

# POPULAR COMMUNICATIONS

## Summer Olympics Use High-Tech Radios

### Also in this issue:

- **Methods To Improve GPS Positioning**
- **Courtesy On The Ham Bands**
- **Checked Out: AOR AR8000 Handheld Scanner**
- **Fire Notification Networks Use Pagers**

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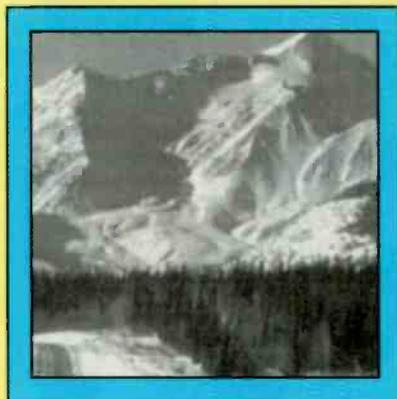
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JULY 1996

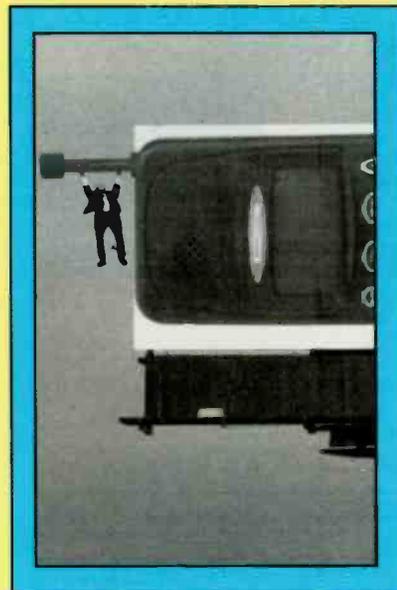
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Atlanta Games will make largest use of radios ever.

*By Chuck Gysi, N2DUP, Editor*

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CB, ham and business radios used by winning team.

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Visiting historic days of yesteryear.

*By Alice Brannigan*

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The AOR AR8000 handheld radio receiver.

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**This month's cover:** Arnold Davis and William Suggs deploy a MASCOT (Motorola Advanced Systems Communications Trailers) transportable trunked radio unit at the 1996 Summer Olympics Games in Atlanta, Ga. Photo by Larry Mulvehill, WB2ZPI.

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### ● Understanding ACARS By E. Flynn

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## FEATURES

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- Computer control ICOM R7000, R7100 and R9000
- Download Scout frequencies to the PC
- NMEA-0183 interface for GPS and LORAN receivers
- Interface AR3000A with DC440 for decoding CTCSS, DCS, and DTMF data under computer control
- Interface M1 frequency counter for datalogging with **Optolog** software
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•Built in NMEA-0183 Interface for GPS interface. OPTOLINX shown with Trimble GPS, and AOR AR8000 Scanner.

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## AN EDITORIAL

### A Need To Communicate

OK, I'll admit I don't have the time or desire to make a filing with the Federal Communications Commission. But I have an idea I'd like to share with you. One that has had me thinking for some time.

I'm willing to bet that a fair number of our readers belong to one organization or another. Perhaps it's the local Rotary Club, which sponsors an annual holiday parade. Maybe it's a high school sports booster club, which operates concessions at athletic events. In almost all instances, these organizations either are trying to raise funds for their activities or community goodwill, or they are operating in a public venue.

In many instances, these groups could better coordinate their activities with the use of two-way radio. The Rotary Club sponsoring a holiday parade could better time the spacing of entries in the parade with the use of radios. The booster club operating a concession stand at an athletic event would be able to call for additional supplies from another volunteer. There is no doubt that two-way radios can help almost any organization that has the funds to purchase equipment.

In the community where I live, I have seen organizations borrow radios from commercial enterprises for use at various events. Imagine my surprise when trying to find the frequency for one event once and it finally popped up in the most unexpected location—a discreet frequency licensed for a major railroad with operations in town. There, smack dab in the middle of the railroad VHF spectrum was a frequency being used to coordinate a large-scale event in town. Apparently, the railroad had lent several of its portable radios for use by one of the organizations involved with the event.

There are technicalities in lending radios for purposes other than what the radios were licensed in the first place. The FCC wouldn't necessarily like to see much of that. On the same note, the FCC doesn't like unlicensed use of two-way radios. Some organizations go out and purchase radios in the business radio service, but never follow through and obtain licenses.

Again, in my community, some organizations have obtained licenses in the business radio service to use radios at their events. The local high school booster club is licensed on itinerant UHF business channels while the Optimist Club is licensed on a VHF business channel. And then there is one sports organization that does not seem to have a license for its operation on

a VHF business channel.

Most organizations that purchase radios that aren't involved with emergency services find themselves licensed in the business radio service, but it is a stretch of the rules that seems to let them do that. Eligibility rules for the business radio service require the applicant to meet one of these requirements: be engaged in a commercial activity; operate an educational, philanthropic or ecclesiastical institution; be engaged in clergyman activities; or operate a hospital, clinic or medical association. Somehow, I just don't see how a routine club can meet any of those eligibility guidelines. However, they continue to get licensed somehow.

At one time, clubs and organizations could obtain licenses in the general mobile radio service at 462/467 MHz. Many groups did obtain licenses there and continue to be licensed there. However, new GMRS licenses for organizations no longer are available as only individuals are eligible in the UHF service now. There is one loophole: An organization can use GMRS for its activities, however, each member using radios must be licensed individually and would be operating under their own licenses. That presents a predicament for a group if they need to license every member to use GMRS frequencies.

While CB is a good service for organizations, and is used as such in many areas, it also has drawbacks between usage and interference and range with portable equipment. Clear-channel FM voice equipment in the VHF and UHF bands usually can reach farther and with better clarity.

Thus, here is my proposal. It seems that in this day and age it would not seem unreasonable to have the FCC consider setting up a new radio service that caters to organizations. Perhaps it should be restricted to non-profit organizations, too, because for-profit organizations could become licensed in the business radio service.

A non-profit organization radio service would need to find some usable spectrum, and while I am sure someone would be willing to point out the shortcomings of my findings, I think I have the place for such. I propose that channels be set up between the 30-kHz-spaced business channels in the 151- and 154-MHz bands. There is no valid reason for 30-kHz channels with the narrowband technologies in use today, especially considering most VHF frequency separation is 15 kHz.

I also recognize that there is some amplitude companded sideband (ACSB) use of frequencies between the 151- and 154-MHz business channels, however, that use is somewhat limited outside frequency-congested southern California. To protect the ACSB operations and to protect the 30-kHz business channel users, I recommend that power output on these new non-profit organization channels be limited to 2 watts maximum. That would provide sufficient power output for most venues.

In addition, I would propose allowing an organization to license on up to four of the 14 channels I propose. That would allow interference to be minimized because some organizations don't always operate in the same location all the time. That also allows flexibility in channel usage and loading. For instance, a booster club could use one channel for gate admissions and another for concession operations.

I propose these frequencies be allocated to a non-profit organization radio service: 151.610, 151.640, 151.670, 151.700, 151.730, 151.760, 151.790, 151.820, 151.850, 151.880, 151.910, 151.940, 151.970 and 154.555 MHz.

With low power and frequency flexibility, non-profits would see the benefit in using this radio service. It also would get them off crowded business channels where there should be only commercial activity.

Do you agree with the concept? Is this something that would benefit America's non-profit organizations? I think it would be a tremendous boost for those groups that have a need to communicate. Let me know your thoughts.

### Oops!

Our astute readers may have noticed that the photos and graphics that accompanied Gordon West's Emergency column in the May issue did not match the column's topic. While the column was about digital signal processing (DSP), the artwork accompanying the column dealt with global positioning system (GPS) adjustments.

OK, if you look at Gordon's June column, you will see we republished the DSP article with the right photos and graphic. And in this issue, we are publishing the GPS article with one photo. If you'd like to see the graphics that accompany the article, please refer to the May issue.

We apologize for the mix-up and hope you aren't inconvenienced too greatly by the error. 73, Chuck

# Mailbag

## LETTERS TO THE EDITOR

Each month we select representative reader letters for our Mailbag column. We reserve the right to condense lengthy letters for space reasons and to edit to conform to style. All letters submitted must be signed and show a return mailing address or valid e-mail address. Upon request, we will withhold a sender's name if the letter is used in Mailbag. Address letters to: Chuck Gysi, N2DUP, Editor, *Popular Communications*, 76 N. Broadway, Hicksville, NY 11801-2909, or send e-mail via the Internet to POPCOMM@aol.com.

### What's That Freq?

I found your article about the Motorola Radius SP-10 in the February issue to be of interest. A local business uses these radios and in a recent visit I noted the use of UHF antennas. Thanks to my frequency counter, on a subsequent visit I found their frequency at 459.225 MHz, meaning it isn't limited to the GMRS band. Does this mean they can be programmed to frequencies not mentioned in your article?

Mike Jacks  
Barrie, Ontario

Mike, the trick lies in the fact that frequency allocations in Canada are different than here in the United States. Thus, the 459.225 MHz frequency basically is for low-power special events in Canada. The Motorola radios for Canada are programmed to accommodate the different allocations.—Editor

### Eye-catching Looks

Your new issue and format for the new year looks wonderful, so bright and eye-catching. I even like the new colors for the headers. It's a job beyond well done to all in the designing room, paste-up...oh well, to the whole staff. Keep up the excellent magazine.

Rich Ortloff, KE6DUG  
Hanford, Calif.  
(via the Internet)

### Long-Play Talk

W.W. Smith's craftsmanlike product review (April 1996) nevertheless missed what is for me the Viking 10-hour recorder's best benefit: taping radio talk shows I'd otherwise miss during the working day. Set a timer to turn on the radio. Then,

using the recorder's voice activation control, you're ready to tape Rush Limbaugh, Dr. Laura or other favorite talk shows.

Afterward, you can carry this portable recorder along for playback in the car, in the yard, or while doing chores around the house. Especially on weekends, it's a nice alternative to vapid rock music and tiresome TV.

R.T. Groce  
Mount Gretna, Pa.  
(via fax)

*It seems to me that the Viking recorder also might work for shortwave listeners who don't want to miss favorite programs. I am sure there are many applications for it.—Editor*

### Analog Situation

I enjoyed your editorial (May 1996) as I do the magazine. It would seem that the scanner companies don't want to jump the gun and produce digital/analog scanners, leaving the analog types to sit on the shelves. It's like the computer chip manufacturers upgrading their products little by little so they can maximize profits on existing stocks. Keep up the good work.

Bob Brull  
(via Microsoft Network)

### The Need to Search

I found your last article (Thoughtwaves, April 1996) interesting about being easy WRONG! With so much of peoples' time being taken up with working and family events, plus chores and other '90s things, no one has time to sit back and try and find some special frequency out of thousands of signals out there.

On shortwave, I just want to find that signal that someone with better equipment found, so I can hear if I am lucky enough on the West Coast. My equipment is cheaper nowadays because I sold all my good stuff to pay bills. Now it's a DX390, Superadio II, an old Uniden Grant, a Uniden Bearcat 800XLT and an exception—a Realistic Pro 2006. I have a computer, but can't afford all the good things to hook it up to my radios.

So with all this easy stuff, most of us are playing with only bits and pieces of it and not having the easy time as you are yet. So what I am saying is we have no time and no money—so we need all the help we can get!

Paul MacDonald  
Langley, British Columbia  
(via CompuServe)

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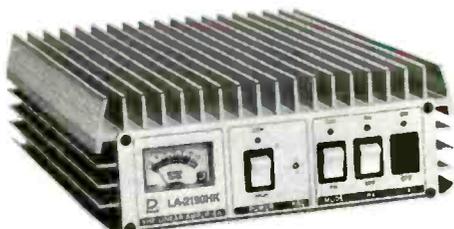


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Mode	FM CW, SSB		
Pre-Amp Gain	VHF 15dB, UHF 12dB		
Power requirement	13.8V DC, 15A (MAX)	13.8V 8A	13.8V 4A
Fuse	15A	10A	5A
Dimension, Weight	160W x 45H x 238D mm 1.5Kg	160W x 45H x 193D mm 1.2Kg	
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**190W**

• LA-2190HK



**90W**

• LA-2090HK



**30W**

• LA-2035R



**130W**

• LA-4130

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Frequency		144 ~ 148 MHz		430 ~ 450 MHz
Preamp gain		15dB		12dB
Input Power	5 ~ 1 - 6W, 14 - 10 - 45W	1 ~ 5 W		0.5 ~ 30 W (Max)
Output Power	24-5W IN ~ 180W OUT 14-30W IN ~ 180W OUT	3 W IN ~ 90 W OUT	3 W IN ~ 30 W OUT	15 W IN ~ 130 W OUT
Power Consumption	13.8V DC/26A Max.	13.8 V DC/12 A Max	13.8 V DC/5 A Max	13.8 VDC 28 A Max
Dimensions (mm)	192W x 71H x 250D	125W x 48H x 175D	100W x 35H x 140D	216 W x 110H x 280 D
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**40A  
MAX**



**PS-220**

**20A  
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	Rating * (2)	24 A 15 A		
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Dimensions (W x H x D mm)	216 x 110 x 280	172 x 150 x 240	135 x 87 x 200 (mm)	156 x 145 x 260
Net Weight	8.5 kg	8.9 kg	2.5 kg	7 kg
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# Olympic Proportions

## Atlanta Games Will Make Largest Use Of Radios Ever

BY CHUCK GYSI, N2DUP, EDITOR

The 1996 Olympic Games in Atlanta taking place from July 19 through August 4 will be the largest radio-frequency (RF) event ever held.

About 200 countries will be represented by 10,000 athletes at the Games and the Atlanta metropolitan area is expecting two million to five million visitors during the event. There will be extensive use of fiberoptics, land mobile two-way radios, cellular phones, pagers and various other RF devices for security, commercial, public and individual communications.

However, on the same note, much of the two-way communications during the Olympics will, for the first time, be carried on digital trunked systems. At past large-scale events, the Federal Communications Commission has temporarily allocated unused UHF TV spectrum for communications during events such as Olympic Games and political conventions. This time, there will be something new on the air.

Don't expect to be able to monitor much of the Olympic-related communications if you live in Georgia or you plan to bring a scanner. Digital communications cannot be monitored on a standard analog scanner. At best, static is all you will hear.

### Motorola System

Motorola Inc., a sponsor of the Centennial Olympic Games, has been active at various levels of Olympic sponsorship since 1972, and has been a primary catalyst in the development of wireless communications for the Olympic movement. The heart of Motorola's contribution to the 1996 Olympic Games is embodied in a state-of-the-art, digital two-way radio network. It will be the largest, most sophisticated two-way radio network ever employed at an athletic event.

The Olympic Games network is designed to meet the extensive communications needs of the tens of thousands of staff and volunteers who are responsible for security, event management, transportation and countless other concerns. The backbone two-way radio system will be supplemented with Motorola pagers, cellular phones, computer modems and secure two-way communications equipment for use during the 271 events.

Motorola was responsible for the design, installation and maintenance of the digital two-way radio communications net-

work. It includes sophisticated, two-way radio systems utilizing Motorola's ASTRO and iDEN digital technologies. Reportedly more than 10,000 portable and mobile radios; 6,000 pagers; 1,500 cellular phones; 1,500 computer modems; and secure two-way communications equipment will be supporting the Games—the largest peacetime event in the 20th century.

"The Centennial Olympic Games will require an unprecedented range of wireless technology," Merle L. Gilmore, president and general manager of Motorola's Land Mobile Products Sector and executive vice president of Motorola Inc., said in a prepared statement. "In 1972, we equipped a handful of coaches and staff with two-way radios. Today, we are meeting the needs of more than 70,000 people involved in organizing and staging the 1996 Olympic Games."

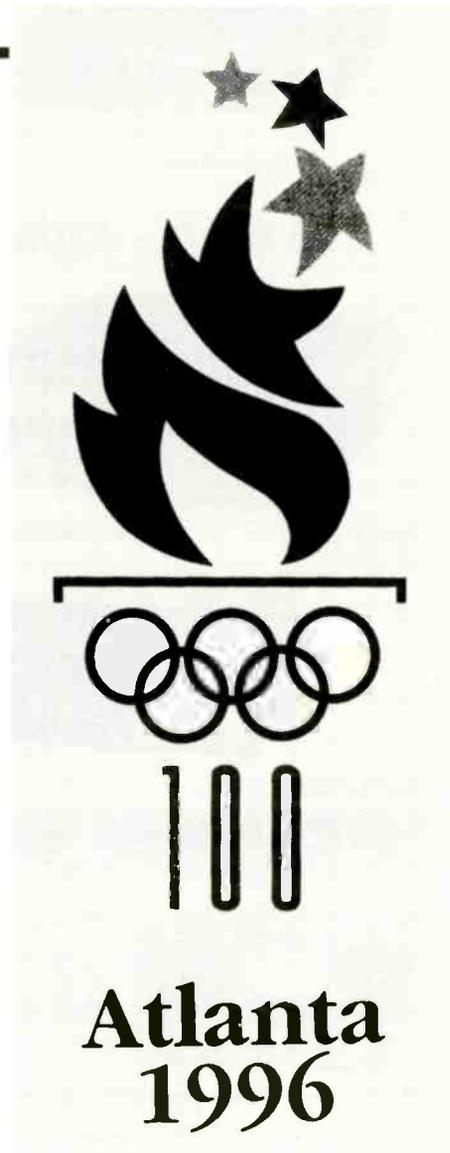
While clarifying the Atlanta Committee for the Olympic Games' communications needs, Motorola also determined that, in addition to being extremely efficient, the network also would have to interoperate with local public-safety agencies. Such interoperability capabilities will allow ACOG to interact with law-enforcement and emergency response forces at every venue of Olympic competition.

### How It Works

One of the biggest problems facing system planners was the lack of radio frequencies in the Atlanta metro area. Because there were only 92 frequencies available, the network had to be efficient enough to provide for heavy demand, especially within the Olympic Ring, a 3-mile radius area in the city where 65 percent of the 37 venues are located. The remaining events will occur throughout the state and across the Southeast. A network had to be designed to accommodate operations in both the metro area and the remote venues.

The essential systems operating in the network are Motorola SMARTNET II digital trunked simulcast systems. A six-site simulcast system will serve the extended metro Atlanta area. Another two-site simulcast system will operate throughout the Olympic Ring. A stand-alone system will be installed in the Olympic Village at the Georgia Institute of Technology to coordinate on-site logistics and operations.

The simulcast systems, although inde-



pendent, will be tied together through Motorola's SmartZone technology for full, wide-area connectivity. For example, a user in Stone Mountain Park, 16 miles away, will be able to speak with a user at the Olympic Stadium.

In more remote locations, stand-alone radio systems will serve the needs of each venue outside of the metro Atlanta area. Finally, two Motorola Advanced Systems Communications Trailers (MASCOT) will provide transportable trunked radio systems for maximum flexibility to handle communications at various locations prior to and during the Games. After the competition has started, the MASCOT systems will take up positions in Stone Mountain

## Radio Savers

Without communications technology, the Olympic Cauldron at the 1984 Olympic Games in Los Angeles might never have been lit.

"A television cameraman accidentally had dislodged the fuel line for the Cauldron at the top of the L.A. Coliseum," Chuck Jackson, Motorola's program manager for the 1984 Olympic Games, recalled. "This happened about an hour and a half before the Opening Ceremony. We paged a technician who was about a mile away at the time. He hurried over, repaired the line, and the Opening Ceremony went off without a hitch."

The example illustrates how communications technology often goes unnoticed. Because the technician could be reached via wireless communications, only a few people even knew of the need to call for a repair. If the repair hadn't been made, however, more than half the world's population would have known of one cameraman's mistake.

Motorola's communications equipment also has given athletes a competitive edge. At the XIV Olympic Winter Games in Sarajevo, U.S. downhill racer Steve Mahre had just completed his run down the twisting mountain course, which was growing icier and more hazardous after days of practice and competition.

Using a Motorola portable radio, he contacted his twin brother Phil at the top of the mountain, and "talked" him down the mountain, warning him about the spots to avoid.



Park and Conyers, Ga., to cover road running and mountain-biking events, which may require flexible mobile communications coverage.

For the intricate task of event management, each venue will be able to accommodate 13 to 20 different groups of individuals, or "talkgroups" as they are known as on trunked systems. With an anticipated 300 users per venue and heavy interaction amongst groups, the Olympic Games wireless communications network will have to effectively accommodate heavy traffic.

When the network was fully tested and shipped, ACOG and Motorola prepared the infrastructure installation sites. Overall, three wireless communications towers and six equipment shelters were constructed for the network, supporting network controllers, 250 repeaters and ancillary equipment such as antennas and transmission lines. The tower construction was completed in January. The remaining equipment storage sites and remaining infrastructure components were completed in February, with final testing of all sites in April.

### Other Devices

In addition to the cutting-edge digital two-way radio network and 10,000 mobile and portable radios, Motorola is incorporating other advanced communications technologies into the overall Centennial Olympic Games communications effort. The company also will supply alphanumeric pagers and cellular phones.

Included among these communications technologies is Motorola's Integrated Dispatch Enhanced Network (iDEN), which incorporates four communications services (voice dispatch, full-duplex telephone interconnect, text messaging and future data capabilities) into one network—operating on one device. For the Games, its wide-area capability was an ideal solution for meeting the needs of the Olympic family transportation system.

The cellular phones and pagers will be used throughout the Games, meeting the diverse communications needs of each event venue. These responsibilities will in-

### CENTENNIAL OLYMPIC GAMES WIRELESS COMMUNICATIONS NETWORK



clude security and transportation, as well as event-management needs such as medical support, event scoring and timing, judging, and food and beverage services.

## Rental Radios

Realizing the increase in wireless communications traffic during the Olympic Games, Motorola expanded its two-way radio rental communications network in Atlanta. Motorola will offer two-way radio coverage to coordinate transportation and logistics for other Olympic sponsors, the media, as well as Olympic Games contractors and suppliers.

A 900-MHz trunked radio system will offer excellent portable and mobile coverage in downtown Atlanta. In the more remote areas outside of metro Atlanta, 800-MHz trunked radio coverage will be available. Additionally, Motorola will offer its iDEN network, its wide-area capability an ideal solution for meeting the transportation needs of organizations.

## Paging

In addition, Motorola set up its ReFLEX 25 wireless messaging system at the Games through MobileComm's Wireless Press Room. Motorola's Tango pager was being considered for use by members of the press because it allows the user to send a response to messages received.

MobileComm, a subsidiary of BellSouth Mobility, will put an additional 20,000 pagers on line for Olympics use, including 2,500 loaned to the Olympic Committee.

Many of the 15,000 media representatives covering the Games will receive their messaging on the narrowband personal communications services (PCS) spectrum acquired by BellSouth to provide event results to laptop and handheld computers and devices. The PCS band covers a 50-kHz channel (930.450 to 930.500) paired with a 12.5-kHz return channel (901.775 MHz) for two-way messaging. Events data will be available in four languages

## Cellular Boost

Because of the shortage of radio frequencies for all the games activities, cellular phone use is being encouraged. And to accommodate an increase in the number of phones being brought into the Atlanta area, BellSouth Mobility Inc. invested more than \$77 million to install additional cell sites, as well as boosting paging, wireless messaging and mobile data services.

BellSouth said it expects 25,000 roaming customers on its cellular network each day during the Games, as well as an additional 15,000 rental cellular phones per day. To meet the increased use, BellSouth upgraded its call-carrying capacity in some areas up to 700 percent of current ability. It expects to provide an additional one mil-

## Olympians Get Pagers

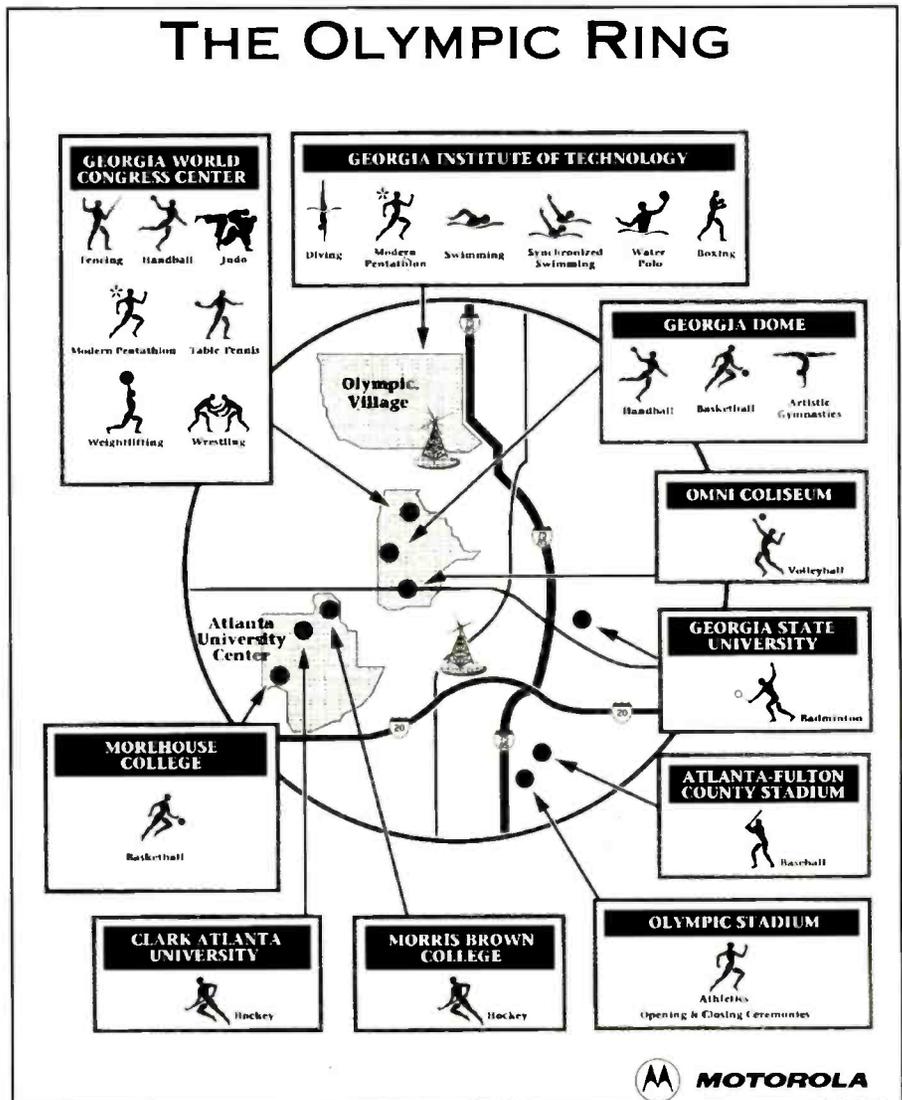
To help Team USA members stay in touch with the important people in their lives during the 1996 Centennial Olympic Games in Atlanta, Motorola created a special limited-edition top-of-the-line alphanumeric pager. Motorola will give every U.S. Olympic athlete an OlymPager, a palm-sized pager that will enable them to receive full-text messages—anytime, anywhere—from coaches, teammates, family and friends.

Motorola also has a limited number of these official OlymPagers for consumers. "From our long involvement with the U.S. Olympic Committee and the U.S. team, we know how stressful and unpredictable an athlete's schedule can be," Rob Pollack, director of marketing for Motorola's North American Paging Subscriber Division, said. "We developed this powerful text pager to meet the demanding communications requirements of the 1996 Olympic Games. For the first time, U.S. athletes always can be in touch, whether they're in the Olympic Village, watching fellow athletes compete, training for their own events or traveling between venues in Atlanta."

The OlymPager has a huge memory—30,000 total characters—and its 4-line, 80-character scrolling display will enable U.S. Olympians to receive detailed messages, while its user-friendly features will make it easy for athletes to access those messages.

The OlymPager's memory can hold the equivalent of 30 double-spaced pages of text. Its text and numeric message slots include storage for 19 personal messages, up to 510 personal and information service notebooks, and up to 15 information services. Individual messages can be approximately 300 words long. The pager's personal notebook is a special memory area for storing up to 255 important messages. Additional memory capability includes storage of up to 255 information service notebooks.

## THE OLYMPIC RING



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## Tune In Public Safety

In plenty of time for the Summer Games, the city of Atlanta late last year put online a new 800-MHz trunked radio system for police, fire and other city services.

The consolidated communications network is a six-site simulcast system with a single dispatch center and an enhanced 911 system.

The Atlanta Citywide Radio System (ACRS) houses three centers all within the command center inside City Hall East. Included is a communications dispatch center, a training center and an emergency operations center. A total of 60 consoles are available to process an average of 1,200 police and fire calls received daily.

The public safety trunked system has 12 channels under call sign WNZG246: 858.2375, 858.4375, 858.7625, 858.9375, 859.2375, 859.4375, 859.7625, 859.9375, 860.2375, 860.4375, 860.7625, 860.9375.

The city government services trunked system has 10 channels under call sign KNJU741: 856.4625, 856.4875, 857.4625, 857.4875, 858.4625, 858.4875, 859.4625, 859.4875, 860.4625, 860.4875.

Hartsfield International Airport uses a five-channel trunked system under call sign KSS642: 851.9625, 852.4625, 852.9625, 853.4625, 853.9875.

lion minutes of airtime per day during the event.

The expansion includes five new cell sites in Atlanta, as well as 105 new microcells. A total of 12 of those refrigerator-size microcells will be in use at the Olympic Stadium alone. In addition, 17 "Cells on Wheels" (COWs) will be available to service areas with temporary heavy call volume, such as the opening and closing ceremonies. A new TDMA digital cellular network also was built in Atlanta prior to the

Games, effectively tripling a single analog channel's capacity.

### Learning Curve

Now that the communications devices have been programmed, users are being taught how to operate them. During April and May, ACOG staffers who were designated communications technology "champions" were trained so they can in turn train the remaining network users. Motorola

## Olympic Radios

Here's a description of the radio equipment that Motorola is providing for use during the Atlanta Olympics:

**ASTRO SABER** portable radio: digital voice capability, prestored phone list dialing, programmable function keys, alphanumeric display.

**ASTRO Spectra** mobile radio: digital voice capability in a remote-mounted radio, prestored phone list dialing, programmable function keys, full keypad, alphanumeric display.

**MTS 2000** portable radio: lightweight, ergonomic design, top-mounted alphanumeric display.

**MicroTAC Elite** cellular phone: 3.9 ounces, vibration alert mode, integrated digital answering machine.

**Memo EXPRESS** pager: user can access and manage messaging information and data on a high-contrast display.

**Tango** pager: two-way alphanumeric pager, user can reply to messages by choosing from 120 preprogrammed responses or from customized responses embedded in the sender's message.

also designed training videos for each particular communications device to provide users with easy-to-follow directions on how their communications devices perform, and how it can enhance users' effectiveness.

To complement the training and the video, each device has an accompanying "help" card with tips for easy device operation. A radio distribution center is located at each venue for additional backup and support. Controlled by the venue's radio communications manager, the center has spare parts for immediate replacement and a spare battery for every radio issued.

To support network operations, Motorola also has about 100 service technicians on site working with ACOG staff throughout the 17 days of the competition to manage network operations. In addition, system managers will monitor network activity around the clock and additional personnel will be on hand to lend technical support.

### Security

One of largest operations during the Games will be security. Thousands of security officers will be provided by Borg-Warner Security Corp. and will be equipped with the Motorola equipment. More than 50 law enforcement agencies and organizations will share information and monitoring during the Games. In addition to highly trained police volunteers from around the world who are part of the Olympic Security Support Group, more than 10,000 military personnel will provide anti-terrorist experts under a U.S. military Olympic Joint Task Force. ■

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# Rally To The Arctic Circle

## CB, Ham And Business Radios Used By Winning Team

*It may be the heat of summer now, however, here's a tale of radio communications used during a rally to the Arctic Circle this past winter. Stay cool and read how the teams rallied from Seattle through Canada and Alaska while keeping in touch with a variety of radio equipment.—Editor*

— • —

A bevy of radio equipment was used this past winter by Isuzu's professional rally team as it continued its dominance by winning the 1996 Alcan Winter Rally to the Arctic Circle.

The team, co-sponsored by Radio-Shack, consisted of Johnny Unser and Paul Dallenbach, with Tom Grimshaw serving as navigator, and is the same team that drove a Rodeo to victory in 1994—the first time a sport-utility vehicle ever had won the Alcan Winter Rally outright.

In second place overall was a second Rodeo, driven by producer-director John Corser and amateur rallyists Greg Bartlett and Revere Jones.

The Alcan Winter Rally is a 4,481-mile race from Seattle, Wash., to the Arctic Circle and south to Anchorage, Alaska.

### Leg 1: Seattle to Quesnel

Fifteen competitors left Seattle on Feb. 23 and crossed the border into Canada on the first leg of the 4,481-mile adventure.

"As we rolled through the start line, our confidence was high and we headed to the first TSD (time-speed-distance checkpoint)

about 90 miles north of Seattle," Dallenbach recounted. "Johnny did the driving, a twisty icy road about 21 miles long."

"It was challenging driving, but not impossible to stay on time," Unser said.

"Johnny did a great job," Grimshaw remembered. "We thought we were in good shape, maybe only taking one or two penalty points. ...Our hearts dropped and a chill ran down our spines in the next 300 miles. We were in big trouble."

As the team checked their mileage with the route book, the guys found that every reading was off. They immediately knew they had a rally computer problem. Over those 300 miles, they continually checked their mileage with Car 8, an identically equipped Rodeo.

"When we recognized that the error was intermittent and we were unable to get any consistent readings, we diagnosed the problem as the sensor," Grimshaw said. "We stopped at the nearest pullout and replaced it."

"The next TSD started at 7 p.m.," Dallenbach said, "and I was driving. Thinking the problem was solved, I was pumped and was determined not to take any points. Everything seemed fine for the first couple miles. We came up on a 'local' in a beat-up pickup. I passed him. He stayed right on my tail as I passed the first checkpoint. A zero was on my display showing me that I was perfect."

"As we passed that checkpoint, I knew the problem wasn't fixed," Grimshaw said, "because the mileage didn't match the

route book. I flipped switches on the computer to reset to the correct time."

"I was sitting proud of myself until I heard Tom yelling... 'We're down, go, go!'" Dallenbach remembered with a smile. "I stomped on the gas. That 190 hp kicked in. I slid through corners and switchbacks. The pickup tried to keep up but never made it past the first turn."

"Paul made it back to zero on the display but we were only guessing at this point," Unser remembered. "We all knew there was something seriously wrong with the computer."

After the first day, the Isuzu team took 54 points, 15 points more than in the entire 1994 Alcan Winter Rally. This put Team Isuzu in sixth place. The next morning at the snow-covered dirt track in Quesnel, British Columbia, the Isuzu Team added 10 points to the competitors in their class by being the fastest around the track, but it didn't change the standings.

### Leg 2: Quesnel to Dawson Creek

Over the next 500 miles, the Isuzu team tried everything.

"We were on the radios constantly," Unser remembered. "We were checking mileage, discussing strategies and possibilities, trying to figure out the problems."

"We had three types of radios," Corser said, "and we couldn't have won without the use of each. Of course we had the FMs (VHF business walkie-talkies) that the rally



Team members participate in the rally using CB, ham and business radios for two-way communications and scanners and multiband radios for monitoring.



A VHF radio is used to communicate with team members during the Alcan Winter Rally to the Arctic Circle.

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The scenic northern backdrop is imposing along the rally trail.

used so we could monitor the status of the other vehicles. We had the CBs and a code so we could discuss our problems without the rest of the competitors knowing what we were up to, and when we got more than 100 miles behind, we used ham radio to contact the rally organizer so that they didn't prematurely close a checkpoint because they thought we crashed."

"It wasn't until that night at dinner we discovered the problem," Grimshaw grimaced. "At a Petro-Canada service station, we again tested all the wiring and sensors. Of course, they were fine.

"It was Rev who noticed it. The only difference between Car 8 and ours was that the computer in ours was mounted to an aluminum plate for stability. It turns out, that in the dry northern air, the aluminum was generating a static electric charge and sending intermittent pulses to the computer, which then would give a false and uncorrectable timing. We removed the plate."

### Leg 3, 4 and 5: Dawson Creek to Fairbanks

Problem solved, the team steadily moved up the ranks, into third place. Car 8 was second to the Chevy Tahoe, driven by past-Alcan winner Tim Patterson.

"We drove hard for the next 3,500 miles passing everybody at will," Unser said. "We wanted to make a clear statement that we were not out of it."

"We figured we'd try to get racy with the Tahoe," Dallenbach grinned, adding, "maybe we could encourage an error."

"You could see it in their eyes," Grim-

shaw chuckled. "They were pushing everybody. They would stay close enough to get the competitive spirit riled. These guys can really drive. The weather was seasonally warm and the snow and ice was melting in places. The roads became very slick."

