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POPULAR COMMUNICATIONS

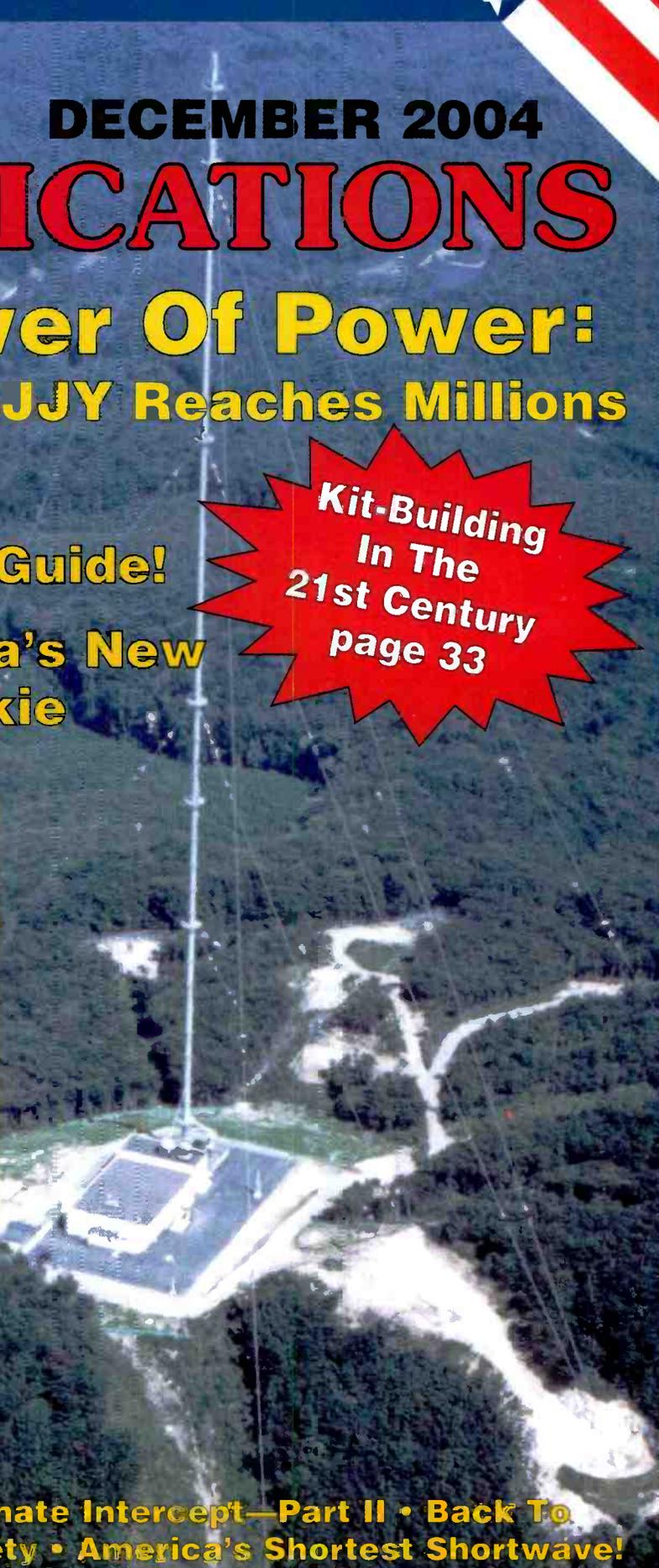
DECEMBER 2004

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**Kit-Building
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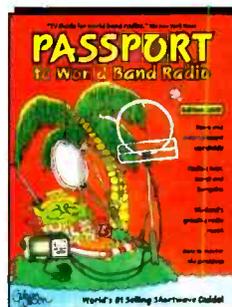
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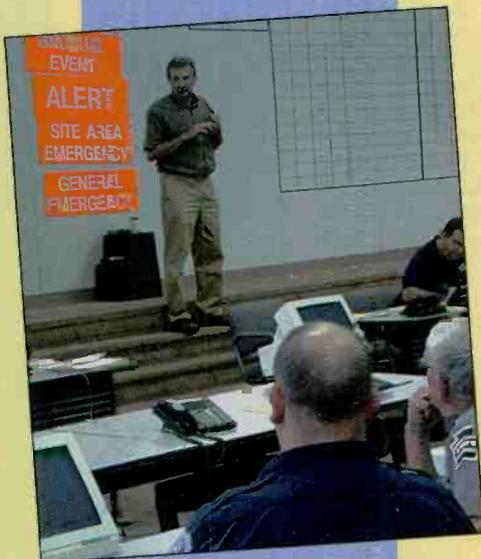


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On The Cover

Here's a look at the ultra-high, 200-plus-meter antenna that radiates station JYJ time signals from Japan to around the world. Join Steven Herman for a special tour inside that country's high-tech radio laboratory in his article "Keeping Time In Japan," beginning on page 10. (Photo courtesy the National Institute of Information and Communications Technology - NICT)



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The Cat's In The Bag

It's that time of year again—the Holidays. Drudgery and a sad time for some, happy and joyous for most of us. But these days on our calendar also, like it or not, cause us to think. It's a time to think about where we are in our lives and where we're going. It's also a good time to think not just about our holiday radio *wish lists*, but also, as the calendar year draws to a close, to reflect on the good old days.

Despite all those things that today, unlike a few years ago, make radio hobbyists suspect, scrutinized, and sometimes detained or worse, this is still a pretty good hobby, and you can be as informed and savvy as you want to be, as long as you go with the flow. You know what I'm talking about. You take a bit of a chance when walking in the airport with a handheld scanner in plain view while waiting for your in-laws to arrive, taking notes on departing and landing flights near the end of the runway on public property, or walking downtown or in the mall with a beefy spare belt battery strapped to your waist and connected to your ham transceiver, or whipping out a tiny frequency counter down the street from the police station, or asking a fellow hobbyist on an Internet list for what might be considered "sensitive" frequencies (keeping in mind that what's sensitive to you might not be sensitive to me, but we'll leave that up to the Feds or local cops to decide, without much oversight because it's the Patriotic thing to do today). Even talking publicly about what you heard on the police frequencies last night, or going to the library and reading about one of those foreign countries you've heard on your shortwave receiver so you can be better informed and at least on par in geography, politics, and religion with most 13-year-olds in the rest of the world, can be suspect. And you better not buy a reel of wire and some connectors for a radio antenna project at the same hardware store where you get your garden fertilizer.

I remember buying \$5 crystals for my Bearcat scanner a few years ago (actually it was more than a "few" years ago; I'm talking about 30-plus years in the rear view mirror!) It didn't even tune the 406- to 420-MHz federal band, but it did let me in on the heretofore hidden world of police, fire, and medical communications. Ah, yes, those were indeed the good old days.

At the time I was working for a small radio station in my hometown in Upstate New York, spinning records and reading the news to the tune of \$1.65 an hour. We had the same scanner sitting in the "newsroom," a small 8 x 10 cubbyhole seemingly etched out of the building as an afterthought. It used to kill me to spend four hours' wages on a single crystal, especially knowing that the rumor mill indicated that next year they'd be useless anyway because the cops were all moving to UHF, and there was no scanner to monitor those frequencies. Way back then I got the feeling there was some strange government plan to keep us—and even the media—from listening. But, of course, that wasn't to come until many years later, in 1986.

The '60s brought plenty of anti-this and anti-that (I think it was called Anti-Establishment) talk on the AM radio. If you weren't around at the time, you didn't miss much, believe me. Then, during the Vietnam War, there was *plenty* to listen to on shortwave—Radio Moscow, Hanoi, Peking, and the Eastern Bloc countries all decrying the United States as imperialist warmongers. Yes, there was plenty to talk about at school and work. It sure was a strange time, wasn't it? If you really think about it, what we hear on shortwave today isn't a whole lot different—many of the players (us included) have changed sides (flip-flopped) but the drumbeat continues unabated.

Traveling with radio was different, too. I had an old Pontiac with a behemoth Midland CB and one of those monster stainless steel 102-inch whips on the bumper. But then so did a lot of folks. And not just radio "hobbyists"—it seemed that nearly everyone from all walks of life was CB-equipped. walkie-talkies were everywhere, too. Those GI Joe walkie-talkies Mom and Dad got me one Christmas were the best, just a single channel (extremely lucky for the local operators that the HTs came ready-to-operate on Channel 11, the local call channel!). Everywhere we went, on a ride "around the horn" or to the camp, those radios would come along. Yes, those *were* truly the good old days!

Today is different, though. We've got to remember to use more common sense, and realize that this is a *hobby*, a pastime, and not to be confused with the radio hobby or holiday traveling of five or 10 years ago. The rules and our world have changed while we were worrying about agencies' migration to higher frequencies and bickering among ourselves about the Electronic Communications Privacy Act and our right to listen to the public airwaves. But yet, in a changed world that's still grappling with the losses of 9/11, a scant three years later the *fact* is that some things never change.

Really, This Is Only A Test

Man, this is 2004 and we're at war (again), with someone or something, for the long haul. So it's only reasonable that after last week's announcement that an undercover FAA employee was able to breach a security checkpoint at Pittsburgh International Airport in a TSA-ordered test that underscores the seriousness of the airport security situation, I was again dismayed. (That's not me editorializing, it's a fact that was widely reported in the mainstream media, and reported again here for your consideration). It doesn't take a Ph.D. in Common Sense to realize that someone's not doing his or her job, because if we're trying to circle the wagons and keep the bad boys and girls at an arm's length, the chances are better of *you* getting pulled aside and subsequently patted down at the security checkpoint and having your radios double-checked than the Transportation Security Administration folks being able to sniff out the real threat. And, please, don't give me the goofy logic that everything's hunkey dorey just because these terrorists haven't done a number on us since 9/11. That's like being in a combat situation and saying our perimeter is secure because it hasn't been infiltrated.

But tonight I feel different—better, actually—about our security. Not because *we'll* be subject to the close scrutiny of our G-men and women at the Nation's airports, but I rest well this evening knowing that the Feds have seen fit to take Cat Stevens, a.k.a. Yusuf Islam, off that plane bound for Washington. Never mind we haven't heard *why* he's on the no-fly list. It's not the media's job anymore to ask questions like that. He's on the list according to Uncle Sam, and that's it. No questions, just salute and keep on truckin'. It's probably easier to land on the no-fly list *yourself*, scanners, shortwave radio, frequency guides, notepad, and radio magazines all neatly tucked away in your carry-on for close inspection by the ever-watchful and highly trained airport security folks. Hold tightly onto those radios, frequency lists, and your *supposed* right to listen and carry that radio equipment on your person here in the United States.

