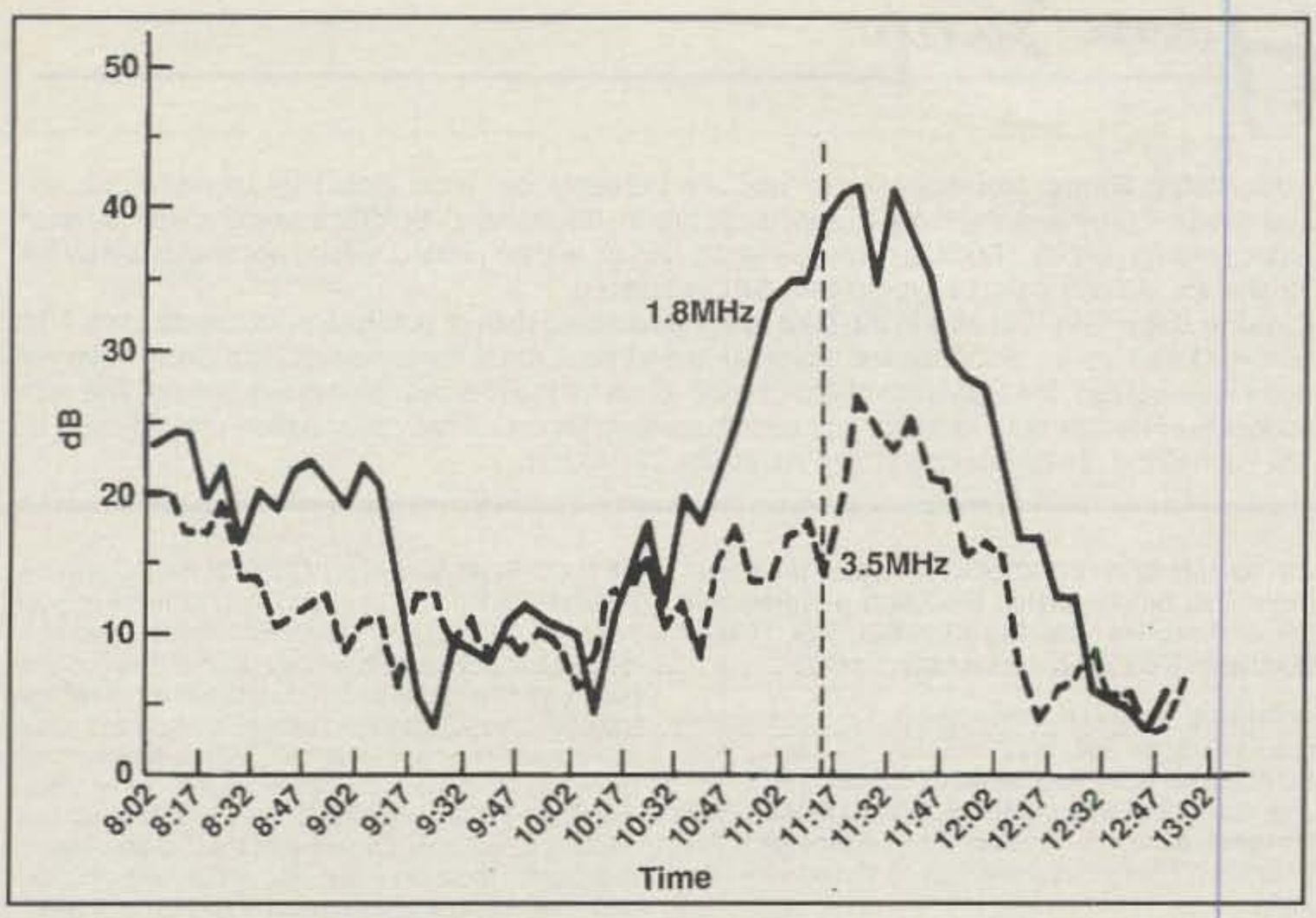

Fig.1– Increase in 1.8 and 3.5 MHz signal strength from Belgium beacon (ON4UBA) noted by G4JNT on the south coast of England during the August 11 total solar eclipse. Time of totality was 10:15 UT (11:15 BST).

Donzella, about 55 miles south of Venice. The eclipse was about 50% total in this area and took place between 10:40 and 10:50 UT. During this time the sky darkened and I noticed the appearance of foreign medium-wave stations, which I normally can only hear during the night. In particular, I noted a very strong signal from Radio Bucharest (1,152 kHz) and from a Czech radio station on 1,098 kHz. In about 10 to 15 minutes, as the eclipse passed, the sky began to brighten and both stations began to fade and disappear.