"As the sun set and the roads refroze the driving really got treacherous," Unser recalled. "We counted at least seven cars off the road by the time we arrived at the hotel in Fairbanks."

### Leg 6: Fairbanks to Prudhoe Bay

The Isuzu rally team awoke to the news of a crash by the first-place Tahoe.

"I'm glad everybody was OK," Dallenbach said, "but I also was happy they crashed."

Grimshaw reported: "The Tahoe rolled outside of Tok, Alaska, and landed upside down, no windshield or side windows and a bent front suspension. Needless to say, they missed the checkpoint in Fairbanks and took 200 penalty points."

"I couldn't believe it, that put us in second to Car 8," Unser said, shaking his head. "It's not over till it's over."

The Isuzu rally team now sat second. The steady course to No. 1 was nearly complete. The morning's travel up to Prudhoe was the worst driving conditions since the rally began.

"We got a call over the radio telling us to turn back," Dallenbach recalled. "The rally organizer had left the night before and got stranded on the road for the entire night; even the big trucks were stranded."

Unser grinned: "That was the challenge."

## Rally Radios

The following RadioShack radio equipment was used by the Isuzu team during the 1996 Alcan Winter Rally to the Arctic Circle:

- Two TRC-484 40-channel mobile CB transceivers with magnetic-mount antennas.
- Two two-channel, 2-watt business band walkie-talkies with extra batteries, chargers, magnetic-mount antennas and speaker-microphones.
- Two digital AM/FM/shortwave radios.
- One 200-channel, 800-MHz scanner with extra batteries.
- One HTX-212 2-meter amateur mobile transceiver with magnetic-mount antenna.

## How It's Scored

During the Alcan Winter Rally, vehicles are scored based on three types of events:

- Time-speed-distance, in which vehicles' times are checked up to six times within each section at unknown points, requiring that vehicles maintain consistent speeds.
- Solo II, closed raceways built on frozen lakes and rivers, the fastest time wins.
- Transit, in which vehicles must finish a section of public roads in a specified amount of time.

In each event, each vehicle may be charged penalty points depending on how far its time deviated from the specified time. The vehicle with the lowest penalty point total at the rally's conclusion on March 2 in Anchorage was the winner.

We pressed on. We met an 18-wheeler that slid off the road and we were stopped for about 40 minutes. In that time, the other cars had caught up. Many wanted to turn back based on the reports from the rally organizer, but we were not to be deterred.

"It was funny," Dallenbach laughed. "All these scared voices: 'What if we don't make it?' 'What if we get stuck or stranded?' 'Let's go back!' But this is why we're driving a Rodeo."

Grimshaw interrupted: "Even truckers who travel this road every day were stopped, waiting for the plows to dig them out. As we continued north, we were get-

ting calls on our CB from the truckers asking us if the road was passable. The two Rodeos led the way for the rally and the truckers, all the way to the Arctic Circle."

"We went farther north than any other vehicle," Dallenbach beamed. "Even the rally organizer couldn't get through."

### Leg 6 and 7: Fairbanks to Anchorage

In the next TSD, Car 8 flipped a wrong switch on the computer and confused their timings. It cost them enough points to put them into third, behind Car 4, the Oldsmo-

bile Bravada. But this also meant the Isuzu Rally Team of Unser, Dallenbach and Grimshaw were sitting in first. Their plan had paid off.

"We took two points and headed for the winners circle," Dallenbach said.

"The drama turned to second and third," Grimshaw noted. "The other Rodeo team did a fantastic job the whole time and proved themselves in the last TSD. They took very few points and moved to second to make it an exceptional win for Isuzu."

Unser smiled and patted his teammates' backs: "You couldn't ask for anything better, first and second overall." ■

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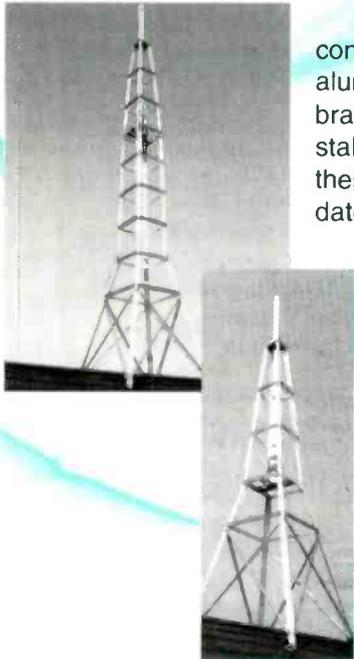
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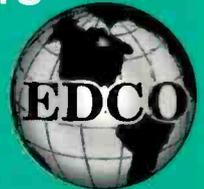


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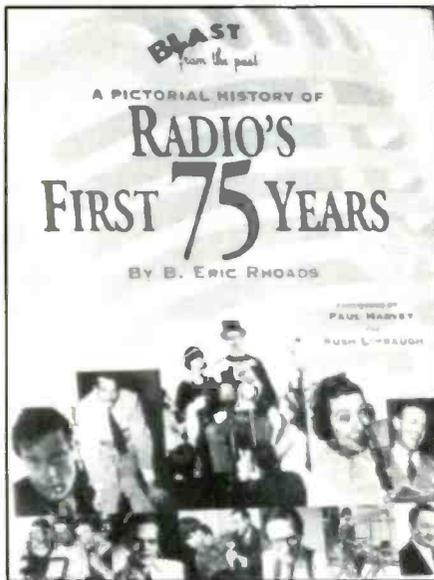
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# Books You'll Like

BY R.L. SLATTERY



## A Worthy Salute

Radio broadcasting arguably is said to have started on Nov. 2, 1920, when KDKA got the ball rolling. As they say, the rest is history. And what a history it has been. *POP'COMM's* monthly coverage of radio's heritage reported by Alice Brannigan always has attracted a large and enthusiastic following.

Now we have gotten our paws on a book that radio history fans will certainly like. This is *A Blast From The Past: A Pictorial History of Radio's First 75 Years*, by B. Eric Rhoads. Spearheading the 75th anniversary of radio this year, archivist and radio history buff Rhoads has assembled a 463-page hardcover book containing a collection of more than 900 captioned photos chronicling radio's impact on American history. Many of the photos have never before been published.

Rhoads' coffee-table book explores the metamorphosis of radio from that first KDKA broadcast up to today's talk shows, and Howard Stern. That takes in a lot.

This is more than photos alone. There also is accompanying text, and it's fascinating. Rhoads interviewed many of the air personalities who made radio what it was, and what it is today.

The photos are varied. Though the majority are on-air performers and personalities, there are many shots of control rooms, studios, mobile units, transmitting facilities and antenna towers.

Rhoads' book takes his readers on a guided pictorial journey from the first broadcast through the Golden Era of the 1930s and 1940s. He touches upon the

networks, FM, introduction of the first DJs, payola problems, the underground movement, and right through to the present.

What a cast of characters you'll come across! Wolfman Jack, Joe "Wanna Buy A Duck?" Penner, Ben Bernie, Ed Wynn, Tom Snyder, "Hop Harrigan," Ish Kabibble, Edward R. Murrow, Fred Allen, Dr. Ruth, "Henry Aldrich," Chris Dahl, Baby Snooks, Garrison Keillor, Bob Costas, Minnie Pearl, Lowell Thomas, Rush, Baron Munchausen, Murray the K, Eddie "Rochester" Anderson, Shadoe Stevens, Cousin Brucie, Fibber McGee and Molly, plus hundreds more of the famous and nearly famous. It looks like Rhoads covered just about every broadcaster worthy of historic note except for the Voice of the Purple Pumpkin.

Many dozens of stations show up in the large index. They include, for instance (to list only a few): 6ADZ, 8MK, 8XK, 4XD, 9XM, 9YI, CFJM, KABC, KCBS, KFVB, KHJ, KGO, KMOX, KOA, KQW, KSL, KTBS, KWK, KYW, XERB, WABC, WBBM, WBT, WBZ, WCAU, WCBS, WCFL, WCKY, WFAF, WFAA, WGAR, WGN, WGY, WHO, WIOD, WJZ, "WKRP," WLS, WOC, WOW, WOWO, WSB, WSM, WWJ, WXYZ, etc. Wish he would have included the station I listen to all day: WWV. Rhoads does pay due homage to pioneers the likes of Stubblefield, Tesla, DeForest, Crosley, Armstrong, Conrad, Marconi, Sarnoff, Fessenden and many others.

Everyone interested in the history of radio broadcasting will find *Blast From The Past...* to be informative, interesting, well-done and a treat. This was obviously compiled using a collection of material Rhoads painstakingly gathered over many years. Rhoads' love of radio's history exudes from every page. Kindred souls who share the author's special feelings for his topic will quickly pick up on this.

Eric Rhoads started out at age 14 as a DJ on a radio station. Now, at 41, he has been in radio ever since. Besides a 10-year career as a popular DJ in Miami, he has been a program director, a programming consultant, a station general manager and the owner of several stations. He developed the Giant Boom Box, the now-famous mobile home-size radios that house remote radio broadcast mobile units. Today, he publishes *Radio Ink*, a leading radio trade magazine.

The hardcover book is available in a special individually numbered copy limited edition, personally signed by the author for \$75 postpaid. The regular hardcover edi-

tion is \$39.95, plus \$5 shipping and handling. Order from Streamline Press, 224 Datura St., Suite 718, West Palm Beach, FL 33401. Phone orders: (800) 226-7857.

## Double Your CB Enjoyment

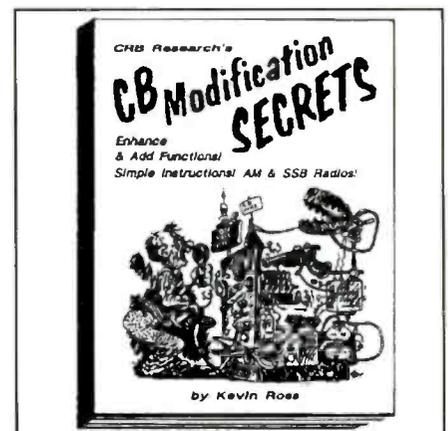
Most CB radios seem to come from the factory with features that could be improved, or missing features that would be worth having. That problem was addressed by Kevin Ross in his best seller, *The CB Radio Hacker's Guide*, which shows CB-ers how make their radios do so much more than ever they were originally intended.

Now Kevin Ross has a new book showing even more ways to expand, enhance and add to the usefulness of current and recent AM and SSB 27-MHz equipment. Ross' new entry, running more than 200 pages, is titled *CB Modification Secrets*. It contains ideas, tricks, mods and enhancements not included in his first book.

Enhancements in this book include things such as frequency expansion, SSB clarifier and voice-lock mods, adding voice control (VOX), a variable frequency control (VFO), an anti-theft transmitter disabler, IF gain control, red RF meter light, bright/dim switch, adjustable tone control, emergency beacon signal, mic gain control, a switch to change "Instant Channel 9" to "Instant Channel 19," add "Roger Beep," a receive preamplifier, channel display automatic dimmer and shut-off, and much more.

Some mods are designated for specific radios. Most are virtually generic and (to the extent of the modifiability of individual models) are applicable to more than 200 current and recent CB radios from Cobra, Courier, GE, Midland, RadioShack, SBE, Uniden/President and Wards.

Ross provides simple step-by-step in-



structions, including large clear pictorials. Indeed, this is a handbook geared to the average hobbyist using readily available tools and equipment. Tech tips and Ross' straightforward approach make everything as easy as possible. As the author says, you don't need to be a rocket scientist to get these mods off the ground.

To make doubly certain there are no glitches, the author devotes a chapter to reviewing modification basics, rules, terminology and troubleshooting.

*CB Modification Secrets* looked pretty good to us. We have the old soldering gun warming up right now; you will, too, as soon as you toss an eyeball onto these bodacious upgrades and enhancements.

*CB Modification Secrets* is available from many communications dealers and mail order suppliers. It also may be purchased by mail for \$21.95, plus \$5 shipping (\$6 to Canada) from CRB Research Books Inc., P.O. Box 56, Commack, NY 11725-0056. New York state residents, add \$2.22 tax. VISA/MasterCard accepted. Toll-free order phone: (800) 656-0056. Canada/Alaska/Hawaii orders: (516) 543-9169.

## Scanning America

The Third Edition of Richard Barnett's *Monitor America* scanner guide has arrived. At more than 1,100 pages, this edition is quite a chubby fella. That's good because the single volume covers a lot of territory.

There is something to offer every U.S. scanner user in this book, because it is truly national in scope. On its most basic level, it presents the state-level public safety networks for each state, then virtually all county and local public safety systems and networks in the United States, plus additional information.

There is highly detailed coverage of those local agencies in hundreds of metro

and suburban areas, as well as areas that attract tourists and vacationers.

State sections include state patrols, prisons, emergency management, forestry, fish and game, parks and recreation, colleges and universities, ski areas, highway maintenance and more. There are maps, unit designators, etc., for some agencies.

Metro sections include law enforcement, fire, EMS, local government, highway repair, some unit designators and codes, PL tones, plus miscellaneous such as amusement parks, casinos, transit systems, stadiums, news media, hotels, etc.

There are also AM/FM broadcast station listings for the entire United States,

showing frequencies, call letters and program formats.

Regardless of where you monitor, *Monitor America* will have information that will advise you where to scan for the action. This chunk of information is cleverly prepared in a handy 5.5-inch-by-8.5-inch size that should make a perfect fit in a car's glove compartment. This we liked!

*Monitor America, Third Edition* is available from many communications dealers and mail order suppliers. It also may be ordered at \$29.95 from Scanner Master Publications, P.O. Box 428, Newton Highlands, MA 02161. Order phone: (800) 722-6701.

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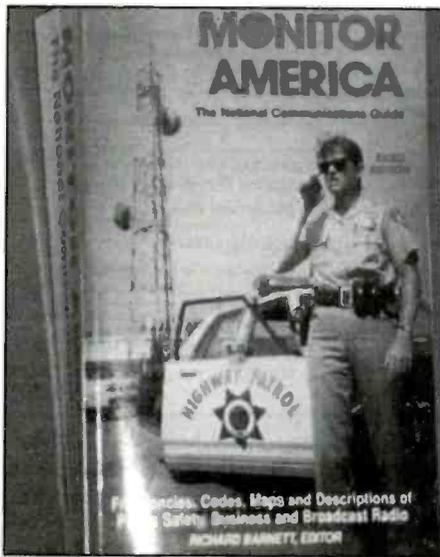
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# A Visit to Radio's Past

## Return to Those Thrilling Days of Yesteryear

BY ALICE BRANNIGAN

Located in the San Francisco Bay Area, KGO is a wonderful and colorful pioneer broadcaster. This month marks the 73rd anniversary of the start of KGO's construction. Many very early stations began as small hobby operations in attics, schools and garages. Hastily prepared home-brewed equipment could be haywired together to put out a low-power signal around a small community. But such was not the case with KGO. Right from the beginning, KGO was a heavy hitter that could be heard coast to coast.

KGO was the second in a link of three sophisticated stations planned by General Electric Co. The first was WGY in Schenectady, N.Y., and the third later would be Denver's KOA. GE proudly announced that KGO would be the first time that an entire building would be constructed to house a major station to be used exclusively for popular broadcasting.

This plant was a two-story, 32-foot-by-71-foot brick studio building and adjacent power house located at 5555 E. 14th St., Oakland, Calif. The transmitter building stood 1,000 feet away, flanked by two 150-foot steel towers spaced 250 feet apart. The antenna was a multiple-tuned type strung between the towers. Beneath the antenna, at a point 14 feet above ground, was a wire counterpoise covering an area of 150 feet by 300 feet.

A 1-kW transmitter had been installed. KGO's inaugural broadcast was Jan. 8,

1924, the day after its call letters were issued for use on 960 kHz. KGO called itself "The Sunset Station" and the "Pacific Coast Station." In June, the station opened a studio in San Francisco's St. Francis Hotel, linked by landline to the transmitter 10 miles away. The station received reception reports from all areas of the United States and Canada.

Broadcasting was going through its birth pains, which resulted in KGO being inconvenienced by shifting frequencies several times. On the plus side, KGO was successful, and soon was given permission to increase its power.

In late 1924, KGO was shifted to 1000 kHz. By the spring of 1926 the station was assigned to 830 kHz, but allowed to increase to 2 kW. A year after that, it went to 3.5 kW, then a few months later to 4 kW. In early 1927 it was approved for 5 kW, then later in the year told to move to 780 kHz. By then, KGO had an excellent regional signal.

On Nov. 11, 1928, major frequency reallocations imposed by a Federal Radio Commission (FRC) plan affected dial positions of most U.S. broadcasters. By FRC mandate, GE's two stations—KGO and WGY—had to shift to 790 kHz. KGO was permitted to increase its power to 7.5 kW.

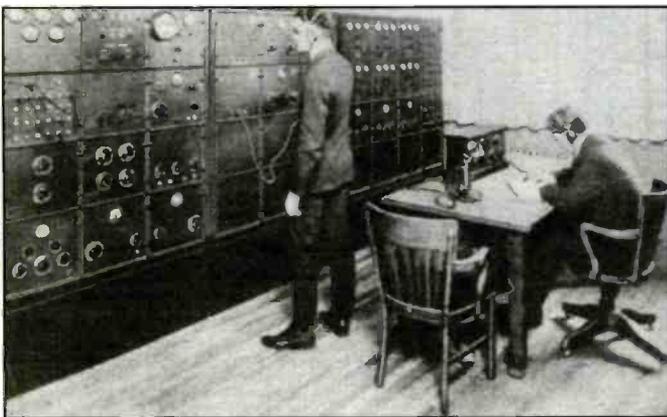
In 1929, KGO moved its studios from the original Oakland building to the new Hunter-Dulin Bldg., 111 Sutter St., San Francisco. The old studio building was

turned over to the GE plant. That year also saw GE lease KGO to NBC to be the San Francisco Bay Area outlet for NBC's Blue Network programs, as a companion to NBC's station, KPO, which carried their Red Network programs. Though GE remained KGO's licensee, NBC assumed responsibility for KGO's sales, programming and day-to-day operations.

Beginning in 1930, KGO had a short-wave relay using the experimental call letters W6XN. This station was authorized to use up to 10 kW on 6425, 8650, 12850, 17300, 25680 and 27325 kHz, as well as 34.24 and 36.585 MHz. W6XN was located at the KGO transmitter site. At the eve of World War II, W6XN was split from KGO to become GE's international broadcast station KGEI, Belmont, Calif. KGEI started out using only 9670 kHz, but by 1946 it had become known worldwide by means of its 50-kW signals on eight frequencies, 6190, 7250, 9530, 11730, 11790, 15130, 15330 and 17880 kHz.

In November 1940, ground was broken for a new \$1 million studio to house NBC's KGO and KPO at the corner of Taylor Street and O'Farrell. In March 1941, KGO was shifted to 810 kHz.

NBC's lease to operate KGO expired in January 1942, at which point NBC purchased the station from GE. NBC transferred KGO to its Blue Network soon after as a prelude to selling that network to outside interests to comply with imminent



The KGO control room, as it was when the station commenced operations in 1924.

**General Electric Company**

1000 Watts      Frequency  
5555 East 14th Street      960 Kilocycles  
OAKLAND, CALIFORNIA      [312 Meters]

Dear Broadcast Listener:

Thank you for your recent communication reporting the reception of programs from KGO, the Pacific Coast Broadcasting Station.

Your report is appreciated very much and we are always glad to receive your comments and suggestions.

**STATION KGO**

**PRESENT SCHEDULE:**

1:30 P. M.—Daily, except Saturday and Sunday (Saturday, 11:30 P. M.), stock market and weather reports.

2:00 P. M.—Monday, Wednesday and Friday, short musical program and speakers.

5:15 P. M.—Daily, except Saturday and Sunday, stock market, agricultural market news, weather reports and news items.

8:00 P. M.—Tuesday, Thursday and Saturday, regular program.

9:00 P. M. to 9:15 P. M.—Tuesday, Thursday and Saturday, regular program.

10:00 P. M. to 1:00 A. M.—Tuesday and Saturday, dance music from the ballroom of the St. Francis Hotel, San Francisco.

**PLEASE SEE NEWSPAPERS FOR OUR PROGRAMS**

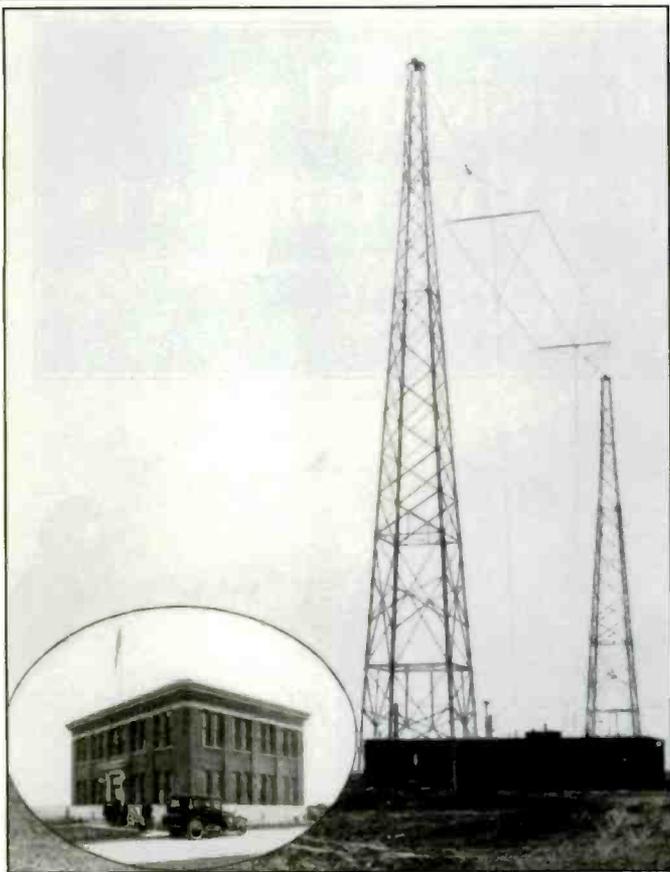
This early QSL card from KGO is dated March 11, 1924, just two months after the 1-kW station began. It was sent to a listener 3,000 miles away in New York City. (Courtesy Paul Hofer Jr.)

Even then, people asked if we  
had the whosy whatsit that connects  
to the watchamacallit.



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We've got answers.<sup>®</sup>



The original Oakland operating site of KGO, showing the towers, transmitter building and (in inset) the studio. (National Archives photo via Broadcast Pro-File)



KGO's transmitting plant, as it looked in 1979. (Photo by Jan Lowry of Broadcast Pro-File.)

FCC duopoly restrictions. KGO then moved from Sutter Street to NBC's "Radio City" at 420 Taylor St.

In October 1943, KGO (and the entire Blue Network, of which it was a part) was sold to the Blue Network Co. As a result of this sale, the following year, KGO's studios were moved to 155 Montgomery St., San Francisco. Until the early 1950s, KGO's transmitter and twin towers remained at the original site in Oakland.

The Blue Network Co. changed its name to American Broadcasting Co. Inc. in December 1944, and KGO became an affiliate of the new ABC network. In December 1947, KGO began operation with 50 kW from a new site on the east side of the Dumbarton Bridge near Newark, Calif. The new facility used three 304-foot self-supported directional towers providing a single pattern for day-night operation.

Seeking a location for new studios, KGO spent \$1 million in 1951 to purchase the five story Eagle Building, 277 Golden Gate Ave. That year, ABC Inc. merged with United Paramount Theaters Inc. By 1954, the station's FM and TV affiliates shared the building.

In 1965, KGO adopted its news-talk-information format, and the licensee name was modified to ABC Inc. A quarter-mil-

lion-dollar program was instituted to remodel a two-story building adjacent to the Eagle Building, and KGO's studios were located there as of 1966.

By 1984, the quarters at Golden Gate Avenue were thought to have become outdated, so KGO was moved into the new 200,000-square-foot ABC Broadcast Center, 900 Front St., San Francisco. The TV station also moved there. In 1985, ABC merged with Capital Cities.

In October 1989, the area was struck by a devastating earthquake. Two of the three KGO towers were damaged, despite the fact that they were anchored in bedrock. They were buckled and out of plumb. Nevertheless, an hour after the quake, KGO managed to get back on the air non-directionally with 10 kW. Five days after the quake, KGO's daytime power was increased to 22 kW. The following June, construction was completed on the new three-tower array at the Newark site, and 50-kW operation resumed.

These days, KGO calls itself "NewsTalk Radio 81," and it's California's 13th oldest continuously licensed AM broadcast station. It's on 810 kHz with 50 kW, operating around the clock.

Many thanks to Broadcast Pro-File for providing the information about KGO,

which allowed us to extract from their lengthy station profile report. Broadcast Pro-File is a commercial service that can prepare a detailed history of any past or present U.S. AM/FM/TV broadcaster. The company charges a reasonable fee for their service. A catalog is available for \$1 from Broadcast Pro-File, P.O. Box 982, Hollywood, CA 90078-0982.

### Frequency Shuffle

As mentioned, on Nov. 11, 1928, most U.S. stations were required to shift to new frequencies using certain power levels. Also, some stations were told they could operate only during specified limited hours. This was an FRC plan to reduce heterodyne interference and bring order to service that had become a chaotic patchwork. Their intention was to help regional and local stations achieve improved coverage by removing high-power stations from their frequencies.

One problem was that broadcasters reviled the FRC plan. In addition, listeners were baffled by here-today-gone-tomorrow stations that changed dial positions.

When the 1928 changes were about to begin, the FRC expected things to take a few months to become effective. They realized that stations needed time to change

NATIONAL BROADCASTING COMPANY, INC.

1111 SUTTER STREET



SAN FRANCISCO

November 19, 1930

PACIFIC DIVISION

Mr. Jos. Hueter  
1510 N. 18th Street  
Philadelphia, Pa.

Dear Mr. Hueter:

In reply to your letter of recent date, we are happy to verify your reception of Station KGO, on November 10th, PST. The program heard was the Hotel St. Francis Dance Orchestra playing from the St. Francis Hotel, the program being broadcast from Station KGO.

We are returning the ten cents enclosed in your letter as we have no station stamps for distribution, and there is no charge for verifications of reception.

Cordially,

NATIONAL BROADCASTING COMPANY INC.

By *[Signature]*  
Audience Mail Division

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Owned by  
GENERAL ELECTRIC COMPANY

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50,000 watts

**KGO**  
379.5 Mtrs.—790 Kc.  
7,500 watts

SCHEDULE

6:00 A. M. to 12:00 Midnight.....SUNDAY.....6:00 A. M. to 12:00 Midnight  
7:30 A. M. to 12:00 Midnight.....WEEK DAYS.....7:00 A. M. to 12:00 Midnight

YOUR RECEPTION OF... **KGO** ...ON... **December 20, 1934** ... HAS BEEN  
VERIFIED.

Very truly yours,  
NATIONAL BROADCASTING COMPANY INC.

▲ By 1935, NBC was verifying with a novel dual card covering both of its Bay Area stations, KPO and KGO. (Courtesy George Saunders, Modesto, Calif.)

◀ A generous 1930 veri from KGO returned the listener's dime, advising that they didn't charge DXers. (From the Joe Hueter collection in the POP'COMM archives)

equipment, and that after the plan was fully operational it might require minor corrections. They didn't expect open rebellion and mass confusion.

We mentioned that in 1928 GE's WGY in Schenectady was moved to 790 kHz, along with the company's KGO. WGY was also told it could no longer operate at night because it would cause interference to KGO. WGY had operated full time since it began in February 1922, at the dawn of broadcasting.

GE responded by hiring high-power attorney Frank J. Hogan to fight the FRC's actions. In the late 1920s, he was as well-known as F. Lee Bailey is today. By Nov. 9, Hogan had obtained a restraining order against the FRC's decision to limit WGY's night operations.

Hogan eloquently argued the FRC's order amounted to federal confiscation of private property. He questioned the FRC's right to mandate power and frequency reallocation. He pointed out that millions of listeners in New York, New Hampshire, Vermont and Massachusetts depended on WGY's night programming.

In rebuttal, the FRC's attorney said that, "Allowing both stations to broadcast simultaneously would blanket the Midwest with heterodyne whistles and create a precedent which could cause chaos to the broadcasting band."

On Nov. 11, the District of Columbia Court of Appeals granted temporary permission for WGY to continue full-time operation on 790 kHz, pending a hearing on the station's merits.

Meanwhile, encouraged by the WGY decision, other stations began feeling their oats. For instance, New York City's WMCA announced it was ignoring the

FRC's mandate. WMCA said it would send out its "full program, breaking into the programs of the stations with which it was to divide its broadcasting time," pending a hearing they demanded before the FRC.

WMCA contended it wanted to continue to operate full time, "uninterrupted" rather than be cut back to one-eighth of the time on the frequency.

In Chicago, 19 of the city's 23 stations had been ordered to move to new frequencies, and/or use different power as of Nov. 11. Listeners who attempted to tune in WJJD ended up hearing WCFL. People who wanted to hear other locals, got DX stations in Texas and elsewhere. Stations forced to new channels reported that they were inundated with telephone calls and telegrams from annoyed radio owners wanting to know why their favorite stations had stopped "coming in."

It was all part of the wonderful and rich high drama of early broadcasting. Some of this information was provided by historian John Faulkner, Reno, Nev. Thanks, John!

**This Call Is For You**

In the February issue we discussed "mis-placed" call letter prefixes—some early broadcasters in the West were assigned "W" calls, while only a few "K" calls were issued in the East. A couple of interesting reader comments came in relating to this.

Jerry Starr of The Radio Center in Youngstown, Ohio (stations WHOT, WBBG, WBBW and WRTK) wrote that he believes, in total, there have been five "K" call letters issued in the east. We listed KDKA, KQV and KYW, but didn't pick up on the other two. Jerry is correct, those two got past us.

He mentions KSGM in Chester, Ill. Also, most interesting of all, KTGG, Spring Arbor, Mich. Jerry notes this AM station on 1540 kHz was assigned a "K" call through an FCC clerical error back in 1985 when the license was first issued. Even though it was an error, the FCC has let the assignment stand.

Based on Jerry's letter, we checked out KSGM and found the oddball call was not an FCC error. That's how we learned that when KSGM was originally licensed in 1947, it was located in Ste. Genevieve, Mo., on the western shore of the Mississippi River. The station received a "K" prefix. The letters "SGM" denoted the initials of the community's name. When KSGM later relocated 17 miles southeast to Chester, Ill., on the eastern shore of the dividing-line river, the FCC allowed the original call letters to remain, even though they had a western prefix.

When it came to "W" calls issued to stations in the west, John Faulkner passed along a good one.

John told us how newspapers were very leery of radio throughout the 1920s. That was because newspapers were in the business of selling news, information and advertising space. Editors perceived radio stations as competition for advertising dollars, yet giving the public news and information absolutely free!

In small towns, newspapers editors were canny characters. They resented people who tried to get free ads in their papers much the same way as doctors don't like being asked for free medical advice during social situations. Newspapers in New York, Los Angeles, Chicago, San Francisco, Dallas, New Orleans, Salt Lake City and other major cities always mentioned local

radio. But small-town papers tended to be wary of printing the schedules of local stations because they saw no reason to provide free advertising for their competition.

In the 1920s, Reno was a small town. When its first commercial radio station, KOH, began testing in October 1928, radio still was a national sensation. Even so, the *Reno Evening Gazette* gave the new station only the briefest possible mention. Worse than that, they didn't provide its wavelength, and incorrectly reported the call letters as "WOH." This error was cer-

tain to confuse all but the most ardent DX buffs because of the call's similarity to popular station WHO in Des Moines, Iowa, which could be easily heard in Reno.

A few days later, the paper printed a notice of a religious program. They probably had to run it because the information had been submitted by the local pastor. At least the call letters were printed correctly.

In the early era of KOH, the Reno paper's radio listings continued to ignore the station, providing frequency and schedule information daily only for KOA in Den-

Blue network

## STATION WOH OF RENO HEARD

Nevada's newest and only radio station, WOH, was on the air for the first time this morning and local radio fans who happened to be at the dials of their sets received an early-morning surprise. It had previously been planned to make an experimental test of the station at midnight last night but the plant did not get going until four o'clock this morning. It continued from four o'clock until eight o'clock.

The station officially opens November 11.

*Station "WOH," of Reno, Nev., never existed! Was this confusing 1928 error the Reno Evening Gazette's subtle way of dealing with its perceived competition as local station KOH was about to open? The paper carried only out-of-town program listings.*

ver, KFI in Los Angeles, KGO in Oakland and KGW in Portland.

Twenty-five years later, in the early days of television, many newspapers refused to carry TV listings. They didn't want to anger movie theater advertisers. It was *deja vu*.

### Trivia

Because it's election campaign time, do you know the first U.S. presidential campaign and president affected by radio broadcasting?

The Harding-Cox Election results (over KDKA) in November 1920, were the first returns ever broadcast. President Warren G. Harding's inauguration (March 4, 1921) was the first one described on the radio. On Feb. 8, 1922, Harding installed the first radio receiver in the White House.

Coincidental trivia: In 1923, Harding and his administration's top appointees were disgraced by the infamous Teapot Dome oil lease scandals. The attorney defending the two oil companies accused of bribing leading federal officials was little-known Frank J. Hogan. That court case received such intense media coverage, it rocketed Hogan to national prominence. Five years later, GE chose Hogan to argue against the FRC's right to institute its mandated broadcast service changes.

We want to hear from you—always seeking input in the form of old-time radio and wireless QSLs (originals or good copies), picture postcards, photos, station lists, anecdotes, memories, questions, comments, ideas and news clippings. ■



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# Product Parade

REVIEW OF NEW, INTERESTING AND USEFUL PRODUCTS

## GPS Unit Available Now At RadioShack

You've seen GPS receivers advertised in electronics catalogs a lot lately. Global Positioning System units are being used increasingly by outdoor enthusiasts, sportsmen and boaters. If you have a need to know exactly where you are on earth and which direction you are headed, these GPS units do all that and more!

Well, RadioShack has jumped on the GPS craze and now offers the Magellan GPS 2000 receiver through its special-order RadioShack Unlimited program.

The Magellan GPS 2000 is a pocket-sized device that will guide the user to their desired location and back again at the push of a button. It is handy for marking trails, recording fishing spots, tracking game and finding the way through difficult terrain.

The on-screen graphic display shows exact location, direction and distance to a chosen destination, and speed. The plotter screen draws a picture of the course, the route to be followed, the location of nearby landmarks and progress to the destination.

The GPS 2000 relies on U.S. government GPS satellites orbiting 12,000 miles above the earth that transmit precise time and position (latitude, longitude and alti-



The Magellan GPS 2000 receiver from RadioShack will let you know where you are, where you are headed and how you can return!

tude) information 24 hours a day. The GPS receiver uses signals from three or more satellites at once to pinpoint the user's exact position on earth.

The Magellan GPS 2000 receiver measures 6-1/2 by 2-1/3 by 1-1/3 inches, weighs just 10 ounces with batteries and will run continuously for up to 17 hours on four "AA" alkaline batteries.

The GPS 2000 unit sells for \$229.99 through RadioShack Unlimited's special order program. Orders for the unit can be placed at any RadioShack store or by calling (800) THE-SHACK.

## Don't Be A Dummy; Use A Load To Test

New high-performance broadband RF dummy loads from Ameco Corp. cover the range from DC to 650 MHz. The 1,500-watt dummy load is available in the following two versions.

Model DL1500 is an air-cooled unit that will handle an average of 1,500 watts for up to 15 seconds and 150 watts continuously from DC to 650 MHz.

Model DL1500-F is a forced air-cooled dummy load. It will handle an average of 1,500 watts for a full 30 seconds and 300 watts continuously. The DL1500-F has a



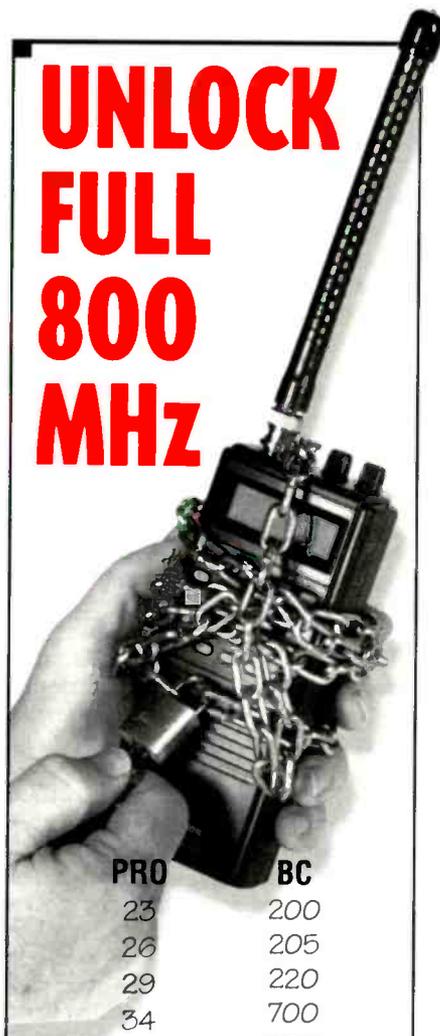
The Ameco Corp. DL1500 dummy load can handle up to 1,500 watts.

low-noise fan that helps keep the non-inductive load element cool for longer life. The SWR for both the DL1500 and DL1500-F is 1.1:1 for 160 to 2 meters, and 1.5:1 for 70cm.