Thankfully that airport breach was only a test and not an actual emergency. Ooh, baby, it's a wild world. ■

OUR READERS SPEAK OUT

Each month, we select representative reader letters for "Our Readers Speak Out" 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 "Our Readers Speak Out." Address letters to: Harold Ort, N2RLL, SSB-596, Editor, Popular Communications, 25 Newbridge Road, Hicksville, NY 11801-2909, or send e-mail via the Internet to popularcom@aol.com.

Al's In The Thick Of The Action

Dear Editor:

So there I was driving around in my East Baton Rouge Parish EMS Command Suburban, watching the 280-mile-long gridlock caused by every living soul leaving New Orleans. The troops under my command were all dressed up and ready to rock as we patiently waited for Ivan to make up its mind. In the meantime—what to do? Why, take my latest issue of *Popular Communications* to read! As I spent many hours at staging points I began reading the October issue. I also was listening to the FRS frequencies with my scanner; it was a regular tragic-comedy saga as panicked people were trying to flee "The Big One" with a radio. Gosh, hurricanes are such fun—NOT!

Back at work on this fine Thursday morning in Baton Rouge, we are now prepping for the "Unvacuation" to begin. We have brought in several members of our EMS Explorer Post to take them to the Nursing Home/Special Needs Shelter. They are going to assist loading people into the transport buses for the trip home.

Today there are still 75 days left to go in the 2004 Hurricane Season! Well, keep up the good work.

Joseph Lee Maurus
Shift Commander
East Baton Rouge Parish EMS

Dear Joseph:

A special, hearty THANKS to you and all those folks who helped—and will continue to help—our fellow citizens during this unbelievable hurricane season. Our hats are off to you and the entire volunteer radio corps for always being there when you're needed!

Putting Up With BPLBS

Dear Editor:

Your September 2004 "Tuning In" concerning Bill Moroney and the BPL situation was right on the button. What you have here is what could be classified as "BPLBS." The guys at the UPLC [United Powerline Council] and the FCC are reading from the

same sheet of music. The positive comments that they are making about BPL are in direct proportion to how deep their hands are into the pockets of the big money CEOs.

Once again greed has taken the place of responsible thinking. As the saying goes, "Money talks and..." well, you know the rest. Hopefully clearer thinking will prevail. The ARRL and others are doing a great job of trying to put the true facts about BPL on the table. The fact that BPL will cause problems with safety and national security cannot be disputed. In the end we must hope that the big money guys will see BPL for what it really is. Until then, we will just have to put up with all of the "BPLBS."

Al Bauernschmidt, N3KPJ

Remembering Heathkit

Dear Editor:

I just want to say that I have enjoyed *Pop'Comm* for about 20 years, usually buying three to four issues a year off the newsstand. Although I've always enjoyed all facets of radio, my best memories are of building my own from shortwave Heathkits. This was brought to mind by your article in the October 2004 issue, where you mentioned the Heath Atomic Clock kit of 1984 in "Looking Back" (pg. 31)! Well, I don't know about that year for sure, but I do know that I built a GC-1000 Atomic Clock in August of 1986. This was to accompany a Heathkit SW-77 Receiver built in 1977, and later a Heathkit SW-7800 built in 1986. I'm happy to report that ALL THREE are still working just fine (with a rare alignment/tune-up)! And while I have newer receivers, including a Satellit 800 and an ICOM R75, I get a kick from listening to my older kit-built radios.

I listen through an Antenna Supermarket Eavesdropper Sloper; it's 68 feet long, sloping from 28 feet to 8 feet high. (I also use a Justice AM Antenna for the R75 and Heaths, but nothing beats the SAT 800's built-in whip with pre-amp.) Thanks for the reminder and nostalgia trip!!

Jim Unger
Philadelphia, PA

P.S. I really ought to subscribe to your mag, huh?

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A publication of



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Offices: 25 Newbridge Rd., Hicksville, NY 11801, Telephone 516-681-2922; Fax 516-681-2926. Web site: www.popular-communications.com.

Periodical postage paid at Hicksville, NY 11801 and additional offices. Statement of Ownership, Management and Circulation, October 1, 2004. Popular Communications, 25 Newbridge Road., Hicksville, NY 11801. Publication #0733-3315. Issued monthly, subscription price \$28.95 per year (12 issues). Publisher: Richard A. Ross, Editor: Harold Ort; owned by CQ Communications, Inc. Stockholders: Richard A. Ross. Circulation (Average of Preceding 12 Months): Net Press Run 32,111, Mail Subscriptions 10,373, Sales Through Dealers and News Agents 14,172, Other Classes Mailed 200, Total Paid 24,745, Free Distribution 272, Total Distribution 25,017, Copies Not Distributed 1,216. Total 26,233. Circulation (single issue nearest filing date): 30,663, Mail Subscriptions 10,192, Sales Through Dealers and News Agents 12,942, Other Classes Mailed 200, Total Paid 23,334, Free Distribution 268, Total Distribution 23,602. Copies Not Distributed 1,333, Total 24,935 s/Dorothy Kehrvieler, Business Manager. Entire contents copyrighted 2004 by CQ Communications, Inc.

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News, Trends, And Short Takes

APCO Urges Congressional Action On Digital TV Transition

The Association of Public-Safety Communications Officials (APCO) International sent a letter to all members of the U.S. Senate and House of Representatives urging them to take action now to pass legislation to require broadcasters to vacate those TV channels that block public safety use of the 700-MHz band. The letter notes APCO International's support for the HERO Act (H.R. 1425), which establishes January 1, 2007, as the date certain for the clearing of Channels 63, 64, 68, and 69 by broadcasters. The HERO Act was introduced by Reps. Jane Harman (D-Calif) and Curt Weldon (R-Penn) in March 2003.

In addition, the letter identifies the most critical parts of interoperable communications as clear and defined regional planning, adequate funding, and training. APCO International notes that funding for these efforts should be included in any legislation on this matter.

"APCO International stands ready to help the Administration and Congress to ensure our first responders have what they need to respond to terrorist threats," APCO International President Greg Ballentine states in the letter. "Our members are committed to making sure our homeland's security is priority number one," he said.

An Explosive Situation

Bob Leef, well-known React official and GMRS (General Mobile Radio Service) radio guru, has always been on the front lines for radio and our great hobby. He recently submitted this information to *Pop'Comm*, which, while technically an opinion piece, certainly has its news value, so we're printing it here in "InfoCentral." Bob says,

As radio users, all of us have probably seen the sign CAUTION! BLASTING AHEAD. NO RADIO TRANSMISSION. Have you ever wondered whether one mode of two-way radio transmitting is more apt to trigger explosions than another? Would it be HF, VHF, UHF, 800 MHz, AM, FM, etc., etc.? What about the relationship of power and distance? Maybe you have also wondered in recent years if terrorists can detonate explosives by means of radio frequencies. And, in very recent times how about cell phones or WiFi from laptops? We should also wonder about the 12 million or so FRS radios sold every year.

Actually, I have not seen one of those signs in quite some time. Perhaps this technology has been outdated by some other means of setting off explosives? One authority is the Institute of Makers of Explosives (IME) in Washington, D.C. Here is part of what they said, "We have a standard on the subject of RF hazards in relation to standard electric detonators used in the U.S. See SLP-20 at <http://www.ime.org/store/slps2.asp> for details." In continuing, they state, "From that you will see that RF can be a threat to any electro explosive device. Generally, the frequency, power, orientation of the antenna and distance are the most important variables. Again, generally, lower frequencies, higher powers, and closer distances increase the threat. Antenna orientation can cause pickup to be 0% to 100%.

IME recommends safe distances for blasting from various RF sources in SLP-20. There is always a direct contact threat, so IME recommends 5 ft. from the weakest (2 watt or less) handheld radios. For one watt or less cell phones, we recommend 8 feet".

The manager of technical services states "the problem with an IED [improvised explosive device] is that you do not know the sensitivity of the device, unlike commercial blasting where we assume nobody will have a detonator with a no-fire level below 40 milliwatts. I am unaware of any standard safe distance for IEDs, and have personally encouraged the IABTI [International Association of Bomb Technicians and Investigators] to develop a policy in this area." In conclusion, he states "for the time being, there must be a balance struck between the threat of premature initiation from RF and the threat of loss of communications or other impacts from banning RF sources. Just as RF can present hazards, so can overreaction to that threat. For example, one must consider how emergency response would be affected if radio communications were banned over a wide area."

This last sentence is thought provoking for me. Just a month ago, three Saddleback Valley (California) REACT members presented to teachers at a local Intermediate school a short information program about types of two-way radios they could use. During our time there I asked the Assistant Principal what their procedures were in the event of a bomb threat. One of the things she mentioned was they had been told to stay off the radio. Does your school/business/public building/agency/etc. have a plan to communicate effectively in this scenario?

DeLorme Announces Introduction Of Xmap/GIS Editor Training To FEMA's National Fire Academy

DeLorme, a leading developer of accessible geospatial software and data solutions, today announced the successful introduction of XMap/GIS Editor Training to the curriculum at FEMA's National Fire Academy. Firefighters and emergency planners from around the nation recently gathered for a training program that covered the development and creation of a workable Geographic Information System (GIS) using XMap/GIS Editor, DeLorme's GIS tool. XMap is DeLorme's powerful geographic software platform, synthesizing the latest in available data sources into interoperable GIS and GPS applications for industries and application around the world. This hands-on training program offered emergency service personnel an opportunity to take a first step down the path towards the implementation of a sustainable GIS. Thanks to the straightforward interface and intuitive tools in XMap/GIS Editor, attendees quickly developed an understanding of GIS principles. Using real life scenarios, they also discovered how those GIS principles apply to emergency management.

Colleen Heilig, Planning and Information Management Curriculum Training Specialist, said, "Students were very excited about the GIS technology and this approach to community preparedness and response planning."

The program included:

- Importing existing data in a variety of formats
- Collecting spatial data using GPS and other technologies

- Working with incident management database systems
- Displaying, analyzing, and querying data
- Sharing data through XMap Web

Since its release in February 2004, XMap/GIS Editor has played a vital role in countless emergency situations from local to federal levels. Applications have included risk assessment and analysis, emergency preparedness, incident response and recovery operations. Public safety officials recognize that, in order to be fully operational, a partial information system must be accessible to those whose mission depends on it. XMap/GIS Editor provides such a platform by putting the GIS tools in the hands of those on the ground. With its included GPS and routing functions, XMap/GIS Editor is equally useful in the office or in the field where the real work of emergency management takes place.

New ARISS Operations Capability

The ARISS (Amateur Radio on the International Space Station) program announced that the amateur radio equipment aboard the International Space Station is now operating in cross-band repeat mode. They state, "We realize that many of you will miss the packet-operating mode, however, cross-band repeat allows further experimentation of the ISS amateur radio system."