"I hope that these observations will be useful. My warmest regards.—Renzo, IK4QJM, <serren@mail.asianet.it>."

VHF Ionospheric Openings

Solar activity is at a high enough level to permit 6 meter DX openings during November. Conditions should peak towards Europe and in a generally easterly direction before noon. Openings should improve towards Africa shortly after noon and continue to swing in a clockwise direction during the early afternoon hours. Expect openings towards the Caribbean and Central and South American areas from late morning until shortly after noon. By late afternoon, start looking for openings towards the south and southwest. For the most part, 6 meter DX openings may be erratic, and the band may remain open for only short periods of time. The best days to look for 6 meter DX openings are those which are expected to be either High or Above Normal.

Some trans-equatorial (TE) type 6 meter propagation may also occur during November. The best time to check for such conditions is between approximately 8 and 11 PM local standard time. TE openings favor locations in the southern tier states, and generally take place to South American countries south of the equator. At best, TE openings are very erratic, with weak signals subject to intense flutter fading.

Two significant meteor showers are expected during November, which should result in some meteor-type ionospheric openings on the VHF bands. The *Taurids* shower, which should last for a day or two, is expected to peak on November 1 with a peak meteor count of approximately 15 an hour. A second shower of about the same duration and intensity, called the *Leonids,* should reach peak intensity on November 14.

November is usually a month of fairly intense and widespread auroral activity, which can result in short-skip propagation on the 6 and 2 meter bands for distances up to approximately 1200 miles. Auroral activity is often associated with periods of radio storminess and is most likely to occur on those days shown as Below Normal or Disturbed in the Last-Minute Forecast at the beginning of this column.

This month's column contains Short-Skip propagation data for use between distances of approximately 50 and 2300 miles, and between the states of Hawaii and Alaska and the continental areas of the United States.

Good luck in the CW section of the CQ World-Wide DX Contest, and be sure to let me know how these special contest propagation forecasts work out.

73, George, W3ASK

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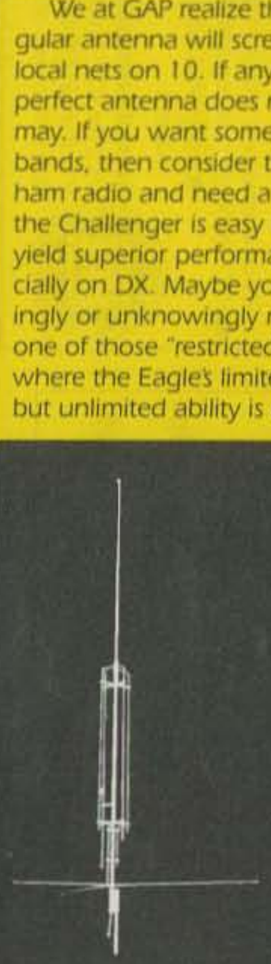
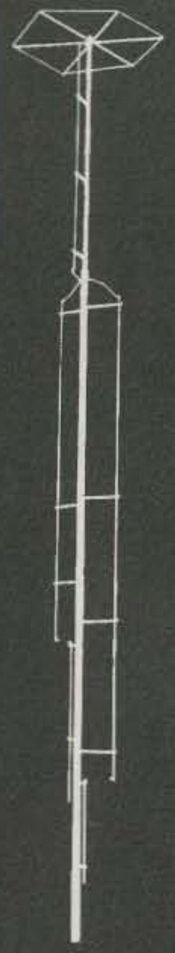


Eagle DX

Challenger DX



Voyager DX

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

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

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

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

The secret is out and people in the know say:

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

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

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

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

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

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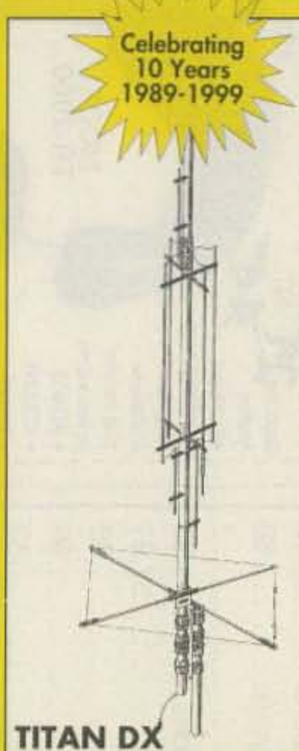

TITAN DX

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

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Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$319
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$399

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– QST, 1/99

IC-2100H ▶ 2 meters has never been easier or more fun! 55 watts of power; PC programmable*; 113 memory channels; die cast aluminum chassis; full control mic; CTCSS; highly intermod resistant; and a cool DUAL color display.