Both units come housed in a strong lightweight aluminum case perforated to enhance cooling.

For more information, contact Ameco Corp., 224 E. Second St., Mineola, NY 11501; phone (516) 741-5030; fax (516) 741-5031.

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# Emergency

COMMUNICATIONS FOR SURVIVAL

BY GORDON WEST, WB6NOA

## GPS Pinpoint Positioning Improvement

The global positioning system is a space-based radio navigation service providing three-dimensional position, velocity and universal coordinated time (UTC), developed and managed by the Department of Defense. All 24 orbiting satellites are fully operational, and inexpensive \$200 handheld GPS receivers routinely download GPS spread-spectrum signals from the five or six satellites in view.

Civilian GPS receivers are preset to tune in 1575.42 MHz, the GPS L1 carrier frequency. The incoming pseudorandom binary sequence at 50 bps is an unclassified code and is available for everyone throughout the world to use.

The L2 carrier frequency, 1227.60 MHz, carries an encrypted P/Y code spread-spectrum signal. Reception of this faster rate code for higher position resolution is restricted to military and government users.

Accuracy of the civilian L1 carrier frequency C/A code could be as good as 95 percent position probability within the radius of a 60-foot circle. However, the Department of Defense purposely denies us this accuracy by imposing "selective availability" (SA) to protect our national security from unauthorized aggressors using our GPS system to guide incoming missiles that could take out specific targets within 60 feet. The Department of Defense purposely degrades civilian GPS accuracy for a position fix 95 percent of the time probable within the radius of a 300-foot circle, rather than a 60-foot circle. Selective availability is an on-purpose offset of the satellite's orbital ephemeris (position) and a variation (dither) in the satellite's clock. This causes an erroneous pseudorange creating a position that seemingly floats around within the radius of a 300-foot circle, sometimes moving at a phantom speed of 1 mph when you are actually standing still, holding your \$200 or \$2,000 portable GPS receiver to the sky.

For casual GPS users, such as boaters and hikers, the 300-foot error may be considered no-big-deal when trying get back to a specific boat dock or the local campground. Without GPS, mariners and hikers could become totally lost with no idea how to get back to where they started from.

But for emergency responders, 300 feet off of a specific coordinate could be a real problem if there are no other local landmarks to home in on visually. A boat sinks in 100 feet of water as a lifeguard patrol

boat takes on the victims. The lifeguards store the GPS waypoint in memory, but come back a few hours later and divers could be as much as  $\pm 300$  feet off from the exact sinking point.

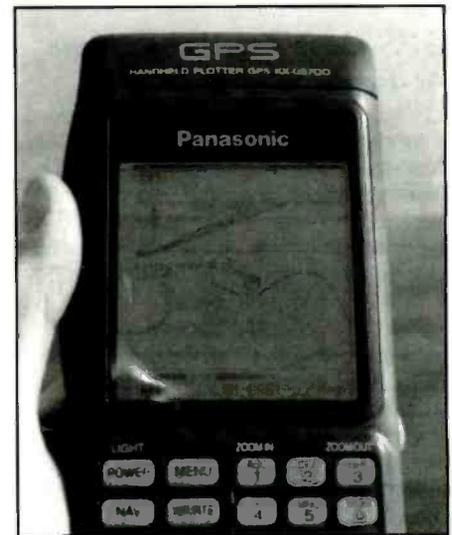
Or what about emergency personnel searching for crime-scene clues on the desert floor, and discovering something and marking it with a GPS position? That night a sandstorm hits, and the next day they are  $\pm 300$  feet this way or that way from the spot they electronically memorized. In specific cases for emergency responders, pinpoint accuracy from GPS is an important requirement.

Differential GPS accuracy is available to everyone for incredible position accuracies down to the radius of a 10-foot circle! For emergency personnel, as well as any civilian or mariner, the U.S. Coast Guard provides free differential corrections on the low-frequency beacon band from 283 to 325 kHz.

U.S. Coast Guard reference stations on a known location compute the selective availability errors, and transmit the pseudorange correction factors for each satellite visible on low frequency. Mariners plug into a \$300 to \$400 Type 9 beacon receiver that decodes the minimum shift key 100 bits/second data stream, correcting the handheld or fixed-mount marine-type GPS receiver for almost pinpoint accuracy.

All coastlines of the United States now are blanketed with differential GPS beacon-band signals, and there also are a chain of stations up the Mississippi River, too. Coastal emergency response teams may find that low-frequency beacon reception is available up to 50 miles inland, using a beacon antenna featuring magnetic loop H-field response for vehicle installations to get away from regular marine beacon antennas, which are tall for E-field response.

Again, there is no user fee for the U.S. Coast Guard differential beacon reception—just the requirement for purchasing a differential beacon receiver that ties into most handheld and fixed GPS sets that have a data input port. For inland users needing differential corrections, the Accpoint precise positioning network for differential corrections is available. A total of 450 FM music stations broadcast real-time correction data across North America, and with simple annual subscription, the data can be received by a low-cost FM portable or mobile receiver that ties into any inexpensive portable or fixed GPS set. An



*Even the handheld GPS sets can take differential GPS corrections for a tenfold improvement in position accuracy.*

incredible 1-meter accuracy costs \$50 a month, and the typical price for a portable or mobile FM SCA (subcarrier access) receiver/decoder is about \$350—about the same price as a marine differential beacon receiver.

Although you are paying \$600 a year for this commercial service in areas where you cannot receive the U.S. Coast Guard differential free service, you are obtaining a position fix within 1 meter, which is at least 10 times more accurate than what the Coast Guard can provide as a 30-foot fix.

Emergency responders wishing to receive a free color coverage map of the Accpoint precise-positioning network may call Ms. Noland at (800) 451-1559. And if your emergency team needs centimeter service, this also is available at a higher price tag.

Will selective availability ever be shut off to zero by the Department of Defense because of increased pressure from civilian GPS users? Probably so—the Federal Aviation Administration and other government agencies are putting pressure on DOD that selective availability really doesn't make much sense. But even if the selective availability is set to zero error, atmospheric and ionospheric errors still contribute to a dissolution of position in excess of  $\pm 80$  feet. So to get down to an error less than 10 feet, tune in to the free U.S. Coast Guard differential broadcasts, or subscribe to FM subcarrier differential corrections and add pinpoint accuracy to your emergency team's vehicle or portable or mobile marine GPS equipment. ■

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# Satellite View

BY DONALD E. DICKERSON, N9CUE

## INSIDE THE WORLD OF SATELLITE COMMUNICATIONS

### Shuttle Communications

Primary communications for shuttle flights are conducted through the Tracking and Data Relay Satellite (TDRS) system. This three satellite geostationary system was completed with the successful launch of TDRS-4 (TDRS-3 was lost on Challenger) in March 1989.

Before TDRS, all manned space missions used a series of ground stations around the world to relay data and voice communications back to Kennedy Space Center and mission control at Johnson Space Center. These ground stations are called the Spaceflight Tracking and Data Network (STDN). There weren't enough stations in the network to provide continuous communications with the astronauts. In addition, satellites are more economical than manned ground stations, hence NASA's development of the TDRS system.

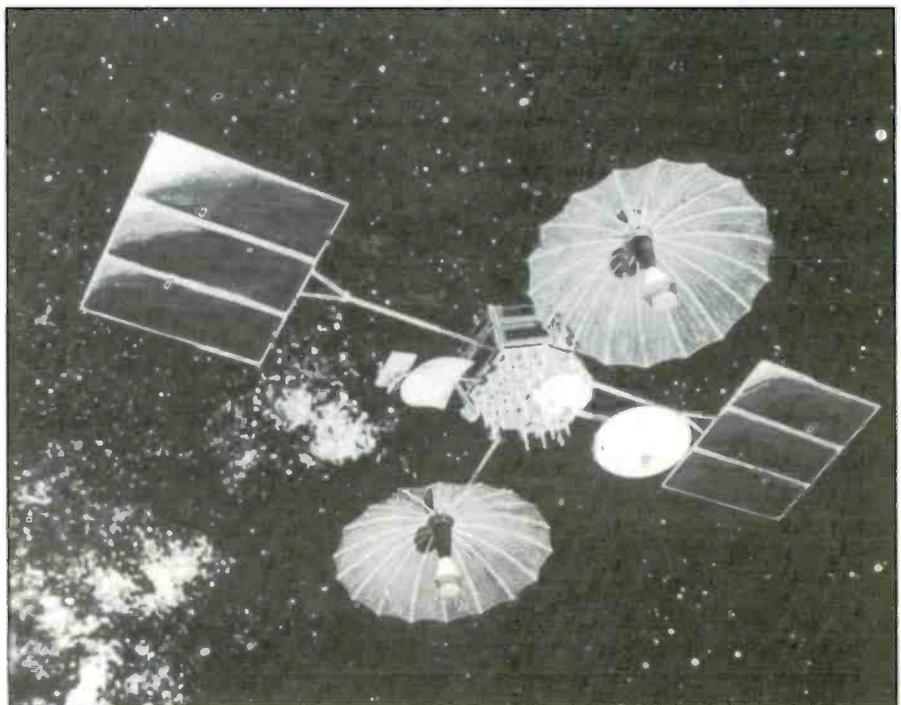
The NASA Communications Network (NASCOM) of Goddard Spaceflight Center in Greenbelt, Md., is responsible for all voice, data and TLM from our manned spaceflights, including NASA and military ground stations and satellites. Providing these communications links is no small task. Goddard, Johnson, Kennedy, White Sands and Wallop Island, Va., all receive voice TLM and data from the shuttle. Fourteen stations complete the STDN, in addition to nine Department of Defense support stations run by the U.S. Space Command, and numerous other military communications centers and space sensor facilities that assist NASCOM in collecting shuttle data. NASA's 14 ground stations each have 85-, 30- and 14-foot dish antennas used for S-band voice and TLM and C-band (ranging) radar. The DOD stations use a single 60-foot dish for both S and C bands.

All antennas require accurate navigation information to track the space shuttle orbiting the earth at an average speed of 17,000 mph, just under 200 miles high. An additional network of computing stations makes these antenna-pointing calculations for each ground station and then distributes this information, real time to STDN. Goddard, White Sands, Vandenberg AFB, Wallops Island and the Air Force satellite control facility at Colorado Springs, Colo., supplies this computer support.

There is an additional navigation system on board the shuttle called TACAN. It is a distance and bearing beacon system that



*The integrated communications system (INCO) console in the mission operations control room (MOCR) of the Johnson Space Center in Houston, Texas. (Photo courtesy of NASA)*



*A fully deployed TDRS measures 42 feet by 57 feet. (Photo courtesy of NASA)*

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## VHF Support Frequencies

### Kennedy Operations

117.8 MHz  
121.9 MHz  
126.4 MHz  
148.4 MHz  
162.6 MHz  
170.1 MHz  
284.0 MHz

### Aircraft

117.8 MHz  
118.4 MHz  
120.7 MHz  
126.3 MHz  
127.8 MHz  
164.8 MHz

### Ships

148.5 MHz  
149.1 MHz  
162.0 MHz  
164.1 MHz

### Edwards AFB

120.7 MHz    236.0 MHz  
121.8 MHz    290.0 MHz  
162.6 MHz    318.0 MHz  
348.7 MHz

## Shuttle Frequencies

### UHF Communications

279.0 MHz  
259.7 MHz  
296.8 MHz

### STDN Frequencies (S-band)

2106.4 MHz uplink	2287.5 MHz downlink
2041.9 MHz uplink	2250.0 MHz downlink
1831.8 MHz uplink	2217.5 MHz downlink
1775.9 MHz uplink	2214.0 MHz downlink
	2205.0 MHz downlink

### TDRS Satellite Frequencies

1750-2300 MHz (S-band)  
15200-17250 MHz (K-band)

### W3NAN shuttle audio

3.860 MHz    21.395 MHz  
7.185 MHz    28.650 MHz  
14.295 MHz

## HF Support Frequencies

### Aircraft

6.693 MHz	9.131 MHz
6.896 MHz	10.780 MHz
6.983 MHz	11.205 MHz
7.461 MHz	13.170 MHz
8.891 MHz	15.015 MHz
9.043 MHz	18.200 MHz

### NASA

2.678 MHz	6.740 MHz	9.974 MHz
4.510 MHz	6.896 MHz	10.780 MHz
4.760 MHz	6.983 MHz	11.104 MHz
4.855 MHz	7.675 MHz	11.416 MHz
5.350 MHz	8.993 MHz	11.548 MHz
6.723 MHz	9.315 MHz	11.805 MHz

### Ships

13.218 MHz	2.625 MHz
14.615 MHz	5.190 MHz
19.306 MHz	5.696 MHz
20.185 MHz	5.810 MHz
20.390 MHz	9.125 MHz
20.475 MHz	11.407 MHz

the pilot and commander listen to. The tone beacon signal is uplinked to the shuttle between 962 and 1230 MHz.

Redundant systems always have been a part of NASA's safety provisions for manned spacecraft. This thinking also applies to the communications system. If, for example, mission control at Johnson

Space Center should become inoperative for any reason, the White Sands, N.M., facility could take over their responsibilities. Should White Sands fail, Goddard could take control.

Many names of NASA's facilities are no doubt familiar to the space enthusiast. There is, however, a NASA control center

for engineering data that may not be as familiar as Kennedy or Johnson called the Huntsville Operations Support Center (HOSC) that is part of the Marshall Spaceflight Center, Huntsville, Ala.

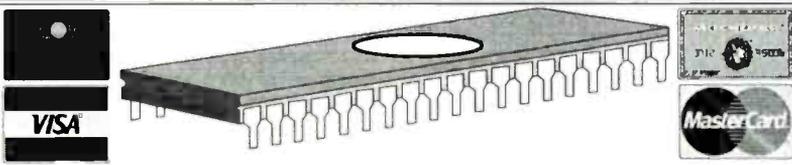
During prelaunch, the countdown, launch and flight of the shuttle, NASA and its contract engineers and scientists man consoles that provide real-time data on shuttle propulsion systems. This includes the engines, external tank and solid rocket boosters.

Information is transmitted directly from the shuttle to Huntsville, processed by computer and displayed on screens and other specialized instruments in 15 stations throughout the engineering console room. During their busiest 10-hour period of the shuttle launch, the center will assess more than 11 million measurements of the propulsion system. The center, staffed by more than 150 specialists, has 25 direct communications links between Huntsville, Kennedy and Johnson space centers.

### Launch

Just prior to liftoff, shuttle communications switch from intercom to SHS, air-to-ground. During ascent, three SHF/UHF ground stations, located on Merrit Island and Ponce de Leon in Florida and Bermuda Island, provide all voice, TLM and data channels.

For the 80 seconds of flight, communications are relayed to other NASA facili-



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ties through Merrit Island. At this point, the exhaust formed of superheated chemicals emits from the solid rocket boosters, completely blocking radio communications. The communications then are picked up by the station at Ponce de Leon, located 30 miles north of the launch site. This station maintains communications for two minutes before Merrit Island again relays for an additional 80 seconds. About six minutes into the flight, Bermuda takes over these responsibilities for an additional five minutes. TDRS-East, located at 41° East, then takes over. TDRS-Central is located at 79° West and TDRS West is at 171° West. After the shuttle reaches orbit, TDRS satellites will relay all communications to ground stations. On re-entry, communications again will revert to UHF air-to-ground.

With the success of TDRS, NASA has closed three STDN stations—Chile, Hawaii and Ascension Island. In addition, the Senegal station in Africa was closed in December 1990. Three other stations in the STDN—Gladstone, Calif.; Canberra, Australia; and Madrid, Spain—have become part of the Deep Space Network managed by the Jet Propulsion Laboratory (JPL). These stations could be pressed into service again should the need arise.

The TDRS control center and ground terminals are located at White Sands, N.M. This site was chosen because of its year-around low cloud cover. White Sands provides all network links for the TDRS spacecraft data to the NASCOM, DOD and NOAA systems.

TDRS is a large spacecraft—42 feet by 57 feet. Each satellite has seven antennas. Two of these antennas are 16 feet across and plated with 14-karat gold. This satellite uses frequencies in the 2-, 14- and 15-GHz range.

On re-entry, the shuttle switches back to UHF air-to-ground. The Ames-Dryden flight research facility and the Gladstone facility of the Deep Space Network provide primary communications for the approach and landing at Edwards AFB.

### Support Operations

Specially equipped EC-135 aircraft called Advanced Range Instrument Aircraft (ARIA) are deployed before every shuttle launch. Based at Wright-Patterson Air Force Base in Ohio, these planes relay launch data on both the shuttle and any spacecraft it may deploy. They are used for backup, missile and SDI tests. They can use

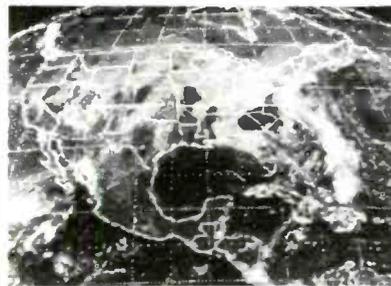
any frequency in the HF, VHF and UHF bands and satellites. (See January 1989 POP'COMM for a close look.)

Throughout shuttle operation, you can find a variety of support communications from chase aircraft, safety ships and more. NASA even has its own fleet of ships to cover shuttle launches and recover the solid rocket boosters. When looking for this traffic, check known frequencies (see the list provided) and search for new ones in the same portions of the bands as the known frequencies. Let me know your findings.

Live video from the shuttle is sent to Johnson Space Center through Spacenet-2 located at 69° W. NASA feeds are found on transponder 5 (3,880.0 MHz), vertical polarization in monaural audio at 6.8 MHz (audio subcarrier). A schedule for these broadcasts is updated daily during shuttle missions. This information can be obtained by calling (718) 483-5817.

Live audio feeds from the shuttle can be heard in the ham bands. The Amateur Radio Club of Goddard Spaceflight Center rebroadcasts live, unedited voice communications from the shuttle. The group's call-sign is WA3NAN. I have provided a list of frequencies in use. ■

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# The Ham Column

BY KIRK KLEINSCHMIDT, NTØZ  
AMERICAN RADIO RELAY LEAGUE

## GETTING STARTED AS A RADIO AMATEUR

### What's Your Courtesy Quotient?

In recognizing and promoting the things that are really right about ham radio, it's often helpful to peel away its sometimes-thin "vener of civilization."

Bad behavior. On-air rudeness. Being a lid. Intentional interference. Kerchunking repeaters. Letting the thrill of the DX or contest chase transform you into an amateur radio "Darth Vader."

I will never forget an incident that, for me, epitomizes bad operating practices. It left me feeling hollow and wondering about the integrity of my fellow hams.

I was 27 years old at the time, and I'd been a ham since I was 13. DXing and paper-chasing were my mainstays then. In all my years as a ham, I had never had a decent 80-meter antenna, nor a good 80-meter DX location.

Moving to the East Coast changed all that, and I set out in search of countries on the lower bands. My antenna wasn't that spectacular, however, and I didn't use an amplifier, so working Europeans on 80-meter CW was a thrill in itself. Heck, as a kid I'd worked thousands of Europeans on 20, 15 and 10 meters...but never on 80. From my rather unspectacular Midwest location, working Europe on 40 meters was rare and exciting.

One night, much to my surprise, I heard a nice, "plenty-strong" 80-meter CW call coming from a station in Oman. I was stunned! This wasn't just Europe, it was the Middle East! I knew I'd better catch this one

as soon as possible (before the Packet Clusters got wind and all was lost).

I called. He came back to someone else. Next turn, I called again—and he came back to me! The problem was, he had only the "ØZ" part of my callsign, and he kept asking for the rest. What happened next shook my faith in amateur radio.

"ØZ? ØZ?" the op kept repeating...and every time he did, a powerful station in Ohio kept transmitting its call sign on top of me (I looked up the call sign...it's a big-time contest club station).

Through five patient rounds, the station in Oman kept trying to get my callsign, and each time he asked for me only, the 8-land big-gun wiped me out.

Finally, the Oman op apologized and moved on to work others who had swarmed in from Packet Cluster Land.

Make no mistake. The 8-lander wasn't confused. He could hear me just fine. He was simply being a lid. Purposefully. And in the process, he crushed my 14-year dream. He just took it away from me. After 20 years of hamming, I have yet to work the Middle East on 80 meters...!

I'm sure you've encountered something similar, and if you haven't yet, you will. Be prepared. Practice forgiving in advance or your blood pressure likely will suffer!

### Roots

The specifics of how bad behavior comes about probably are moot. The fact

### Repeater Operation

- Much like on HF, always listen before you key up a repeater. If others are using the machine and you need to make a call, simply say your call sign between their transmissions. When one of the ops acknowledges you, say, "This is NTØZ, I'd like to make a quick call." Wait for the go-ahead, then make your call: "W1XYZ from NTØZ."

If your friend responds, ask him or her to move to a simplex frequency where you both can talk. Then, thank the others for letting you make the call and pop over to your new simplex frequency. If your call gets no reply, offer a quick "thanks" and clear off the machine so the others can resume. It's simple. It's common courtesy.

- Emergencies are a whole different ball game. Interrupt an in-use repeater by saying, "Break," or "Break—emergency." Emergency situations always take priority, so don't worry about upsetting anyone's conversation.

- Whenever you use the repeater, be sure to pause between transmissions so others can break in if necessary. And don't blab on endlessly during "prime time" repeater hours (early morning and late afternoon for most areas).

— Kirk Kleinschmidt, NTØZ



is, ham operators—though technical pioneers, housewives, carpenters and wonderful comrades—are people, too. And people act strangely every now and then. Always have...always will.

Although every generation of new hams seems to think radio rudeness is a modern creation, it's not (old-timers often contribute to this myth by recounting radio's fabled "good old days," which, when reviewed impartially, weren't always so good. Uncrowded, yes. Pioneering, sure. Filled with friendship and imbued with a sense of wonder, absolutely. Free of bad behavior—no way!).

Poor operating probably is more noticeable nowadays because the number of hams has dramatically increased over the decades, which, ironically, increases the need for good on-air behavior.

To our credit as members of a radio service, the ranks of hams who are habitual offenders comprise a tiny minority. But a healthy dose of prevention always is a good idea. And erring on the side of courtesy is more desirable than its alternative.

In examining several facets of one key practice—finding a clear frequency—this month's column really is about common sense and common courtesy, qualities every new ham should cultivate (along with patience!).

## On a Clear Day...

Hams, or groups of hams who, for whatever reason, seem to have "laid claim" to certain frequencies, can be problematic to this day...even when FCC regulations and common courtesy clearly indicate that emergency communications always have priority, and when emergencies do not exist, frequencies appropriately are utilized on a "first-come, first-served" basis.

And even if everyone's not playing by the rules, you should. Here's how considerate operators find clear frequencies!

- Tune up your rig and/or antenna tuner with as little power as possible. Carelessly laying down a strong carrier on an "in-use" frequency is rude at best, life-threatening at worst. Most modern antenna tuners and SWR/power meters tune up just fine with 5 or 10 watts instead of 100 or 1,000. If you're really considerate, use one of several new devices to tune up your antenna system without radiating any power.

- Before you call CQ, tune the part of the band you want to operate on and listen. Then listen some more. You'll get a good initial idea of propagation and general activity, both of which vary daily, seasonally and yearly.

- When you've found what seems to be an unused, clear HF "channel," say (for voice modes): "Is this frequency in use? This is NTØZ." (Use your own callsign.) If using Morse code, send: "QRL?" No matter what "QRL?" meant in the early days, it now means, "Is this frequency in use?"

If a frequency is occupied, you should hear a polite, "Yes it is, thanks for asking," or something similar. On CW you might hear "QRL," or the Morse letters "C" or "R."

Even if you get no immediate reply, the frequency still may be in use. This happens most often on 15, 10 and 6 meters, where, because of propagation, two ops may be conversing, but you can hear only one of them. Be patient!

Keep your first transmission short just in case.

- Considerate operating procedures should be the rule, not the exception. Set the best possible example for others. If a DX station says he's "listening for nines," if you're callsign doesn't have a nine, don't transmit—even if a dozen other ops do. When the DX is listening "up five," don't transmit on the DX op's calling frequency.

Setting a good example may mean that you don't get through. You might miss that DX station. You might not get a chance to speak with Jordan's King Hussein. That long-winded op in New Hampshire or Wyoming may blab with his or her friends all morning—and never get around to you. If your operating practices win out, how-

ever, your dignity still will be in tact, which is more important in the end. And it's more important for amateur radio.

Keep your photos, letters and column suggestions coming to me at American Radio Relay League, Dept. PCN, 225 Main St., Newington, CT 06111; or send e-mail to kirk@uslink.net. ■



# World's Most Powerful CB and Amateur Mobile Antenna\*

Lockheed Corp. Test Shows  
**Wilson 1000 CB Antenna Has  
58% More Gain Than The  
K40 Antenna (on channel 40).**

In tests conducted by Lockheed Corporation, one of the world's largest Aerospace Companies, at their Rye Canyon Laboratory and Antenna Test Range, the Wilson 1000 was found to have 58% more power gain than the K40 Electronics Company, K40 CB Antenna. This means that the Wilson 1000 gives you 58% more gain on both transmit and receive. Now you can instantly increase your operating range by using a Wilson 1000.

**Guaranteed To Transmit and Receive  
Farther Than Any Other Mobile  
CB Antenna or Your Money Back\*\*  
New Design**

The Wilson 1000 higher gain performance is a result of new design developments that bring you the most powerful CB base loaded antenna available.

### Why Wilson 1000 Performs Better

Many CB antennas lose more than 50% of the power put into them. The power is wasted as heat loss in the plastic inside the coil form and not radiated as radio waves.

We have designed a new coil form which suspends the coil in air and still retains the rigidity needed for support. This new design eliminates 95% of the dielectric losses. We feel that this new design is so unique that we have filed a patent application on it.

In addition, we use 10 Ga. silver plated wire to reduce resistive losses to a minimum.

In order to handle higher power for amateur use, we used the more efficient direct coupling method of matching, rather than the lossy capacitor coupling. With this method the Wilson 1000 will handle 3000 watts of power.

### The Best You Can Buy

So far you have read about why the Wilson 1000 performs better, but it is also one of the most rugged antennas you can buy. It is made from high impact thermoplastics with ultraviolet protection. The threaded body mount and coil threads are stainless steel; the whip is tapered 17-7 ph. stainless steel. All of these reasons are why it is the best CB antenna on the market today, and we guarantee to you that it will outperform any CB antenna (K40, Formula 1, you name it) or your money back!

\*Inductively base loaded antennas  
\*\*Call for details.

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Wilson Antenna Company Inc.  
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Henderson, Nevada 89015

Subject: Comparative Gain Testing of Citizen's Band Antennas  
Ref: Rye Canyon Antenna Lab File #670529

We have completed relative gain measurements of your model 1000 antenna using the K-40 antenna as the reference. The test was conducted with the antennas mounted on a 16' ground plane with a separation of greater than 300' between the transmit and test antennas. The antennas were tuned by the standard VSWR method. The results of the test are tabulated below:

FREQUENCY (MHZ)	RELATIVE GAIN (dB)	RELATIVE POWER GAIN (%)
26.965	1.30	35
27.015	1.30	35
27.065	1.45	40
27.115	1.80	45
27.165	1.50	41
27.215	1.60	45
27.265	1.75	50
27.315	1.95	57
27.365	2.00	58
27.405	2.00	58

**58%  
MORE  
POWER GAIN  
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K40**

Individual test results may vary upon actual use.

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TOLL FREE: 1-800-541-6116  
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500 Magnetic Mount.....59<sup>95</sup> Call About Fiberglass!!!

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# You Should Know

BY CAPT. WILLIAM MAULDIN, WG4R

INTERESTING THOUGHTS AND IDEAS FOR ENJOYING THE HOBBY

## Notification Networks—An Update

Several issues ago, I introduced you to the new information notification networks that are springing up all around the country. Here is an update on just some of the information that has come in as a result of that article.

If you missed the initial article, notification systems are one of the hottest and fastest things of this information age. There are two types of "notification" systems. The first is where a group of individuals or a commercial service notifies you of a series of events through a commercial alphanumeric pager. The other type is where a group of interested individuals get together and obtain a GMRS or business radio repeater. Members notify everyone else in the group by "broadcasting the news" about a fire, accidents or news making events. Either way, those interested get the news firsthand and long before the local news media is on the scene. This article will be devoted mostly to the new pager notification services.

Why would you want to join such a service? The answer depends on who you are and why you would have a desire for knowing what is going on. Of course, news media personnel and free-lance photographers make their living by being first with a photograph or a news story.

Others who subscribe range from ambulance-chasing lawyers to hobbyists who just like to know because of their keen interest in such news-making events. This also is why people like listening to scanners and hearing fire and police calls. The growth of notification systems is impressive and quite rapid.

### Linked Systems

To expand my knowledge of notification services, I contacted the one offering coverage for my local area. This group is headquartered in Raleigh, however, much to my surprise, I discovered the service had "dispatchers" in my city as well. I also made another mistake in thinking the system would notify me only of fires, special weather alerts and emergencies in North Carolina. Carolinas Fire Page and Jeff Harkey were especially helpful in doing some research for this article. In talking

with Jeff, I learned that not only does the Carolinas system cover North Carolina and South Carolina fires and severe weather alerts, but the system is linked to 22 other notification systems throughout the country. When you secure your alphanumeric pager from the commercial pager company that they use, you get much more than just fire and emergency information for the Carolinas. You'll quickly discover that you'll also get information related to emer-

gencies in New York City, Los Angeles, Chicago, Atlanta, Miami, Denver, St. Louis, Boston, Detroit, San Francisco, Seattle and many other major cities.

What does this wealth of information cost? I was surprised to discover that the cost is amazingly low. After establishing your personal account with the required commercial paging service, Carolinas Fire Page service costs only \$5 a month, payable in yearly subscriptions. There is an ini-

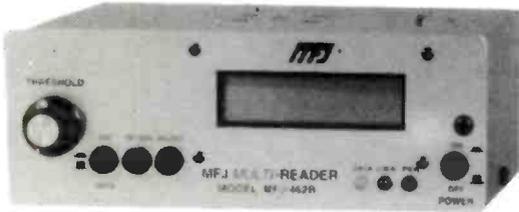
### What Info Is Sent?

Actual pager messages received on the Fire Page network:

- BALTIMORE CITY, MD: 3RD ALM 5414 HARFORD RD, 2 AND 3 STY BRICK STOREFRONT. A BASEMENT FIRE DC4
- CFP5: WINSTON-SALEM: W/F+ 1651 WEST NORTHWEST BLVD AT WEST 1st. OCC MULTIPLE DWELLING, HVY SMK AND FIRE SHW'G ON ARRIVAL; S/C 2 ADD'L ENGS, NOW U/C, EXT SALV AND OVERHAULING ATT (599 VM) [700]
- PHILADELPHIA, PA: 6TH ALM 58TH AND GRAY FERRY. VAC 100X150 FACTORY BLDG, F/I, DWH AREA HOMES EVAC'D FPNJ
- CHESAPEAKE, VA: 2ND ALM ON ARRIVAL, 2034 LINSTER STREET, 2 STY APT BLDG F/I, POSSIBLE PEOPLE TRAPPED VFN02
- CFP7: ZEBULON (WAKE) W/F 807 PRIVETTE STREET, HSE FIRE, REPORTED SUBJECT TRAPPED, NFI ATT, FIRE SHOWING ON ARRIVAL. NFI (702 VM) [700]
- SCARSDALE (WESTCHESTER) GENERAL ALM FIRE, 6 OAK LN, LRG PRIVATE DWELLING, M/A TO FIRE AND FOR COVERAGE BNN
- CITY OF NEWBURG, NY (ORANGE): 3RD ALM 18-20 DUBOIS ST, TWO THREE STY FRM DWELLINGS, F/I, M/A INTO THE CITY TO FIRE AND FOR COVERAGE BNN
- TAMPA, FL: 2ND ALM AND H/M, 1915 WEST BEACH STREET, UNKN TYPE OF CHEMICAL SPILLED, 22 PERSONS EVAC'D FROM BLDG TPA
- U/D PHILLY: 6TH ALM BOX 596: FIRE BLDG WAS 1 AND 3 STY BRK VAC BOX FACTORY. 800X125 THE 3 STY SECTION 200X75 WAS F/I AND THRU THE ROOF WITH SEVERAL COLLAPSES FPNJ
- CFP7: HOPKINS FD (WAKE) W/F 6500 BLK OF HODGE RD, HSE FIRE, M/A FR WENDELL STA 2 TNKR (702 VM) [700]
- NEWARK, NJ: 3RD ALM BOX 3312 254 MT PROSPECT AVE, 4 STY BRK OMD HVY FIRE DWH EC
- CFP5: ALAMANCE FD (GUILFORD) W/F 1626 WILEY LEWIS ROAD, MOBILE HME SMK SHOWING ON ARRIVAL. FIRE NOW U/C. INSPECTOR REQUESTED. STATIONS 44 AND 4 RESPONDED. <DISP 46.500, FG 46.340> [599]

# Tap into secret Shortwave Signals

Turn mysterious signals into exciting text messages with this new **MFJ MultiReader™**



Plug this self-contained MFJ MultiReader™ into your shortwave receiver's earphone jack.

Then watch mysterious chirps, whistles and buzzing sounds of RTTY, ASCII, CW and AMTOR(FEC) turn into exciting text messages as they scroll across your easy-to-read LCD display.

You'll read interesting commercial, military, diplomatic, weather, aeronautical, maritime and amateur traffic... traffic your friends can't read -- unless they have a decoder.

## Eavesdrop on the World

Eavesdrop on the world's press agencies transmitting *unedited* late breaking news in English -- China News in Taiwan, Tanjug Press in Serbia, Iraqi News in Iraq -- all on RTTY.

### Super Active Antenna

"World Radio TV Handbook" says MFJ-1024 is a "first rate easy-to-operate active antenna... quiet... excellent dynamic range... good gain... low noise... broad frequency coverage."

Mount it outdoors away from electrical noise for maximum signal, minimum noise. Covers 50 KHz to 30 MHz.

Receives strong, clear signals from all over the world. 20dB attenuator, gain control. ON LED. Switch two receivers and aux. or active antenna. 6x3x5 in. remote has 54 inch whip, 50 ft. coax. 3x2x4 in. 12 VDC or 110 VAC with MFJ-1312, \$12.95.

**Indoor Active Antenna**

MFJ-1020B \$79.95

### Rival

outside long wires with this *tuned* indoor active antenna. "World Radio TV Handbook" says MFJ-1020 is a "fine value... fair price... best offering to date... performs very well indeed."

*Tuned* circuitry minimizes intermod, improves selectivity, reduces noise outside tuned band. Use as preselector with external antenna. Covers 0.3-30 MHz. Has Tune, Band, Gain, On/Off/Bypass Controls. Detachable telescoping whip. 5x2x6 in. Use 9 volt battery, 9-18 VDC or 110 VAC with MFJ-1312, \$12.95.

### Compact Active Antenna

MFJ-1022 \$39.95

Plug this new compact MFJ all band active antenna into your general coverage receiver and you'll hear strong clear signals from all over the world from 300 KHz to 200 MHz -- including low, medium, shortwave and VHF bands.

Also improves scanner radio reception on VHF high and low bands.

Detachable 20 in. telescoping antenna. 9 volt battery or 110 VAC with MFJ-1312B, \$12.95. 3 1/4 x 1 1/4 x 4 in.

Copy RTTY weather stations from Antarctica, Mali, Congo and many others. Listen to military RTTY passing traffic from Panama, Cyprus, Peru, Capetown, London and others. Listen to hams, diplomatic, research, commercial and maritime RTTY.

Listen to maritime users, diplomats and amateurs send and receive error free messages using various forms of TOR (Telex-Over-Radio).

Monitor Morse code from hams, military, commercial, aeronautical, diplomatic, maritime -- from all over the world -- Australia, Russia, Hong Kong, Japan, Egypt, Norway, Israel, Africa.

## Printer Monitors 24 Hours a Day

MFJ's exclusive *TelePrinterPort™* lets you monitor any station 24 hours a day by printing their transmissions your Epson compatible printer.

Printer cable, MFJ-5412, \$9.95.

### MFJ MessageSaver™

You can save several pages of text in 8K of memory for re-reading or later review.