The downlink for this operating mode remains the same, so listen for the station on 145.80 MHz. The new uplink frequency is 437.80 MHz. All frequencies are subject to Doppler shifting. For further information on working satellites and adjusting for Doppler shift, please review Emily Clark, WØEEC's excellent presentation on AMSAT's website at http://www.amsat.org/amsat-new/information/faqs/Intro_sats.pdf.

Japan FM Network (JFN) Delivers First-ever Surround Sound Soccer Broadcast

Japan SRS Labs, Inc., a leading provider of innovative audio, voice, and semiconductor technology solutions announced that member stations of the Japan FM Network (JFN) delivered the first-ever surround sound soccer broadcast in Japan on August 1. TOKYO FM broadcast the Kashima Antlers against FC Barcelona game in full 5.1-channel surround sound and encoded the surround mix live into the standard two-channel broadcast format using SRS Circle Surround. The signal was then broadcast to over 100 million soccer fans in Japan via the JFN network. Listeners with a home theater or automotive entertainment system that offers multichannel capability heard incredible life-like surround sound, while those listening over regular two-speaker stereo systems heard the broadcast in enhanced stereo. JFN Network has 38 member stations throughout Japan, including TOKYO FM, which already uses SRS Circle Surround its standard broadcasting format.

Knesset Passes Tough Pirate Radio Law

In Israel, the Knesset has passed by a vote of 36-20 a tough new law aimed at discouraging the operation of pirate radio stations. At times, illegal broadcasts have led to serious interfer-

ence to air traffic control at Ben-Gurion International Airport. Prime Minister Ariel Sharon requested that legislators view the law as a vote of confidence in his administration. The new law means that convicted radio pirates will face a jail term of three to five years.

Forgetful Pensioner Complains To Police About Own Radio

A forgetful pensioner in Germany could be charged with wasting police time. Seventy-one-year-old Elsie Weiss of Mulheim called the police late at night and complained she couldn't sleep because of loud music. But when the police turned up to investigate, they found the music was coming from the pensioner's own radio. She had taken it outside earlier in the day, and left it switched on at full volume when she went inside. A neighbor commented that "she always plays her music really loud. For once she gave herself a taste of her own medicine."

AIR Seeks More Money To Stay On Air

With the Indian government reluctant to write out a check for \$40 million, the state-owned national radio broadcaster, All India Radio, is in a crisis. Patna AIR station sought sanction from the headquarters in Delhi to partially close down its services, because of insufficient funds to pay its electricity bills. The Chennai All India Radio station faxed a proposal to switch over to low-power transmission to save electricity. That, however, will mean a smaller coverage range.

Things have become difficult for AIR since it was made a corporation. Although it is in no position to compete in the marketplace, the organization's "corporation" status has induced state governments to slap all kinds of taxes and duties on it.

AIR-Bangalore Seeks Reception Reports

The officials of AIR Super Power SW transmitters at Bangalore (6x500 kW) would like to get some feedback reports on their transmissions from listeners in Europe, in particular from England and also from Southwest Asia and Australia. Those interested should e-mail Mr. R. Narasimha Swamy, Superintendent Engineer, at narasimhaswamy@yahoo.com.

Indonesia Radio Silenced During Election

The Ministry of Communications Indonesia has banned the use of shortwave radios in order not to disturb the presidential election runoff and the Annual Session of the People's Consultative Assembly. According to a circular issued by the ministry's Directorate General of Post and Telecommunications, shortwave radio users must halt all radio communications seven days prior to the runoff on September 20 until three days after the Assembly's session ends on September 27. Only the state's telecommunication institutions, the government-sanctioned Amateur Radio Organization, and the Indonesian People's Radio Organization are allowed to operate during this period, it said. Anyone violating the ban can be punished with a jail sentence or fine. ■

How He Knows You've Been **BAD**



IC-756PROII All-mode, HF, 50MHz PROII offers 32-bit floating DSP, 24-bit AD/DA converter, selectable IF shape, and adjustable noise blanker. 13.38" w x 4.38" h x 11.2" d, 21 lbs, 1 oz. **FREE PS-125*** with purchase.



IC-746PRO 100W, 102 memories, and a multi-function LCD command the HF/50/144MHz 746PRO. 24-bit AD/DA converter and digital noise reduction. 11.3" w x 4.7" h x 12.5" d, 19 lbs, 13 oz. **FREE PS-125*** with purchase.



IC-V8 The polycarbonate and diecast aluminum 144MHz FM, 5.5W V8 offers 100 memories and standard CTCSS/DTCSS and DTMF. 2.13" w x 5.19" h x 1.38" d, 12.3 oz.



IC-17H A 6W amp circuit provides superior transmit on VHF/UHF when 13.5V DC is supplied. In addition, 500mW of AF is output. Separate CTCSS tone encoder and enc/decoder standard. 2.25" w x 4.34" h x 1.06" d, 10 oz.



IC-27H SPORT The 6W 12H Sport meets MIL SPEC for shock and vibration and is more than enough for long distance communications. The 2M handheld boasts tone squelch, customizable keys, DTMF encode, 40 memories, 10 weather channels and cloning. 2.3" w x 5.5" h x 1.3" d, 14.8 oz.



IC-7800 The hottest rig with the most bells and whistles. The 200W, HF/50MHz 7800 is a fusion of 40 years of analog design expertise with digital technology. Built-in supply and auto antenna tuner, four 32-bit floating DSPs, TWO identical receivers! 16.6" w x 5.9" h x 17.1" d, 55 lbs.



IC-706MKIIG The 160-10M + 6M, 2M, 70cm Mark II G is constructed for stable, quality output with low IMD and spurious emissions. Tone squelch, DSP, auto repeater and 107 memories. 6.56" w x 2.28" h x 7.88" d, 5 lbs, 6 oz. **FREE RMK706*** with purchase.



IC-2100H-25N The 2100H25N offers 50W on transmit, extending its range. It also features CTCSS tone enc/decode, tone scan and 100 alphanumeric memories. Remote controlled using backlit mic. 5.5" w x 1.56" h x 7.09" d, 2 lbs, 10 oz.



IC-208H This 2M/70cm mobile provides 55/50W, plus reduced power for local. The 208H covers 118-173, 230-549 and 810-999MHz (cell blocked) rx as standard. Improved DMS, detachable front, and 500 memories. 5.56" w x 1.56" h x 7.31" d, 2.65 lbs.



IC-718 With the performance of the HF all-band 718, such as wide dynamic range, high S/N ratio, and full duty operation, making distant contacts is easy. 9.44" w x 3.75" h x 9.41" d, 8 lbs, 6 oz. **FREE UT106*** with purchase.



IC-V8000 Offers 75/25/10/5W output. With clear, operator-facing speaker, the 2M features CTCSS/DTCSS, DTMF encode and 207 memories. 5.9" w x 1.97" h x 5.9" d, 2.22 lbs.



IC-2720H The 2M/440MHz, 50/35W 2720H offers simultaneous rx capability, independent band controls, and DMS with 212 memories. Also has CTCSS/DTCSS, wide rx, auto repeat, remote mic and remote control head (mnt. opt.). 5.5" w x 1.56" h x 7.38" d, 3 lbs. (main)



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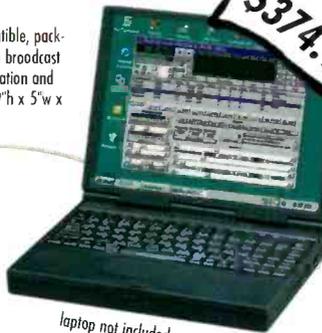
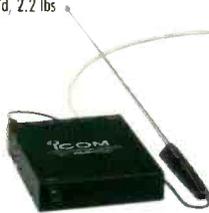


R-20-06 Covers AM/FM radio, TV broadcasts, wireless communications for boaters, aviation, conventional public safety, etc. (0.15-3304.99MHz, cell blocked). Features a digital recorder. 11 hours continuous receive. 2.28" w x 5.5" h x 1.22" d



R-3-26 Covers 0.5-2450MHz (cell blocked). Shows operation status, broadcast visual information (TV, sporting event, cameras, security, and amateur TV) on 2" color display. 2.41" w x 4.72" h x 1.28" d, 10.6 oz

PCR-1000-02 80N Lap/desk top PC-compatible, packaged with the Banito Software. Listen in an broadcast radio, television, ham stations, marine, aviation and more (0.5 to 1300MHz, cell blocked). 1.19" h x 5" w x 7.84" d, 2.2 lbs



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R-10-05 Coverage from 0.5MHz-1300MHz (cell blocked) with all mode receive capability. 5.1" h x 2.3" w x 1.2" d, 11 oz



R-5-06 Listen in on car-to-pit calls, look for sites while traveling, or catch a favorite program at home (0.015-1309.995MHz, cell blocked). 3.38" h x 2.28" w x 1.06" d, 6.5 oz



R-8500-02 Super wide band, all mode coverage from HF to 2GHz (cell blocked), including shortwave and VHF/UHF. 11.3" w x 4.4" h x 12.2" d, 15.4 lbs



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Headquarters of NICT, home of JJY's atomic clocks.



Keeping Time In Japan

A Special Look Inside The Core Of This Country's Radio Laboratory!

by Steven Herman, K7USJ / 7J1AIL

Driving into northwestern Tokyo from downtown, the seemingly endless urban congestion finally begins to thin, showing signs of agricultural pursuits. One can see the occasional rice field or tiny farm where ornamental shrubbery is grown.

Time has always moved a little slower in this part of the city. Back in the feudal era, when Tokyo was known as Edo, the present suburb of Kokubunji was a quiet zone where development was limited so as not to disturb the falcons kept by the Tokugawa Shogunate. As Japan modernized, the area became popular for the second homes of Tokyo's urbanites looking for a close, but relaxing, escape from the bustle of city life. Scientists also flocked to the area to build their laboratories as it kept them close enough to university colleagues, government bureaucrats, and corporate clients in the capital, but not too close.

100-Plus-Year Roots!

Today the area is home to the headquarters and main research facility where Japan's next-generation communications sys-

tems are being developed. What is now known as the National Institute of Information and Communications Technology (NICT) traces its roots back to the Electro-technical Laboratory of the Communications Ministry, which began studying radiotelegraphy in 1896. The current site of NICT's headquarters and main research facility goes back to before World War II, when Japan's Imperial military forces used it to intercept U.S. and British communications.

NICT's present pursuits stretch from ultra-fast photonic network systems to getting robots to comprehend human emotions. Radio is still, however, very much at the core of NICT, whose predecessor agencies were modeled after the U.S. National Bureau of Standards (now known as the National Institute of Standards & Technology). And, true to that original mission, NICT remains Japan's national laboratory responsible for telecommunication technologies, radio science, and radio applications.