Only 4.3" Wide
The IC-207H's super compact remote head boasts a large display with soft key menu controls.*

Green or Amber
Select which color you want the display to show. The large alphanumerics and soft key controls are easy to see

◀ IC-207H The ultra-compact remote control* head of this 2 meter/440 MHz dual bander fits on just about any kind of dashboard. Also enjoy: CTCSS encode/decode; up to 9600 bps packet*; built-in duplexer; 182 memory channels; full control mic; auto repeater; and more.

Enter to **win a new IC-2800H** in ICOM's Connect 2000 contest. See your dealer for complete rules and details.

IC-2800H ▶ Audio excellence, video excitement. 2M/440MHz dual bander with: remote control head; independent tuning & control knobs; cross band repeat; TFT color LCD display; NTSC video port; 118 - 174, 440 - 450 MHz wide band receive**; band scope; 9600 bps data port; CTCSS encode/decode; 232 memory channels; PC programmable*; die-cast aluminum chassis; full control mic; and MUCH more.

PC Ready!

*Optional equipment required. Check with your authorized ICOM dealer.

Optional Wireless Mic
Available for each mobile radio shown. Enjoy cable-free control and operation.

Get out and have MORE fun. Whatever your 2 meter or 440 MHz needs, ICOM has the rig for you. Contact your authorized ICOM dealer today or call for a free brochure, 24 hours a day: **425-450-6088**