## High Performance Modem

MFJ's high performance *phaseslock loop* modem consistently gives you solid copy -- even with weak signals buried in noise. New threshold control minimizes noise interference -- greatly

improves copy on CW and other modes.

## Easy to use, tune and read

It's easy to use -- just push a button to select modes and features from a menu.

It's easy to tune -- a precision tuning indicator makes tuning your receiver easy for best copy.

It's easy to read -- the 2 line 16 character LCD display with contrast adjustment is mounted on a sloped front panel for easy reading.

Copies most standard shifts and speeds. Has MFJ AutoTrak™ Morse code speed tracking.

Use 12 VDC or use 110 VAC with MFJ-1312B AC adapter, \$12.95. 5 1/4 x 2 1/2 x 5 1/4 inches.

## No Matter What Guarantee

You get MFJ's famous one year *No Matter What™* unconditional guarantee. That means we will repair or replace your MFJ MultiReader™ (at our option) no matter what for a full year.

## Try it for 30 Days

Order an MFJ-462B MultiReader™ from MFJ and try it in your own setup -- compare it to any other product on the market regardless of price.

Then if you're not completely satisfied, simply return it within 30 days for a prompt and courteous refund (less shipping).

Order today and try it -- you'll be glad you did.

## Receive Color News Photos, Weather Maps, RTTY, ASCII, Morse Code

MFJ-1214PC \$149.95

Use your computer and radio to receive and display *brilliant full color FAX* news photos and incredible WeFAX weather maps with all 16 gray levels. Also RTTY, ASCII and Morse code.

Animate weather maps. Display 10 global pictures simultaneously. Zoom any part of picture or map. Frequency manager lists over 900 FAX stations. Automatic picture capture and save.

Includes interface, easy-to-use menu driven software, cables, power supply, comprehensive manual and Jump-Start™ guide. Requires 286 or better computer with VGA monitor.

### Super Hi-Q Loop™ Antenna

The Super Hi-Q MFJ-1782 Loop™ is a professional quality remotely tuned 10-30 MHz high-Q antenna.

It's very quiet and has a very narrow bandwidth that reduces receiver overloading and out-of-band interference.

### High-Q Passive Preselector

MFJ-956 \$39.95

The MFJ-956 is a high-Q passive LC preselector that lets you boost your favorite stations while rejecting images, intermod and other phantom signals. Covers 1.5-30 MHz. Has preselector bypass and receiver grounded position. 2x3x4 in.

### Mobile Scanner Ant.

Cellular MFJ-1824BB/BM look-a-like. Covers 25-1300 MHz. High - est gain on 406-512 and 108-174 MHz, 19 in. Magnet mount. MFJ-1824BB has BNC/UHF plug; MFJ-1824BM has Motorola plug.

### MFJ Antenna Matcher

MFJ-959B \$99.95

Matches your antenna to your receiver so you get maximum signal and minimum loss.

Preamp with gain control boosts weak stations 10 times. 20 dB attenuator prevents overload. Pushbuttons let you select 2 antennas and 2 receivers. Cover 1.6-30 MHz. 9x2x6 inches. Use 9-18 VDC or 110 VAC with MFJ-1312, \$12.95.

### High-Gain Preselector

MFJ-1045C \$69.95

High-gain, high-Q receiver preselector covers 1.8-54 MHz. Boost weak signals 10 times with low noise dual gate MOSFET. Reject out-of-band signals and images with high-Q tuned circuits. Pushbuttons let you select 2 antennas and 2 receivers. Dual coax and phono connectors. Use 9-18VDC or 110 VAC with MFJ-1312, \$12.95.

### Dual Tunable Audio Filter

MFJ-752C \$99.95

Two separately tunable filters let you peak desired signals and notch out interference at the same time. You can peak, notch, low or high pass signals to eliminate heterodynes and interference. Plugs between radio and speaker or phones. 10x2x6 in.

### Easy Up Antennas Book

How to build MFJ-38 \$16.95

and put up inexpensive, fully tested wire antennas using readily available parts that'll bring signals in like you've never heard before.

Covers receiving antennas from 100 KHz to almost 1000 KHz. Includes antennas for long, medium and shortwave, utility, marine and VHF/UHF services.

MFJ-107B \$9.95

MFJ-108B \$19.95

MFJ-105B \$19.95

MFJ-108B, dual clock displays 24 UTC and 12 hour local time *simultaneously*. MFJ-107B, single clock shows you 24 hour UTC time. 3 star rated by *Passport to World Band Radio!*

MFJ-105B, accurate 24 hour UTC quartz wall clock with large 10 inch face.

### MFJ Antenna Switches

MFJ-1704 \$59.95

MFJ-1702B \$21.95

MFJ-1704 heavy duty antenna switch lets you select 4 antennas or ground them for static and lightning protection. Unused antennas automatically grounded. Replaceable lightning surge protection device. Good to 500 MHz. 60 dB isolation at 30 MHz.

### World Band Radio Kit

MFJ-8100K \$59.95 kit

MFJ-8100W \$79.95 wired

Build this *regenerative* shortwave receiver kit and listen to shortwave signals from all over the world with just a 10 foot wire antenna.

Has RF stage, vernier reduction drive, smooth regeneration, five bands.

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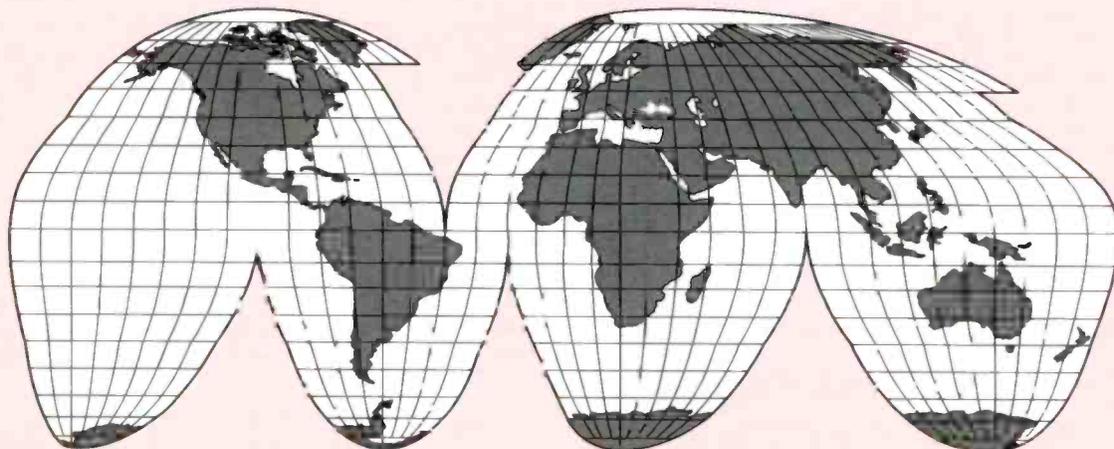
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# POP'COMM's World Band Tuning Tips

July 1996



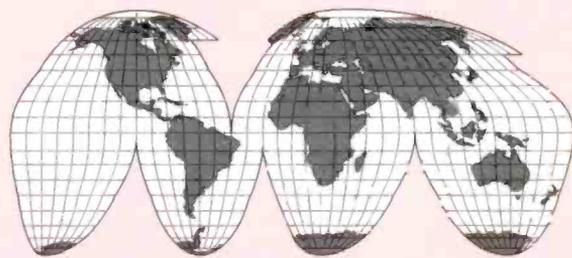
This POP'COMM feature is designed to help you hear more shortwave stations. Each month this pullout guide shows you when and where to tune to hear a wide variety of local and international broadcasters on the shortwave bands. The list includes broadcasts in languages other than English. Most of the transmissions are not beamed to North America. Keep in mind that stations make frequent changes in their broadcasting times and frequencies.

Changes in propagation conditions may make some stations difficult or impossible to receive. Your equipment and receiving location also will have a bearing on what you are able to hear.

Note: EE, FF, PP, etc., are abbreviations for English, French, Portuguese, and so on. Some frequencies may vary slightly. All times are in UTC, which is five hours ahead of Eastern Standard Time (i.e., 0000 UTC equals 7 p.m. EST).

Freq.	Station/Country	UTC	Notes	Freq.	Station/Country	UTC	Notes
2390	Radio Huayacacotla, Mexico	1130	SS	4850	Radio Luz y Vida, Ecuador	1100	SS
3222	Radio Kara, Togo	0600	FF	4875	Radiodifusora Roraima, Brazil	0200	PP
3250	Radio Luz y Vida, Honduras	1100	SS	4890	NBC, Papua New Guinea	1130	
3260	Radio Madang, Papua New Guinea	1100		4895	La Voz del Rio Arauca, Colombia	0230	SS
3270	Namibia Broadcasting Corp.	0300		4905	Rdf. Nationale Tchadienne, Chad	0600	FF
3290	Radio Centro, Ecuador	0900	SS	4905	Radio Anhanguera, Brazil	0900	PP
3330	CHU, Canada	0200		4905	Ecos del Orinoco, Colombia	0400	SS
3356	Radio Botswana	0300		4914	Radio Cora, Peru	0300	SS
3360	Radio Nahuala, Guatemala	1100	SS	4915	Ghana Broadcasting Corp.	0600	
3398	Radio Internacional, Peru	0930	SS	4920	Radio Quito, Ecuador	0400	SS
3975	Radio Budapest, Hungary	0530		4930	Radio Internacional, Honduras	0200	SS/EE
4702	Radio Eco, Bolivia	0200	SS	4935	Kenya Broadcasting Corp.	0430	
4725	Radio Myanmar	1100	Burmese	4950	Radio Baha'i, Ecuador	0900	
4760	ELWA, Liberia	0600		4955	Radio Nacional, Colombia	0200	SS
4765	Radio Rural, Brazil	0200	PP	4960	Radio Federacion, Ecuador	1130	SS
4770	Radio Nigeria, Kaduna	0430		4980	Ecos del Torbes, Venezuela	0200	SS
4790	Radio Atlantida, Peru	0300	SS	4991	Radio Ancash, Peru	0400	SS
4805	Radiodifusoras Amazonas, Brazil	0200	PP	5010	Radio Garoua, Cameroon	0530	FF
4815	Radio Burkina, Burkina Faso	0700	FF	5020	La Voix du Sahel, Niger	0600	FF
4820	La Voz Evangelica, Honduras	0200	SS/EE	5025	Radio Rebelde, Cuba	0400	SS
4830	Radio Tachira, Venezuela	0300	SS	5030	Adventist World Radio, Costa Rica	0230	
4835	Radio Tezulutlan, Guatemala	0200	SS	5047	Radiodiffusion Togolaise, Togo	0530	FF

Freq.	Station/Country	UTC	Notes	Freq.	Station/Country	UTC	Notes
5055	Faro del Caribe, Costa Rica	1030		9925	Radio Vlaanderen Int'l, Belgium	0030	
5075	Caracol Colombia, Colombia	0200	SS	9930	KWHR, Hawaii	1000	
5645	La Voz de San Antonio, Peru	0100	SS	9955	WRMI, Florida	1400	
5900	Radio Vlaanderen Int'l, Belgium	0015		9965	KHBN, Palau	1500	
5930	Radio Prague, Czech Republic	0000		11000	China National Radio	0900	CC
5960	Radio Japan, via Canada	0300		11335	Radio Pyongyang, North Korea	0000	
5975	BBC, England, via Antigua	0000		11402	Icelandic National Broadcasting Serv.	1430	Ice
5981	AWR, Guatemala	1230	SS	11570	Radio Pakistan	1600	
6000	Radio Havana Cuba	0400		11615	Radio France Int'l	1230	
6005	BBC, via Ascension	0530		11645	Voice of Greece	1800	GG/EE
6015	Radio Singapore	1300		11660	Radio Australia	1500	
6020	Radio Netherlands, via Bonaire	0100		11675	Radio Kuwait	0300	AA
6030	CFVP, Canada	1200		11715	China Radio Int'l, via Mali	0000	
6040	Radio Clube Paranaense, Brazil	0200	PP	11715	RAE, Argentina	0100	
6045	Deutsche Welle, Germany	0300		11734	Radio Tanzania, Zanzibar	1930	AA
6065	Christian Voice, Zambia	0500		11740	Radio Havana Cuba	1700	SS
6070	CFRX, Canada	0700		11765	Radio Universo, Brazil	2200	PP
6090	Radio Esperanza, Chile	0700	SS	11780	Radio Austria Int'l	1600	
6115	Radio Union, Peru	0300	SS	11780	Radio Nacional Amazonas, Brazil	2300	PP
6130	CHNX, Canada	1200		11805	Radio Globo, Brazil	2200	PP
6150	AWR, Costa Rica	0500		11815	Polish Radio	1330	
6160	CKZN, Canada	1100		11840	Radio Denmark, via Norway	1430	
6185	Radio Educacion, Mexico	0400		11870	FEBA, Seychelles	1500	
6205v	Radio For Peace Int'l, Costa Rica	0200		11900	Radio New Zealand Int'l	0400	
6210	Radio Fana, Ethiopia	0400	Amharic	11925	Radio Bandeirantes, Brazil	2300	PP
6250	Radio Nacional Malabo, Eq. Guinea	0500	SS	11930	VOIRI, Iran	1130	
6260	Voice of Greece	0300	GG/EE	11960	HCJB, Ecuador	2000	
6402	Radio Imperial, Peru	1100	SS	11970	Radio Jordan	1200	
7105	Voice of Russia	0100		11990	Radio Kuwait	1800	
7115	Radio Yugoslavia	0030	Serb.	11995	Radio France Int'l, via French Guiana	2330	
7115	Trans World Radio, Monaco	0800		12000	Radiostansiya Atlantica, Russia	0200	RR
7143	Radio Altura, Peru	0200	SS	12019	Voice of Vietnam	1300	
7170	RTV Senegal	0600	FF	12055	Voice of Russia	1100	
7185	Channel Africa, South Africa	0500		13675	UAE Radio, Dubai	1600	
7185	Radio Bangladesh	1200		13730	Radio Austria Int'l	1400	
7255	Radio Botswana	0500		13755	Reshet Bet, Israel	1300	
7265	BBC, via Cyprus	0000		15060	Bcst. Svc. of Kingdom of Saudi Arabia	1400	AA
7345	Radio Prague, Czech Republic	0100		15095	Radio Damascus, Syria	2030	
7370	Croatian Radio	2300	CR	15160	Radio Algiers, Algeria	2000	
7465	RTT, Tunisia	0500	AA	15240	Channel Africa, South Africa	1600	
8000	Voice of Sudan (clandestine)	1400	AA	15240	Radio Sweden	1430	
9022	VOIRI, Iran	1930		15265	Radiobras, Brazil	1800	
9370	KSDA, Guam	1000		15290	Radio Jordan	0500	AA
9420	Voice of Greece	0100		15325	Radio Canada Int'l	1400	
9445	Voice of Turkey	0400		15400	Radio Finland	1230	
9505	Radio Havana Cuba	0500		15400	BBC, via Ascension	1900	
9540	Radio Exterior de Espana, Spain	0000		15420	BBC	0600	
9555	Radio Portugal	0200		15510	Radio Vlaanderen Int'l	1000	
9565	Radio Universal, Brazil	2300	PP	15530	Radio Australia	1100	
9590	Radio Denmark, via Norway	0830	DD	15530	Radio Australia	1100	
9605	UAE Radio, Abu Dhabi, UAE	2300		15650	Voice of Greece	1500	
9620	Radio Ukraine	0000	GG	17575	Radio France Int'l, via French Guiana	1400	
9650	Radio Korea, via Canada	1130		17585	Vatican Radio	1300	
9675	Radio Cancao Nova, Brazil	0800	PP	17620	Radio France Int'l	1600	
9680	Voice of Indonesia	1200	II	17795	Radio Australia	2300	
9710	Radio Vilnius, Lithuania	2230		21455	HCJB, Ecuador	1400	
9715	Radio Tashkent, Uzbekistan	1430		21615	Radio Portugal	1430	
9720	SLBC, Sri Lanka	1500					
9725	Adventist World Radio, Costa Rica	2300					
9755	Radio Canada Int'l	0300					
9775	Voice of America, via Botswana	0500					
9780	Republic of Yemen Radio	0300	AA				
9805	Radio France Int'l	1200					
9810	Far East Bcing Assn., Seychelles	1530					
9840	Voice of Vietnam	1300					
9870	Bcst. Svc. of Kingdom of Saudi Arabia	2230	AA				
9900	Radio Cairo, Egypt	0000					





# How I Got Started

Popular Communications invites readers to submit in about 150 words how they got started in the communications hobby. They preferably should be typewritten, or otherwise easily readable. If possible, your photo should be included.

Each month we will select one entry and publish it here. You need submit your entry only once; we'll keep it on file. All submissions become the property of Popular Communications, and none can be acknowledged or returned. Entries will be selected for use taking into consideration if the story they relate is especially interesting, unusual, or even humorous. We reserve the right to edit all material for length and grammar, and to improve style.

The person whose entry is selected will receive a one-year gift subscription (or a one-year subscription extension) to Popular Communications.

Address all entries to: How I Got Started, Popular Communications, 76 N. Broadway, Hicksville, NY 11801-2909, or e-mail to POPCOMM@aol.com.



Hugh Waters has come a long way since listening to his original low-capability multiband radio. He is pictured at home in his shack.

## Our July Winner

This month, Hugh Waters writes in from Singapore:

"The year was 1968 when my friend Bill Purvis and I were tuning around a multiband radio in a Georgia Tech dormitory. The unit had a large, impressive cabinet with plenty of knobs, dials, switches, even a rotating mediumwave directional loop on top! Besides the standard AM/FM bands, it offered public safety bands and shortwave! Its performance was dismal though, except for nearby high-power stations!

"Anyway, we managed to tune in Radio Netherlands and were excited to receive far-away Holland! We did discover later that we had been receiving the Netherlands Antilles relay from the Caribbean.

"While in the U.S. Air Force Security Service, I spent time in various

language, radio and survival schools training to become an airborne radio intercept operator/Chinese linguist. Subsequent duty involved flights in the periphery of the Vietnam conflict.

"Since those days, my interest and knowledge of shortwave have increased. I've visited more than 20 countries within Asia and Eastern Europe, and have been entertained and accommodated by staffs of various national shortwave services. Advice gained in the air during home stays on avoiding or dealing with local black markets, Mafia taxis, etc., resulted in my saving lots of money and possibly my life, especially in countries like Cambodia, Romania and Russia.

"Americans are lucky that listening to foreign shortwave broadcasts is not considered a treasonous or unpatriotic act."

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## 27 MHz COMMUNICATIONS ACTIVITIES

### Response To Citizens Radio Corps Idea

A few months ago, this column published a letter complaining about overpowered CB operators written by a gentleman who works in the Federal Communications Commission's Philadelphia area office. Apparently, the FCC agent didn't realize the majority of CB operators also are overwhelmingly in favor of getting "bad apples" off CB airwaves. He asked for help in solving the problem.

In response to the FCC letter, and to many letters I have received from readers who would like the airwaves cleaned up, and also as a partial remedy to downsizing the FCC nationwide, I proposed the creation of the Citizens Radio Corps (CRC).

The CRC would be a volunteer organization with two purposes:

- To monitor and, when appropriate, respond to distress calls on frequencies that are available to the public—CB Channel 9 (27.065), VHF Marine Channel 16 distress/calling frequency (156.800), the aircraft emergency frequency (121.500) and GMRS travelers assistance frequency (462.675).

- To detect and resolve interference problems on any of these frequencies. With proper training and licensing, CRC operators would be empowered to locate stations that may be causing interference, to inspect those stations, and to issue violation notices.

The response to this idea was astounding—the greatest I have had to any single column. A lot of people wrote to the FCC and sent me copies of their letters.

Larry Fisher, a volunteer firefighter for more than a decade in West Virginia,

wrote, "I think your idea on the national Citizens Radio Corps is a very good idea. And I would be very willing to participate in this program." He also added that if the CRC gets started, that CRC license plates (like many states have for volunteer firefighters) would be a good idea, so authorities would know "who we are and why we might be on a scene."

Nelson Pickett from Colorado wrote to me (in part): "There are a lot of decent CBers that I know of who won't tolerate the crap that we hear every night...and I am one of them...I hope to God that something is done to stop these illegal operations on the radio, and I would like to be a part of the CRC that is proposed."

Pickett, a former reserve military police officer, also wrote to the FCC: "I agree with the CRC and feel that it's a good idea...I myself am a CBer for close to 40 years, and I also possess a restricted commercial FCC license that I have had since the mid-1950s. I am very much an advocate of enforcement of the rules and regulations."

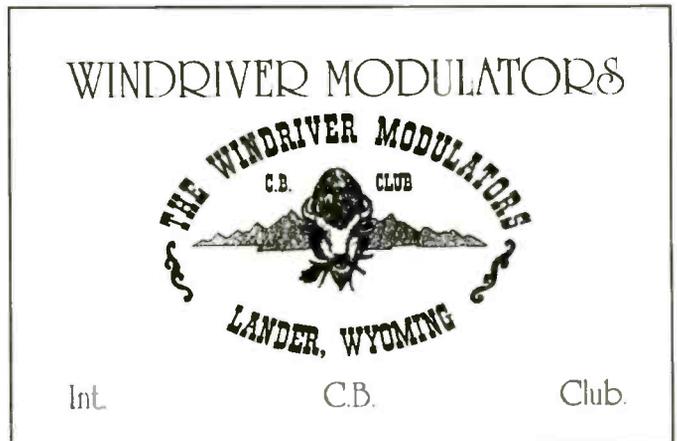
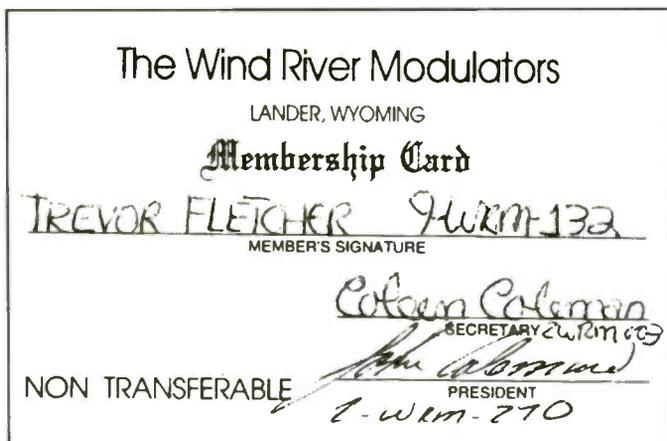
Brian Flaherty, deputy chief, administration, of Jersey Coastal Emergency Services Inc. in Glen Rock, N.J., wrote to the FCC: "I am writing on behalf of our volunteer public safety agency that uses CB radio to aid the general public. Our members monitor CB Channel 9 and report emergencies and distress calls to the police and appropriate authorities. During an executive board meeting on Feb. 17, our chief, Paul Haggerty, distributed copies of Jock Elliott's most recent CB Scene column from the March 1996 issue of *Popular*

*Communications* magazine. The article "FCC Seeks Help Vs. Illegal Operators" featured your letter regarding your office's enforcement problems.

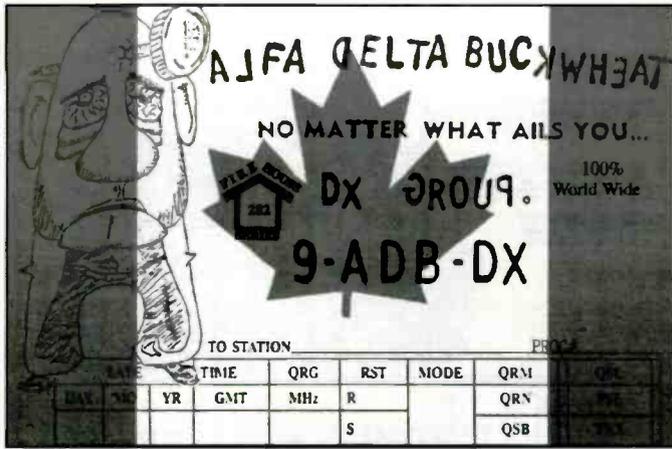
"In response to your letter, Jock Elliott proposed creating a Citizens Radio Corps (CRC) of trained volunteers that would assist your agency in policing CB radio. Jersey Coastal wholeheartedly endorses his proposal. Our members would be more than willing to participate in such an endeavor to self-police the CB airwaves and assist the FCC. The problem of CB interference is just as bad in the New York-New Jersey metro area where our members must constantly battle interference from CBers running illegal, powerful transmitters. With the right training and direction, CRC members could be an added benefit to your enforcement efforts."

Charles Hollowell of North Carolina said to the FCC: "I agree that something has to be done about maintaining law and order when it comes to emergency communications. As a 911 operator, I know firsthand the problems with CB operators interfering with telephones and television. Our 911 center experiences interference from CBers with high-power linears from time to time. The 911 center also receives calls from time to time about telephone and television interference from CBers.

"I am a CB operator myself...I would like to know more about how a citizens radio corps group could be established and what type of power would the members have to enforce the laws...We need something soon before other communications



Trevor Fletcher sent in these great cards from the Windriver Modulators.



These Canadian cards came from "Archie."

such as GMRS and VHF marine radio services become polluted by violators like that of the CB radio service."

There were many other letters as well, all supporting the idea of the CRC (although some proposed variations on the idea).

On a related theme, Philip Galasso, an amateur radio operator, wrote from New Jersey to point out to the FCC that often consumer electronics equipment is so poorly designed that it is very susceptible to interference, even when the local radio

operator (CBER or amateur) is running a perfectly legal station.

Galasso's point leads to another thought: we have to get our priorities straight when dealing with interference complaints. It is my belief that emergency communications should have priority over all others. (In addition, the communications of professional emergency responders—fire, police, and so forth—should have equal priority.) In other words, it is more important that a ship, an aircraft or a motorist in distress

should be able to get through with their call for assistance—and have that call responded to—than it is for someone to, say, watch a TV program or listen to a stereo.

Even one of the most common calls we take on CB Channel 9, a car stalled in traffic, is a serious situation. I've been monitoring Channel 9 for a little more than a decade, and I can tell you that, just as surely as apples fall from the tree, if a stalled car is not cleared from the traffic lane within a few minutes, it becomes an accident...usu-

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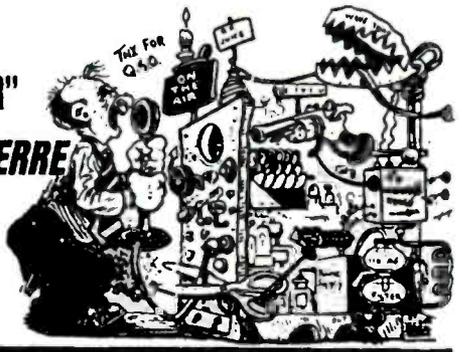
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Danny Newman sent in these fine-looking cards.

ally with damage to property and sometimes with personal injuries or worse.

So it makes me wonder, wonder very much indeed, why the FCC will choose to pursue low-priority cases like Howard Stern (probably because it has such high public visibility) when so little seems to be done to keep Channel 9 available for emergency and assistance communications. The answer to Howard Stern is easy enough: If you don't like him, turn him off.

But Mr. or Mrs. John Q. Public, stranded on the crowded freeway with a couple of kids in the car, doesn't have that option: either CB Channel 9 works for them, or it doesn't (and not everyone can afford the monthly charges for a cellular phone). And the same thing can be said of the other emergency frequencies: when you need them, you really need them.

When it comes to CB Channel 9, there's even worse news: failure to protect it has

resulted in Channel 9 monitors becoming discouraged by the interference and ceasing to monitor for people in distress. I have heard of a couple of REACT teams that no longer monitor Channel 9 because of interference. The public deserves better.

On the other hand, a number of dedicated teams across the United States have shown time and again that persistent Channel 9 monitoring produces admirable results—Channel 9 usage actually rises in

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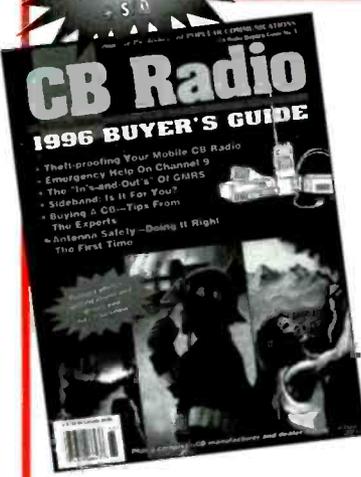
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areas where the public knows that the channel is being monitored; lives are saved; emergency response is speeded; property is protected; and everyone who participates feels that they are part of something worthwhile.

You haven't heard the last of the Civilian Radio Corps idea. Keep your eye on this column for further developments.

### From The Mailbag

The Mid-Iowa Sideband Association wrote a nice letter and sent a certificate making me an honorary member. Thank you! I am honored, and if someone from your club will write to me with your return address, I'll make sure that the people who read this column will know how to reach you for additional information.

Unearthed from a long-neglected corner of the mailbag: Jumping Jack from Jackson, Miss., wrote wondering whether digital signal processing will make its way into CB radio? The short answer: eventually. One CB radio incorporates a digital noise reducer, but its effectiveness is marginal. There are ham rigs and top-gun shortwave receivers with digital signal processing available now, and they are expensive. But the real problem is that digital processing requires lots of "head room." Otherwise, the received signal just sort of



Join the Mid-Iowa Sideband Association, and you get this impressive certificate.

"falls apart" when a really loud signal starts to overwhelm the receiver.

To provide that head room, you need a really fast digital processor. Unfortunately, really fast processors are expensive for now. But as the price of processing drops, as it has in the past, and as chip manufac-

urers get more and more onto their products, we'll see truly effective digital signal processing appearing in CB rigs.

Well, that's it until next time. Thanks for those cards and letters and shack photos! Please keep them coming to me here at POP'COMM.

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CIRCLE 58 ON READER SERVICE CARD

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## AOR AR8000 Handheld Radio Receiver

I can remember sitting around one night at a radio convention about a dozen years ago. As late night became early morning, the conversation shifted to receivers we wished somebody would design.

It was unanimous. We all wished for a DC-to-daylight receiver we could hold in the palm of our hand. At that time, we also laughed off the idea as nearly impossible and probably too darned expensive even if somebody really could design one. Well here we are in the middle of 1996 and just such a radio exists: a true all-band, all-mode handheld receiver—the AOR AR8000. As if DC-to-daylight coverage weren't enough, this little box has more features than I could cover in several articles.

The AR8000 came my way as part of my Checked Out duties for the Optoelectronics Scout (*POP'COMM*, June 1996). Up until now, I had admired this rig from a distance. Finally, I had the chance to see whether it lived up to its reputation. The AR8000 is so popular that it tends to go on back order with many of its suppliers on a regular basis. Further, a whole body of support software has been made available both through shareware and commercial distribution.

There even is a "users group" for this rig, something I've heard of only once before—some years ago, for the Collins R390A. Needless to say, the Internet is the home of several ongoing discussion groups. Not many receivers achieve true cult status. The AR8000 seems to be one of those few. Part of this popularity must be attributed to the fact that it is one of the few receivers in production today that lends itself to cellular frequency restoration. But this radio's popularity and performance go well beyond this single feature. Let's open the box and see what we find.

### What's It Got?

General specifications include full frequency coverage capability from 500 kHz to 1900 MHz. In other words, take a standard mediumwave broadcast receiver, a general coverage shortwave receiver and a premium VHF/UHF scanner and combine them into a single unit. In addition to this wide frequency coverage, the AR8000 boasts all traditional modes of operation such as AM, USB, LSB, CW, NFM and WFM. This capability is further supported by 1,000 memory channels. These basic



### AOR AR8000

List price: \$799

Street price: > \$600

Manufacturer: AOR Ltd., 2-4-6 Misuji, Taito-ku; Tokyo 111, Japan

### North American distributor:

EDCO Electronics Distributors  
325 Mill St., Vienna, VA 22180  
phone (703) 938-8105

capabilities would be considered exceptional in any desktop receiver but here they are found in a lightweight handheld unit.

The receiver's physical size is 6-3/4 inches tall, 2-7/8 inches wide and 2-3/4 inches deep (with belt clip installed). This is relatively the same size as many currently popular handheld scanners and amateur radio FM transceivers. Because I am known to walk the earth with a scanner perpetually hanging from my belt, the AR8000 fit right in with my lifestyle. The unit also has one "hard point" for attaching a carrying or support/security strap. I don't know about you, but the thought of losing a radio worth more than \$600 makes me glad this feature was included by the designers.

The first and most important feature of the AR8000 is its comprehensive 115-page manual. No radio of this sophistication and size can be mastered by a few minutes of fiddling with its buttons. The AR8000's engineers anticipated this issue and designed it in two levels of operation to facilitate shrinking the learning curve as much as possible. The receiver can be set to operate in either NEWUSER or EX-

PERT status. I was glad for the NEWUSER mode because my time with the receiver was limited and I wanted to get listening without any delay. Still, if you've never responded positively to the words "read the manual" in the past, now is the time to change your ways. The AR8000 can be mastered only through the manual. This is by no means a criticism. Rather, it points to the myriad features that are available to any serious user.

The receiver is controlled by way of 24 buttons, most of which are multifunction. There also are control knobs for power/volume, squelch and dial tuning. The AR8000 provides frequency readout as well as a great deal of other information by way of an LCD dot-matrix alphanumeric display. The display and buttons have backlighting capability for operation in dark places. You also will find jacks for 12-volt DC power input, 3.5mm earphone and external antenna. The receiver has an internal ferrite rod antenna for mediumwave reception. The receiver can be connected to most external antennas by way of the standard 50-ohm BNC connector I just mentioned. The AR8000 comes with a 16cm "rubber duck" antenna for general use. Internal power comes from 4 AA cells. The unit will accommodate rechargeable cells and charges these by way of the supplied charger/power supply. The receiver has a POWER SAVE function that allows the receiver to go into a dormant state in order to save battery resources. This function is adjustable to suit the user's needs.

### Features

Hidden away under the battery cover is the most intriguing connector of all. A special RS232C connector, only 10mm wide and 3mm high, allows the AR8000 to link with computers and other devices such as the Optoelectronics Scout. This port also can be used with AOR options that allow tape recorder control and "cloning" of data between two AR8000 units. Let's say a friend of yours has taken the time to program all 1,000 channels of his or her AR8000 with frequencies of mutual interest. Rather than wearing out your finger entering the same 1,000 channels, the data port can be used (with AOR optional CU-8232 interface) to copy all of those frequencies into your own unit. I took advantage of just this feature to quickly enter a chunk of local

## AR8000, Scout Symbiosis

As I mentioned, this receiver was part of a larger test of the Optoelectronics Scout's "reaction tuning" capabilities.

The Scout was hooked up to the AR8000's data port by way of a short cable through a modified battery cover. Together these units provided the ultimate event-oriented scanning tool. The Scout would capture any active frequencies within range and directly dump them into the AR8000's memory banks. The user could take full advantage of this on-the-fly programming to hear what was going on without needed to resort to a good deal of frequency research and manual programming. The AR8000 functions excellently in this symbiotic role with the Scout.

— W.W. Smith

As I stated at the outset of this article, cramming all of the AR8000's features into the space I am allotted for this column would be impossible. I will, however, go over the major features that impressed me during my tests as best as space allows.

The 1,000 memories are available to the users as 20 search banks of 50 frequencies. Memory locations are identified on the LCD panel by a combination of letters and numbers. Each memory location is capable of storing frequency, mode and seven characters of text. If you're like me and a bit weak on keeping track of who is on what frequency, this text-entry feature is a big help in keeping things sorted out, especially when dealing with 1,000 possible frequencies. Frequencies can be massaged in a number of ways to allow best use of the memory banks. An interesting feature is an assignable PASSWORD. This feature allows you to prevent access to 10 of the memory banks by assigning a four-digit password. This allows the user to protect proprietary frequency information from prying eyes. Any of the 1,000 channels can be set as a priority channel. Once selected, this channel is checked every five seconds for activity. The contents of the AR8000's memory are stored in an EEPROM. This means that no battery backup or capacitor is needed to assure that memory locations are not lost.

The BANDSCOPE feature displays five

channels on each side of an assigned center frequency. This lets the user check these nearby channels for activity by way of a vertical bargraph shown on one line of the alphanumeric display. This is like having a small spectrum analyzer built into your handheld receiver. This feature goes beyond the dreams of my friends and I during that bull session 12 years ago. The unit also has a bargraph style signal-strength meter capability and a 10dB attenuator to reduce overloading by strong signals.

The receiver is capable of operating in a SEARCH mode allowing automatic storage of active frequencies in one bank of the AR8000's memory. This mode of operation can be further augmented by "reaction tuning." This process allows direct entry of frequencies into the AR8000's memory locations by way of a device such as the Optoelectronics Scout. This is accomplished through the unit's data port.