Perhaps the NICT system most widely used and best known by the public is its JJY time signals, transmitting on 40 kHz and 60 kHz from two different sites in Japan. While JJY's short-

wave signals went silent at the end of March 2001, the low-frequency (LF) service has proved to be extremely popular thanks to digital technology. (The service is also available on the Internet at http://www2.crl.go.jp/cgi-bin/JST_E.pl.) More than 10 million “atomic” clocks and watches are already ticking in Japan, which are kept accurate to the second using built-in LF receivers to coordinate with the JJY time signals.

Talk About DX!

Japanese manufacturers Casio, Citizen, and Seiko are in fierce competition to make fashionable and extremely thin wristwatches with LF receivers and antennas. Casio reports sales of 1.5 million radio-controlled wristwatches in 2003, a 50-percent jump from the year earlier. The first LF radio watch is believed to have gone on the market in Germany in 1990. But the antenna for that device, the Junghans Mega 1, was in the wristband. Japanese developers took the technology a step further, figuring out how to cram the receiver and antenna inside the watch.

“The difficult part was how to get the good reception without getting interference from the metal parts. Metal absorbs the radio signals,” said Etsuro Nakajima, general manager at Casio Computer’s Timepiece Products Research and Development Center. “We initially used a composite of metal and resin for the watchcases which will be replaced with a full metal case in the near future.”

Some of the domestic and export Japanese models can also be synched to receive the 50-kW WWVB 60-kHz signal from near Ft. Collins, Colorado. But some owners of the Japanese watches outside Asia have discovered that their timepieces allow a type of LF DXing. Eugene Fornario in Berkeley, California (roughly 8000 kilometers from the JJY Fukushima station) owns five Casio watches tuned to the 40-kHz Japan signal. “If I place the watches in a quiet area of my apartment, which is the bathroom, it will set those watches almost every day of the year,” says Fornario. When I told Japan Standard Time (JST) group researcher Noboru Kotake that his signals were being picked up by tiny wristwatches across the Pacific, he expressed surprise. NICT makes no claims on its coverage maps that their 50-kW transmissions can reach that far.

Passing on a query from Fornario, the JJY team confirms it will be happy to issue QSLs for wristwatch reception of the LF signals.

Supreme Accuracy!

The LF signals are much more accurate than the time tones of the shortwave era. That is critical for all sorts of computer applications related to synchronization of high-speed data communications or time stamping. “For that we need accuracy of one microsecond or more sometimes,” says Dr. Hiroyuki Ohno, the leader of NICT’s Information and Network System Department’s Secure Networks Group. “One second accuracy has no meaning. It’s like in the world of human beings if a clock only displays what year it is. It would be useless.” To get the level of accuracy demanded in the digital age, NICT and other labs around the world rely on atomic clocks that are 10 to 100 times more accurate than commercial cesium clocks.

The man who could be called Japan’s official timekeeper contends that his clocks sitting in NICT headquarters, which set JST, are second to none. “We are constantly observing the comparisons between UTC and our NICT UTC. Now we can keep

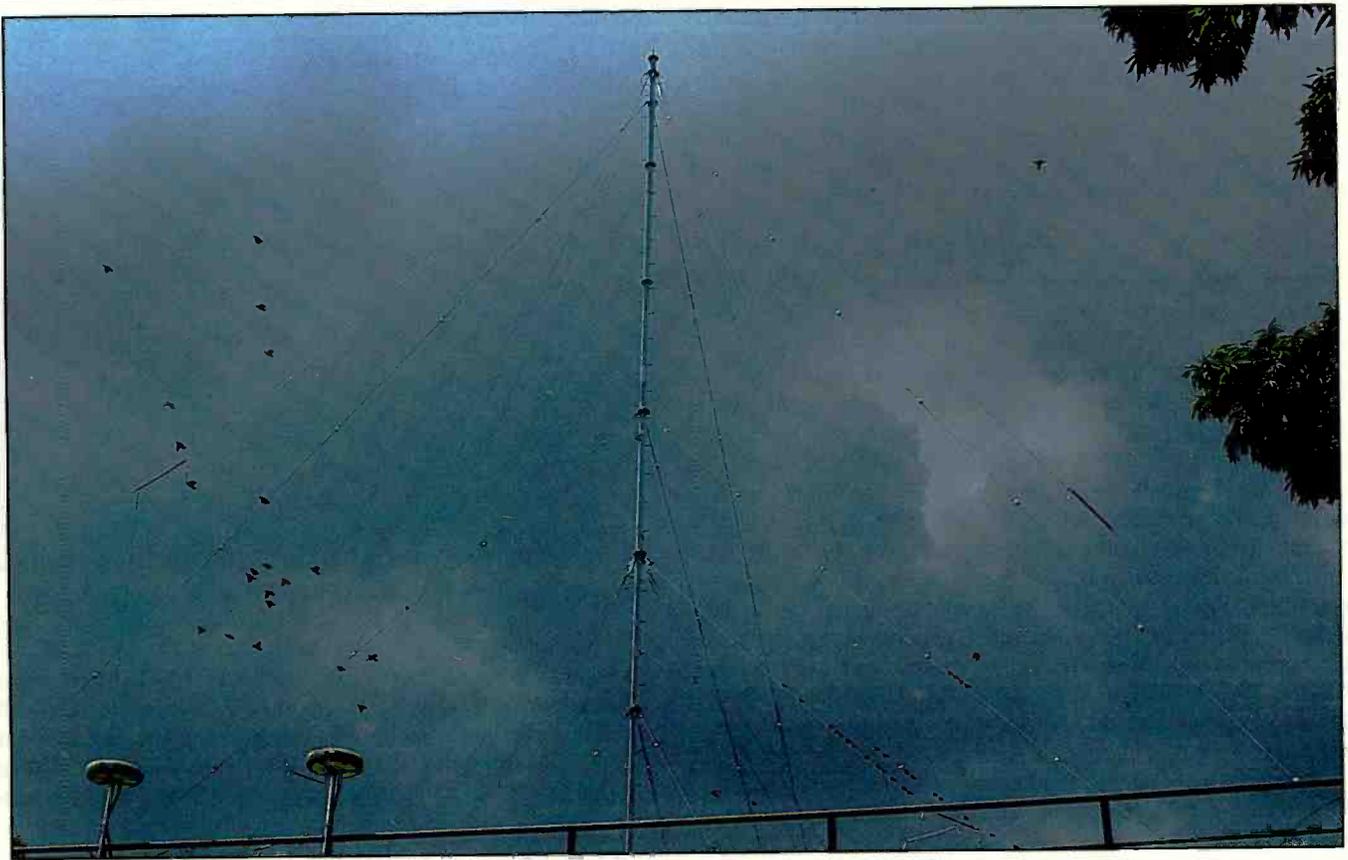


A display promoting the JJY LF signals to prospective clock buyers.

it synchronized within 50 nanoseconds of UTC,” says Yukio Takahashi, head of the JST group of NICT’s Applied Research and Standards Department. NICT uses 15 cesium clocks to set the JST primary clock and then feeds its results to the Bureau International des Poids et Mesures (BIPM) in France, which relies on more than 230 atomic clocks in 60 laboratories worldwide to issue International Atomic Time (TAI). There is a friendly competitive aspect with the timekeepers vying for bragging rights to having the most precise clocks. The chronological



The official Japan Standard Time clock.

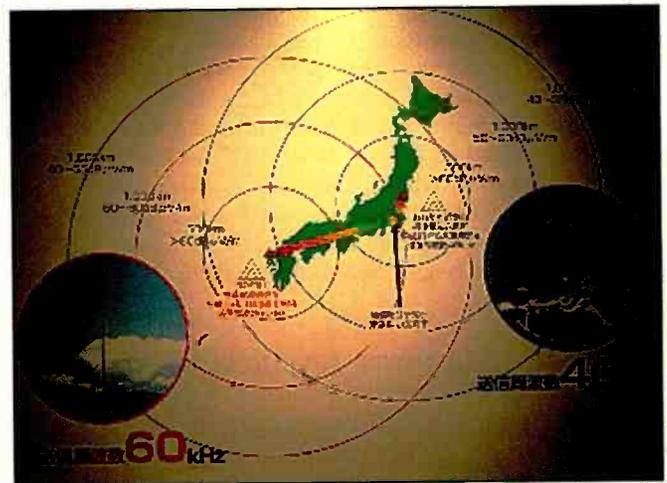


The Kokubunji wideband Delta array that radiates pulse signals across the HF spectrum every 15 minutes.

game follows the ground rule that has been in effect since 1967, defining a second as equal to 9,192,631,770 vibrations of a cesium-133 atom. The U.S. NIST considers its F-1 fountain clock to be the world's most accurate, because it will drift less than one second over 20 million years. The secret, the NIST scientists say, is chilling those vibrating cesium atoms in a vacuum and then bombarding them with microwave energy.

Japan's NICT is hoping to beat the F-1 clock by creating an even more accurate "optical primary" device, according to Takahashi. "We must continue to develop our JST more precisely," he says, explaining that their goal is to have, within five years, a timepiece that is 10 to 20 times more accurate than the most precise contemporary atomic clocks. Research labs in the United States and Great Britain are also hard at work on their own optical clocks. Scientists say these next-generation clocks will keep time with a single cooled mercury or ytterbium ion. The breakthrough relies on the use of a femtosecond laser and a photonic fiber to replace the cumbersome frequency chain needed to relate the optical signal to microwave signals.

While the JST group ponders atoms and tinkers with its two LF transmitters, some of its NICT colleagues across the street are still content with the bigger picture in the higher-frequency spectrum. Tucked away in a far corner of the NICT campus, in a musty building that is the institute's oldest, are the researchers of the Ionosphere and Radio Propagation Group. Outside sits a large delta array, one of five the group maintains (four in Japan and one in Antarctica) for its work. The coax from the base of the antenna leads back to a transmitter-receiver pair inside the building, known as the 10C Ionospheric Sounder. Every 15 minutes the transmitter emits a 100-kHz pulse that sweeps from 1



NICT does not make any claims that JJY can be heard across the Pacific, but it sure can be.