ISO 9001

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ICOM

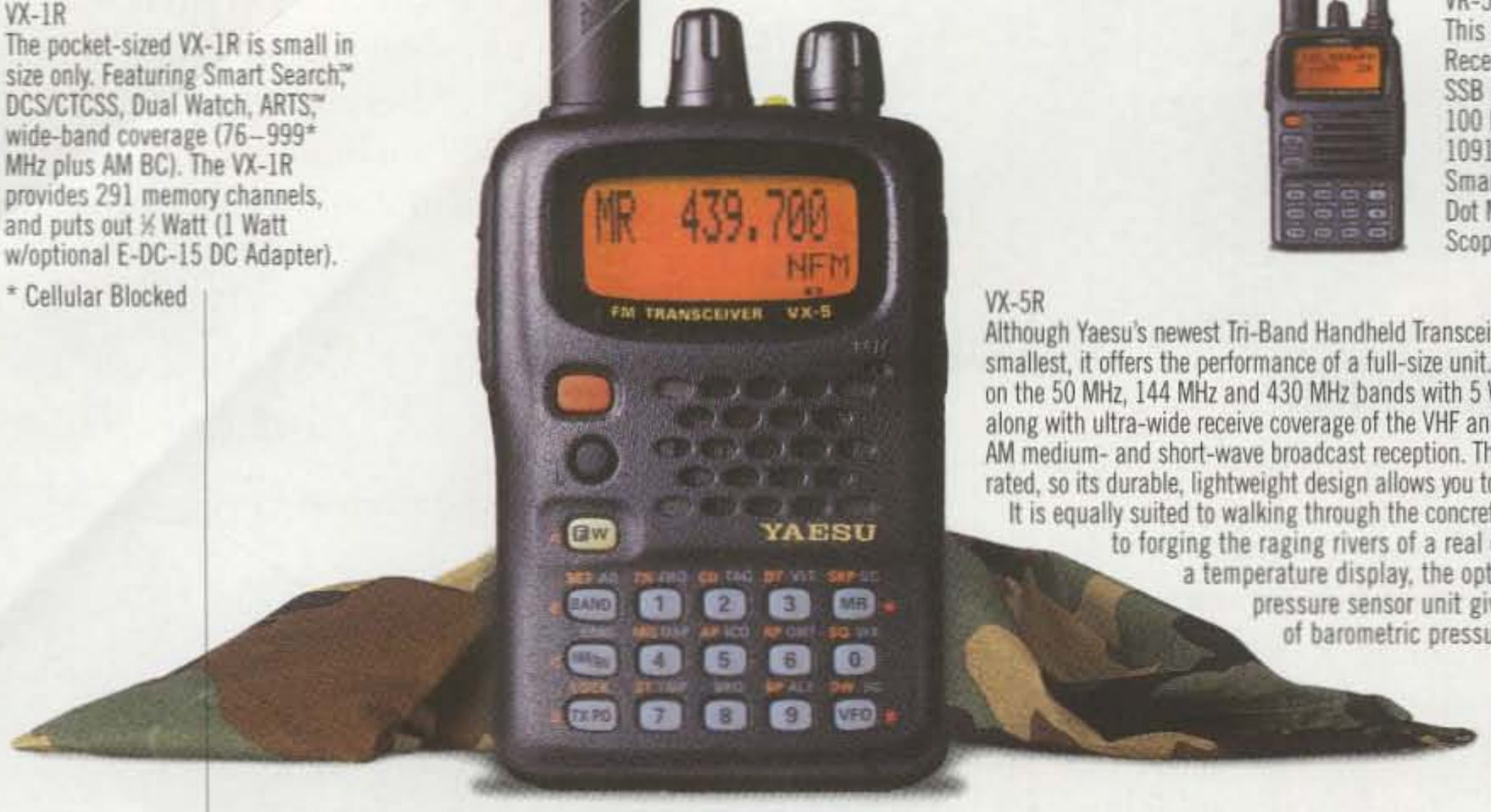
www.icomamerica.com

FT-50RD
This durable, multi-featured 5 Watt Dual Bander is manufactured to rigid MIL-810 standards. Featuring wideband frequency coverage,* CTCSS/DCS operation, Dual Watch, 112 memory channels, and Digital Voice Storage.

FT-51R
This full-featured 5 Watt Dual-Band Handheld includes dual receive, 120 memory channels (80 if Alphanumeric), Auto Tone Search, Spectra Scope, and V/V, U/U and V/U operation.

VX-1R
The pocket-sized VX-1R is small in size only. Featuring Smart Search,™ DCS/CTCSS, Dual Watch, ARTS,™ wide-band coverage (76–999* MHz plus AM BC). The VX-1R provides 291 memory channels, and puts out ½ Watt (1 Watt w/optional E-DC-15 DC Adapter).

* Cellular Blocked



VX-5R
Although Yaesu's newest Tri-Band Handheld Transceiver is the world's smallest, it offers the performance of a full-size unit. The VX-5R operates on the 50 MHz, 144 MHz and 430 MHz bands with 5 Watts of power output, along with ultra-wide receive coverage of the VHF and UHF spectrum, plus AM medium- and short-wave broadcast reception. The VX-5R is military rated, so its durable, lightweight design allows you to take it anywhere. It is equally suited to walking through the concrete jungle as it is to forging the raging rivers of a real one. Along with a temperature display, the optional barometer pressure sensor unit gives a read-out of barometric pressure and altitude.

FT-11R
This compact 2M Handheld features 150 memory channels (75 if Alphanumeric), 10-memory DTMF Autodialer, Automatic Battery Saver (TX/RX), backlit Keypad, and are available in 1.5 Watt and 5 Watt versions.

FT-411E
The affordable FT-411E is compact and durable. This 5 Watt VHF FM Handheld features a die-cast case, 40 memory channels, 10 DTMF memories, built-in VOX, CTCSS, and multiple scan modes.

FT-23/33R
These ultra-compact, 5 Watt VHF FM Handhelds feature rugged die-cast aluminum cases, 10 memory channels, optional CTCSS, and multiple scan modes. The FT-23R (2M) and the FT-33R (222 MHz) are easy to operate, and give outstanding performance.

FT-10/40R
These single-band handhelds are manufactured to MIL STD 810 specifications, featuring either 30 or 99 memories, CTCSS/DCS operation, Dual Watch, and are available in 2.5 Watt or 5 Watt versions, with four keypad options.

VR-500
This miniature Handheld Receiver provides FM, AM, SSB and CW reception on 100 kHz–1300 MHz, with 1091 memory channels, Smart Search,™ versatile Dot Matrix display, Band Scope, and Dual Watch.

TOUGH GUYS.

When you're small, you get picked on. Isn't that how it goes? Well not in Yaesu territory, because not only do we design compact handhelds for efficiency, but we give these clever little guys plenty of muscle. Yaesu handheld transceivers have earned the bragging rights for being the smallest handhelds with the most durable water resistant casings ever created. And packed inside the brawn are engineering accomplishments in performance that are unmatched in the industry. Our high-tech handheld transceivers provide clean power output on the VHF and UHF bands and offer revolutionary features that allows these tough guys to continually outperform the competition. Learn more about Yaesu products on the web at www.yaesu.com

YAESU ...leading the way.