The AR8000 is capable of operating in a dual VFO mode. This allows one frequency to be active while a second frequency is held in standby. A press of a key toggles between these two frequencies.

Unlike most receivers on the market, the AR8000 lets the advanced user make adjustments to the timing of some features that normally are factory set. VCO/phased lock loop, squelch detect, audio wait, audio level and level wait all can be modified to suit the user's specific needs.

frequencies thanks to another AR8000-equipped scannist in my neck of the woods. This ability to transfer and massage data sets the AR8000 apart from all but the most advanced receivers on the market today. Also, the unique data port configuration brings this data control feature, usually reserved for tabletop receivers, to the handheld world.

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**Put To The Test**

So how does the AR8000 perform in the real world? I hung the receiver on my belt for a long weekend and found the unit hard to ignore. I had programmed in the "normal" 200 or so VHF/UHF frequencies I regularly carry in my scanner. This level of operation was what I was used to. I found the AR8000 to be a fine "scanner." The real novelty and versatility of this receiver came about, to me, by virtue of its ability to do things that a traditional scanner cannot. This included monitoring frequencies below 30 MHz. I programmed in about 50 popular shortwave broadcast frequencies as well as a dozen or so of my favorite mediumwave stations. Now I essentially could listen to just about anything I normally would tune in on the receivers I have in my office. Like most modern receivers, the most significant improvement in overall performance comes from the addition of higher performance antennas.

Positioning the unit to hang from my belt helped tune the easy stations. Connecting the AR8000 to a good outside long-wire brought in many DX catches on shortwave. Mediumwave performance was enhanced by connecting the receiver to an air-core loop.

The receiver's performance is excellent with improved antennas, though this sacrifices portability. This is a reasonable tradeoff, especially for the traveler. A good performance compromise might be a longer whip antenna. I happened to have a 48-inch collapsible whip with a BNC base connector on my workbench. The addition of this antenna improved the shortwave performance over the shorter rubber ducky antenna.

Remember, the AR8000's data port also allows the user to interface the unit with a personal computer. There are several programs available on the commercial and shareware markets that allow the AR8000 user to both load and extract information using a PC. The addition of this capability actually serves to reduce some of the more time-consuming and complicated tasks associated with using the AR8000. The hot setup here is the addition of a laptop computer to the user's collection of listening tools. Toss in a couple of good antennas and you end up with a complete monitoring station in a briefcase that would make all but the most advanced surveillance professional green with envy.

The AOR AR8000 is a truly amazing development in the radio hobby. True all-mode DC-to-daylight scanning capabilities in such a small package proves that dreams can come true. I guess its time to put in my request for 12 years in the future. By then, I fully expect the folks at AOR to have this package down to the size of my wristwatch!

# Broadcast DXing

BY TIM KRIDEL

DX, NEWS AND VIEWS OF AM AND FM BROADCASTING

## Army Hauls One Trucking Station

While the Federal Communications Commission's computer still was trying to figure out which stations could move to the expanded AM band, the U.S. Army set up a temporary radio station of its own on 1670 kHz in early February. The 5-kW station, run by the Army Broadcast Service, broadcast from a portable setup based in Fort Meade, Md. The studio and equipment were housed in a 19-foot-long trailer and featured a Harris Gates 5FA transmitter running into a TUP-3 folded monopole antenna. The four-day test began on Feb. 5 and included everything from songs by Iron Butterfly and Queen to test tones, and was heard by DXers as far away as California.

The station first IDed as KTRK and "K-Truck," after its facilities. But that ID was soon replaced by "ABS," for Army Broadcast Service, following a complaint by Houston's KTRK-TV.

Although the test broadcasts were on 1670 kHz, the station is frequency-agile, meaning it can operate anywhere from 530 kHz to 1705 kHz. This feature provides a great deal of flexibility as the station is moved around the world—it can pick any open channel, regardless of whether stations in that area are tuned in 9- or 10-kHz steps. And that feature soon proved handy—following the broadcasts, the station was packed up and shipped to Bosnia, where it was planned to broadcast on 1143 kHz to U.S. troops stationed there.

Reception reports can be sent to Dave Browne at the Army Broadcast Service, Room 340, 601 N. Fairfax St., Alexandria, VA 22314.

### Country Wasn't Cool?

Although country music remains by far the most popular format in the United States, the nation's largest radio market has lost its only major country outlet. New York City's WYNY-FM in late January dropped its decade-old format of country in favor of urban-dance music as "The Beat, WKTU." The long-rumored switch apparently is the result of ratings in the high teens, which didn't please executives at parent company Evergreen Media.

The switch itself was one of the more unusual in recent memory—rather than abruptly dropping the old format for the new, the station spent six days undergoing the change.



Lloydminster, Alberta, is home to CKSA-AM. The Canadian station runs 50 kW days and 10 kW nights on 1080 kHz. (Courtesy of Trevor Fletcher, Edmonton, Alberta)

The first day, WYNY simulcast one of Evergreen's Chicago outlets, WRCX, IDing as "Rock 103.5, Chicago-New York." During the course of the week, similar joint simulcasts of KKBT, WLUP, KIOI and WXKS were featured, until disco and the WKTU calls finally were debuted. This strange process led several industry insiders to conclude that Evergreen used the format change to kill two birds with one stone—dump an unsuccessful format and showcase some of the company's other stations in Wall Street's back yard.

Although at press time the station hadn't yet received FCC approval to change its calls to WKTU, station officials apparently hope to build on the legend of the old WKTU. That station ruled the New York City airwaves as a disco music outlet in the late 1970s—and promptly lost its position when that music became as unfashionable as the wide lapels and bell bottoms it was associated with. Whether the new WKTU can make a Travoltaesque comeback remains to be seen, but one thing is certain—the format change puts the station in the middle of an already-fierce competition for the urban-dance audience.

Now that WYNY has gone the way of WJRZ, WKHK and WHN, many urban cowboys are left frustrated, wondering where they can tune for their favorite music

and whether another station will change formats to serve them. The change fueled rumor and speculation that one or more stations in New York City and on Long Island would go after the homeless country fans, with the stations being circulated including WAQX, WNEW, WMXV, WBLI, WKJY and WDRE, all FM. While country is the format at some 2,600 U.S. stations—more than twice that of adult contemporary and talk combined—it constitutes only a small slice of the New York City radio pie. That portion wasn't enough for Evergreen, and it may not be enough to entice other broadcasters. As one industry insider told the Long Island newspaper *Newsday*, "Stations are deciding whether they want to go after a two to three share and own the market, or get into a dogfight for part of a 25 share."

### The C-Word

A new broom sweeps clean. Perhaps nowhere else does that cliché ring more true than in St. Louis. First Mike Keenan came to town, remaking the Blues as part of his "culture of change." Then Tony LaRussa took over the Cardinals, bringing with him coaches, trainers and players until the franchise almost became the Oakland Cardinals.

Now, Rod Zimmerman has done much the same with another St. Louis institution

—KMOX. And the general manager is starting to feel the wrath that comes when fan favorites are sent packing. In the past few months, the station has laid off several high-profile on-air personalities and engaged in a nasty confrontation with the American Federation of Television and Radio Artists over contracts. Downsizing is clearly the driving force, with 10 jobs being cut, including a couple of news producers and sports reporter Randy Karraker. There was briefly even a rumor that Jack Buck had resigned—a rumor that both Zimmerman and Buck quickly denied. “We’ve been decimated,” one staffer told *The Riverfront Times* newspaper. The place “feels like a funeral home,” said another.

In the end, “The Voice of St. Louis” may well be the leaner and meaner—or at least bitter—outfit that new owner Westinghouse Electric is demanding since its \$5.4 billion purchase of CBS last year. While KMOX still commands the lion’s share of the St. Louis radio audience, its ratings have declined from 26 percent in 1976 to about 13.9 percent in 1995. Several programs that focused on local issues have been eliminated over the past two years, sometimes to make room for ratings-boosters like the Rush Limbaugh show, sometimes simply to cut overhead by eliminating on-air and production staff. Sports—long a KMOX monopoly and a solid source of revenue for the station—has suffered as well. Labor problems in hockey and baseball cost lucrative games, and the station lost a bid last year for the broadcast rights to Rams football.

Anne Keefe, host of *At Your Service* from 1976 to 1993, attributed KMOX’s declining ratings in part to the steady increase in the number of news sources, from other radio and TV stations to C-Span and CNN. (Ironically enough, it’s a former CNN correspondent, Charles Jaco, who will co-host KMOX’s revamped early morning show.)

“It used to be that KMOX was where the breaking news was,” Keefe said in a 1995 *St. Louis Post-Dispatch* interview. “You tuned immediately to KMOX, because that’s where you’d find out, right now, what’s going on.” Today, “there are too many stations, too many television stations, too many news stations. So the people have too many choices.”

But Keefe admits that KMOX’s slide also is because of a loss of stability that has come with new ownership. “I think what KMOX had was a feeling of family, the same people had worked there for many years,” she said. “When I came there, Bob Hardy and Rex Davis and Jim White and [Jack] Carney had all been there 10 to 15 years, so that it was a family I was coming into. And since then everybody is young and new, and so you feel like your next-door neighbor has moved, and there is a new family in there. Whether they’ll make it or not, as close friends, I don’t know.”

## Applied for Permits to Construct New FM Stations

AK	Anchorage	93.7 MHz	
AR	Viola	94.3 MHz	
AZ	Phoenix	89.1 MHz	
AZ	Superior	91.9 MHz	
CA	Healdsburg	96.7 MHz	
CA	Rancho Bernardo	106.5 MHz	4 watts (KKLW booster)
IA	Sioux City	91.3 MHz	
IA	Waterloo	91.3 MHz	
IL	Colchester	104.1 MHz	
IL	Hoopeston	91.3 MHz	
IL	Morrisonville	89.1 MHz	
IN	Goshen	89.5 MHz	
IN	Graysville	88.1 MHz	
IN	Terre Haute	89.1 MHz	
KS	Topeka	90.9 MHz	
KY	Mount Eden	88.1 MHz	
KY	Wilmore	90.7 MHz	
MD	Salisbury	88.1 MHz	
MI	Benton Harbor	89.9 MHz	
MI	Kalamazoo	91.7 MHz	
MN	Brainerd	91.5 MHz	
MN	St. Joseph	99.9 MHz	
MO	Crane	91.9 MHz	
MO	Jefferson City	91.9 MHz	
MO	Joplin	91.3 MHz	
MS	Calhoun City	102.3 MHz	
NC	Charlotte	91.9 MHz	
NJ	Ocean City	88.1 MHz	
NM	Albuquerque	88.7 MHz	
NM	Raton	96.5 MHz	
NV	Pioche	98.9 MHz	
NY	Rosendale	102.5 MHz	
OH	West Lodi	88.5 MHz	
PA	Erie	90.5 MHz	
PA	Hazleton	88.3 MHz	
SD	Chester	89.9 MHz	
TX	El Paso	91.5 MHz	
TX	Karnes City	103.1 MHz	
VA	Jonesville	99.1 MHz	
VA	McGhaneyville	88.1 MHz	
WA	Pasco	93.7 MHz	
WI	Oshkosh	91.3 MHz	
WI	Platteville	89.7 MHz	

## Granted Permits to Construct New FM Stations

FL	Apalachicola	105.5 MHz	6 kW
GA	Demorest	88.3 MHz	6 kW
HI	Hanalei	90.9 MHz	900 watts
HI	Kilauea	91.9 MHz	950 watts
IL	Freeport	89.1 MHz	2.2 kW
IL	La Salle	91.3 MHz	8 kW
IL	Sterling	91.5 MHz	2.1 kW
IN	Terre Haute	91.9 MHz	1 kW
ND	Bismarck	98.7 MHz	100 kW
OK	Pawhuska	103.9 MHz	3 kW (ex-104.9 MHz)
TN	Cookeville	91.7 MHz	5 kW
WY	Newcastle	99.3 MHz	6 kW

## Canceled

KDLP	Bayou Vista, LA	1170 kHz	500 watts
KMMX-FM1	Lubbock, TX	104.7 MHz	4.5 kW (KMMX booster)
KZAM-FM1	Eugene, OR	95.3 MHz	(KZAM booster)
WAEI	Wautoma, WI	93.1 MHz	6 kW
WFYN	Rocky Mount, VA	99.9 MHz	3 kW (ex-WZBB)
WHMI	Howell, MI	1350 kHz	500/29 watts
WQMR	Jewett, NY	97.9 MHz	1.45 kW
WVOM	Iuka, MS	1270 kHz	1 kW
WWGS	Tifton, GA	1430 kHz	5/1 kW
WYMI-FM1	Greenville, SC	102.5 MHz	(WYMI booster)
WZPR-FM1	Erie, PA	100.3 MHz	23 watts (WZPR booster)

## Seeking Modified AM Facilities

KXKS	Albuquerque, NM	1190 kHz	Seeks to add night service.
WBCB	Levittown, PA	1490 kHz	Seeks to add synchronized transmitter.
WHFB	Benton Harbor, MI	1060 kHz	Seeks to add night service.
WSQR	Sycamore, IL	1560 kHz	Seeks to add night service.

## Modified AM Facilities

KRAO Opportunity, WA 840 kHz Moved to Colfax, 10 kW/ 280 watts.

## Changed AM Call Letters

New	Was	
KBSZ	KTIM	Wickenburg, AZ
KHIT	KNRX	Great Falls, MT
KJOX	KZTA	Yakima, WA
KPKG	KAON	Gunnison, CO
KSLX	KOPA	Scottsdale, AZ
KSML	KAFX	Diboll, TX
WDLX	WRRF	Washington, NC
WEBG	WJRV	Loretto, PA
WEEX	WIPI	Allentown, PA
WPLV	WCJM	West Point, GA
WRAH	WLWZ	Easeley, SC
WTCK	WWWB	Greensboro, NC
WXGO	WORX	Madison, IN

## Pending FM Call Letter Changes

New	Old	
WRQM	WESQ	Rocky Mount, NC
WYFQ-FM	WRPL	Wadesboro, NC

## Changed FM Call Letters

New	Was	
KAKT	KROG	Phoenix, OR
KATZ-FM	KNJZ	Alton, IL
KBSZ-FM	KBSZ	Wickenburg, AZ
KCAD	KRRD	Dickinson, MD
KENZ	KMXB	Orem, UT
KFMQ	KKJI	Gallup, NM
KMXA	KBQQ	Minot, ND
KNNK	KLVK	Dimmit, TX
KREU	KYUC	Roland, OK
KRKQ	KRUU	Boone, IA
KRQT	KAZL	Castle Rock, IA
KSLX-FM	KLXO	Scottsdale, AZ
KZZF	KGLE-FM	El Centro, CA
WAHV	WMZX	Owosso, MI
WCYK-FM	WVAO-FM	Staunton, VA
WERI-FM	WBLQ	Block Island, RI
WERO	WDLX	Fairfield, ME
WGLD	WXTZ	Nobleville, TN
WJLW	WANG	Chenango Bridge, NY
WKHI	WKRE-FM	Exmore, VA
WKHW	WKHI	Pocomoke City, MD
WKTU	WYNY	Lake Success, NY
WLAZ	WRAI	Clermont, NY
WLGP	WAED	Harkers Island, NC
WLQE-FM	WYMY	Bedford, VA
WMHX	WLKA	Canandaigua, NY
WMLI	WMXF	Madison, WI
WMMU	WWKO	Shelbyville, TN
WMMV	WLLZ	Detroit, MI
WPER	WPVB	Culpeper, VA
WRAX	WWBR	Trussville, AL
WRVI	WAJE	New Albany, IN
WRVW	WYHY	Lebanon, TN
WSMS	WQNN	Artesia, MS
WSSH	WAIG	Marlboro, VT
WTHN	WWWK	Ellenville, NY
WYKU	WKTU	Ocean City, NJ
WTKV	WHES	Oswego, NY
WVAO-FM	WCYK-FM	Crozet, VA
WWKS	WDCM	Cruz Bay, VI
WWMO	WRER	Asheboro, NC
WWRR	WWRD	Brunswick, GA
WYFQ-FM	WRPL	Wadesboro, NC

## Newly Issued FM Call Letters

KAIR	Wenatchee, WA
KAOX	Kemmerer, WY
KAPC	Butte, MT
KAPF	Taos, NM
KAPG	Bentonville, AR
KAPI	Ruston, LA
KAPK	Grant Pass, OR
KAPM	Alexandria, LA
KCYT	Hoston, AK
KGFC	Great Falls, MT
KKCR	Hanalei, HI
KRNM	Saipan, MP
KSSR-FM	Santa Rosa, NM
WAAE	Hagerstown, MD
WAIL	Thompson, OH
WAPC	Terre Haute, IN
WAPD	Campbellsville, KY
WGYJ-FM	Brewton, AL
WJVP	Culebra, PR
WNJM	Manahawkin, NJ
WPAE	Centreville, MI
WUFM	Columbus, OH
WVCF	Eau Claire, WI
WXCD	Syracuse, NY

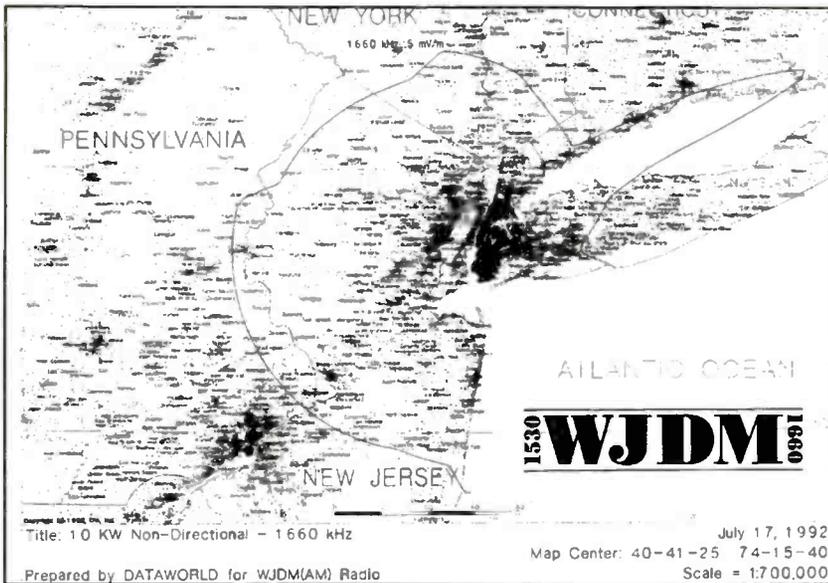
Keefe's former boss, John Angelides, built KMOX's news department into one of the most-respected in the country over the course of his 21-year career as news director. The station won dozens of national, local and regional awards, including three Peabodys. It was the reputation of Angelides that resulted in President Clinton's 1993 appearance on KMOX's *Morning Meeting* show.

Across the Mississippi, Belleville, Ill.'s WIBV-AM is gearing up to knock KMOX off its perch by playing on the low morale at the station. Tim Dorsey, who is negotiating to buy WIBV, already has wooed away fan favorites Kevin Horrigan, Wendy Wiese and Bill Wilkerson as the cornerstone of his new lineup. Dorsey offered the three big salary increases in the belief that listeners would follow them to his station. He's also pursuing a change in antenna pattern to provide better coverage of metro St. Louis.

## For The Kids

The first U.S. broadcast station to move to the expanded AM band has been sold to the children's programming network Radio Aahs, pending FCC approval. Elizabeth, N.J.'s WJDM was bought for a reported \$10 million, and by early February the station was carrying Radio Aahs programming on its pioneering frequency of 1660 kHz. Although the station originally had planned to abandon 1530 kHz, it has decided instead to exercise its option to use both frequencies for the full five years expanded-band broadcasters are permitted to simulcast.

WJDM runs 10 kW between sunrise and sunset, and 1 kW sunset to sunrise, on 1660 kHz. The transmitter is a Harris DX10, running into an 80-foot-tall folded



A 1992 engineering study produced this coverage map for WJDM-AM, showing a 10-kW signal on 1660 kHz would offer coverage slightly beyond the tri-state region. That proved to be an underestimate. The station is being heard on the West Coast of the United States and elsewhere — a feat that has “both surprised and pleased us,” the station’s chief engineer said.

unipole, which it shares with its 1530 kHz transmitter, a Broadcast Electronics AM-1. The setup is clearly a good one—each day the station receives reports from listeners

worldwide who have logged the pioneering broadcasts, WJDM chief engineer Don Neumuller said.

WJDM continues with Spanish pro-

gramming weekdays on 1530 kHz, according to Louis J. Sicilia, of Fairview, N.J., with a mixture of Polish, Irish, German and Haitian shows on weekends.

### Fans vs. Format

It’s a familiar story by now—an AM station dumping music for news, talk and sports. But for the residents of Birmingham, Ala., the change by WAPI-AM leaves them without a source for big-band music. Some are so upset, in fact, that a day after the mid-January switch, the station had already received some 50 calls protesting the station’s switch to an all-news format. “Most of them were pretty much irate and nasty,” WAPI-AM program director William Jenkins said in a Birmingham *Post-Herald* article sent in by Tony Klimt of Alabaster, Ala.

It’s not just that listeners already are overloaded with news from TV and newspapers, but rather that WAPI offered something other than rock and country music. Songs by Benny Goodman, Frank Sinatra, Perry Como and Tony Bennett were “timeless,” one fan told the *Post Herald*. “It’s like when you find a favorite restaurant; you start telling all your friends about it. I was telling all my friends about WAPI.”

Station owners say the change allows them to offer advertisers a package of WAPI and its all-sports sister station WJOX-AM. “It was a good mix to sell all sports with all news.”

### In Brief

- A new car from General Motors may add a twist to DXing on the road, thanks to a patented antenna sandwiched between the headliner and the roof, made of a composite material. The electric-powered EV1, set to hit showrooms later this year, features a “slot” antenna that GM engineers claim is designed for optimum results, regardless of polarization. Field tests in the San Fernando Valley resulted in several unsolicited comments on the ability to tune in stations clearly, according to the industry newspaper *Radio World*.

- Chicago’s O’Hare International Airport has two new travelers information stations, according to Elmer Wallesen of La Grange Park, Ill., and Klaus Spies. Those entering the airport can tune to 870 kHz, while those leaving can tune to 88.1 MHz.

- For those with nostalgia for radio from the 1960s and 1970s and a computer, there’s “Uncle Ricky’s Top 40 Radio Repository,” which offers vintage audio clips of on-air personalities like Birth Huey and Charlie Tuna. It’s available on the Internet’s World Wide Web at <http://www.reel-radio.com/>

Let us know what’s happening on your radio dial. Send us news clippings, station and shack photos, bumper stickers and QSLs. ■

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# Pirates Den

BY EDWARD TEACH

FOCUS ON FREE RADIO BROADCASTING

## Here's A Load Of Pirate Loggings

Here we go again with more loggings from the pirate radio scene. Pat Murphy in Virginia has been particularly busy at the radio of late and has a load of loggings for us.

Razorback Radio was on 6955 LSB at 2300-2318 with a song parody on Clinton, program hosted by "Federal T. Hog," "broadcasting from the heart of God's country." (Murphy) 2309-2328 with political-type hillbilly/ragtime songs, including *The Democratic Sidestep* and mention of "The best damn radio station and truck stop in Arkansas." Address given as P.O. Box 146, Stoneham, MA 02180. (Mike Layden, PA)

Mystery Radio, 6955 USB at 1845-1915 with strange, new-age sounding ethereal music, ID as "Mystery Radio." Also 2050-2110 with techno-rock. The announcer sounded like a young woman or the voice was electronically accelerated. (Murphy)

Radio Free Speech, 6955 at 1925-1947 close with Burger Biggie commercial, Earl Pitts, "Bill O. Rights," "Ollie Tells The Truth" skit, a spoof of the national anthem and close. Also at 0448-0522 sign-off with commentary on why we don't need a big government, letters from listeners, *Truckers Tabernacle*, *Black Magic Marker* song. And, again, at 1436-1459 close with features such as the *Federal Follies*. (Murphy, PA)

Free Hope Experience, 6955 USB at 1928-2046 with DJ "Major Spook," mention of Pirate Radio Insanity 3, "a hiker stumbled through our antenna farm." Gives Blue Ridge mail drop. (Murphy, PA)

WREC, 6955 LSB at 2150 to 2216 sign-off. "CJ" was the DJ. "Another fun-filled program," funny commercials for BS School of Broadcasting and an ID from Jack of WLIS. (Murphy, VA)

Partial India Radio, 6955 USB at 2315-2348 close, parody about India and its religion, a lot of reincarnation talk. "We are leaving now. Goodbye." (Murphy, VA)

WPN, 6955 LSB at 2050-2112 with "Captain Squirt Long" as DJ, Pink Floyd, Billy Joel. Announced as 170,000 mW. Lost to RTTY QRM. (Murphy, PA)

Up Against the Wall Radio, 6955 USB, 1445-1508 with a skit about computers and online services, ID with echo, rock with Frank Zappa song. (Murphy, VA)

WWWW, 6955 USB, 1920-1947. DJ with a gruff, low voice who never identified himself. Station ID as "WWWW—4W Radio." Lots of rock numbers and "we'll be glad to QSL, of course." (Murphy, VA)

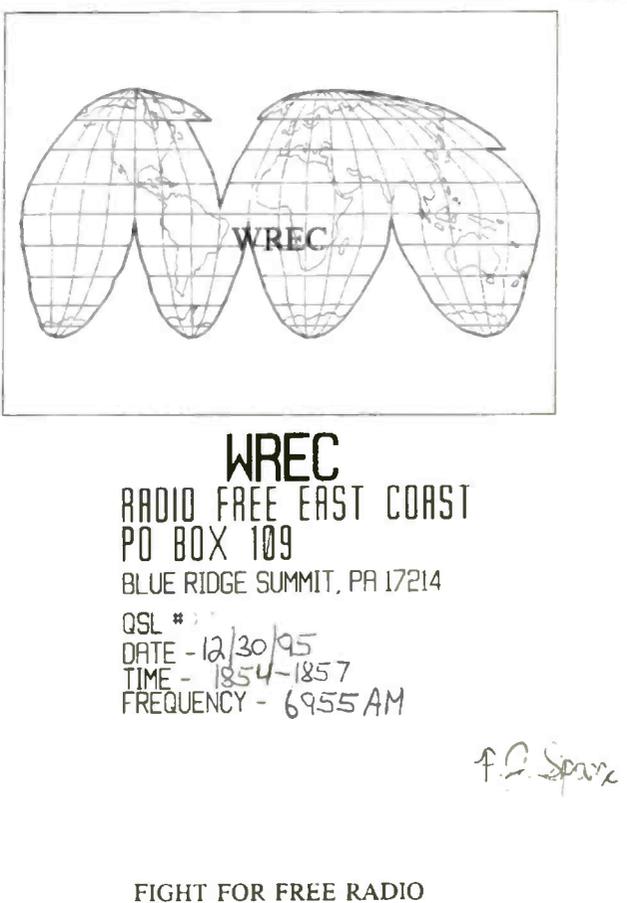
KAOS, 6955 USB at 0130-0151 close, rock, 800 telephone number that turned out to be a sex line, funny commercials for fertilizer sticks. No QSL info given. (Murphy, VA)

CELL, 6955 at 0400 to 0421 sign-off. DJ was "Sprint Contel" with comedy bits with cellular phone calls between fighting couples. "Love and hate, war and peace on CELL Phone Radio." and "America's most notorious pirate radio station, the one that violates every provision of the ECPA." (Murphy, VA)

Radio Bob Communications Network, 6955 USB at 2040-2055 off. Radio Bob was taken over by a guy named Dave who said "no one has to put up with disco anymore." "This is Radio Bob—no, wait! Make that Radio Dave." (Murphy, VA)

WLIS, 6954 at 1715-1739 close with IS and appeal to write in and choose your QSL. The announcer said they have more than 50 to choose from. (Murphy, VA)

Omega Radio, 6955 from 2000-2059 with rock, heavy metal, Christian rock. "Welcome to another edition of Omega Radio.



**WREC**  
RADIO FREE EAST COAST  
PO BOX 109  
BLUE RIDGE SUMMIT, PA 17214  
QSL # :  
DATE - 12/30/95  
TIME - 1854-1857  
FREQUENCY - 6955 AM  
F. J. Spax  
FIGHT FOR FREE RADIO

Radio Free East Coast sent this full-size QSL to Mike Layden in Pennsylvania.

I'm your host Dick Davis with a three-part series." Interviews with musicians. Excellent audio. QRM from some of the QSO boys. (Murphy, VA)

Food Not Bombs Radio Network, 6955 from 1900-1945 sign-off. Long, rambling series of speeches about microcasting. No QSL info given and, from past experience, they do not QSL. I wrote to these people last year and got a letter back that offered me the opportunity to buy tapes. In fact, the return letter didn't even confirm that I had their broadcast. Seems, if they went to the effort to have the shows broadcast they'd help themselves with a minor expense of producing QSLs." (Murphy, VA)

Radio DC, 6956 from 0220-0230 and 6950 at 0100-0110 airing a CW message repeating "Radio DC. Don't vote Republican." (Mike Martin, MD)

That's it for this time. Thanks to reporters Martin, Layden and especially Pat Murphy, who has really been burnin' the bands lately. It is pretty easy to tell where you should tune to find the action! I hope to hear from you three and several more folks next month and beyond. ■

# Antennas & Things

BY JOE CARR, K4IPV

SIMPLE ANTENNAS AND ACCESSORIES FOR SIGNAL IMPROVEMENT

## VHF/UHF Antennas You Can Make With Twin-Lead—Part 2

In the last installment of this column, we looked at the different types of twin-lead transmission line (open-wire parallel line, 300-ohm TV antenna twin-lead and 450-ohm twin-lead). These transmission lines can be easily obtained wherever radio stuff is sold, or by mail order from a number of different companies. Some people report a little trouble getting 450-ohm twin-lead, so because we'll introduce an antenna made of that line, I'll pass along where I obtained mine via mail order:

Ocean State Electronics, 6 Industrial Drive, Westerly, RI 02891; (401) 596-3080; catalog part No. LL-450.

Two different antennas were covered last time: half-wavelength folded dipole and the ZL-Special beam. The ZL-Special basically is a pair of side-by-side folded dipoles, phased 135 degrees and spaced an eighth-wavelength apart. The folded dipole is a bidirectional antenna, with the maxima broadside to the antenna and minima off the ends. The ZL-Special is monodirection-

al, so behaves like a beam. Up to 3 dB of gain is obtained by the ZL-Special over the folded dipole.

### Coaxial Cable Feed

One topic that I did not show graphically last time was the matter of coaxial cable feed for the folded dipole. Most people today rather would use coaxial cable for the download from any antenna, folded dipole or not. That's a good idea for sever-

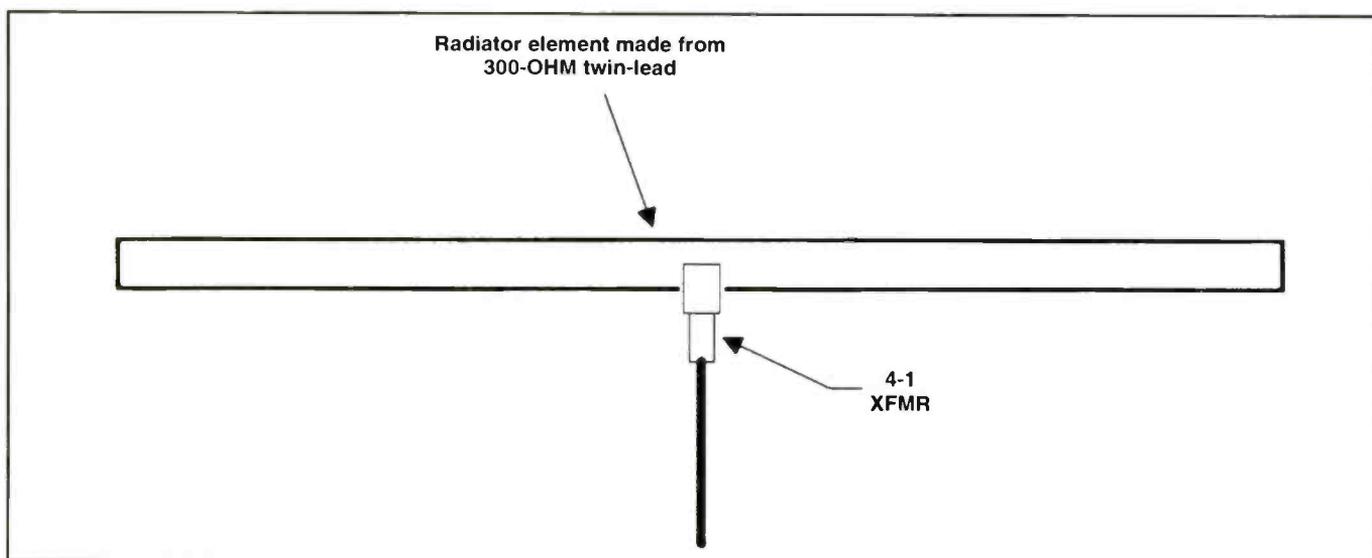


Fig. 1. Coax-fed folded dipole.

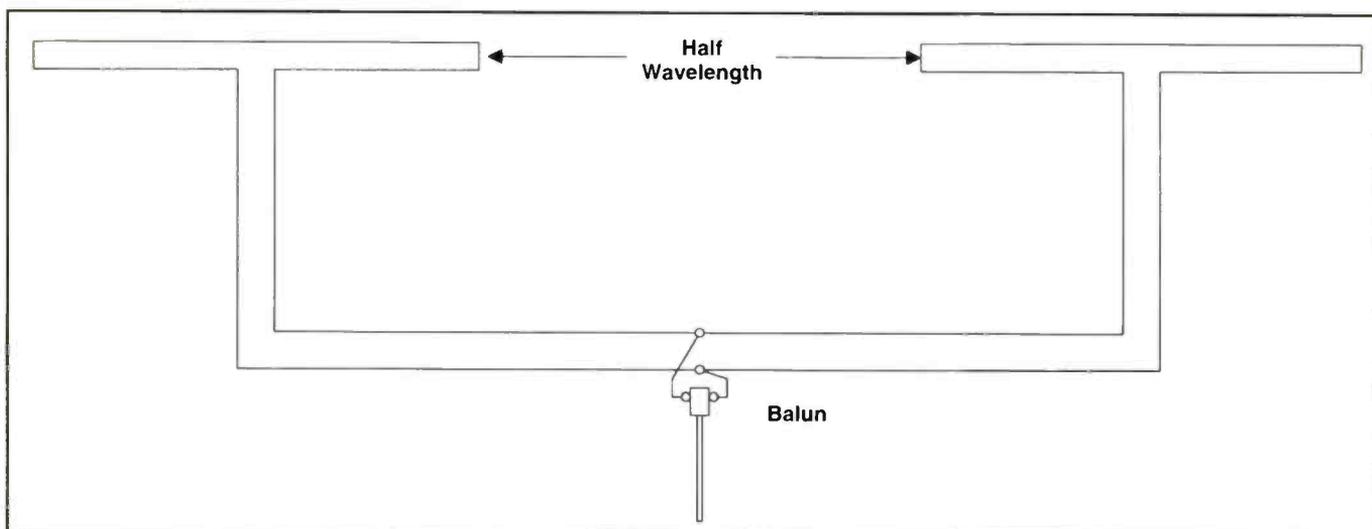


Fig. 2. Stacked folded dipoles (3 dB gain).

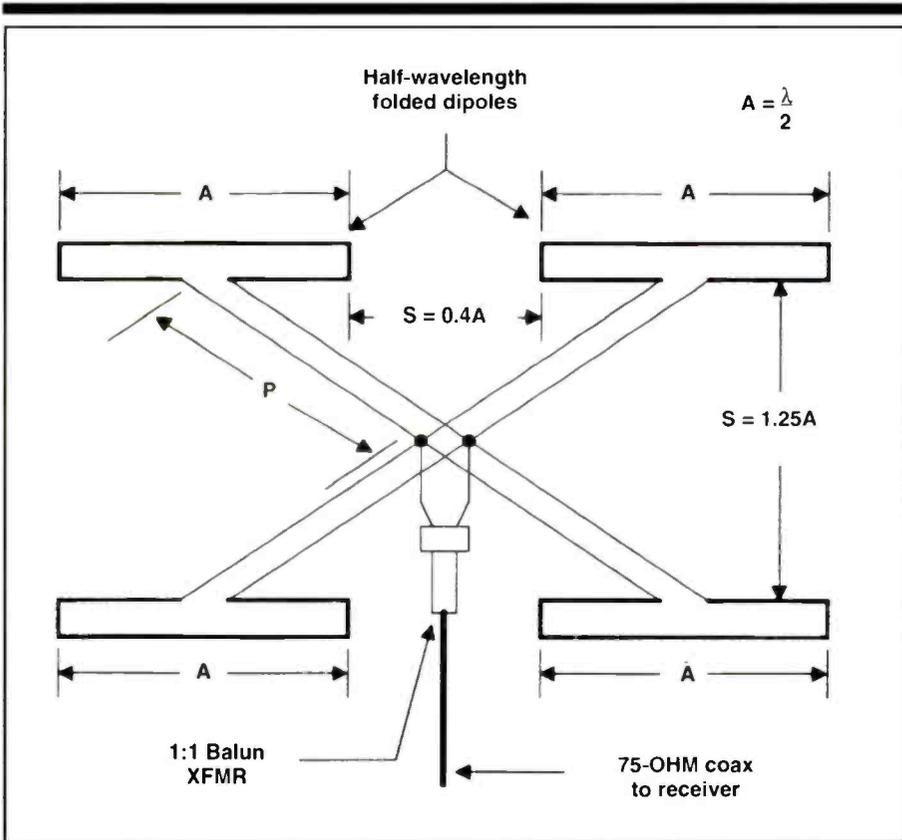


Fig. 3. Stacked-Stacked folded dipoles ("X-array," 6 dB gain).