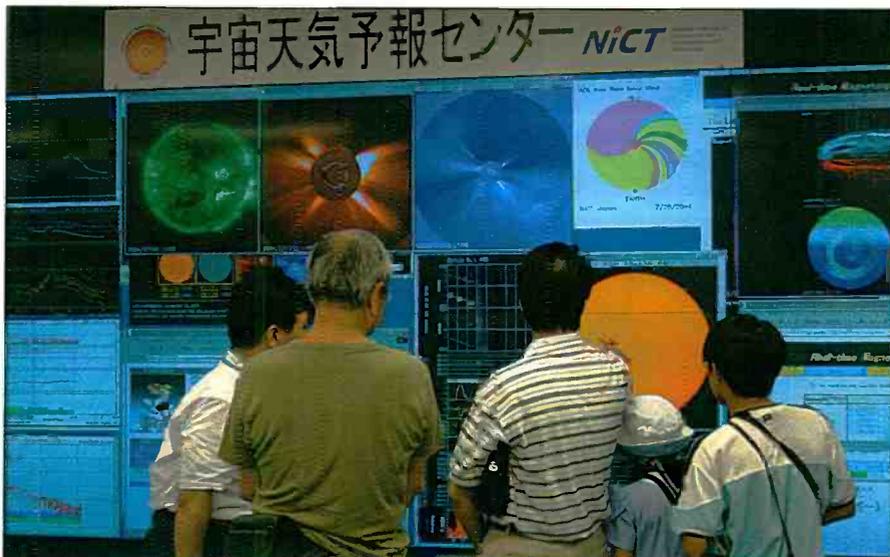
MHz to 30 MHz in 20-kHz steps. It only spends 80 microseconds transmitting on each frequency before moving up 20 kHz. "That means it covers the entire HF spectrum in 15 seconds," says Dr. Takashi Maruyama, the group leader. "It does this 96 times a day." The transmitter pumps out 10 kW, but Dr. Maruyama assures me that the pulses are so brief that they do not cause noticeable QRM unless an HF receiver is located fairly close to the facility.

After the Kokubunji transmitter goes through its cycle, the next ionospheric sounding station in line begins transmitting 30

seconds later, with its clock coordinated to its sisters by calibrating it using the GPS birds. The value of this data is apparent to any SWLer or ham. NICT does make the color ionograms with 8-bit intensity available in English for those outside Japan at <http://wdc.nict.go.jp/ISDJ/index-E.html>.

Around The Corner

The organization, which has been making ionospheric observations for about 70 years, believes there is still something new under the sun. Dr. Maruyama is excited about the 10C, which just went online a few years ago, because it can receive faint echoes, such as those from meteor showers, which would have gone unnoticed previously. For experiments in the field the group has created a portable "FM chirp" ionosonde that sweeps from 2 to 30 MHz with less than 300 watts. Some of the group's fieldwork is more exotic. One of Dr. Maruyama's current propagation



Visitors to NICT tour its Space Weather Center.

research projects involves something called "plasma bubbles." This mysterious ionospheric phenomenon was not pinned down until the mid-1970s, and scientists

are still not certain of its cause, which many believe probably has to do with magnetic fields. The bubbles are charge-deficient holes in the ionosphere's F layer,



Dr. Takashi Maruyama with the FM Chirp portable XMITR/RCVR package for ionospheric research in the field.



Writer Steven Herman, K7USJ / 7J1AIL, with the Kokubunji 10-kW ionospheric sounder.

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Key features include:

- Multifunction LCD shows digital frequency, clock, and more
- Alarm and 1-90 minute sleep timer
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usually observed above equatorial regions from late evening to early morning. They form at the bottom of the ionosphere and rise upwards, as fast as 500 meters per second, reaching an altitude of 1000 kilometers or higher.

While this equatorial spread *F*-layer phenomenon is not likely to excite most amateur radio operators or SWLers (as they do not affect communications below 40 MHz), it is of concern to satellite operators and users. "There have been cases of these ionospheric scintillations causing a 20-db peak-to-peak amplitude fluctuation," explains Dr. Maruyama. "This can cause information loss and phase distortion of satellite signals, such as for GPS." In other words, any critical VHF or microwave signal that is unfortunate enough to propagate through a plasma bubble is likely to see its phase and amplitude pretty messed up. And the plasma bubbles can cause interference from seconds to hours. NICT is cooperating with university and institutional partners in Asia to set up ionosondes in Thailand, the Philippines, and Indonesia to learn more about plasma bubbles, which seem to have a correlation with sunspot activity.

The Sky's Not The Limit

NICT's Applied Research and Standards Division also casts a wider eye. Its space weather group tracks solar winds (data also available in English at <http://www2.nict.go.jp/dk/c231/ace/index.html>). One of the division's most colorful products is its real-time Magnetosphere Simulator (see <http://www2.nict.go.jp/dk/c232/realtime/> and <http://www2.nict.go.jp/dk/c232/index-e.html>). NICT is eager to expand international cooperation and is one of the few Japanese institutions that appear to go out of its way to hire and welcome foreign researchers, especially those at the post-doctoral level. It even posts employment information in English at <http://www2.nict.go.jp/so/f463/index-e.html>.

"These technologies have an unprecedented amount of potential for humankind," says NICT President Makoto Nagao, considered one of Japan's foremost experts on machine translation. "Our role is to unlock this potential so it is easily comprehensible, not only to citizens of Japan, but also the international community."

The falcons may be long gone from Kokubunji but they have been replaced by a new flock of high-flying pioneers. ■

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Happier Holidays...

How To Add To Your Radio Wish List!

Last month "ScanTech" turned seven when I wasn't looking (no, Harold, it just seems like forever!). Over the years, it's become a bit of a tradition that we take the December issue to review some of the new products that you may be interested in adding to your wish list for the Holiday Season. So let's jump right in with some suggestions for Santa!

A New Radio?

Probably the most excitement this past year has been around the new digital-capable scanners, including one from Uniden and another from RadioShack (the PRO-96 reviewed last month). These are top-of-the-line scanners and will serve you well in almost any area, conventional or trunked. If you're not running into digital signals or trunked systems already, you will soon—they're spreading as quickly as city budgets will allow for communications upgrades. True, there are some signals that even these new super receivers can't decode, so they may not be the answer to all your problems. Specifically, anything that is encrypted will not be received, nor will some proprietary digital systems (EDACS digital, for instance). If all this is Greek to you, you should check with someone in your area to find out what will work.

How about exploring some other parts of the band, maybe those areas with longer wavelengths than you're used to. How about a shortwave receiver to check out the action below 30 MHz. I'd strongly recommend a receiver capable of SSB reception so you can listen to both the broadcasters and the utility stations that are to be found in the HF range. Many of the utility stations operate like the scanner frequencies you're used to listening to, but at longer range. Coast Guard operations on the high seas can be every bit as exciting as a local police chase.

Computer Control

If you've been reading this column for any length of time, you've probably realized that I'm a big fan of computer-controlled scanning. At the low end, there's computer-assisted scanning where the computer is used to save keystrokes and reprogram the radio quickly. This alone is a major enhancement to your scanning, as you won't be afraid to reprogram the radio for a special event since your normal memories are safe in the computer, and it takes only a minute or so of reprogramming time away from your regular life.

Computer control takes this one giant step further. The computer becomes the brains of the scanner, and the radio is simply used as a radio receiver. This yields a whole host of advantages which are outside the scope of this month's column, but if you're interested, let me know and we'll revisit this issue in the future. There are many methods of computer-controlled scanning, but of course you'll need a computer-controlled receiver. Look around at the numerous offerings to see what



RadioShack is somewhat famous for the telescoping scanner antenna (right), which can be very useful for testing and listening in controlled conditions. You probably wouldn't want to carry this one on your belt though as it could be bent quite easily. Even the small telescoping antenna with a swivel (left) can be quite useful at times. If you don't have one of these in your arsenal it's a good thing for your wish list. Of course, there's a whole bunch of other antennas that might be equally interesting.

receiver suits your needs best, and then shop around again to find software that works for you.

There are plenty of software packages out there that will greatly expand your scanner's capabilities—and give you the added benefit of additional channels, increased scan speed, and countless other features. Some of the more popular (by no means all!) games in town are Scancat-Gold for Windows, ScanCat Lite Plus, and Scancat Gold for Windows SE. Check out www.scanct.com or phone 318-687-2555 (9 a.m. to 3 p.m. Monday–Friday, CST). TrunkStar785D is a high-performance, full-featured software package for Uniden's BC785D, BC250D, BC796D, and BC296D digital trunking scanners. Data management, operational control, and spectrum analysis features are provided. For more information visit scanstar.com or phone 408-926-5630 or fax: 408-926-0303. Also take a look

at ScanPro software at www.bc785d.net, bensware.com for Radio Manager 2004 Software. The only software developed exclusively for Optoelectronic's Optocom and Optoscan 456, Optoscan Lite, and Optoscan 535-equipped scanning receivers is PROBE, which continues to lead the way in "computer controlled scanning" by providing new, innovative, and versatile features. Probe is at datafileinc.com.

Add To The Radio Congestion!

You might want to get out of the listening habit and become part of the action you're listening to! Many transmitters no longer require a license and can be extremely handy for home or work applications. FRS and MURS radios are available just about everywhere these days.

What I had in mind for your wish list, though, was a study guide for one of the radio amateur exams. Getting your ham license has become much easier in recent years and it's a very good idea for scanner listeners in many states—and having a transmitter handy just in case something happens is never a bad idea either. There are many study guides available from all sorts of sources, including RadioShack, American Radio Relay League, and *Pop'Com's* own Gordon West's Radio School! Check them out and see how easy it can be to become a licensed ham!

Antennas

Scanner nuts never seem to have enough antennas. Of course, on a handheld, they're easy to change so swapping back and forth can be advantageous for various conditions or frequencies of interest. Base users can also gain some mileage by changing antennas from time to time. Perhaps you've been using a model you're not quite satisfied with, or maybe you've got a second scanner that could use a little signal boost. On the other hand, if you're hearing all that you care to, a new antenna is probably not the best choice for your holiday shopping spree.

If you don't have a telescoping antenna that can be adjusted for various frequencies, you should. These are great for handhelds, of course, and handy for testing base and mobile scanners, too. I was recently testing a radio that I thought was defective. Just before giving up and sending it back to the manufacturer for replacement, I thought to check with a direct-connect antenna—and it worked! My coax connector was bad and the radio was trying to receive with no antenna. Once that was fixed, it was a great receiver. Those little antennas do come in handy!

If you're still using the antenna that came with your radio, you are really a good candidate for an upgrade. Look around and see what strikes your fancy, but keep in mind the major consideration in antennas: frequency coverage.

All antennas, not just handhelds, are designed and built for particular frequency ranges. The telescoping system mentioned above has the advantage of offering adjustable length, which means adjustable frequency response, too. I have a tendency to use ham antennas for my scanners because they're so widely available and because they're close to the frequency ranges I'm interested in monitoring on the scanners. You may be able to get significant performance increases on a single band by using commercial antennas built for just that frequency range, but you're quite likely to sacrifice bandwidth (the ability of the antenna to perform over a wide range of frequencies). On a handheld, that



Probably the two most exciting radios this year have been the RadioShack PRO-96 (left) and the Uniden BC-250 (right). Digital has arrived, and if you need that feature you should look at both of these radios carefully. If you don't need it yet, you should probably look at these anyway because you'll need it sooner or later!

may not be a major concern, depending on the intended use for the antenna. For instance, if you mostly listen to stuff in the 154- to 158-MHz range, finding a commercial antenna that operates there will probably improve performance. You may not hear much *outside* that range, however, so you'll have to assess the frequencies you listen to. For example, trunktracker users who listen mostly to the trunked system in their city tend to benefit considerably from an antenna designed for the 800-MHz range.