FT-1000MP
The radio of choice for world-class contest operators, the FT-1000MP provides 100 Watts of power, Enhanced DSP,™ Dual In-band Receive, Cascaded IF filters, General Coverage RX, and 160-10 M TX. (DC-only version also available.)

FT-920
The FT-920 HF/6M Transceiver is designed for today's active Ham. It features high-speed DSP in all modes, 127 memory channels, AFSK or FSK Digital operation, new-technology MOSFET PA finals, high-speed Automatic Antenna Tuner, and high-resolution LCD display.

FT-1000D
Truly an elite-class HF masterpiece, the 200 Watt FT-1000D provides Dual Receive (in-band or cross-band), Cascaded IF Filters, extraordinary Dynamic Range, DDS, high-speed Automatic Antenna Tuner, and 100 memory channels.

FT-100
This ultra-compact HF/VHF/UHF 100 Watt Transceiver provides SSB, CW, AM, FM and AFSK coverage of the HF, 6M, 2M and 70 CM bands. Features include 300 memory channels, built-in Electronic Memory Keyer, DSP, IF Shift, IF Noise Blanker, and CTCSS/DCS.

FT-840
Affordable yet feature filled, the FT-840 is an ideal traveling companion. It offers 160-10M TX with general coverage RX, 100 memory channels, DDS, CTCSS, Twin Band Stacking VFOs, and excellent receiver dynamic range.

FT-600
This compact 100 Watt HF Transceiver offers the utmost in operating simplicity. The MIL-STD rated FT-600 covers the 160-10M Amateur bands with General Coverage Receive, 100 memory channels, Direct Keypad Frequency Entry, and a front-mounted speaker.

VL-1000/VP-1000
The VL-1000 Quadra System is a Solid-State Linear Amplifier featuring four twin-MOSFET PA modules to produce 1000 Watts of clean power output on 160-15 Meters (500 Watts on 6M, modifiable for 12/10 meters). Included are an Automatic Antenna tuner, 2 Input and 4 Output Antenna Jacks, and extensive status displays on the multi-function LCD.

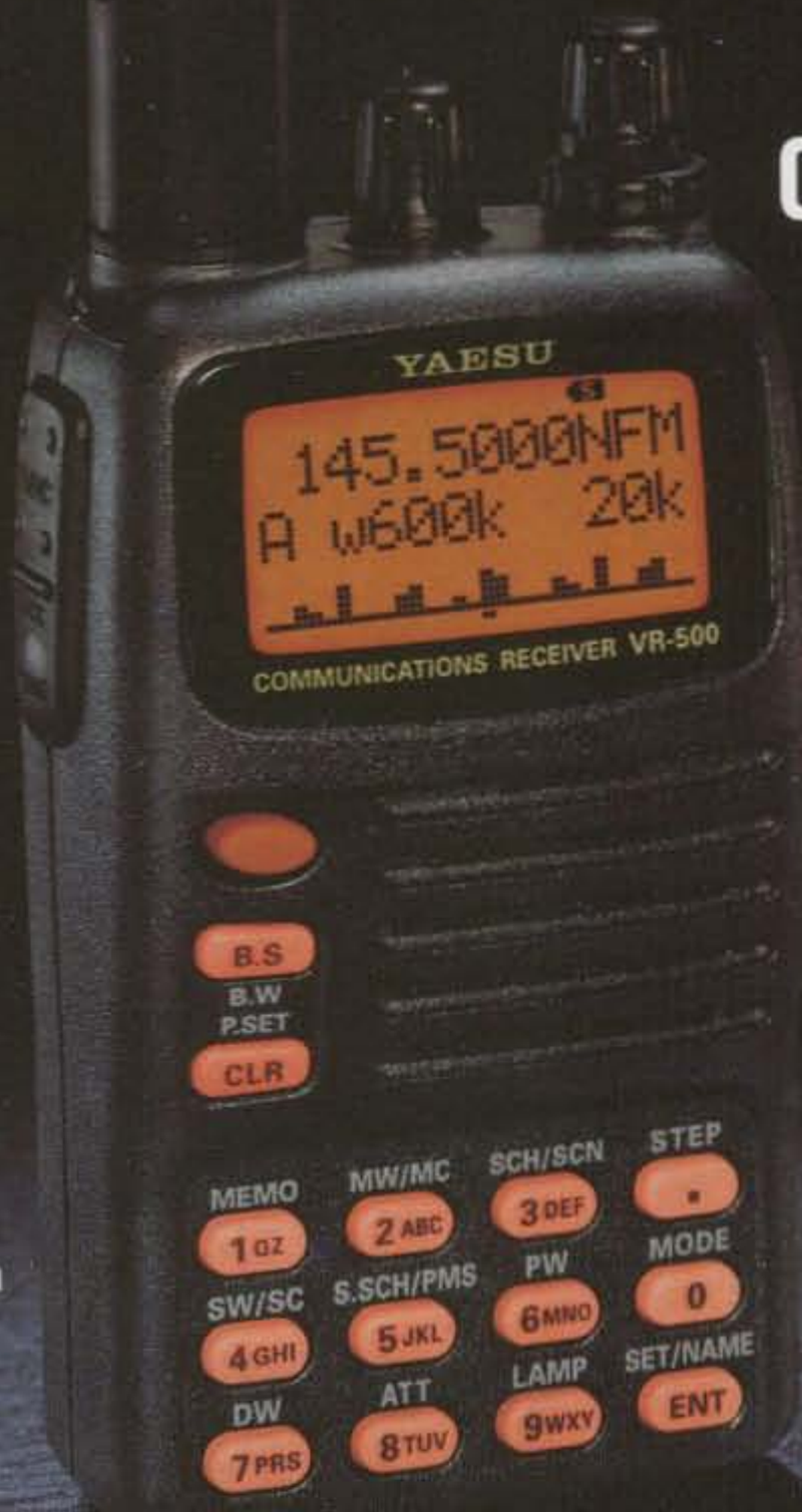
FT-847
The introduction of the FT-847 completely redefines base station operation by offering three radios in one—HF, VHF/UHF and Satellite. A full power multi-mode transceiver, the appropriately named Earth Station covers the HF, 50 MHz, 144 MHz and 430 MHz bands, and it includes crossband Full Duplex operating capability for satellite work. Its exceptional receiver performance is ready for all aspects of DX work thanks to the DSP filtering. And for local FM work both CTCSS and DCS encode/decode are built in. The FT-847 is an engineering breakthrough offering you the earth, the sky, and the moon in one compact package.