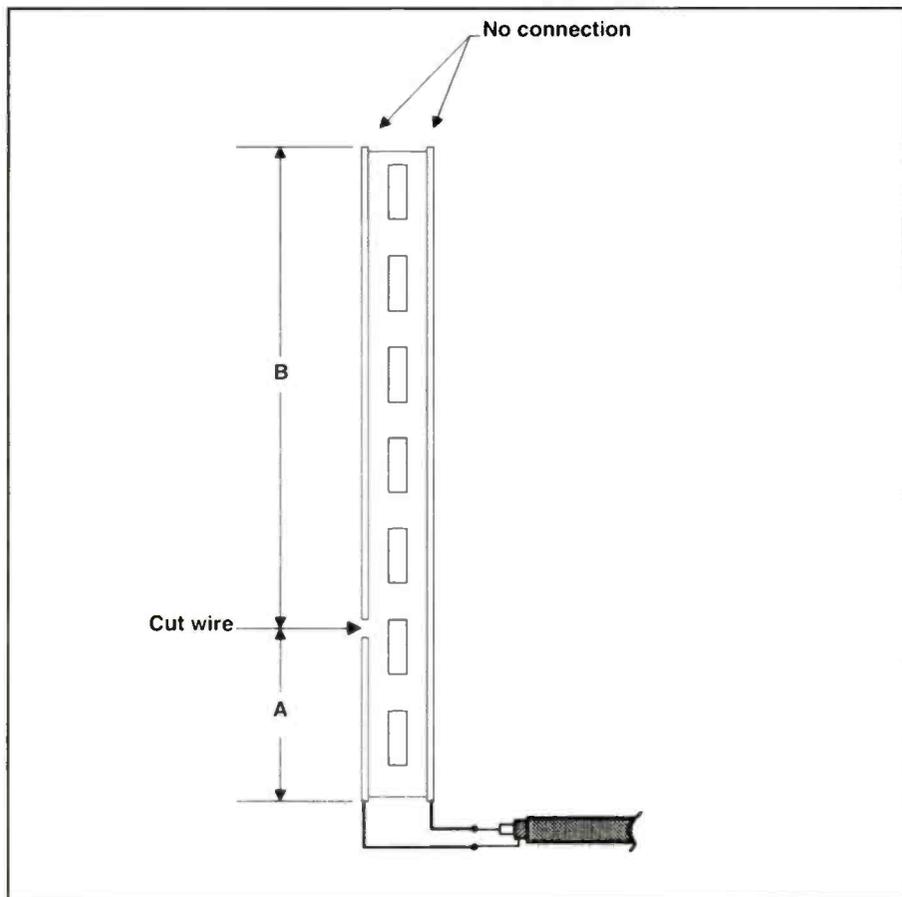


Fig. 4. Vertically polarized, omnidirectional J-pole.

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al reasons: 1) the VSWR on twin-lead systems is much more dependent on what the line is near; 2) the twin-lead line is noisier; 3) and there is a lot higher possibility of multipath reception (e.g., the same thing as "picket-fencing" on FM and "ghosts" on TV). Fig. 1 shows the basic method for connecting the twin-lead folded dipole to coaxial cable. The feedpoint impedance of the folded dipole is nearly 300 ohms, and the antenna is a balanced feed design. The balun transformer converts the balanced feed antenna to the inherently unbalanced configuration of coax, and if you make that a 4:1 balun, the 300 ohms drops to 75 ohms—just about right for coaxial cable. As mentioned last time, a TV-antenna outdoor style balun will work well (indoor type can be used if the antenna is indoors).

### Vertically Polarized

Many VHF-UHF scanner users prefer vertically polarized antennas for the reason that so many communications signals in those bands are vertically polarized. Although receiving reflected signals tends to destroy the polarization relationships, the preference still is there nonetheless. The

folded dipoles shown last month and as Fig. 1 this month can be stood on end (rotated 90 degrees) and made into a vertical. In that case, the azimuthal antenna pattern will be omnidirectional, like any antenna.

### Stacked Folded Dipoles

Fig. 2 shows how to get about 3 dB gain by using a pair of folded dipole antennas. Although the end-to-end arrangement is shown here, the antennas also can be stacked one on top of another if you prefer. Spacing between the antennas actually is a little wider than the length of the antenna, by about 5 percent. The reason is that the antenna length formula takes into account the fact that the twin-lead has a velocity factor of 0.95, so the length is foreshortened 0.05. The correct spacing would be 1.05 times the antenna length, or:  $L_{\text{antenna}} = 5,500/F \text{ MHz}$ , and  $L_{\text{spacing}} = 5,775/F \text{ MHz}$  (both lengths are in inches).

The lengths of the transmission lines connecting the feedpoints of the dipoles to the balun transformer are not critical except for one point: they must be exactly the same length and made from the same roll of cable. Also, make sure that the right side of one dipole is connected to the right side of the other, and the left side to the other left side (in other words, keep the antennas in phase).

The coaxial cable to the receiver should be 52-ohm cable, rather than the usual 75-ohm cable. The reason is the lowered impedance looking into the parallel connected transmission lines. There will be a small mismatch even with 52-ohm cable.

### X-Array Antenna

The theme is taken a little further in Fig. 3. This antenna is called the X-array, and provides up to 6 dB of gain from a few scraps of 300-ohm twin-lead (by the way, every 3 dB of gain represents a doubling of signal strength received, so this is a cheap way to get more signal from any given station).

The four folded dipoles are arranged in the same plane, so we basically have two end to end as one array, and two arrays as one on top of the other. The length of each folded dipole is found in the usual manner ( $L \text{ inches} = 5,500/F \text{ MHz}$ ), and the other dimensions are scaled from the calculated length of the dipoles.

### J-Pole Verticals

Thus far, all of our antennas in the two parts of this mini-series have been made of 300-ohm twin-lead. The two J-pole variants discussed in this section, however, are made from 450-ohm line. Such line is about twice as wide as 300-ohm line, and usually has rectangular holes cut into the dielectric to reduce loss.

The variant in Fig. 4 probably is the most

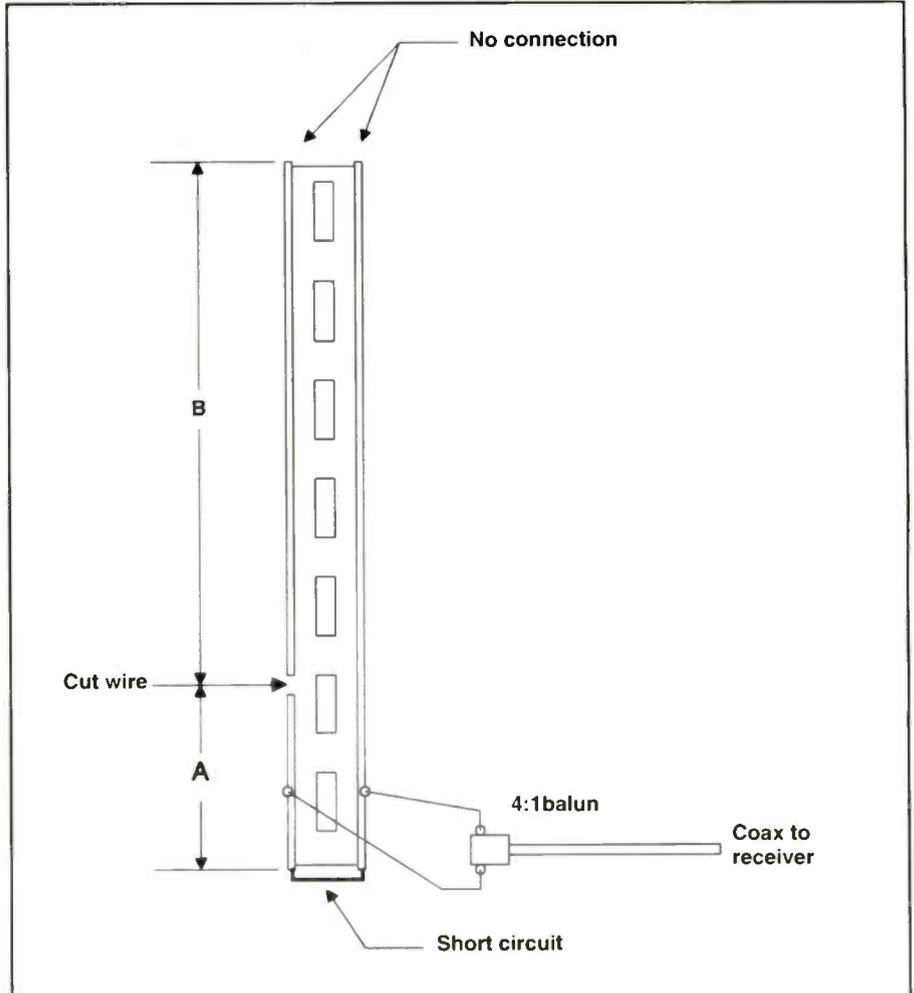


Fig. 5. Alternate J-pole.

popular because it can be fed with coaxial cable without using a balun transformer. The antenna consists of a length of 450-ohm twin-lead with one of the two conductors cut at a distance that is 34 percent of the overall length. Length "A" is found from:  $A \text{ inches} = 2,880/F \text{ MHz}$ , and "B" is found from:  $B \text{ inches} = 5,540/F \text{ MHz}$ .

The overall length to cut from the roll of 450-ohm line is, of course, A+B.

The two conductors of the 450-ohm line are connected to the coaxial cable, one conductor to the coax center conductor and the other to the coax shield. The parallel conductors of the 450-ohm line are NOT connected at the top end of the antenna.

OK, it's a fair question: "How do you install this thing? After all, the line won't stand up on its own, will it?" Well, 450-ohm line might come close, but no it'll fall over just as you might expect. Mount the antenna from an overhead hook (like in the ceiling). If you prefer, tie a little bit of string through the topmost hole of the twin-lead and use it to hang the antenna.

The variant of Fig. 5 is similar, and uses the same dimensions. But the feed point is different. In this case the two conductors

of the twin-lead are shorted together at the bottom, and a 4:1 balun is used to connect to the two conductors at a point where the impedance is matched (i.e., VSWR is lowest). This is obtained experimentally. See why Fig. 4 is more popular?

### Conclusion

Really useful antennas, some with gain, can be easily and cheaply constructed from 300-ohm and 450-ohm twin-lead transmission line. In this two-part series of Antennas 'n' Things, we've seen a number of different types of antennas that could be built for little or nothing—if you can get some scrap line somewhere.

As with all antennas, safety comes first. Do not install these or any other antennas near electrical power lines, either indoor or outdoor. They may look insulated, but that's often only an illusion. AC power can kill you.

### Contact

You can write to me in care of POP'COMM, or via Internet e-mail at carrj@aol.com. ■

# Communications Confidential

## YOUR GUIDE TO SHORTWAVE "UTILITY" STATIONS

### Mail Brings Interesting QSLs

Allen Renner of Pennsylvania had this to say in a recent letter: "I've been lucky enough to receive some interesting beacon verification cards, U.S. Navy and Coast Guard ship verifications, a unique QSL card from WA3NAN (Godard Space Flight Center Amateur Radio Club), plus a long-awaited return from NNNØICE at McMurdo Base, Antarctica! "I have forwarded some beacon and shortwave utility loggings from the last few months. These loggings were obtained with my Realistic DX-440 receiver in conjunction with a homespun loop antenna and/or Realistic amplified shortwave antenna. All were logged from my home."

A letter from Perry Crabill Jr. in Virginia said in part: "I have had Internet access since late December, using a local server here in Winchester that charges only \$12.95 for 140 hours of connect time. I don't know much about it, but I've discovered all sorts of things. There are various types of home pages on the World Wide Web for radio subjects. I found a maritime radio home page, and printed out information about WLO Radio in Mobile and the Globe Wireless Network.

"There's a web address that allows you to access the ITU ship registry; for example, you can input the ship's callsign and find its name and the code for the country of registry. You also can input the name of a ship to find its call. The ITU home page is: <http://www3.itu.ch/MARS/> and the direct address for ship registry and callsign search is: [http://www3.itu.ch/cgi-bin/htsh/MARS/ship\\_search.sh](http://www3.itu.ch/cgi-bin/htsh/MARS/ship_search.sh).

"These addresses must be entered exactly with the indicated lower case or caps as shown, with no spaces."

An informative note was received from Robert Hall in South Africa. "This past Jan. 23, I was twiddling the dials on the old R71E when up came the familiar high-speed buzz of a French station on 16280.3 kHz at 1510. Cut in with the Universal M7000 and soon we had all the lights flashing on ARQ M2 at 200/380 baud/shift. Three IDs came up in rapid succession: RFFLC (FN Toulon) calling RFQPJVN (French ship Jules Verne) via Jibouti on the RQF circuit, then RFFTB (MOD Paris) with pairs of 5L groups for umpteen addressees with callsigns beginning with the letters

*This USCG weather broadcast information for the Atlantic/Gulf of Mexico area was provided by Michael Miller, WA. →*

#### a. COGARD CAMSLANT CHESAPEAKE(NMN):

TIME	CARRIER FREQUENCY (KHZ)	TYPE	CONTENT	
0130Z	518.0	NAVTEX	NTM/WX	C
0400Z	4426.0, 6501.0, 8764.0	VOICE	WX-Offshore	#
0530Z	4426.0, 6501.0, 8764.0	VOICE	WX-High Seas	&
0530Z	518.0	NAVTEX	NTM/WX	C
0930Z	518.0	NAVTEX	NTM/WX	C
1000Z	4426.0, 6501.0, 8764.0	VOICE	WX-Offshore	#
1130Z	6501.0, 8764.0, 13089.0	VOICE	WX-High Seas	&
1330Z	518.0	NAVTEX	NTM/WX	C
1600Z	6501.0, 8764.0, 13089.0	VOICE	WX-Offshore	#
1730Z	8764.0, 13089.0, 17314.0	VOICE	WX-High Seas	&
1730Z	518.0	NAVTEX	NTM/WX	C
2130Z	518.0	NAVTEX	NTM/WX	C
2200Z	6501.0, 8764.0, 13089.0	VOICE	WX-Offshore	#
2330Z	6501.0, 8764.0, 13089.0	VOICE	WX-High Seas	&

# HF Offshore WX: 0400Z, 1000Z, 1600Z, 2200Z  
West Central North Atlantic,  
New England, Caribbean  
and Gulf of Mexico  
(0400Z does not include New England)

& High Seas WX: 0530Z, 1130Z, 1730Z, 2330Z  
NAM 1 AND 2 (WWNT20 AND FPNT20)

C NAVTEX Offshore Wx: 0130Z, 0530Z, 0930Z, 1330Z, 1730Z, 2130Z  
West Central North Atlantic

#### b. COMMSTA MIAMI(Remotely keyed by CAMSLANT):

TIME	CARRIER FREQUENCY (KHZ)	TYPE	CONTENT
0000Z	518.0	NAVTEX	NTM/WX
0400Z	518.0	NAVTEX	NTM/WX
0800Z	518.0	NAVTEX	NTM/WX
1200Z	518.0	NAVTEX	NTM/WX
1600Z	518.0	NAVTEX	NTM/WX
2000Z	518.0	NAVTEX	NTM/WX

WX: Jupiter Inlet to Key Largo out to Bahama Banks, >  
Key Largo to Dry Tortugas including Florida Straits and  
Florida Bay, and Southwest North Atlantic

#### c. COMMSTA NEW ORLEANS:

TIME	CARRIER FREQUENCY (KHZ)	TYPE	CONTENT
0300Z	518.0	NAVTEX	NTM/WX
0700Z	518.0	NAVTEX	NTM/WX
1100Z	518.0	NAVTEX	NTM/WX
1500Z	518.0	NAVTEX	NTM/WX
1900Z	518.0	NAVTEX	NTM/WX
2300Z	518.0	NAVTEX	NTM/WX

WX: Synopsis Gulf of Mexico,  
Northwest Gulf north of 25N and west of 90W,  
Southwest Gulf south of 25N and west of 90W,  
middle of Gulf between 85W and 90W,  
East Gulf between 81W and 85W

#### d. GANTSEC SAN JUAN:

TIME	CARRIER FREQUENCY (KHZ)	TYPE	CONTENT
0015Z	518.0	NAVTEX	NTM/WX
0305Z	2670.0	VOICE	NTM/WX
0415Z	518.0	NAVTEX	NTM/WX
0815Z	518.0	NAVTEX	NTM/WX
1210Z	157.1 MHZ (CHNL 22A)	FM-VOICE	NTM/WX
1215Z	518.0	NAVTEX	NTM/WX
1505Z	2670.0	VOICE	NTM/WX
1615Z	518.0	NAVTEX	NTM/WX
2015Z	518.0	NAVTEX	NTM/WX
2210Z	157.1 MHZ (CHNL 22A)	FM-VOICE	NTM/WX

WX: Puerto Rico and Virgin Islands coastal waters out  
20 miles and Eastern Caribbean Sea, east of 75 west

e. COMMSTA BOSTON:

TIME	CARRIER FREQUENCY (KHZ)	TYPE	CONTENT
0030Z	6312.3, 8414.8, 12577.3	SITOR	Ice Info (Seasonal)
0045Z	518.0	NAVTEX	NTM/NTF/WX-Offshore *
0050Z	8502.0, 12750.0	CW	Ice Info (Seasonal)
0140Z	6312.3, 8414.8, 12577.3	SITOR	NTF/HYDRO/NAV IV/ WX-Offshore #
0300Z	6340.5, 12750.0	FAX	WX-Maps C
0440Z	2670.0	VOICE	NTM/WX-Offshore 6
0445Z	518.0	NAVTEX	NTM/NTF/WX-Offshore *
0800Z	6340.5, 12750.0	FAX	WX-Maps C
0845Z	518.0	NAVTEX	NTM/NTF/WX-Offshore *
0905Z	6340.5, 12750.0	FAX	WX-Maps C
1040Z	2670.0	VOICE	NTM/WX-Offshore 6
1218Z	8414.8, 12577.3, 16804.8	SITOR	Ice Info (Seasonal)
1245Z	518.0	NAVTEX	NTM/NTF/WX-Offshore *
1250Z	8502.0, 12750.0	CW	Ice Info (Seasonal)
1350Z	8502.0	CW	NTF
1600Z	6340.5, 12750.0	FAX	Ice Info (Seasonal)
1630Z	8414.8, 12577.3, 16804.8	SITOR	NTF/HYDRO/NAV IV/ WX-Offshore #
1640Z	2670.0	VOICE	NTM/WX-Offshore 6
1645Z	518.0	NAVTEX	NTM/NTF/WX-Offshore *
1730Z	6340.5, 12750.0	FAX	WX-Maps C
1810Z	8502.0, 12750.0	FAX	Ice Info (Seasonal)
1835Z	6340.5, 12750.0	FAX	WX-Maps C
2015Z	6340.5, 12750.0	FAX	WX-MapsZ C
2045Z	518.0	NAVTEX	NTM/NTF/WX-Offshore *
2240Z	2670.0	VOICE	NTM/WX-Offshore 6

note (1) Notice To Fisherman (NTF) is Fixed Fishing Gear information. Given on NAVTEX (\*), and designated SITOR (#) broadcasts.

note (2) (Seasonal) Ice information broadcasts are given during ice season at 0030Z and 1218Z on SITOR; 0050Z and 1250Z on CW; and 1600Z, and 1810Z on Facimile.

\* NAVTEX Offshore WX: 0045Z, 0445Z, 0845Z, 1245Z, 1645Z, 2045Z  
New England Continental Shelf and slope waters from 25 NM offshore to the Hauge line, (Includes Gulf of Maine, South of New England from Great South Channel to Hudson Canyon out to 1000 fathoms, South of Nova Scotia from Sable Island to New England Channel out to 1000 fathoms).

# HF High Seas WX: 0140Z, 1630, NAM 1 AND 2

6 MF VOICE Offshore WX: 0440Z, 1040Z, 1640Z, 2240Z  
NAM 1 AND 2, West Central North Atlantic west of 65W and north of 32N to 40N, East Port to Merrimack River 25 miles offshore, Merrimack River to Watch Hill Rhode Island, Buzzards Bay, local Boston Harbor.

C FAX New England Waters WX CHARTS and broadcast information is continued on page K-6-6.

Change 1

C FAX New England Waters WX CHARTS:

- 0300Z - FAX schedule,  
00Z satellite pix annotated,  
00Z Surface analysis,  
00Z 500 MB analysis.
- 0800Z - 24 HR wind/wave forecast VT 00Z,  
24 HR WX depict fcst VT 00Z,  
48 HR surface forecast,  
48 HR 500 MB forecast,  
48 HR sea state forecast.
- 0905Z - 06Z Surface analysis,  
06Z satellite pix annotated,  
Gulf stream analysis (area A),  
Gulf stream analysis (area B).
- 1730Z - 12Z surface analysis.
- 1835Z - 12Z surface analysis,  
12Z 500 MB forecast,  
12Z sea state analysis,  
96 HR 500 MB forecast,  
96 HR surface forecast,  
Gulf stream analysis.
- 2015Z - 24 HR wind/wave forecast VT 12Z,  
24 HR WX depict forecast VT 12Z,  
48 HR surface forecast,  
48 HR 500 MB forecast,  
48 HR sea state,  
18Z satellite pix annotated,  
18Z surface analysis.

USCG weather broadcast continued



To radio AA4JN: This confirms reception of radio transmissions from the German Naval Vessel

# Mölders

Deutscher Seestreitkräfte

DRAF

Date: 9 Nov 1994 Time (UTC): 0556 Freq: 6779 kHz Mode: USB  
Approx. location: off coast of VA Homeport: USC  
Vessel type: 204 KC 1013 Hull No: 0495  
Remarks:

Reception confirmation PFC of Jim  
Navy, VA.

'RU' (?), and finally RUMSGG (MOD Paris for NATO?) with pages of tlc/FF and 5L groups for yet more 'RU' and other call-signs many of which could be ID'd as US/GB/FF warships and troop transports!

"Traffic marked URGENT and PRIOR-ITE and partly encrypted with well more than 60 different non-FF call-signs continued for more than an hour! Dramatic stuff indeed; clues came with the names BAH-REIN and MASIRAH among all the crypto, which seemed to confirm big panic in the Persian Gulf. The next day we learned the trouble was within Bahrein itself. Interesting that HF was used and one wonders whether ARQ M2/200 can be read by other than FF stations?"

A phone call from Perry Crabill Jr. clarified the FSK transmissions reported by Bunky in Illinois that he heard in the LF aero beacon band. Perry reminded me about the DGPS (differential GPS) navigation system. Information on this system has appeared in various issues of the *Lowdown*, monthly newsletter of the Longwave Club of America.

An explanation of DGPS was given as follows: "The DGPS system was developed to improve the accuracy of the commercial GPS navigation system. For strategic reasons, the Air Force added random errors to the GPS signal so that the accuracy is no better than 300 feet. The DGPS system receives the GPS signal and, because it already knows the exact location of the receiver, computes and broadcasts the correction data via the radio beacon. The corrected data should improve accuracy to 30 feet. The first radio beacon with the DGPS data was the Montauk Point, N.Y., beacon, MP, on 293 kHz."

Contributors of beacon loggings in the past have reported PYD on 414 kHz frequently. *Lowdown's* March 1996 issue carried some information regarding location efforts. "LWCA member Wayne Rankin suggests that the unidentified beacon PYD actually may be located inland somewhere in the southern part of California. He used a loop and took a DF cut on the signal recently, and it was 50/230 degrees true from his location in Tunjunga, Calif. Based on his experience in past loggings of day and night DX, he believes it may be

**Abbreviations Used For Intercepts**

AM	Amplitude Modulation mode
BC	Broadcast
CW	Morse Code mode
EE	English
GG	German
ID	Identification/led/location
LSB	Lower Sideband mode
OM	Male operator
PP	Portuguese
SS	Spanish
tfc	Traffic
USB	Upper Sideband mode
w/	With
wx	Weather report/forecast
YL	Female operator
4F	4-figure coded groups (i.e. 5739)
5F	5-figure coded groups
5L	5-letter coded groups (i.e. IGRXJ)

located inland and northeast of Los Angeles. This possible location would be suggestive of it being a military beacon."

Perhaps other southern California monitors with a LF loop might help in determining the location of this longtime unidentified beacon by using the loop on PYB. Report results to Wayne Rankin, P.O. Box 41, Tunjunga, CA.

Don Tomkinson of California recently commented on beacon PYD saying "I am receiving PYD at 1830 using LF Engineering's L-400B active antenna. I cannot pick up PYD with my coax loops during daylight. Possibly PYD is an off-shore oil drilling rig. I have been logging PYD since November 11, 1993."

William Cooper of New York writes: "I am a first-time contributor to the column. I have been a shortwave listener for more than five years. My receiver is a Drake R8 with a 100-foot longwire." Welcome to the column, William.

Along with his loggings, Walt Petersen of Florida sent a note: "I recently purchased a Kenwood TS-450S, a big improvement in selectivity and notch filter."

Al Hemmalin of Rhode Island reported a strange signal on 372 kHz. "It is M normal space, and PT run together. I first logged it in November 1995 and hear it about 18 times a month. That length of time is too long for defective keying to go unnoticed, so I conclude it's intentional."

For the purpose of exchanging beacon information, Perry Crabill advises he can be reached via the following e-mail address: pcrabill@visuallink.com

Time to look at this month's loggings:

**UTE Loggings  
SSB/CW/RTTY/SITOR/etc.  
All times in UTC**

- 200: Beacon YAQ, Kasabonika, Ontario, Canada, at 0456. (RH2)
- 216: Beacon YFA, Fort Albany, Ontario, Canada, at 0450. (AR)
- 218: Beacon RL, Red Lake, Ontario, Canada, at 0542. (AR)
- 219: Beacon OQ, Indianapolis, Ind., at 0505. (PC); Beacon YMG, Manitowadge, Ontario, Canada, at 0925, 877 miles. (AH); Beacon EV, Evansville, Ind., at 2127; Beacon HU, Houma, La., at 0319; Beacon TO, Toledo, Ohio, at 1731. (RH2)
- 220: Beacon CZB, Casey, Ill., at 0324. (ML) The

Beacon Guide shows this beacon on 359 kHz. — Ed.)

- 221: Beacon OR, Orlando Executive Airport, Fla., at 0200. (WP)
- 222: Beacon CVX, Charleroi, Ill., at 0542. (PC)
- 224: Beacon BH, Birmingham, Ala., at 0500. (AR)
- 227: Beacon TNZ, Walnut Ridge, Ark., at 0538; Beacon SQ, Connersville, Ind., at 0541. Able to hear these because local GDx, 227 kHz, off the air. (PC); Beacon UZ, Rock Hill, S.C., at 0507. (AR)
- 229: Beacon SD, Louisville, Ky., at 0533. DSB? (PC)
- 230: Beacon ZUC, Ignace, Ontario, Canada, at 0554. 400 Hz; Beacon HPT, Hampton, Iowa, at 0605. (PC); Beacon UCL, Cayo Largo del Sur, Cuba, at 0201. (WP); Beacon YBM, St. Bruno de-Guigues, Quebec, Canada, at 0526. (AR)
- 235: Beacon GNI, Grand Isle, La., at 0145. Has wx info. (HS)
- 240: Yankton (S.D.) Municipal Airport automated wx observations at 2344. (TJ)
- 242: Beacon PJN, Fort Lauderdale/Hollywood, Fla., at 0523, DSB. (PC)
- 245: Beacon YZE, Gore Bay, Ontario, Canada, at 0340. Long dash after call. (WP)
- 248: Winnipeg Radio, Channel 5 terminal forecast—Winnipeg: Brandon—Duluth—Grandforks, etc., continuous. Hrd at 2113. (TJ)
- 250: Beacon DDA, u/i at 0256. 1000 Hz, DAID. (PC)
- 254: Beacon FPY, Perry, Fla., at 0225. (WP)
- 256: Beacon UNV, Nuevas, Cuba, at 0400. (call preceded by E). (WP) Suspect E was trailing, indicating emergency equipment or power. — Ed.)
- 257: Beacon TZ, Gibraltar Point (Toronto Island), Ontario, Canada, at 0412. (AR)
- 258: Beacon CIU, u/i at 0548. 1000 Hz. (PC); Beacon ORJ, Corry, Pa., at 0327. (ML)
- 260: Beacon JH, Jackson, Miss., at 0606. (AR); Beacon MTH, Marathon (Vaca Key), Fla., at 0227. (WP); Beacon PYA, Penn Yan, N.Y., at 0309; Beacon UFX, St. Felix de Valois, Quebec, Canada, at 0308. (RH2)
- 265: Beacon EDE, Edenton, N.C., at 0622. (PC)
- 269: Beacon FES, Festus, Mo., at 0632. DSB; Beacon LRT, Lawrenceburg, Tenn., at 0633. DSB. (PC)
- 270: Beacon OAX, Oaxaca, Mexico, at 0336. (WP); Beacon TPF, Tampa, Fla., at 0351. (HS)
- 272: Beacon W, St. Scholastique, Quebec, Canada, 315 miles, at 0905. (AH)
- 278: Beacon XSD, Tonopah Range, Nev., 296 miles, at 0545. (DT)
- 280: Beacon VW, u/i, at 0511. 1000 Hz, DSB; peaks N/S. (PC); Also hrd by RH2 at 0322.
- 285: Pipestone (Minn.) Municipal Airport automated wx obs. Hrd at 2115. (TJ)
- 290: Beacon QR, Regina, Saskatchewan, Canada, at 1010. (RH2); Beacon YNP, Managua, Nicaragua, 2,222 miles, at 0733. (AH); Beacon YF, Penticton, British Columbia, Canada, 1,093 miles, at 1215; Beacon ADP, Rock Springs, Wyo., 733 miles, at 0730. (DT)
- 293: Beacon CJJ, Cresco, Iowa, at 0522. (AR)
- 300: Beacon ABL, Ambalema, Colombia, at 0525. (AR)
- 302: Beacon EAG, Eagle Grove, Iowa, at 1232; Beacon QW, North Battleford, Saskatchewan, Canada, at 0906. (RH2)
- 305: Beacon YQ, Churchill, Manitoba, Canada, at 0458. (AR)
- 308: Beacon BVG, Enterprise, Ala., at 0521, DSB. (PC)
- 309: Beacon EEX, Swainsboro, Ga., at 0509. (AR)
- 310: Beacon H, Egmont Key (mouth of Tampa Bay), Fla. Audio sounds very fuzzy because GPS enhancement sig also is carried. Hrd at 0515. (HS); Beacon ST, Sukkertoppen, Greenland, 1,798 miles, at 0647. (AH)
- 314: Beacon CVY, Fort Riley, Kan., at 0537. DSB; Beacon EIW, Lilbourn, Mo., at 0531. (PC)
- 315: Beacon UPI, Barranca de Upia, Colombia, 2,557 miles, at 0647. (AH)
- 322: Beacon H, Seal Island LS, Nova Scotia, Canada, at 0428. (AR)
- 323: Beacon UWP, Argentia, Newfoundland, Canada, at 0319. DAID. This would seem to be over 2,000 miles; Beacon HHW, Hugo, Okla., at 0316. (WP)

- 326: Beacon PKZ, Pensacola, Fla., at 0259. (HS); Beacon COO, Covington, Tenn., at 0627. (PC)
- 328: Beacon YTL, Big Trout Lake, Ontario, Canada, at 0313. DAID. (WP)
- 330: Beacon BH, Bar Harbor, Maine, at 0620. (AR)
- 332: Beacon CUL, Carmi, Ill., at 0144; Beacon HEG, Jacksonville, Fla., at 0433; Beacon ULH, Tullahoma, Tenn., at 0158. (RH2)
- 338: Beacon MRK, Rayville, La., at 0454. (AR); Beacon HE, Sheboygan, Wis., at 0358; Beacon LM, St. Louis, Mo., at 0233; Beacon POB, Fort Bragg, N.C., at 0325. (RH2)
- 342: Beacon CXE, Chase City, Va., at 0432. (RH2)
- 344: Beacon LNT, Millinocket, Maine, at 0452, 315 miles. (AH)
- 347: Beacon AAF, Apalachicola, Fla., at 0330. (WP)
- 349: Beacon APG, Aberdeen, Md., at 0421. (RH2)
- 350: Beacon DF, Deer Lake, Newfoundland, Canada, at 0412. (AR)
- 351: Beacon YKQ, Fort Rupert, Quebec, Canada, at 0258. DAID. (WP)
- 353: Beacon PG, Portage La Prairie, Manitoba, Canada. 1000 Hz, DAID, ex-YPG, 1,226 miles. (PC)
- 359: Beacon BO, Boise Airport, Idaho, 690 miles, at 0555. (DT)
- 360: Beacon PN, Port Menier, Quebec, Canada, at 0226. DAID. (WP)
- 362: Beacon AK, Akron, Ohio, 525 miles, at 0746. (AH)
- 367: Beacon FVX, Farmville, Va., at 0525, 478 miles. (AH)
- 368: Beacon BEQ, Bessemer, Ala., at 0208; Beacon IFA, Iowa Falls, Iowa, at 0213. (RH2)
- 370: Beacon YBV, Berens River, Manitoba, Canada, at 0525. 400 Hz. (PC)
- 371: Beacon GW, Kuujivarapik, Quebec, Canada, at 0320. (AR)
- 374: Beacon SA, Sable Island, Nova Scotia, Canada, at 0230. (WP)
- 375: Beacon BUN, Buenaventura, Colombia, at 0328. (AR); Beacon GPA, McRae, Platform PGP-I, Brazil, at 0732. (AH)
- 376: Beacon YAG, Fort Frances, Ontario, Canada, at 0436. (AR); Beacon LC, Columbus, Ohio, at 0950, 623 miles. (AH)
- 378: Beacon RJ, Roberval, Quebec, Canada, at 0325. DAID. (WP)
- 379: Beacon TL, Tallahassee, Fla., at 0347. (HS)
- 382: Beacon POS, Port of Spain, Trinidad, at 0323. (RH2)
- 382.9: Beacon D9, listed as Sable Island, Nova Scotia, Canada, on 407 kHz. Hrd at 0225. DAID. (WP)
- 385: Beacon HYX, Saginaw, Mich., at 0220. (WP); Beacon WL, Williams Lake, British Columbia, Canada, at 0540, 1,289 miles. (DT)
- 386: Beacon SYF, St. Francis, Kan., at 0417. (western Kansas near Colorado border; verified as 25 watts). (AR)
- 388: Beacon ISZ, Cincinnati, Ohio, at 0711, 713 miles. (AH); Beacon AM, Tampa, Fla., at 0517. (HS)
- 391: Beacon CPB, Culver, Ind., at 2203. (RH2); Beacon EBY, Neah Bay, Wash., at 0530, 1,066 miles. (DT); Beacon 3B, Brockville, Ontario, Canada, at 0649, 311 miles. (AH)
- 392: Beacon ML, Charlevoix, Quebec, Canada, at 0235. DAID. (WP)
- 394: Beacon ENZ, Nogales, Ariz., at 0600, 444 miles. (DT)
- 396: Beacon JC, Rigolet, Newfoundland, Canada, at 0625, 1,385 miles. 400 Hz. (PC)
- 397: Beacon LLJ, Challis, Idaho, at 0355, 774 miles. (DT)
- 399: Beacon XW, u/i, at 0717. (AH); Beacon G, Charlottetown, Prince Edward Island, Canada, at 0200. DAID. (WP)
- 400: Beacon QQ, Comox Canadian Forces Base, British Columbia, Canada, at 0400, 1,164 miles. (DT)
- 401: Beacon XW, u/i at 0710, 500 Hz?, peaks E/W. (PC); XW also hrd at 0225. (RH2); Beacon YPO, Peawanuck, Ontario, Canada, at 0508. (AR)
- 404: Beacon MOG, Montague, Calif., at 0605, 607 miles. No wx. (DT)

**407:** Beacon IE, Natchitoches, La., at 0816, 1,383 miles. (AH); Beacon IBU, Statesboro, Ga., at 0136; Beacon RZZ, Roanoke Rapids, N.C., at 0626. (RH2)

**408:** Beacon SFB, Sanford, Fla., at 0136. (HS)

**411:** Beacon RD, Redmond, Ore., at 0935, 750 miles. (DT)

**413:** Beacon TAM, Tampico, Mexico, at 0414. (AR); Beacon OEG, Eagle, Ariz., at 0245, 215 miles. (DT)

**414:** Beacon MSD, Mansfield, La., at 0012. (RH2); Beacon CBC, Anahuac, Texas, at 0402. (HS) *The Beacon Guide* shows frequency to be 413 kHz. (— Ed.)