Base antennas, however, present a whole different set of problems. The major concern with a base antenna is likely to be performance over a broad range of frequencies you're interested in, followed by how much room the antenna takes up in the attic or outside. Are you going to have to add structural support to the mast or tower to support the "wind load" of the antenna? Something to keep in mind as you're shopping.

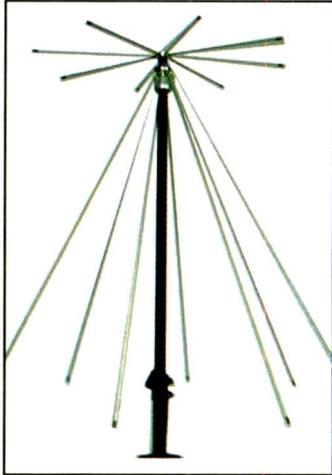
Today, many of us are finding that there just isn't enough space to erect a different antenna for each of our radio pursuits. Scannists who are also hams frequently use a single antenna (okay, sometimes two!) for scanning and ham activity. If you're primarily interested in the VHF band, the Hy-Gain GPG-2B is a 5/8-wavelength ground plane for 2 meters, but it's tunable from 142 to 185 MHz. It costs \$49.95 and is available through www.hy-gain.com.

The new MFJ Discone antenna from mfjenterprises.com (phone: 800-647-1800) costs \$59.95 and is an ultra wideband antenna that receives 25 to 1300 MHz and handles 200 watts on several ham bands. It even includes 50 feet of coax, stainless-steel elements and mounting hardware!



The MFJ-1714 telescoping antenna for handheld scanners is only \$16.95.

The MFJ Discone Antenna is the ideal scanner antenna; it's ultra wideband, and hams can use it to transmit as well.



Again, keeping in mind that you just might want to get the biggest bang for your buck, consider the MFJ-1714 telescoping antenna for your handheld scanner and ham HT. It's \$16.95 and collapses to 10.5 inches or extends to a whopping 40 inches. But be careful of those low branches if you're hiking!

If you're going mobile and don't relish the idea of marring that new car with a magnet-mount antenna, consider a new on-glass antenna. Harold will be reviewing Antenna Specialists' APR143 in an upcoming *Pop'Comm*. He tells me it's perfect for mobile scanner use and transmitting on 2 meters! It features a 21-inch whip, 15 feet of RG/58U cable terminated with a PL259 connector. The APR143 is available from antenna.com.

Antenna Specialists is by no means the only on-glass antenna manufacturer; another offering is from longtime radio friend Radiall/Larsen with their well-known Kulglass series of on-glass antennas. They also have a Tri-Band Scanner Antenna, the NMO-150450800, that sells for about \$30 and covers 150 to 165, 450 to 470, and 806 to 940 MHz. It's 16.5 inches tall and requires a standard NMO mount, available from most radio dealers.

Weather Radio

If you live in an area of the country that is subject to severe weather you should



Shortwave receivers come in all shapes and sizes (and price ranges). This Drake SW-8 is a great base station and semi-portable unit, but there are others that will work quite well and fit in your briefcase better.

have a weather band radio. The recent hurricane season is good evidence of just how important this can be. Storms and tornadoes that were spawned all over the south and east were extremely serious in their own right. Add to the actual storms the resulting flooding and that all-hazards weather radio becomes a lifesaver!

Many of today's scanners include a weather mode. Almost all of them will receive the pertinent frequencies and also allow for them to be put into a memory and locked out during your normal scanning operations. However, many of the new radios, particularly at the high end, also include SAME (Specific Area Message Encoding) codes so you can tell the radio the specific area you're interested in hearing. A weather radio with SAME is much more likely to remain on than one without (hearing the alerts for areas you're not interested in can get mighty annoying). Of course, many stand-alone weather radios have this feature, too.

Other Accessories

Handheld radios may benefit from one of the many amplified speakers on the market. Since handhelds are always fighting a battle between battery life and performance, the audio stage is frequently weak. Using a handheld in the car, or even at home, can result in ear strain as you try to hear over the ambient noise. An amplified speaker will solve that problem in a hurry.

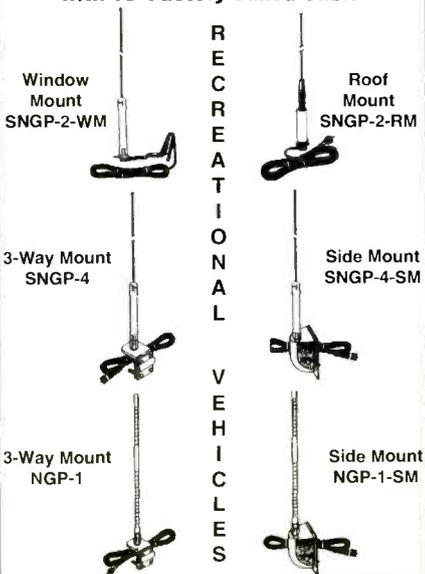
Speakers can also be tailored to the voice range that you listen to on your scanner. Sometimes, depending on your radio, just a bigger speaker will make the audio a bit easier to listen to. Sometimes you might want one of the communications speakers available from the major retailers for a variety of applications. Even RadioShack has a few speakers that work well for scanner applications. I've been using the RadioShack Minimus 0.3 (40-1254, now discontinued) with some success for years. While not the best possible speaker, it does serve the purpose of getting the audio out into the room, and it's cheap and small enough that you can use a number of them without making a major dent in shelf space. Have a look around at some of the not-so-usual places. Sure, RadioShack carries a full line of speakers and accessories. However, with the computer boom, many computer stores and non-specialty stores also carry some cheaper amplified speakers that may be just the ticket for your scanner.

Keep in mind that you don't need a real high-fidelity speaker to reproduce the voice information that most of us listen to on our scanners. In fact, a high-fidelity speaker may work against you. These speakers will often have a "whine" or ringing sound to them. There isn't anything wrong with the speaker, it's just the speaker's attempt to reproduce some of the CTCSS or tone squelch tone that your scanner is allowing through to the audio amp. It's annoying to listen to, but doesn't hurt anything either. Finally, external



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speakers can be used to separate the audio. That is, if you have more than one radio, the simple concept of using your ears to determine where the sound is coming from can help you distinguish what radio is active. External speakers can be mounted on the ceiling or walls, or can simply be placed at opposite ends of a desk. The idea is to put them in spots that will enable you to hear the difference!

Depending on where your scanner is located in your house, and more importantly the activity level in your house, it might be helpful for domestic tranquility to have a set of headphones around. These can come in very handy for those late night listening sessions, or for listening to the scanner while others are watching TV nearby. Some shortwave listeners find that they prefer listening through headphones all the time, while others almost never use them. The only slight problem I've found with headphones is that picking a pair that you'll be comfortable with might be a difficult task for anyone but you. Also be aware that headphones come in stereo and mono (mostly stereo for obvious reasons). Some of our receivers will support the stereo headphones by

Frequency Of The Month

Each month we ask our readers to let us know what they're hearing on our "Frequency Of The Month." Give it a listen and report your findings to me here at "ScanTech." We'll pick a name at random from the entries we receive and give the lucky winner a free one-year gift subscription, or extension, to *Pop'Comm*.

Our frequency for this month is **154.570**. Let me know what you can hear. Even if you don't hear anything on that frequency in your local area, you can still enter with *that* information! We'll put all the entries in the drawing when it comes up!

And we have a winner from our last drawing! Rick Ericksberg of Springfield, Massachusetts. Rick sent in his entry for 154.875. He says, "Although I haven't heard them lately, I know this frequency is Narragansett (Rhode Island) Police and also Binghamton (New York) Police. I've heard these while vacationing and visiting relatives in the past." Thanks Rick!

Please don't hesitate to write in with questions or suggestions. If you're entering the "Frequency of the Month" drawing, please put the frequency in the subject of the e-mail or on the outside of the envelope.

You can contact me via regular mail at Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126, or send questions and suggestions via e-mail to radioKen@earthlink.net. Until next month, good listening!

putting the signal into both ears, but most do not and you'll only get audio in one ear under these circumstances. That might not be all bad, as it leaves the other ear open for room noises, but it can be annoying if you want to concentrate on the radio. There are adapter plugs to solve this problem, or you might prefer a pair of headphones that are optimized for communications listening, which are available from any of the major manufacturers of ham and shortwave equipment.

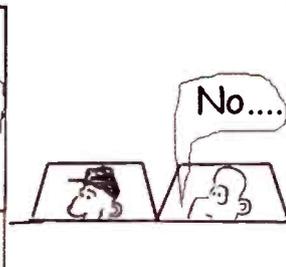
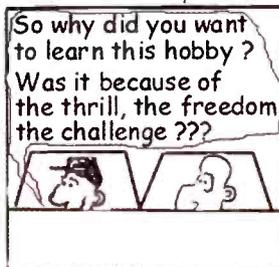
Another audio accessory I'm regularly asked about is the audio filter. For shortwave listeners, these are a great help, depending on your receiver's capabilities. However, for scanner listeners, I don't think they are quite as useful. In my opinion, you'll get much more mileage out of a pure amplified speaker (which I think is how a lot of scanner listeners wind up using filters anyway). If you also listen to shortwave you might find a use for one, and then you can hook it to your scanner to see how well it works. Some units, including the TimeWave 599+ have dual receiver inputs! By the way, if you're into

shortwave listening, I can highly recommend the TimeWave if the price doesn't put you off. MFJ Enterprises also has a nice DSP filter that's worth a look. I've heard good things about it, but never actually used it.

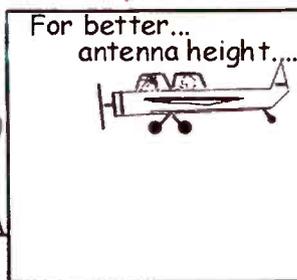
Don't Forget To Scan!

Holiday scanning can be interesting, too. Police, fire, and ambulance services all tend to be busy this time of year with the increased activity and traffic problems. One of the first things you should do is plug in the frequencies for your local mall, if you don't already have them in your scanner. Even small shopping centers have maintenance people and often security for the holidays that use radios. You can find store and mall security on just about any business frequency, so you may have to do some hunting to find just what you're after. In some cases, the security is provided by off-duty officers who are equipped with police frequencies and a special unit number. Larger malls will all have their own system.

The Adventures of Scanner Dweeb by M.A. Coletta



Location, Location, Location!





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Other good places to look are the FRS and MURS frequencies, particularly within individual stores (larger stores all have security staff of their own these days). Equipment operating on these channels is widely available. These radios are required to operate at low power levels so, while it's plenty to carry the signal within a building, you may not be able to hear them unless you're close by. Larger shopping centers will have dedicated frequencies, possibly several channels to keep security and maintenance functions separated. Two of our local centers even use repeaters, which makes listening that much easier since you can hear both sides of the conversation.