THE TASK MASTERS.

They're out there. Those elusive DX signals that can't poke through the QRM regardless of the late-night hours you put in trying to find them. But when a Yaesu HF enters the picture, weak signals suddenly jump into your headphones. Yaesu's High Frequency transceiver technology uniquely combines years of RF and AF design know-how with cutting edge advancements in IF filtering, noise reduction, and dynamic range. Whether you're on high bands or low, at home or away, the high frequency technology of Yaesu's task masters quickly fills up your log with contacts. Learn more about Yaesu products on the web at www.yaesu.com

YAESU **Choice of the world's top DX'ers.**

THE VR-500 BRINGS YOU THE WORLD!



Actual Size

CARRY THE WORLD WITH YOU!

Continuous Coverage:
100 kHz to 1299.99995* MHz!

*Cellular telephone frequencies are blocked and cannot be restored.

All Mode Reception:
FM, Wide-FM, USB, LSB, CW, and AM!

Huge Memory Capacity:
1091 Channels!

Ultra Compact Size!
58 mm x 24 mm x 95 mm
220 g (including Antenna / Battery)
Simulated display / keypad Illumination

Features

- Multiple Power Source Capability
- Direct Keypad Frequency Entry
- Large High-Output Speaker
- Polycarbonate Case
- Real-Time 60-ch* Band Scope
  *Range 6 MHz / Step 100 kHz

- Full Illumination For Display And Keypad
- Versatile Squelch / Monitor Key
- Convenient "Preset" Operating Mode
- Huge 1091-ch Memory System With Search & Scan
  - Regular Memories (1000 ch)
  - Search Band Memories (10 ch)
  - Preset Channel Memories (19 ch +10 Weather Channels)
  - Dual Watch Memories (10 ch)
  - Priority Memory (1 ch)
  - Smart Search™ Memories (11/21/31/41 ch)
- Convenience Features
  •1 MHz Fast Steps •Front-end 20 dB Attenuator •RF Squelch •Power On / Power Off Timers • Adjustable Battery Saver •Extensive Menu Customization •Clone Capability •Computer Control

COMMUNICATIONS RECEIVER

VR-500

All-Mode Wideband Receiver

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Choice of the World's top DXers™

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