**415:** Beacon IEE, Platform Irene, Calif., at 0505, 169 miles. (DT)

**417:** Beacon EVB, New Smyrna Beach, Fla., at 0307. (AR); Beacon IY, Charles City, Iowa, at 0728, 1,092 miles. (AH)

**420:** Beacon CEK, Crete, Neb., at 0428. (AR)

**423:** Beacon OC, Ocala, Fla., at 0430. (WP)

**430:** Beacon LML, Lomalinda, Colombia, at 0651. (AR); Beacon VA, Varadero, Cuba, at 0215. (WP)

**435:** Beacon ILY, Washington, Ga., at 0312. (AR)

**450:** Beacon PPA, Puerto Plata, Dominican Republic, at 0505. (AR)

**512:** Beacon HMY, Lexington, Okla., at 0332. (AR)

**513:** Beacon PP, Omaha, Neb., at 0929, 1,270 miles. (AH)

**515:** Beacon ONH, Jefferson City, Mo., at 0554. (AR)

**521:** Beacon INE, Missoula, Mont., at 1055, 944 miles. (DT)

**523:** Beacon JJH, Johnstown, N.Y., at 0233. (RH2)

**526:** Beacon RWE, Camp Roberts, Calif., at 0915, 214 miles. (DT)

**530:** Beacon F9, Chatham, New Brunswick, Canada, at 0220. New ID, ex-YCH. (PC)

**1620:** Community service station WPAM217, Channelview, Texas. (GJ)

**1700:** Travelers Information Station, city of Anaheim, Calif., highway advisory. ID is HAR. Hrd 24 hours. (GJ)

**2598:** Stephenville Coast Guard Radio, Newfoundland, Canada, w/marine info bcst at 0208 in USB. (AR)

**3016:** Singapore 25 wkg Gander at 0450 in USB. Gave position reports, Selcal AEGS. (WC)

**3494:** N504M pp in USB at 0152 to Challenger 094M, discussing diversion because of East Coast storm. (TJ)

**4028:** YL/SS in AM at 0605 w/5F grps. Also on 6785 kHz but not //. (TS)

**4030:** YL/EE in AM at 0229 rptng 865. At 0230, sent 5F grps and signed down w/00000. (TS)

**4357:** WAH, St. Thomas, Virgin Islands, w/marine info bcst for surrounding areas at 0206 in USB. (AR)

**4369:** WLO, Mobile, Ala., in USB at 0505 w/shlp-to-shore telephone calls. (TJ)

**4384:** Vancouver, British Columbia, Canada, Coast Guard station in USB at 0700 w/wx bcst. (TJ)

**4408:** VCS, Halifax Coast Guard, Nova Scotia, Canada, at 0207 in USB w/wx. (TS)

**4423:** OM/EE advising u/i boat "Don't fish in U.S. waters." Sounded like skipper kept interrupting. Apparently was advising on how to avoid U.S. Coast Guard vessels. "If they tell you to go in, go in, but if not, just make a quick exit." Hrd from 2255-2300 in USB. (RK)

**4426:** NMC, COMMSTA Point Reyes (San Francisco), Calif., in USB at 0438 w/wx. Announced that NMC to use new antennas and will be conducting tests. (TJ)

**4449:** "20" wkg "22" in USB at 0622. U/i military net? (TS)

**5417:** Cuban CW cut nbr stn at 0304 w/2 mgs. Msg 1 for 56303, and msg 2 for 06471. (TS)

**5500:** Speech-inversion scrambling in USB at 0318. (TS)

**5547:** San Francisco, Calif., ATC wkg New Zealand 15 at 0505 in USB. Selcal CPLG. Primary given as 5547 kHz and secondary of 3413 kHz. (AR)

**5550:** CAR-A New York wkg American 148, American 56, American 68, N504M, Air Mexico 034

in USB at 0130. (TJ)

**5598:** New York Radio clg Aeroflot 326 at 0444 in USB. No answer. The New York opr told 326 to QSY to VHF 128.725 MHz if he could hear New York. At 0450, 326 called New York. (WC)

**5696:** Coast Guard Rescue (Falcon) 2104 wkg CG Group Mayport, Fla., at 0430/0432 in USB. Rescue 2104 is advised a Marine aircraft (FMP 604) also in area and they standing by on Channel 16 if contact desired. Mayport also stated they were standing by on 5696 kHz and on Channels 16 and 23. At 0433, Rescue 2104 is advised CG Cutter Drummond under way for SAR. Above probably related to downing of two civilian planes near Cuba earlier in day. (AR)

**5700:** Addressee wkg Night Watch at 2014 in USB. (AR)

**6453:** NPG, Stockton, Calif., w/WEFAX charts at 0419. (TS)

**6535:** Dakar, Senegal ATC wkg Atitalia 688 in USB at 0432. (AR)

**6683:** Navy 4096 wkg Andrews Air Force Base, Md., at 0054 In USB. (AR)

**6925:** OTH radar at 1105. (TS)

**6955:** YL/SS at 1800 in AM w/Atencion 931/03, 03, 43, and then into 5F grps til 1804 w/Final, Final and carrier off. Few secs later, carrier back on and entire bcst rptd. YL/SS was not the same voice as one on 6826 kHz at 0300 in AM on Sunday. In background of 6955 bcst were numerous "water-drippers," and QRM from OM w/fake SS accent saying "Hey Baby, how 'bout the Enchilada" rptng as if on tape or digitally sampled loop. After nbrs signoff at 1810, OM also looped "Coca-Cola" and "Quarter-Pounder with Cheese" and "Mucho Enchilada." (ML)

**7396.1:** U/i, unlisted FAX at 0540, 120/576. Looked like Moscow meteo w/ASXX RUMS chart. (RH)

**7868.1:** U/i, unlisted FAX, poor chart, 120/576, at 0520. (RH)

**8207:** "Houston Base" wkg Conoco 232 and Site 45 (oil rig & oil well on land). "Tell Bubba to bring in some dy-nee-mite (dynamite)! A whole (this word long and drawn-out, almost a yodel) heap of it!" Hrd fm 2300-2310 in USB. (RK)

**8828:** Auckland in USB at 1153 w/wx, later covered by Honolulu radio. (TS)

**8843:** Honolulu, Hawaii ATC wkg Delta 54 in USB at 0454. (AR)

**8968:** Israel 008 wkg Andrews Air Force Base, Md., w/pp to Seymour Johnson Air Force Base re wx at their location. (RK)

**8971:** COBRA 95 wkg Ascension w/in-flight emergency (No. 2 engine on fire). Gave location roughly around St. Helena. Reported they could make it to Ascension. Hrd at 1754 in USB. (RK)

**9007:** 2X4 wkg Trenton Military (NATO). Trenton advises "Shelly will arrive at Halifax 1750 tomorrow." OM/EE opr at 2X4 sounded as if he'd never used a radio before. Lots of "ahhhs" and false starts. (RK)

**10493:** WGY908, FEMA, Denver, Colo., at 1745 in USB wkg GLA309 re earthquake exercise. At 1750, WGY908 wkg PARKSIDE, u/i Air Force call, and KNY57, FAA, Hagerstown, Md. WGY908 QSL'd msg from FABULOUS, u/i, at 1852. (CM); WGY912, FEMA, Mount Weather, Va., conducting SHARES Net from 1300 to 2100 in USB. Check-in stations included: WWJ4B (FHA, Lakewood, Colo.); WGY966 (FEMA, Conway, Ark.); WGY914 (FEMA mobile vehicle, Thomasville, Ga.); NNNØFKQ (Navy-Marine MARS, Baton Rouge, La.); WGY925 (FEMA, Madison, Wis.); WWJ85 (FHA, Ames, Iowa); NAV (HQ, Navy-Marine MARS, Washington, DC); AFA6FN (Air Force MARS, Albuquerque, N.M.); NNNØIYX (Navy-Marine MARS, Amarillo, Texas); WGY901 (FEMA, Maynard, Mass.); WGY908 (FEMA, Denver, Colo.); KNY57 (FAA, Hagerstown, Md.); AAR8USB (Army MARS, Fort Carson, Colo.); FIR20 (CAP, Toledo, Wash.); SOUTHWEST10 (CAP, Dallas, Texas); WGY916 (FEMA, Bedford, Texas); AFA3AO (Air Force MARS, Medicine Lake, Minn.); NNNØJHR (Navy-Marine MARS, Elktion, Texas); KPA535 (GSA, Hagerstown, Md.); AFA2ID (Air Force MARS, Panama City, Fla.); WWJ47 (FHA, Kansas City, Mo.); WGY955 (FEMA, Springfield, Ill.); SPARROW90 (CAP, Orlando, Fla.); AFF30 (Air Force MARS, Milwaukee, Wis.); WGY957 (State Emergency Operations Center, Lincoln, Neb.); WUH5 (Army Corps of Engineers, Kansas City, Mo.);

WGY901 (FEMA, Maynard, Mass.); DLA303 (Defense Logistics Agency, Tacoma, Wash.); WGY948 (North Dakota State Emergency Management, Bismark, N.D.); AAA6USA (Army MARS, Fort Sam Houston, Texas); WGY918 (FEMA, Lakewood, Colo.); AAA7IA (Army MARS, Long Grove, Iowa); WGY910 (FEMA, Bothell, Wash.); KTQ314 (EPA, Las Vegas, Nev.); AAF4C (Army MARS, Dallas, Texas); KGD34 (SHARES, Arlington, Va.); THUNDERBIRD4 (CAP, Arizona director of communications); WGY918 (FEMA, Denver, Colo.); HUMPHREY (Unidentified type of aircraft in flight. Advised WGY912 to look up call sign in their reference book. No additional information broadcast.); NNNØNHB (Navy-Marine Corps MARS, Morgantown, W.Va.); AAV50F (Army MARS, Washington, Ind.); NNNØMPN (Navy MARS, Camp Pendleton, Calif.) Congratulations, Charlie. A great logging! (— Ed.)

**11175:** Tunisian ship clg Air Force Base Whisky Zulu (?), finally got Offutt. Crew on board overcome by toxic fumes, ship adrift off Strait of Hormuz. Faded at 2239. Hrd fm 2230 in USB. (RK); REACH 3231 (Air Mobility Command Aircraft C-130) wkg Albrook Air Base, Panama, for pp to FURIUS (Albrook Air Base, South American ALCC) at 2018 in USB. (AR); Alpha Delta Mike Papa at 0307 in USB clg Albrook. No response. Andrews answered and ADMP requested pp to RAIDER. ADMP gave position, direction of travel, speed, ETA, sea conditions, and nbr of POB. At 0313, ADMW clg Albrook. No response. Andrews answered ADMW and made pp to RAIDER. ADMW also sent report like above report. Both vessels located in Pacific Ocean off coast of Mexico. (CM)

**11220:** Executive 1 Foxtrot wkg Andrews AFB, MD at 2104 in USB. (AR)

**11427:** YL/SS nbs stn w/5F grps fm 0030-0058 in USB. (RK)

**13366.8:** 5YD, Nairobi, Kenya, in RTTY 50/170 at 2119 w/RYS. Also on 13373.5 kHz. (TS)

**15016:** MacDill w/Mainsail msg "MQQUDI-HW5EJNSNS2BECO. Msg rptd by McClellan Air Force Base, Calif., and Lajes, Azores. (RK)

**15821.9:** MFA Stockholm w/pages of 5L grps. SWED ARQ 100/385 at 1545. (RH)

**16035.7:** U/i JJ newspaper in FAX 60/576 at 1540, unlisted. (RH)

**16101.1:** Swiss Embassy, Cairo, in SITOR-A at 1050 w/5L grps. (RH)

**16165.3:** RFFAAP, "FM GUERRE DIPERMIL PARIS TO RFQPT/BATSERV JIBOUTI". ARQ M2 at 1131. Tfc in FF. (RH)

**16218.2:** u/i in PACTOR at 1453. Very strong sigs! (RH)

**16280.3:** RFFTB, MOD Paris, in ARQ M2 200/380 at 1546 w/tfc in FF/ 5L grps for naval deployment of Bahrain. (RH)

**16335.6:** St. Denis meteo in RTTY 75/377 at 1210 w/wx codes & aero tfc info. (RH)

**16801.1:** URS?, "FM MA-0052" w/Traflet Murmansk w/fish catch off Namibia in RTTY 50/170 at 1145. (RH)

**16829.5:** KFS, San Francisco, Calif., in FEC at 2226 w/tfc list. (TS)

**17314:** NMC, CommSta, Point Reyes (San Francisco), Calif., at 2235 in USB w/wx bcst. (TS)

**18275.2:** U/i RTTY stn, unable decode. ???/383. Hrd at 1050. (RH)

**18891.5:** IDR?, u/i, umpteen pages of 5L grps in RTTY 50/876 at 1207. (RH)

**19699.1:** UFN, CIS Novorossisk in SITOR-A at 1235 w/UGF. Gladimir Vysotskiy. (RH)

Contributors this month were: PC—Perry Crabill Jr., Virginia; WC—William Cooper, New York; AH—Al Hemmalin, Rhode Island; RH—Robert Hall, South Africa; RH2—Russ Hill, Michigan; CJ—Gary Jackson, California; TJ—Terry Jones, South Dakota; RK—Richard Klingmen, New York; ML—Michael Layden, Pennsylvania; CM—Charlie McAtee, West Virginia; WP—Walt Petersen, Florida; AR—Allen Renner, Pennsylvania; HS—Hans Schellenbert, Florida; TS—Tom Severt, Kansas; DT—Donald Tomkinson, California. ■

# Clandestine Communique

WHAT'S NEW WITH THE CLANDESTINES

## Cuban Incident Results in Stepped-Up Activity

The U.S. government's Radio Marti service to Cuba has been stepped up in the wake of two private airplanes shot down in or near Cuban waters earlier this year. That, however, may be about the extent of any heating up in the Cuban radio wars. We've seen one report that La Voz del CID was off the air for a time before the incident, although it is in operation at this writing. This long-time anti-Castro broadcaster is one of the most extensive such operations but has had problems raising funds during the last year or so.

Cuba continues to jam other anti-Castro clandestines. We've seen one reference to Radio Havana Cuba's transmitters being used for this purpose (carrying noise rather than RHC programming), thus creating a cutback in RHC services. You might find it worthwhile to check between 7000 and 7100, an area favored by the occasional Florida-based, anti-Castro clandestine.

Meantime, WHRI continues to carry two anti-Castro broadcasts: Alpha 66 is on Monday-Friday at 0800 on 7315 and 2300 on 9495. La Voz de Fundacion airs a two-hour broadcast Monday through Saturday at 0000 on 9495.

In addition to the address in Germany for the Voice of the Oromo Liberation we noted last month, there's one in the United States: SBO Committee for USA, c/o P.O. Box 73247, Washington, DC 20056. This opposition radio's broadcasts are aired now only at 1600-1700 Mondays, Wednesdays and Saturdays on 5960, via a Russian site.

Another station address also turned up recently. You can write to the Voice of Iraqi Kurdistan via the Kurdistan Democratic Party, Box 2443, Merrifield, VA 22116, attention Nemat Sharif. The Washington, D.C., area (including nearby areas of Virginia) is the best place to start looking for such addresses. Many resistance groups seem to make it a point to have some kind of representation in the capital. Iraqi Kurdistan most recently has been reported around 4075 at 0500 UTC.

The Voice of Iranian Kurdistan, operated by the Kordestan Democratic Party of Iran is operating from 1400-1530 and again from 0700-0830. Frequencies are highly variable, but center around 4000 and 7300.

Radio Denge Medya, the Kurdish language station broadcasting from a Russian



*La Voz del CID, operating on 6305, 7340 and 9942, is the oldest anti-Castro broadcaster. If the current increase in U.S.-Cuba tensions spawns other such stations, they may well appear between 7000 and 7100 so you may want to keep an early evening listening watch there.*

transmitter site, apparently has left the air. Whether this is a temporary or permanent move is anyone's guess.

The anti-Vietnam Voice of Democracy program continues to air at 1300 Monday-Friday (Saturdays and Sundays at 1400) on KWHR, Hawaii, on 9930.

Half a world away another station, called Voice of Democracy, reportedly is active in the vicinity of the Burundi-Zaire border. Said to be operated by Hutu extremists, the programming is aimed at listeners in Rwanda. At this point, we don't know if this is on mediumwave or shortwave.

The return of a Karen opposition radio in Myanmar (Burma) reported a couple of months ago was a false alarm. The station in question actually is the reverse: a government operation that obviously broadcasts against the idea of independence for the Karen people. The station, Thabye Radio, broadcasts in Burmese and Karen languages on 6355.5 from 0030-0130, 0530-0630 and 1030-1230. Any chance we might have of hearing this would be during the latter time period.

Colombian clandestine Radio Patria Libre may not have been reported in quite awhile (and, in fact, probably is inactive) but the guerrilla group that operates the station, the Ejercito de Liberacion Nacional (ELN), reportedly is planning to further increase its operations within Colombia, targeting multinational corporations and

increasing kidnapping attempts. Thus, you may want to listen for a resumption of activity from Radio Patria Libre. In the past, the station has aired broadcasts of 30 to 40 minutes, mostly at 0030 and 1130 in the upper half of the 6 MHz band—6530, 6600 and others. There have also been occasional weekend appearances on variable 15050 around 1500 and occasionally at various times during local afternoons as well. Although the station has been sporadically active since the fall of 1988, no one ever has turned up any sort of address.

Radio Echo of Hope in South Korea broadcasts to the North on 3985 at 0900-1800 and 2000-2300, and on 6348 from 0300-0600, all in Korean.

The clandestine Voice of Sudan continues to be heard on 8000 and 9025 at around 1900. This one is tricky because the government station makes a point of using frequencies very close to those used by the Voice of Sudan in an obvious attempt to confuse listeners.

That covers the clandestine news for this time. Remember that your logs of clandestine and quasiclandestine stations and broadcasts always are welcome. Also welcome are operating schedules, information about QSLs, the addresses of stations or their representatives, details about backing organizations or the stations you might run across in the press and etc.

Until next month, good hunting! ■

## WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

### Radio Canada Dealt Reprieve

New people, sitting behind the desks of the Canadian heritage and foreign affairs ministries, have given Radio Canada International a reprieve. After Ottawa heard long and loud protests from all over the world, the foreign ministry decided to round up the funds necessary to replace the 50 percent funding cut that would have ended the 51-year old service. But, the next question has to be: For how long? Each of the several monetary crises RCI has gone through over the past few years has brought the service nearer and nearer to a final shutdown.

### Venezuelan Voice

It's always refreshing to have a strong, new station from Venezuela or Colombia show up on the 60-meter band. A few months ago, Ecos del Orinoco (4905) from Colombia showed up. Now comes Radio Amazonas in Puerto Ayacucho, Venezuela, which is occupying 4940 (actually perhaps a shade below). The station is quite widely heard evenings and early mornings with its all-Spanish programming. Oddly, Radio Amazonas, 35 kHz from Ecos del Orinoco on the dial, is only about 50 miles away from Puerto Carrenas, where Ecos del Orinoco is located!

### Cool Target

I am one who always has enjoyed tuning in the Icelandic National Broadcasting Service, aka Ríkisutvarpid. None of the broadcasts are in English, so perhaps the attraction is just the realization of where they're coming from; and the fact that they're intended for the Icelandic fishing fleet—which brings back echos of when shortwave had a more romantic "feel." Anyway, here is the current schedule: 1215 to 1300 on 11402 and 13680; 1410 to 1440 on 11402 and 13680; 1855 to 1930 on 7740 and 9275; 1935 to 2010 on 11402 and 13680 and 2300 to 2335 on 9275 and 11402. All the broadcasts are in sideband.

### A Boost For Forli

Recent changes in Italian broadcasting law have allowed Adventist World Radio to apply for government approval to turn AWR's small station at Forli, on the Adriatic coast, into a much more significant player in AWR's station lineup. If permission is granted, AWR-Forli would greatly increase power which, in turn would mean adding target areas and languages to



# TRANSmissions

## New Italian Law Provokes Speedy AWR Response

The Adventist  
World Radio  
Newsletter  
December 1995

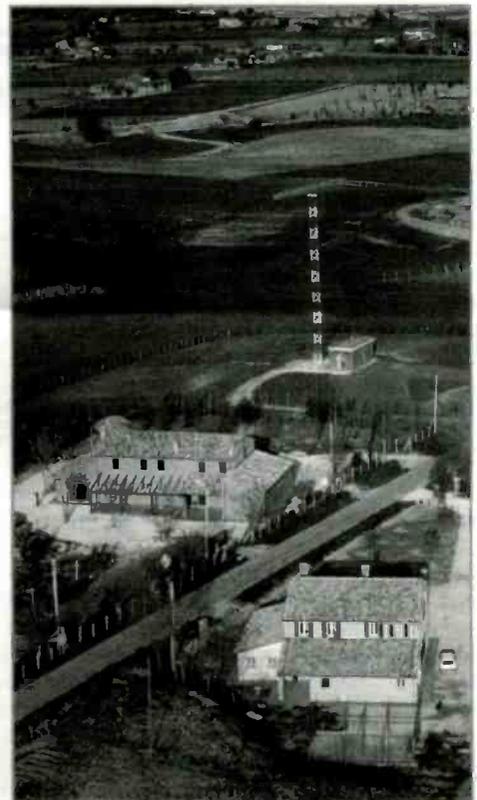
*The land, reclaimed from the sea during Mussolini's rule, is ideal for shortwave transmissions.*

We had given up hope for a major AWR station in Italy. And now the Lord surprises us with this. It is amazing." Gordon Retzer, AWR president, who was obviously delighted, was reporting to the AWR board of directors. AWR had just heard that President Oscar Luigi Scalfaro of Italy had finally signed the law permitting AWR to apply for a shortwave license for international broadcasting.

"The law allows 60 days for existing stations to apply for licenses," Retzer continued. "AWR knew the proposed law had this provision, and had already done preliminary application work. Even so it will take considerable effort to get the documentation ready. AWR is filing on behalf of its existing low-power station in Forli, with a request that a license be granted for an upgraded high-power operation."

Now AWR engineers and consultants are busy putting the necessary documents together for the early December deadline. If successful the license will enhance AWR's ability to broadcast effectively in key languages.

Italy looks directly at North Africa and the Middle East. Antennas could throw a strong signal into India, Central Asia and Africa. These areas include some of the prime global mission targets. Broadcast paths could



AWR's Forli, Italy, station

AWR's station in Forli, Italy, on the Adriatic coast may get government permission for much higher power.

the existing service. An enhanced AWR-Forli likely would mean that AWR would drop its relay agreements with stations in Eastern Europe and Russia.

### Poland

Polish Radio has not been in the "arm-chair copy" category for many, many years. At least not for most North American listeners. It still isn't, really. But things

are a little better. Station engineers have done some work on the antennas in the hope of improving reception in North America. Try Polish Radio at 1300 on 11815 in English.

Polish Radio's facilities are also used by Radio Maryja (Maria), which is owned by the Catholic Church. Radio Maryja's programming is carried on shortwave from 0700 to 0930 on 5900 and to 0825 on 7285, as well as from 1100 to 1430 on

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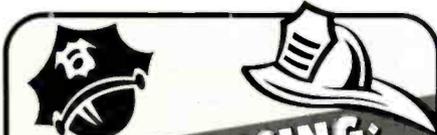
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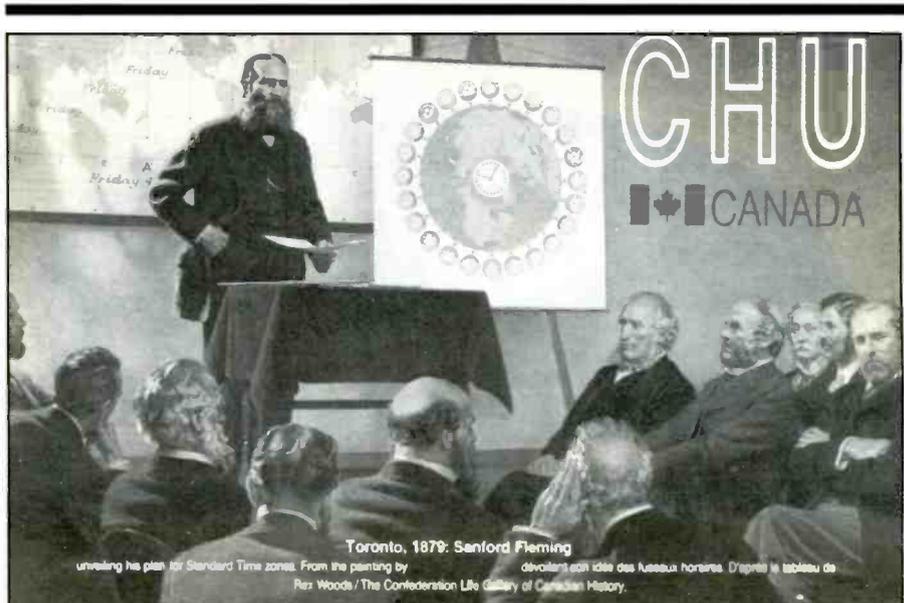
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 hand to "talk CB and Scanning" -- join them at  
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Time station CHU in Canada sent Jill Dybka of Tennessee this neat QSL depicting Sanford Fleming explaining his plan for standard time zones back in 1879.

5970. Radio Maryja's address is: Ul. Zwirki i Wigury 80, 87-100 Turan, Poland.

### Norway

There's another relay site in the making. Radio Norway is adding another 500-kW transmitter at its Sveio site and plans to rent time on the new facility to other stations and programs. Let's try and keep that information just between us and not tell any of the U.S.-based shortwave program producers about it!

### African Scene

Radio Uganda is a tough log for most of us, but your chances may be somewhat better now. That is, if its recent move to 3340 still is in effect. This frequency is a replacement for the usually QRM'd 4976, and is scheduled to run to 0600.

Swaziland Commercial Radio, occasionally reported on 6155, has been sold. The transmitter now belongs to Radio Cidade, which favors South Africa's Portuguese community. The transmitter, though a 100-kW'er, always was difficult to hear. We don't have any info yet on Radio Cidade's schedule. Their address is P.O. Box 1586, Alberton 1450, South Africa.

Malawi is another fairly tough customer when it come to trying to find their signal. It appears that the Malawi Broadcasting Corp. has brought a new, high-power transmitter into play on its 3380 frequency. Try 'em at their scheduled 0255 sign-on.

Egypt is reported to have contracted for a new 500-kW transmitter but whether for



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Adventist World Radio sent this very attractive certificate to winners of the contest sponsored by its DX program Wavescan last year.

AM or shortwave isn't certain. Many would agree that Radio Cairo needs to clean up its modulation more than it needs higher power!

### Asia/Pacific

Radio Bougainville in Papua/New Guinea has been reborn from a new site—Baka Island. It is using 3325 until sign-off at 1300 or just after.

Radio Dushanbe in Tajikistan is being heard with its domestic service in Tajik, Uzbek and other area languages between 0500 and 1200 on 11895. The transmitter site, however, probably is in Russia, not Tadjikistan.

A reminder that the BBC will close its Hong Kong relay station before the year is out. Not only will it close it, but it also will tear it down. That's to prevent the Chinese from making use of the facility to perhaps jam BBC broadcasts. You may want to go after this one before it is too late. The new BBC relay station in Thailand, due on by the end of the year, will pick up where BBC-Hong Kong leaves off.

That covers things for now. Before we get to the logs here's the usual reminder that your shortwave broadcast loggings always are very welcome! Please list them by country, leave a space or two between each one and add your last name and state abbreviation after each one. The logs get

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Ministère de l'Information

Radiodiffusion Télévision  
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TIME (UTC): 1830 الساعة

Le Directeur  
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Signature: J. TANANE

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cut up and sorted and we cannot take the time to add identifying information after each item.

We also are very happy to receive any station information you care to contribute: schedules, brochures, station news, spare QSLs you no longer need, news of station QSL requirements, addresses and so on.

And how about a photo of you and your shack? All contributions are very much appreciated!

### Loggings

You will find that the log report is different his month. A computer glitch mur-

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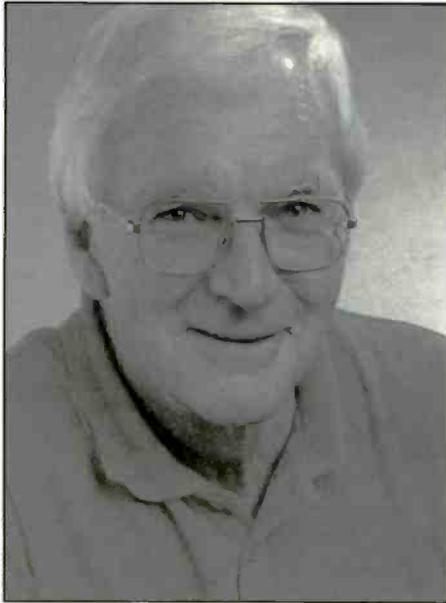


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**Abbreviations Used in Listening Post**

- AA Arabic
- BC Broadcasting
- CC Chinese
- EE English
- FF French
- GG German
- ID Identification
- IS Interval Signal
- JJ Japanese
- mx Music
- NA North America
- nx News
- OM Male
- pgm Program
- PP Portuguese
- RR Russian
- rx Religion/ious
- SA South America/n
- SS Spanish
- UTC Coordinated Universal Time (ex-GMT)
- v Frequency varies
- w/ With
- WX Weather
- YL Female
- // Parallel Frequencies

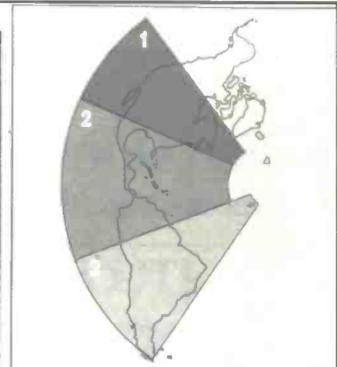
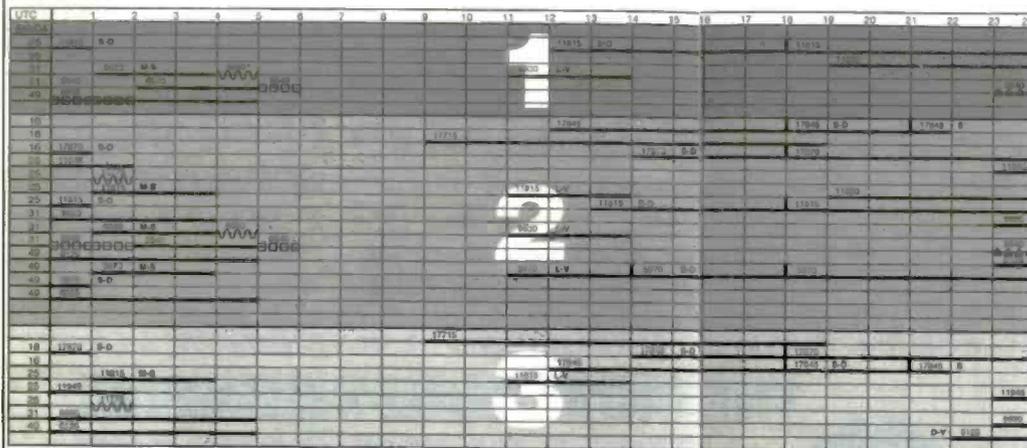
*This Radio Australia QSL stars Denis Gibbons, who hosts the Feedback program.  
(Thanks to Trevor Fletcher, Alberta, Canada)*

**ALBANIA**—Radio Tirana, 6140 in EE at 0230.  
**ALGERIA**—Radio Algeria International has English at 1800-1900 on 11715, 15160 and 15205, though it doesn't always begin on time.  
**BANGLADESH**—An even tougher log than the external service is the Radio Bangladesh domestic service. Best bet is probably from 1150 sign-on, using 4880//15520.  
**BELGIUM**—Radio Vlanderen International is airing English at 0630 on 5985 and 9925 Monday through Fridays. Check also on Sundays at 1205 on

dered the loggings that were destined to appear this month. What follows is an abbreviated, last-minute collection of station news and listings we've put together from a variety of sources. Unchanged,

however, is the fact that all times are in UTC and abbreviations such as FF (French), GG (German) or SS (Spanish) indicate the language used in the broadcast being reported.

**AMERICA**



HISPASAT (para América)  
Posición Orbital: 30° Oeste / N.º transponder: 6  
Servicio Video: TVE Internacional  
Frecuencia Central descendente: 12.078 GHz (12.078 MHz)  
Polarización vertical / Subportadoras: 7.56 MHz REE y 7.56 MHz RI

LUNES	MARTES A VIERNES	SABADO	DOMINGO
UTC	UTC	UTC	UTC
00 Clarín/ENGLISH*	00 Claves de América/ENGLISH*	00 Claves de América/ENGLISH*	00 Clarín/Amigos de la Onda Corta/ENGLISH*
01 Radiogaceta/Correo del Oyente/ENGLISH*	01 Diario hablado cultural/ENGLISH*/SEFARDI (M)*	01 Diario hablado cultural/ENGLISH*	01 Radiogaceta de los deportes/La copa/ENGLISH*
02 Mundo médico	02 Mundo solidario	02 Mundo solidario	02 Mundo solidario
03 Famosos y famosas	03 Claves de América	03 Claves de América	03 Vanguardia de la Ciencia
04 Radiogaceta de los deportes/Correo del oyente*	04 Un idioma sin fronteras/SEFARDI (M)*	04 Un idioma sin fronteras	04 Radiogaceta de los deportes/España y su folklore
05 ENGLISH	05 ENGLISH	05 ENGLISH	05 ENGLISH
06	06	06	06
07	07	07	07
08	08	08	08
09 Españoles en el mundo	09 España en el mundo	09 Informalivo catalán, gallego y vasco/España y su folklore	09 Semana cultural
10 Crónica	10 Crónica	10 Famosos y famosas	10 La máscara
11 Viaje por España	11 Viaje por España	11 Mundo solidario	11 Mundo solidario
12 Diario hablado cultural	12 Diario hablado cultural	12 Vanguardia de la ciencia	12 La actualidad e debate
13 Diario hablado cultural	13 Diario hablado cultural	13 Diario hablado cultural/Correo del oyente*	13 Diario hablado cultural y Avance deportivo
14 Españoles en la mar	14 Españoles en la mar	14 Españoles en la mar	14 Españoles en la mar
15 Mundo solidario	15 Mundo solidario	15 España parada y fonda	15 Tablero deportivo
16 Crónica	16 Crónica	16 7 Días	16 Tablero deportivo
17 Diario hablado cultural	17 Diario hablado cultural	17 Vanguardia de la ciencia	17 Tablero deportivo
18 Diario hablado cultural	18 Diario hablado cultural	18 Semana cultural	18 Tablero deportivo
19 Españoles en el mundo	19 Españoles en el mundo	19 Diario hablado/Tablero deportivo*	19 Diario hablado /Tablero deportivo
20 Españoles en la mar	20 Españoles en la mar	20 Tablero deportivo	20 Tablero deportivo
21 Radiogaceta de los deportes	21 Radiogaceta de los deportes	21 Tablero deportivo	21 España en la mar
22 Suena en España/Informalivo catalán, gallego y vasco	22 Suena en España/Informalivo catalán, gallego y vasco	22 Suena en España/Informalivo catalán, gallego y vasco	22 Suena en España/Radiogaceta de los deportes*
23 Diario hablado cultural/FRANCAIS*	23 Diario hablado cultural/FRANCAIS*	23 Mundo solidario/FRANCAIS*	23 Mundo solidario/FRANCAIS*
24	24	24	24

*Radio Exterior de Espana's schedule for the Americas.*

13605. More English is at 1300 Monday to Saturday on 13605 and 15540.

**BOLIVIA**—Radio Tropic, 4549v, in SS to sign-off just past 0100.

Perla del Acre, 4600, in SS at 1000.

**BRAZIL**—Try the reactivated Radio Alvorada from Londrina on 4865. Sign-on appears to be at 0800, or possibly 0830, all PP.