Finally, you may have some luck finding frequencies in more traditional references like *Police Call* and *Monitor America*. Both of these excellent references should be in your library as a good starting point for frequency information. For some cities, *Monitor America* actually lists mall and shopping center frequencies in particular.

It's very entertaining listening from time to time, and pretty interesting the rest. Most of the security officers and others that are to be heard on the radio are not professional communications specialists, to say the least. And during the holidays,

there's likely to be part-time staff added to help with the increased workload. Part-timers often need directions and answers to questions that customers may ask a hundred times a day, but that one particular employee hasn't heard before and so must contact a senior employee via radio. Sometimes the answers to questions asked for the hundredth time are somewhat "less than polite"!

I don't actually have the frequencies in the scanner that I carry (I listen mostly at home), but I do make a point to watch employees with radios. It's clear that some of the stores have put some effort into training proper radio procedures, while others are hoping that the employees will have seen *Smokey and the Bandit* enough to get the idea. It shows.

Our particular mall also runs into parking problems around the holidays, and there is a whole detail of folks dedicated to helping solve the problem, transporting staff and guests to whatever off-site parking is available. And to say the least, security is tighter and there are likely to be more problems in general during the holiday shopping season with so many people coming and going and (unfortunately) more opportunities for unscrupulous types to take advantage of as well.

Check it out. If you don't have the frequencies already, it's a bit of a fun challenge to identify them. If you can't find anything listed at all, or don't have access to the frequency directories, go have a look around the store or mall you're interested in. See if you can spot any antennas on the roof, or if you can spot someone using a handheld radio. The length of the antenna may give you some indication, but not always. In the good old days, you could tell just by how long the antenna was on the handheld transceiver what frequency band they were operating on. That information was very helpful in narrowing the search. However, today's modern antennas, particularly on portables, have many shapes and sizes and don't always correlate well to the band they're designed for. As an example, I have an 800-MHz rubber duck antenna that's much longer than several common VHF-Hi antennas. Perhaps you can find a friendly mall employee to let you look at the radio itself. Sometimes the radios have meaningful labels (sometimes even the frequency itself), but sometimes not.

Let's go for another seven years; your questions, photos, and comments are always welcome Good hunting and Happy Holidays!

Central Pennsylvania's Radio Services Rise To The Challenge Of Hurricane Ivan

The "Real" Information Came From The Scanners And Local Volunteer Radio Operators!

by Rich Arland, K7SZ

Tearing myself away from the arms of Morpheus, I swung my legs over the edge of the bed, kicking Oki, my 125-pound Alaskan Malamute in the chest. Oki emitted a "grumph!" and settled back down on the floor beside my bed. I, on the other hand, was trying desperately to find the damned cell phone that was burping incessantly. Grasping the infernal instrument, I answered the incoming call from my daughter, Maja.

"Dad, my car won't start and neither will Al's," she said in an irritated voice reserved for those occasions when she's really upset with life, her bank account, and me or her mother.

"Where are you?" I responded groggily.

"Kingston, on "The Ave" near Dr. Fath's office" she replied.

"Okay, stay put, and get out of the rain. I'll be there in about 10 minutes," I said flipping the cover of the cell phone closed and simultaneously glancing at the alarm clock. Three thirty a.m.! Oh, joy! What a swell start to a Saturday.

Once dressed I hastily grabbed an ancient ICOM IC2-GAT 2-meter HT and a new Midland GTX-400 3-watt GMRS/FRS handheld and headed out the door in the general direction of the truck. Once inside the cab, I fired up the Yaesu FT-1500 2-meter mobile and dialed up the Luzerne County Amateur Radio Emergency Service (ARES) repeater on 145.41 MHz (see sidebar for frequencies). As I started the trip down River Street in Wilkes-Barre (Pennsylvania) heading toward Kingston and the Susquehanna River, I gave a short call to find out whether or not the Luzerne County EOC had activated the ARES volunteers for the anticipated river watch, courtesy of a hurricane named Ivan that was dumping rain on the Wyoming Valley and points north and west at the rate of one and a half to two inches per hour!



The operations floor, a.k.a. "The Pit" at the Luzerne County EOC.

Mike Navin, N3FJA, quickly answered me, stating that he was in Mountain Top, about 15 miles south of Wilkes-Barre, and had been out with the volunteer fire department checking out the various streams and creeks in the area for flooding. Mike told me that so far no one had activated ARES, but he would be on station should the need arise for direct reporting from his area.

I thanked Mike, and soon found myself driving across the Market Street Bridge that connects Wilkes-Barre with Kingston. Looking at the Susquehanna River from the crest of the bridge I noticed that the river levels were much higher than reported earlier on the evening news. The "Old Susquehanna" was definitely on the rise!

After retrieving my daughter and her boyfriend, I ended up back at the house, unable to get back to sleep. The Weather Channel provided a nice strategic picture of the remnants of Hurricane Ivan, which was dumping lots of water all over the



Al Bardar, Luzerne County EMA Director and EOC "Head Honcho," briefs the staff on the operations floor.



Luzerne County EMA Deputy Director Kevin O'Brien directs the action at the EOC.

northeast, but the "real" data regarding what was happening came from the scanner. The local public safety VHF/UHF channels were busy with the various municipalities reporting the conditions of the small streams and creeks in their respective areas. Toby's Creek in the Shavertown/Dallas area was already out of its banks, threatening several local businesses. Low-lying areas of Edwardsville and Larksville were inundated, with many stores near the creek suffering flooding. Soloman's Creek in south Wilkes-Barre, was rapidly approaching the top of its banks and would soon overflow, inundating homes and the area around Mercy Hospital, forcing the evacuation of many families. Then there was the mighty Susquehanna. She was in no mood to play and was rapidly rising to flood stage in many areas along the riverbank.

Finally, having maintained a radio watch on the ARES repeater for about four hours and hearing nothing, I decided to venture out into the torrential downpour and report to the Luzerne County Emergency Operating Center (EOC). I arrived at the EOC about 0730 to find about 100 volunteers already ensconced in their various operating positions. Upon seeing me, Al Bardar, the Director of the Luzerne County Emergency Management Association, asked me to bring up the ARES VHF net and get some assessment of river conditions and rain prediction figures from the northern end of the Susquehanna near Cooperstown, New York. Although he had notified Alice Rogers, KA3KMH, the Luzerne County ARES Emergency Coordinator (EC), she hadn't arrived by the time I entered the facility. Initially, Al felt that there was no pressing need to have the ARES volunteers called up, but now with the rapid rise in the Susquehanna, we needed to have some "eyes" in place to provide some real-time data on how the river was looking, especially "up north."

Firing Up The Radios

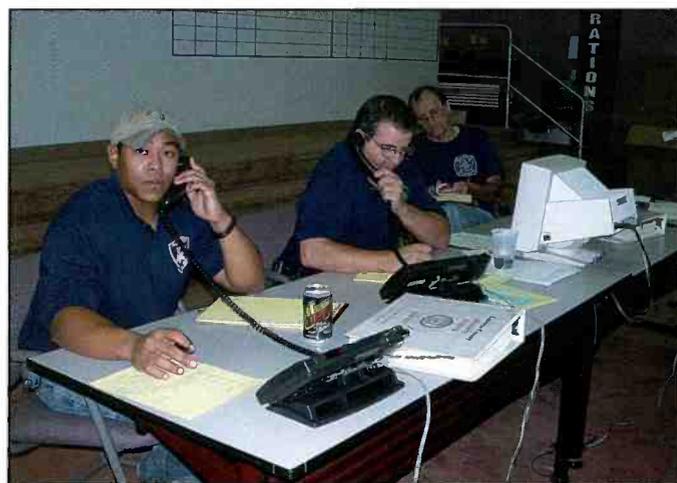
Entering the amateur radio station at the Emergency Operations Center (EOC), I immediately fired up two of the ICOM 2-meter rigs and brought up the Luzerne County ARES net on the 145.41 machine, using the EOC's callsign, W3LUZ, and started a listening watch on the 146.94 machine that Lackawanna County ARES (W3LAC) uses when activated. Upon calling the net, Mike, N3FJA, mobile in Mountain Top

was the first check-in, followed by Bill, KC2RLX, already busily engaged at the GAR High School Shelter, which had been activated and staffed by the local American Red Cross chapter to provide sanctuary for evacuees of the flooded areas. Additional check-ins were Mike Kelly, W3SKY, Dave Smith, N3OHI, Bill Williams, N3OJ, Tom Loree, NS2I, Kathy Kolb, WB3KRN, and Elaine Kollar, KA3VQR, to name a few.

Over the next hour, more stations checked into the net and Alice, KA3KMH, and Jim Martin, N3DCG, the Easter Pennsylvania District Three EC, arrived at the EOC. Boy, was I glad to see them! Over the course of the next several hours we provided information to the EOC staff, answered numerous questions regarding river conditions, and obtained reports from the outlying municipalities on flooding conditions and damages in those areas that were not being covered by local police or fire departments.

The Susquehanna Crests

Jim was keeping track of the rapidly rising water levels on the Susquehanna. The river was due to crest in Wilkes-Barre at



EMA staff volunteers, Nate Sewell, Joe Perugino, and Joe Herbert man the phones during Ivan's visit to Northeastern Pennsylvania. The EOC depends heavily upon volunteers during times of crisis.



Bill Harding, KA3QPQ (foreground), and Greg Berholtz, N3SFO, man the Wilkes-Barre Mobile Command Post during the remnants of Hurricane Ivan. Bill and Greg spent 29-plus hours in the mobile Command Post, providing much needed comm interfacing between the local municipalities, Army/USAF MARS, the National Command System, the Army National Guard, and the Luzerne County and Pennsylvania EMAs.

about 0200 on September 19 at between 34 and 36 feet. Although these figures are well below the 40-plus-foot level of the reinforced dikes, it still spelled inundation for low-lying areas above and below Wilkes-Barre and Kingston, Pennsylvania. In short, the EOC staff and ARES volunteers were in for a long night.

One by one the bridges that spanned the Susquehanna were closed. The newly renovated Market Street Bridge in central Wilkes-Barre was closed and the levee flood gates (extremely large, heavy steel plates) were put into position by huge cranes on each end of the bridge to keep the river waters in check.

Although there was localized flooding in and around the Wyoming Valley, it was nothing like the inundation suffered during the 1996 flood or the horrendous damage that occurred during the Hurricane Agnes flood of 1972.