Radio Educadora Rural, 4765 in PP at 0400 with talk, time checks, ID.

Radio Clube do Para, 4885 at 0200 in PP.

**BULGARIA**—Radio Bulgaria, which recently celebrated its 60th year on the air has English at 2300 on 7480 and 9700 and at 0400 on 9700 and 11720.

**CANADA**—Radio Canada International, in EE at 2100 on 11945.

**CHILE**—Check for Radio Esperanza in Temuco on slightly variable 6090 with SS programming running as late as 0700.

**CHINA**—China Radio International's Mali relay is reported to have moved from 11715 to 11760 for English at 0000 and 0300.

**COLOMBIA**—La Voz del Cinaruco, 4865, SS at 0130.

Radio Nacional, 4955 at 0200 in SS.

**CONGO**—RTV Congolaise has resumed activity on its 4765 channel, signing on in FF at 0400.

**COSTA RICA**—Radio Exterior de Espana's Costa Rica relay has begun using 3225. Bit by bit, the big North American powerhouses are invading the tropical bands!

**ECUADOR**—La Voz del Napo noted on 3280 in SS around 1000. (Reported to be Maywoods DX Reporter Loy Lee's favorite station!)

HD2IOA time station, 3810 with time announcements in SS at 1030.

**ETHIOPIA**—Radio Fana, 6210 at 0500 in Amharic. Off a little past 0530.

Voice of Peace, 9560 from 0428 sign-on. Some English, but mostly local languages.

**FRENCH GUIANA**—Radio France International relay, 9800 at 0500 in FF.

**GERMANY**—Deutsche Welle, 6120 at 0500 in EE.

**GREECE**—Voice of Greece is on in English at 1900 on 7430.

**GUATEMALA**—Radio Cultural Coatan in SS at 0200. No connection with Radio Cultural on 3300.

**GUYANA**—Keep an ear on 5950 for the reappearance of Guyana Broadcasting Corp., which is scheduled to resume broadcasting here at any time, using a new 10-kw transmitter.

**HONDURAS**—Radio Copan International has resumed broadcasting, now using 7460, running to 0230 some nights, 0330 other evenings. At this writing, it still is in a test mode.

**HUNGARY**—Radio Budapest, 6190 in EE at 0200.

**INDIA**—All India Radio, 9910 in Pushtu; into EE at 1530.

**INDONESIA**—RRI Jakarta, in Indonesian on 15130 at 1300.

**ISRAEL**—Kol Israel is heard with English at 0400 on 7465, 9435 and 17545.

**JAPAN**—Radio Japan via French Guiana in EE at 0300.

**JORDAN**—Radio Jordan, 11970 in EE at 1500 and running to 1700.

**KUWAIT**—Radio Kuwait's English service airs until 2100 on 11990. The station is identifying now as "Radio State of Kuwait."

**LIBYA**—Radio Jamahiriya is being quite widely heard, apparently having reactivated some transmitters and frequencies. Try channels such as 15235 and 15415 during our morning and afternoon hours.

**MEXICO**—Radio Mexico International is being well heard on 9705 from 1200 sign-on with programs in SS.

Radio Mil, 6010 at 0900 in SS.

**MONACO**—Trans World Radio, Monte Carlo, 7115 in EE from 0745 with religious programs.

**MOROCCO**—RTV Marocaine, all AA from 1700 tune-in on 15345.

**NEW ZEALAND**—Your chances of logging the rarely heard ZLXA (Radio Reading Service station) are a little better now that they have moved from 5960 to 7290. Transmissions run until 0600.

**NICARAGUA**—Ex-clandestine Radio Miskitu is still

heard on 5770 running in upper sideband, all SS and usually closing around 2340, but occasionally running as late as 0300. They'll be best heard at that later hour during these summer months.

**NIGERIA**—Radio Nigeria, Kaduna, 4770 at 0500.

**NORTH KOREA**—Radio Pyongyang, 11700 in EE at 2300

**NORTHERN MARIANAS**—KHBI—Monitor Radio—on 9355 at 1400.

**NORWAY**—Radio Norway's Sunday half-hour in English is aired at 0600 on 7180, 7295, 9590; 0800 on 17760; 1200 on 9590, 13800, 15305; 1300 on 13800, 15340; 1600 on 11840, 11860, 13805; 1800 on 7485, 9590, 13805, 15220; 2000 on 9590, 2200 on 9495; 0100 on 9560; 0400 on 7465.

**OMAN**—Radio Oman, all in Arabic, is heard around 0700 on 9540.

**PAKISTAN**—Radio Pakistan in EE at 1730.

**PALAU**—KHBN is noted at 0800 on 9965, a new frequency.

**PAPUA NEW GUINEA**—Radio North Solomons, 3325, in Pidgin, using a 10-kW transmitter at Rabul (studios are at Burka) and is heard around 1130.

**PERU**—Radio Cora with SS talks and Peruvian music on 4914 at 0400.

Estacion X at Yurimaguas, 4594 at 1100 in SS.

Radio Altura, 7143 has been putting in some fine signals during our local evenings. This isn't the same Radio Altura which uses 3340.

**PHILIPPINES**—Far East Broadcasting Corp., 5890 at 1530 in CC.

**PORTUGAL**—Radio Portugal International, 9570 at 0230 in EE.

**SINGAPORE**—Radio Singapore International has English on 6015 from 1100-1400. 6135 carries

Malay, 7280 airs Mandarin and 6155 has the domestic service.

**SOUTH AFRICA**—Look for Channel Africa in English between 0300 and 0500 on 3220 and 5955; 0500 to 0600 on 5955 and 11900; 1500 to 1800 on 3220 and 95430; 1600 to 1700 on 11770.

Radio France International is now using the Meyerton transmitter site for beams to eastern and central Africa between 0300-0400 on 7135.

**SWEDEN**—Radio Sweden's English for North America is at 1130-1200 and 1330-1400 on 11650, 15240; 0230-0300 on 7290; 0330-0400 on 7155.

**UNITED ARAB EMIRATES**—UAE Radio, Dubai, 17825 in AA.

**VATICAN**—Vatican Radio, 4005 at 0330 in Albanian. Also in EE on 7305 at 0250.

**VENEZUELA**—Radio Amazonas, Puerto Ayacucho, 4939.5 in SS at 0200, with sign-off time varying widely—anytime after 0300, it seems.

**YEMEN**—Republic of Yemen Radio, 9780v, in AA with news at 2200.

**ZANZIBAR**—Radio Tanzania via Zanzibar is still noted on 11734.1 to 2000 sign-off.

**ZIMBABWE**—Zimbabwe Broadcasting Corporation, 3306 at 0345 in EE with African hi-life tunes and commercials.

Again, apologies for this abbreviated column and to the reporters whose logs vanished. Our plan is to have things back to normal next month. Until then, thanks and good listening!

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# Scanning VHF/UHF

BY J.T. WARD

MONITORING THE 30 TO 900 MHz "ACTION" BANDS

## Letting The Drama Unfold Over The Airwaves

Recently, a friend asked why I always seem to have a scanner turned on in the background no matter what else I'm doing. I gave him the quick answer—because it's interesting and I like knowing what's going on in the community around me. Then he asked a question that was more difficult to answer. He asked about the most interesting or exciting thing that I'd ever heard on a scanner.

Boy, now that took some thought. After all, I've been listening to scanners both professionally and as a hobby for about 25 years. The first incident that came to mind—and probably the most dramatic that I've ever heard—occurred just over a year ago.

The quiet of a Wednesday evening was shattered by the voice of a local television news photographer reporting that a Tampa, Fla., police helicopter had crashed into Tampa Bay.

The helicopter crew was searching for the body of a fisherman presumed drowned in a boating accident. The photographer and several others on the scene heard the chopper hit the water and could hear the pilot and observer screaming for help as they tried to stay afloat. Although the pilot was rescued quickly, darkness kept other officers from spotting the observer.

For the next several hours I monitored the frenzied communications as police, fire rescue and U.S. Coast Guard personnel searched the black waters of the bay for Officer Norris Epps Jr. Unfortunately, Epps, who could not swim and who was not wearing a life vest, drowned following the crash.

Another dramatic incident—this time with a happier ending—occurred about two months ago. My wife, Paulette, and I were watching television when I heard a civilian aircraft calling "Mayday" on 123.700 MHz, the VHF control tower frequency at MacDill Air Force Base in Tampa. Although the transmission was broken, I copied the pilot saying that he had lost power and was trying to glide to the runway at MacDill.

Because this was happening late in the evening, after 11 p.m., I knew that the control tower was unmanned. I quickly called the command post at the base and told the duty sergeant what I had heard. It would be quite possible for a small plane to land (or crash) unnoticed at night on MacDill's huge runway.

Because MacDill is surrounded by water on three sides, I also called the Coast Guard duty officer at St. Petersburg to alert them to the pending emergency, and I called the local EMS and fire dispatch center as well.

Less than five minutes later, the scanner came alive as both EMS and fire rescue personnel were dispatched to a reported airplane crash near a highway on the east side of Tampa Bay about five miles from the air base. Fortunately, the pilot had made a safe landing on a road and the Cessna sustained only minor damage when it knocked down a stop sign and a couple of street signs.

As a courtesy, I re-called both MacDill and the Coast Guard to let them know the outcome. Officials at both bases said they appreciated the advance notice that something was happening and were pleased to find the pilot and plane were fine.

Not all monitoring events are so dramatic, but they still can be quite memorable.

One evening about two years ago I was monitoring some military aviation frequencies with a RadioShack Pro-43 handheld scanner when I heard an aircraft using a "Spirit" callsign requesting a weather briefing from the Flight Service Station in St. Petersburg.

After the pilot received his briefing he offered a "pirep," or pilot report of weather conditions where he was flying at the moment. You can imagine my surprise when he started his pirep by identifying his aircraft as a B-2 bomber flying at 41,000 feet about 75 miles west of Tampa. This was the first B-2 "stealth" bomber I'd copied, and remains the only B-2 I've monitored except for those at airshows.

Another interesting "catch" occurred about 10 years ago while I was searching the old UHF mobile telephone frequencies with a Bearcat 200XLT. I snagged a call from Ross Perot—who at the time was flying in his private jet over the Gulf of Mexico on his way from Florida to Texas. I listened in as Perot—in those days just another billionaire—had his secretary place a series of calls through the corporate switchboard.

A favorite monitoring event for me has always been a high-speed chase by police officers. A few months ago I listened to one chase for more than an hour as six juveniles in a stolen car led police through four counties before running out of gas. All six eventually were captured.

Of course, over the years I've listened in as rescue crews struggled to save the lives of thousands of people hurt in auto accidents, and as firefighters battled brush fires, chemical spills, structure fires and hundreds of other incidents that easily could have become disasters.

How about you? What is the most interesting and/or the most exciting thing you've ever heard on your scanner? Write in and I'll print a selection of your letters in a future column.

### Mil Band Antenna

By the way, several months ago I wrote about the joys of listening to the UHF military aircraft band, 225-400 MHz. Well, that column has generated a lot of interest, and one question that's come up frequently is about the type of antenna needed.

Any good wideband discone will give pretty good performance on the UHF mil air band. But if you want a less expensive alternative, try the little VHF-UHF ground plane from RadioShack for about \$15. Just use a hacksaw to cut the elements to about 11.5 inches in length to match the middle of the band. I use this antenna with my Uniden 9000XLT and it works just great. My antenna is on my patio, only about 5 feet above the ground, yet I still can hear the Miami Air Route Traffic Control Center controllers transmitting from the Sarasota remote site, a distance of about 50 miles from my home.

### Scan These Bands

While we're speaking of military aircraft monitoring, don't forget the 138-144 MHz range. Many air-to-air tactical frequencies are in this range, and up around 168 MHz, as well. You'll still need a scanner that lets you manually select the AM mode because virtually all scanners automatically tune in FM mode in this range. While the RadioShack Pro-2037 doesn't tune the 225-400 range, it does let you select the AM-FM modes manually allowing access to the VHF military aircraft transmissions.

And don't forget, the military still uses shortwave for much of its long-range, non-classified communications. An inexpensive shortwave portable radio such as the Grundig Yacht Boy 400 or the Sony 7600G (both sell for about \$180) works well for HF communications.

## Moving On Up

Don Whiteman, KK9H, of Northfield, Ill., responded this month to a request for help from Kevin Reynolds of nearby Glenwood, Ill. Kevin had asked about changes being made by the Illinois State Police.

According to Don, the old District 4, which was based out of Crestwood, has been moved to 8330 S. King Dr., Chicago, but continues to serve the southside area. The whole Chicago-area state police communications system has moved to 800 MHz. That is why they no longer have the low-band whips on the cars and no longer use 42.34 MHz. District 3, which serves the northside area, also has moved to an 800-MHz system and no longer uses 42.56 MHz. The new 800-MHz system is a General Electric trunked system using the following frequencies:

- North/Northwest Group—Chicago, Des Plaines, Elgin, East Dundee: 866.4625, 866.8875, 866.9625, 867.3875, 867.4625, 867.8875, 868.3875, 868.4625, 868.8875 and 868.9625.

- South Group—Argonne, Chicago, Chicago Heights: 866.4125, 866.4375, 866.9375, 867.4125, 867.9125, 867.9375, 868.4125, 868.4375, 868.9125 and 868.9375.

Mark Loewe, of Lake In The Hills, Ill., also responded to Kevin's request, adding that also in use in the Chicago area are the mutual aid frequencies listed by Tom Kneitel in "Uncle Tommy's Freaky Frequency Festival." (POP'COMM, April 1996) Those mutual aid frequencies are 866.0125, 866.5125, 867.0125, 867.5125 and 868.0125 MHz.

Don and Mark, this is super stuff. It's this kind of response and the sharing of knowledge that makes this hobby unique. Thanks much. I'm sure Kevin and others in the Windy City will appreciate it.

## Delco Freqs

David Donahue of Upper Darby, in Delaware County, Pa., says the area has very active fire and police departments. Some frequencies used in the suburban Philadelphia area include the following: 154.190, Upper Darby fire; 159.090, Upper Darby police; 46.48, Delaware County fire and EMS; 453.275, Haverford police; and 46.22, Haverford fire.

Local disaster nets or emergency groups operate on 462.000 and 154.600 MHz.

## Conn. Comms

Sebastian Cultrera of Wetherfield, Conn., offers the following frequencies for scanner-equipped summer tourists visiting New England.

Wetherfield police are on 460.350 and 453.275; Wetherfield fire uses 460.625 and 465.5875; Wetherfield Volunteer

Ambulance Association uses 453.025; and Wetherfield Physical Services uses 45.720. Aetna Ambulance can be found on 452.725.

Sebastian says Wetherfield's public safety agencies are planning a switch to an 800-MHz trunked system later this year.

Nearby, the city of Hartford already has switched to an 800-MHz trunked system, but the fire department also uses 154.310, and the local ambulance service remains on 462.950.

## Decoding Dilemma

Ken Jones of Austin, Texas, responded to a letter in the April column inquiring about hardware or software to decode Motorola's mobile data terminals.

"About three years ago, I moved from Houston to Austin. Prior to moving, I met a gentleman who has just such a setup. He could monitor the Houston Police Department's MDTs. He had the capability to read the originator as well as the receiver of the message and could log everything to disk or printer," Ken wrote.

"I will see if I can locate him again. As I said, it's been over three years since I have spoken to him," he said.

Please do. A system like you describe would be in wide demand among scanner listeners.

Ken also wanted to know whether there is any hardware or software available to decode the Motorola trunking system and allow him to read the fleet, subfleet, etc. information transmitted on the control channel. He has a Realistic Pro-2005 with the Optoscan 456 computer control board and he's already decoding CTCSS, DCS and DTMF on the control channels.

Ken, I'm not an expert on monitoring trunked systems, and I'm sure not familiar with all the monitoring software packages out there. Perhaps a reader or manufacturer who knows of such a system will drop us a line and let us know what's available.

## Home In Mountain Home

James Vincent of Mountain Home, Idaho, is looking for modifications for the RadioShack frequency counter and the RadioShack Pro-26 scanner.

How about it? Anyone out there have any ideas for James? He sent along the following frequencies for Mountain Home: Mountain Home sheriff/police, 460.475; Mountain Home sheriff F-2, 460.075; Mountain Home police car-to-car, 465.275; Mountain Home fire, 154.145; Kmart, 158.400; and McDonald's, 154.570.

## Users Guide

Finally this month, let me mention a scanner users' guide that summer visitors to the Florida panhandle may find helpful. It is published by John Harr, 465 Rush Park

Circle, Mary Esther, FL 32569, and the little soft-cover, 16-page guide includes frequencies for the Fort Walton Beach area.

## Write In

As they say in show biz, that's a wrap. Keep those cards, letters and pictures (especially) coming, folks. The address is: J.T. Ward, Scanning VHF/UHF, *Popular Communications*, 76 N. Broadway, Hicksville, NY 11801-2909. Send Internet e-mail to JTWard@genie.com.

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# Telephones Enroute

BY TOM KNEITEL, K2AES

WHAT'S HAPPENING WITH CELLULAR, MARINE & MOBILE PHONES

## Cellphones And The Bad Guys

It didn't take long for the nation's bad guys to realize that cellular phones were a boon to their economic well-being. Drug dealers, kidnappers and cellphone number stealers owe much to the wonders of telecommunications development.

One of the latest scams is the so-called "lifetime" phone. A standard cloned phone uses one stolen cellphone number, which means the phone usually doesn't provide service for more than one month. As soon as the hapless customer assigned that number receives the bill showing thousands of dollars in overseas calls, he makes sure his stolen number is canceled.

Ah, but a lifetime phone is loaded up with as many as 99 numbers, all ripped off from legitimate cellphones. These gizmos sell for \$500 on the wholesale market, retailing on city streets for a whopping \$1,500.

Police point out that this little monster concerns them because kidnappers like to use cellphones. Having 99 numbers makes these number-rich phones essentially untraceable because the police won't know which number to tap.

Recently, a couple of wiseguys were blatantly offering illegal lifetime cellular phones online over CompuServe. You thought only hobbyists read those online offerings? Not so, because their posting drew the attention of the New York Electronic Crimes Task Force, a team of federal agents and local police. In the first case of its kind, NYECTF secured a court order to tap the e-mail account of the people offering the illegal cellphones.

After establishing contact with the equipment suppliers, task force members posed as international drug dealers, saying they wanted to purchase a whole lot of equipment, and also launder drug money. It was like James Bond, as agents set up several meetings with the suppliers in Las Vegas, New York City and Hong Kong.

Agents claim the sting culminated in the purchase of 30 lifetime phones, also equipment used for decoding cellphone numbers and cloning more equipment. They also handed over \$225,000 to be laundered.

Three people were arrested in the incident. Two suspects were electronic engineers. They face as many as 40 years in prison for fraud, one of them another 20 years if convicted on money-laundering charges.

Cellphones also figure in other enforce-



How about that man (photo left) about to jump from the billboard? The dummy caused an avalanche of cellphone calls to 911 in Little Rock, Ark.

ment matters. In many states, there have been a considerable number of court orders allowing electronic surveillance ("wire-taps," for lack of a better word) of the conversations of criminal investigation suspects. These are suspected drug dealers, organized crime figures, counterfeiters, extortionists, swindlers, industrial spies, obscene callers, terrorists, kidnappers, violent felons, etc., monitored while using legitimate cellphones. Because of the Electronic Communications Privacy Act and worthless promises by cellular suppliers, they thought they were guaranteed privacy. Joke's on them!

Remember how the Los Angeles Police Department taped O.J. Simpson's supposedly private cellphone calls during the famous Bronco ride? There was no authority for the tapes to have been made. Within a few months, the transcripts were leaked to supermarket tabloids.

For one reason or another, so-called "privacy" does not exist when it comes to cellphone customers. This, despite the privacy laws and hype, and the assurances that continue to be made by the cellular industry. Ultimately, "privacy" means nothing more than hobbyists who wish to casually monitor cellphones using late-model scanners may have to go through more trouble to do so.

In the end, it's only the FCC-licensed cellular service suppliers who come out

smelling like roses. They keep raking in the big bucks and grinning as police and federal agents are busy chasing down many of their best customers.

Consider this. Suppose all of a community's drug dealers used a local taxi company to regularly drive them around selling their wares. The law would consider the taxi company to be an accessory, even if they claimed ignorance of what their fares were doing via company facilities.

Law enforcement agencies are aggressively pursuing cellphone criminals via electronic surveillance. Yet, though cellular service suppliers regularly provide the comms facilities for criminals and their activities, service suppliers are neither sanctioned nor penalized for doing so. Why? Cellular companies conveniently hide behind the federal privacy laws they insisted on creating "to protect their customers." They simply claim privacy laws prevent them from knowing what their customers are doing.

I say it looks like high time to realign the old cellular telephone "privacy" machine. This worn-out gimmick is completely out of phase with reality. Repeal the meaningless ECPA of 1986. End the fraudulent practice of promising customers a privacy they never had. People get cellphones because of their convenience and portability. Privacy is not the big sales attraction the cellular industry thought it would be.

Let's restore the right to manufacture full-frequency coverage 800-MHz scanners and converters. Moreover, when criminals who use cellphones or beepers to abet their activities are convicted, let's penalize the common carriers that profited as accessories to those activities.

Your thoughts on these matters are invited. Why not drop me a letter in care of this column. Alternately, you can send your e-mail to k2aes@aol.com, which reaches me directly and in a flash.

## Here's a Great Idea

For the past six years, two professional firefighters in Massachusetts have been operating a highly specialized service called East Coast Paging Systems. ECPS is one of several dozen similar systems across the nation (many exchange information with one another) providing alphanumeric paging of fire, police/MVA, and/or news incidents to their customers.

ECPS's founders, Joe Hubley and Paul Trahon, tell me that they provide this service so that subscribers may custom select the categories they want to be notified about. For instance, Massachusetts members can pick fire incidents according to districts, and police/MVA according to Massachusetts State Police troops, then news as a statewide group.

Fire pages include all incidents as soon as they are designated a "working fire," as well as updates and additional alarms. Information on the type of structure, size, and whether it is occupied is provided. Hazmat information is also provided, as appropriate. National fire group pages all second-alarm fires in many major cities around the nation.

Police/MVA-type pages include things such as robberies, chases, hostage situations, shootings, stabbings, K-9 searches. For certain incidents where police personnel might be placed in danger if a page were sent, the page is held up until after the danger no longer exists. MVA pages include major traffic problems, serious accidents, or when medevac is requested.

The news group includes other incidents such as air or rail crashes, water rescues, searches, severe weather warnings and other miscellaneous incidents. Forestry pages provide major brush fires as well as daily fire classes.

ECPS presently serves New England and many Mid-Atlantic areas, providing full coverage of some states, and partial coverage of others: Massachusetts, New Hampshire, Maine, Vermont, Connecticut, Rhode Island, New York, New Jersey and Pennsylvania. Customers also have regular paging capabilities, and other options. The basic charge averages less than \$15 per month.

Paul Trahon told me that ECPS subscribers include volunteer and profession-



Mitsubishi's AH-129 offers built-in cloning protection.

al firefighters, police officers, forest rangers, EMS personnel, news media, police/fire buffs, scanner fans, and "lots of plain folks who want to know what's going on."

For more information on ECPS's services, coverage areas, rates, etc., please contact them directly at: East Coast Paging Systems, 245 Turnpike Road, Suite 2, Southborough, MA 01772; phone (508) 229-2288. The best time to call is between 9:30 a.m. and 4 p.m. Eastern Time. Please let them know you read about them here.

## Idea Was Too Good

A billboard erected by ALLTEL Mobile Communications Inc. created a major flap in Little Rock, Ark., as many well-intentioned motorists on Interstate 30 dialed 911, thinking they were going to become "life savers."

Motorists were triggered into action by the sight of someone getting ready to jump into the Arkansas River, 75 feet below. It was man in a gray business suit barely hanging on to the extended antenna of a huge replica of a Nokia cellular phone protruding from a roadside billboard adjacent to the Arkansas River bridge.

The apparent "jumper" actually was an all-too-realistic mannequin put there as a part of the billboard's display promoting cellphones as "life savers." As soon as calls began flooding in to 911, the Little Rock Fire Department rushed a tactical rescue unit to the scene. When they realized that the jumper was merely a mannequin, they requested ALLTEL Mobile to remove the billboard. ALLTEL complied without delay.

Steve McNulty, ALLTEL marketing vice president, commented, "Obviously, we were too realistic." The concept of the billboard

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was to state that cellars save lives every day. The reality of the billboard was that it proved people will use their cellphones when they feel someone is in harm's way.

McNulty stated, "Certainly, this is a situation where no one actually was in danger, but it shows the incredible impact cellular communication can have in emergency situations.

ALLTEL Mobile Communications Inc. operates a number of cellular systems in the Southeast and Midwest.

## Clogged Lines

This brought up a good point worth noting. Did you know that nationally there are more than 500,000 cellphone calls every month to 911? That's nearly seven million calls for help per year via cellular phones alone. Usually there are no air-time charges for calls placed to 911.

One problem has been that all too many cellphone and landline calls to 911 aren't sufficiently serious or urgent to warrant being processed through 911 emergency aid systems. Such calls serve only to needlessly tie up vital personnel and equipment, which diminishes the usefulness and slows the response of police, fire or medical services to urgent incidents.

Police confide that many motorists tend to consider it a highway emergency when the vehicle they are driving has a flat tire, overheats or runs out of fuel. If you have ever experienced one of these situations,

the words "highway emergency" probably flashed through your mind. Still, except in unusual circumstances, police do not consider such as representing incidents that warrant calling 911. These driving situations are best categorized as inconveniences or annoyances, as opposed to emergencies.

Highway emergencies include accidents, fires, traffic or road hazards, life-threatening medical situations, carjackings, reports of drunken drivers and crimes in progress, also vehicles that can't be driven because of severe weather or dangerous road conditions, according to police.

Most police agencies have, in addition to their 911 emergency number, a local seven-digit number for use in calling about non-emergency matters. Along with 911, the other number often is displayed on the side of an agency's police cars. This a great idea. Why? After Arlington County, Va., began displaying both numbers on its police cars, only 15 percent of the calls to 911 needed to be switched to the non-emergency number.

Some areas are exploring other alternatives. Where I live, 911 long ago bogged down in non-emergency cellphone and landline calls. A friend with the county's emergency response system tells me that 911 gets some real doozies—like the cellphone call from a driver parked in front of a trendy restaurant. He dialed 911 to notify police that the hood ornament from his Mercedes had been stolen while he was din-

ing. This might be one reason my county is studying the possibilities of opening up an 811 non-emergency number service.

## New Address

*Private Line*, which aptly describes itself as "a journal of inquiry into the telephone system," has moved. The bimonthly's new mailing address is: Private Line, P.O. Box 1059, Isleton, CA 95641-1059; phone (916) 777-4420. E-mail to [privateline@delphi.com](mailto:privateline@delphi.com) will reach editor-publisher Tom Farley.

This is a worthy publication with a sharp focus on cellular and hardware technology, cloning countermeasures, phonecards, laws, phreaking, plus other assorted odd-ball information about telephone comms. It leans toward the technical side of things, and has lots of opinions.

They offer one year (six issues) for \$27, and US\$37 in Canada/Mexico, US\$44 elsewhere.

## Stop Cloning Around

Mitsubishi Wireless Communications Inc. just came out with the model AH-129 cellphone. This is a dandy little 8.3-ounce portable with 105 minutes of talk time and a car-home adapter that quick-charges the battery in two hours or less.

Among the AH-129's special features is authentication, a special process that automatically verifies that the phone is legitimate. It's the first entry-level phone with this advanced fraud-prevention feature.

For added security, four function levels restrict use of the phone. In cellular systems that require a PIN prior to each call, the AH-129 dials it automatically. Other security features include an electronic lock, programmable unlock code and special dialing function that allows users to call 911 even when the instrument is locked or restricted.

The AH-129 can save 11-character alphanumeric name tags for phone numbers, as well as recall and display the last three numbers called. There are 39 alphanumeric speed-dial memory locations, with nine available for one-touch super-speed dialup.

Other nifty features include the call-in-absence indicator, low-battery alarm, any key answer, A/B system switch, dual NAM with easy NAM programming.

The AH-129 comes from Mitsubishi Wireless Communications Inc., 2001 Cherry Drive., Braselton, GA 30517; phone (706) 654-9500.

We look forward to your comments, questions, news clippings, new products and services information relating to cellular, PCS, cordless phones, air-ground, ship-shore, and other personal comms. Please mark "For Telephones Enroute" in the address of all correspondence sent to this column. ■

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# Washington Pulse

## FCC ACTIONS AFFECTING COMMUNICATIONS

### New Experimental Stations

The Federal Communications Commission has granted the following experimental licenses:

KA2XYW, Hitachi Telecom USA Inc. Fixed and mobile in Northeast Atlanta, Ga. Use 151.890 MHz to test and develop single-frequency duplex operations connected to PBX.

KA2XHV, Motorola Inc. Fixed and mobile in Fort Lauderdale, Fla. Use 220.1075, 220.1125, 220.2575 and 220.2625 MHz for test and development of equipment for export.

KA2XNN, Ramar Technology Ltd. Mobile used nationwide. Use 433.920 and 915 MHz to demonstrate equipment intended for Part 15 market.

KA2XYV, Schlumberger Industries, MCS Division. Mobile in 40-mile radius of Springfield, Mo. Use 451.125 MHz to test and develop an automatic utility meter-reading system.

KQ2XXO, Sprint Communications Co. L.P., Fixed in San Mateo, Calif. Use 889.320, 889.950, 891.840, 892.470, 893.100 and 893.730 MHz to test PCS equipment and its interface to the public switched telephone network.

KA2XLN, Symbol Technologies, Inc. Fixed and mobile nationwide. Use 896-901 and 935-940 MHz for technical demonstrations to prospective customers.

KA2XBI, Diablo Research Corp. Fixed in San Francisco Bay Area, Calif. Test and evaluate a Part 15 system on 902-928 MHz.

KA2XPO, Nippondenso America Inc. Fixed in San Diego, Calif. Use 902-928 MHz and 2450-2480 MHz to compare electronic toll collection systems.

KE2XLE, Ventura County Air Pollution Control District. Fixed in Simi Valley, Calif. Use 915 MHz for a wind profiler to study air pollution.

KA2XBK, British Broadcasting Corp. Mobile within the United States. Operate an INMARSAT-B terminal on 1626.5-1646.5 MHz to cover live events and fast-breaking news in remote locations where no alternative means of communications exists.

KA2XBL, KCI Communications Inc. Mobile within the United States. Operate an INMARSAT-C terminal on 1626.5-1646.5 MHz to test data transmission capabilities.

KA2XIE, The Philadelphia Inquirer. Mobile within the continental United States. Operate an INMARSAT-M terminal on 1626.5-1660.5 MHz.

KA2XLM, Houston Lighting & Power Co. Mobile within the United States. Operate an INMARSAT-M terminal on 1626.5-1660.5 MHz for emergency communications.

KA2XKZ, Mobile Telesystems Inc. Mobile within the continental United States. Operate an INMARSAT-B terminal on 1636.5-1645 MHz for tests and demonstrations.

KF2XJK, The Boeing Co. Fixed within 154-mile radius of various temporary fixed sites in the state of Washington. Operate on frequencies 1670, 1675, 1800 and 1805 MHz to install, test and certify a Terrestrial Flight Telephone System.

KA2XLH, U S West Communications Inc. Fixed in Littleton and Highlands Ranch, Colo., Use 2400-2483.5 MHz to test equipment designed for wireless local loops.

### Changes Proposed In Public Safety Rules

The Federal Communications Commission proposes to initiate an overall evaluation and assessment of public safety wireless communications. Public safety agencies today have serious problems with communications systems that do not interoperate, have minimal access to emerging technologies, have limited service feature options, have less than optimal transmission and reception quality, and have a scarcity of capacity on existing systems.

The goal of this proceeding is to develop the data necessary to evaluate the present and future needs of public safety agencies, to solicit comment on how best to meet these needs, and to facilitate a transition to a communications environment in which public safety agencies have access to the most modern, effective and efficient wireless communications systems.

This notice seeks comment on:

- Regulatory approaches that will facilitate the development of interoperable equipment and technologies.

- The service features and system requirements essential to the effective performance of public safety functions.

- Technological issues regarding the enhancement and improvement of public safety wireless communications.

- Means of allocating spectrum for public safety agencies to ensure that they have adequate spectrum to perform their duties.

- The measures needed to foster an environment that promotes public safety wireless communications that are spectrally efficient, of high quality and effective.

- The means to promote competition in the supply of goods and services used by public safety agencies.

Specifically, the commission proposes to adopt new definitions for public safety and public safety services, and requests comment on these definitions. In other matters, the notice concludes that current management and administration of public safety spectrum is inefficient and too lengthy, and requests comment on how to improve the process.

Comments on this notice are due Sept. 20 with reply comments due Oct. 18.

### Radiotelegraph Removed For Maritime Distress

The commission has eliminated the requirement that Global Maritime Distress and Safety System (GMDSS) equipped vessels also carry a manual Morse code radiotelegraph. The commission requested authorization for this change from the Congress and it was included in the Telecommunications Act of 1996.

Previously, U.S.-flagged cargo vessels of more than 1,600 gross tons and U.S.-flagged

passenger vessels were required to carry a manual Morse code radiotelegraph installation when navigating in the open sea or on international voyages. The radiotelegraph-based vessel safety system, however, is being phased out internationally and is scheduled to be replaced by the GMDSS on Feb. 1, 1999.

Thus, the commission requested authorization and the Congress mandated that the commission eliminate the radiotelegraph carriage requirement for each GMDSS-equipped vessel, upon a determination by the U.S. Coast Guard that the vessel has GMDSS equipment installed and in good working condition.

The rule change exempts GMDSS-equipped vessels from the radiotelegraph requirement of the Communications Act, provided that each vessel is inspected by the commission, or its designee, and is issued a safety certificate or endorsement. The commission noted that the U.S. Coast Guard intends to accept the safety certificate or endorsement as prima facie evidence that the GMDSS has been installed and found to be operating properly.

The commission stated that this action will reduce economic burdens for vessel operators, enhance worldwide competition in the shipping industry by eliminating a requirement generally applicable to only U.S. vessels and increase safety at sea by promoting the timely implementation of the GMDSS.

### Report On Long Distance Carrier Code Assignments

The FCC has released the latest available information on Carrier Identification Codes, 500 service, 555 line number assignments, 800 service, and 900 service as of Dec. 31, 1995.

This information is used within the telephone industry and by users of telephone services for a variety of purposes. Carrier identification codes are used within the telephone industry for routing calls as well as for accounting and billing records. They are also used by customers to reach alternative carriers and by corporations to employ least-cost routing techniques. The codes assigned for 500 and 900 services identify carriers and are used by local telephone companies to direct calls to the service provider. Both residential and business customers frequently seek these codes to identify particular carriers.

The report is available for reference in the Common Carrier Bureau's Public Reference Room, 1919 M St. N.W., Room 509, Washington, DC. Copies may be purchased by calling International Transcription Services Inc. at (202) 857-3800. The report also can be downloaded from the FCC-State Link computer bulletin board system at (202) 418-0241—BBS file name LDC4Q95.ZIP. The FCC-State Link also can be reached by using a gateway feature available through the National Technical Information Service's FedWorld system. FedWorld can be reached via direct-dial access at (703) 321-3339, via internet telnet access (fedworld.gov), or via the World Wide Web (<http://www.fedworld.gov>). ■

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**Please take note: As of May 1, 1995, we are no longer accepting free subscriber ads.**

**LOOKING FOR crystals for Drake 2B receiver.** Also need information on restoring cellular capacity to Realistic Pro-46 scanner. Sue Wilden, 2204 6th Street, Columbus, IN 47201.

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**LAST CHANCE:** We have a very limited supply of the modifiable cellular Bearcat scanners left, BC-200XLT, BC-2500XLT, BC-890XLT, etc. Once these are gone, they are gone forever. Call for close-out prices—we ship COD, and free U.P.S. shipping to 48 states. Galaxy, Box 1202, Akron, OH 44309, (216) 376-2402, 8:30-4:30 EST. Our 11th year!

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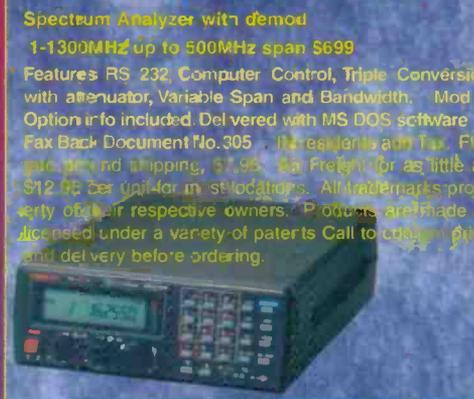
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