DATE	Time	Height	TIME	HGT	TIME	HGT
9-19	0530	8.53	10:30	21.21		
	0550	9.12	10:35	22.13		
	0614	10.14	11:23	23.02		
	06:30	09.2	12:04	24.36		
	06:55	11.19	12:30	25.30		
	07:11	12.65	13:00	26.06		
	7:55	14.70				
	8:20	15.85				
	8:50	17.47				
	9:20	18.64				
	9:37	19.37				
	10:05	20.83				

The "official" river flood chart at the EOC. Note that from 0530 (EST) to 1300 (EST), the Susquehanna River rose almost 18 feet! It crested near 36 feet early on Sunday morning.

Frequencies Used

ARES/Amateur Radio

- 145.410 N3DAX Repeater (Luzerne Co ARES)
- 146.940 K3CSG Repeater (Lackawanna Co ARES)
- 147.000 K3KAW Repeater (EPA District 3 ARES)
- 145.450 KB3DXU Repeater (Lycoming County ARES)
- 147.225 KB3BJO Repeater (Columbia County ARES)
- 147.525 (Multi-county ARES Simplex)
- 145.010 LUZBBS/K3YTL (Luzerne Co ARES Packet)

EMA/PEMA Tactical

- 145.300 PEMA Low-band Simplex
- 158.835 LUZ CO EMA Repeater Output/Simplex
- 154.100 LUZ CO EMA Repeater Input
- 453.525 PEMA Main Repeater
- 453.350 PEMA Mobile Repeater
- 855.7125, 857.7375, 858.7375, 859.7375, 860.7375, LUZ CO EMA/LUZ Comm Center

ARMY MARS

- 3.348.5, 6.997, 14.403.5 All USB

USAF MARS

- 4.593.5 Nighttime, 7.324 Daytime, 3.315 & 13.927 Air/Ground All USB

ARMY National Guard

- 30.30 FM

Luzerne County Comm Center (C³ for Municipalities)

- Zone A: 158.730
- Zone B: 151.265
- Zone C: 151.370
- Zone D: 155.070
- Zone E: 155.925
- Zone F: 155.760
- Zone G: 158.805
- General Alarm: 155.700
- EMS Primary: 155.160
- EMS Secondary: 155.220
- County Fire/Ambulance: 159.465
- County Wide Fire Ground: 159.060
- County Road & Bridge: 156.240
- County Sheriff: 155.415

In the end, the river crested below 36 feet early Sunday morning. The EOC was returned to normal activity and, once again, the hams involved with Luzerne County ARES proved their worth to the professional emergency management community by being ready, willing, and able to meet the challenges of Hurricane Ivan.

A Stronger Network

During this emergency a couple of new alliances were forged between the Luzerne County ARES and both the Army and USAF Military Affiliate Radio System (MARS), thanks to the efforts of Larry Kwasnick, KA3GRS, and Mike Carl, KB2AUJ. In this day and age of large-scale disasters, terrorism, and homeland security issues, the more communications services that are able to work together productively, the better we can collectively handle emergencies—in Pennsylvania or anywhere else in North America!

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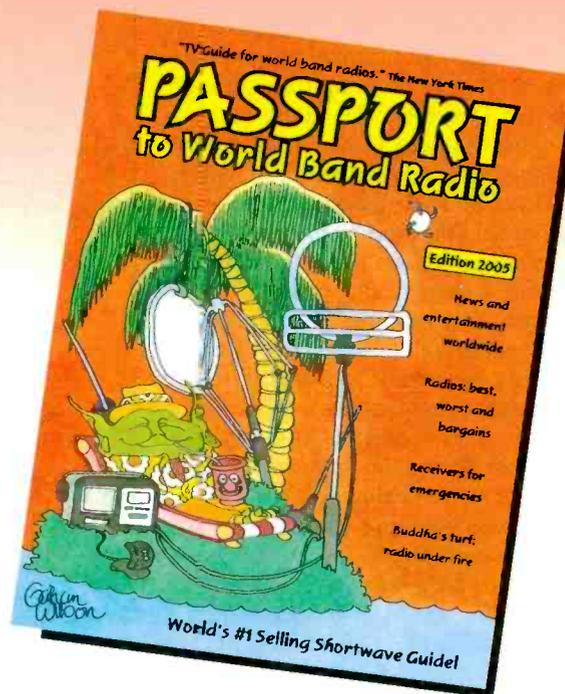
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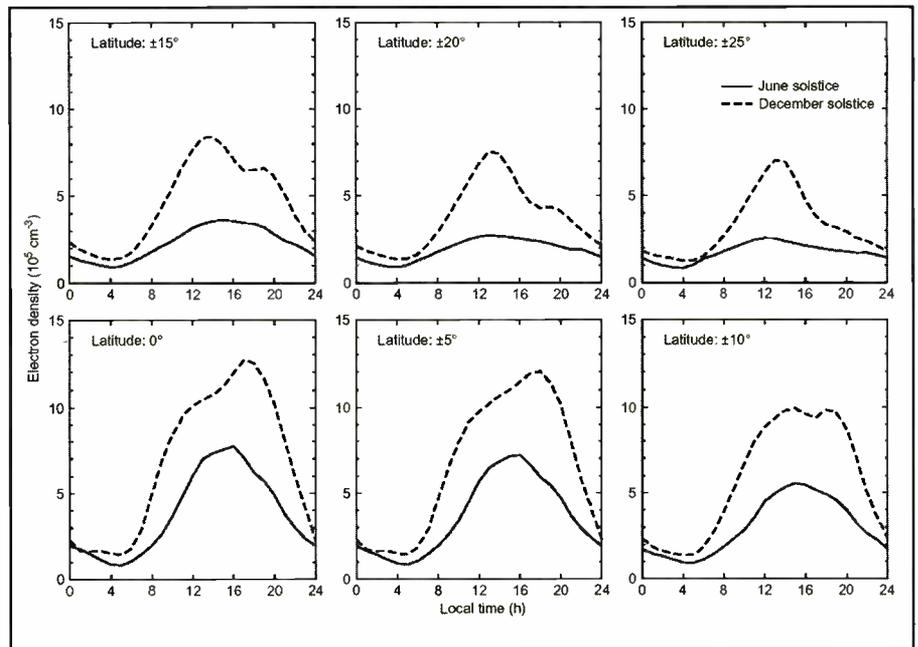
The Winter DX Season: How You Can Reap Its Benefits!

The autumn and winter DX season is in full swing! Listeners throughout the Northern Hemisphere are enjoying mediumwave (MW) DX. Shortwave DX is getting hot, too, especially on the mid- to low-HF bands from early evening until late at night, and then again from early morning through high noon. On December 21, 2004, at 1242 UTC, the Northern Hemisphere experiences the longest day of darkness. This is the Winter Solstice, marking the peak of the seasonal DX window on the SW and MW bands. Amateur radio operators enjoy this time of year by participating in the many international DX contests scheduled during this optimal season.

During the winter months the maximum usable frequencies (MUFs) are generally higher during the daylight hours than during the summer daylight hours (for more details, see <http://vesuvius.jsc.nasa.gov/er/seh/sun.html>). This provides short, but strong, openings on higher SW bands during the winter day. Then, at night, the MUF dips down much lower than what would be seen during the summer nights. Summertime MUFs are generally higher during the night hours than during the winter nights, in part because the ionosphere stays energized through the short nights. Winter nights are longer, so recombination of the ionosphere (which results in a lowering of the MUF) is more complete.

This also means that the *D* layer of the ionosphere is less ionized during the winter, allowing MW and SW frequencies to propagate through the *D* layer and off of the *E* and *F* layers. Finally, the seasonal decrease in weather-related noise makes it easier to hear the weaker DX signals on lower frequencies. With thunderstorms few and far between, storm-related static and noise is greatly reduced.

Seasonally, the geomagnetic activity tends to quiet down during the winter months. The most active geomagnetic seasons are centered on the two equinoxes, in the spring and autumn. Combined with the seasonal decrease in geomagnetic activity, the 11-year solar cycle geomagnetic activity is continuing its down-



Diurnal variations of the observed electron density at latitude 0 degrees, and the averages of the observed electron densities at latitudes ± 5 , ± 10 , ± 15 , ± 20 , and ± 25 degrees, for June solstice (solid curves) and December solstice (dashed curves). (From "Annual and seasonal variations in the low-latitude topside ionosphere," Su, Bailey, Oyama)

ward trend toward the end of the current cycle, which will occur sometime at the end of 2006 or during the start of 2007. This will result in more stable and reliable propagation on the SW spectrum, especially on the lower frequencies.

December is well enough past the autumnal equinox and the associated peak auroral activity to support transpolar propagation. With this overall reduction of geomagnetic activity and the decrease of radio signal absorption comes more stable high-latitude propagation. MW DXers enjoy catching broadcast station transmissions from over the North Pole. Shortwave DXing over high-latitude paths becomes exciting, even if the higher-frequency bands might be dead.

The Winter Anomaly

The only exception to this pleasant winter propagation is "the winter anomaly." There are actually two different win-

ter anomalies. First, there is a small winter anomaly that appears in connection with ionization at relatively low latitudes in the bottom of the *D* layer of the ionosphere. There, the electron densities in the winter happen to be less than would be expected. Second, the better known classic winter anomaly is present when the upper *D* layer, again at relatively low latitudes, has more ionization than would be expected during the winter. For more information, see http://www.science-master.com/physical/item/solar_glossary.php.

Both of these effects are due to the slant compression of the geomagnetic field produced by the solar wind in the winter season. The standard winter anomaly is caused by the influx of a super solar wind that penetrates into the Earth's polar atmosphere down to *E*-layer heights. There, it is concentrated through a funneling action at the winter pole of the distorted geomagnetic field, slowing down the winter polar vortex. An equa-

tor-ward motion of the polar air with its content of nitric oxide brings about the excess of ionization in the upper *D* layer at lower latitudes (Gian-Carlo Rumi, Italy (<http://www.ingv.it/~wwwannali/rumi443.htm>). The end result of this winter anomaly is that MW and lower-frequency SW bands are attenuated much like you would expect during the summer season. This winter anomaly also appears to happen in relationship with sudden stratospheric warming events (<http://www.albany.edu/faculty/rgk/atm101/weather.htm>). The Space Weather reports provided by WWV and NOAA (and also found at <http://prop.hfradio.org>) list stratospheric warming events. On those days with stratospheric warming alerts, it is possible that the winter anomaly condition exists, causing a degradation of MW and low HF band propagation. (I'd love to hear real-world reports from you, if you can correlate such stratospheric warming events with a change in MW DXing. Drop me a letter or an e-mail with your observations, please.)

MW DX Season

When is the best time to look for MW DX? The general rule is to start in the early evening, and to continue through the night and into the early daylight hours. As sunset approaches, the ionosphere starts to change. The *D* layer recombines and signals begin to punch through to the *E* and *F* layers, and distant propagation is more likely. Most broadcast stations in the United States change from high power to low power after their local sunset. If you listen just prior to their local sunset time, their

higher power will propagate well because of the characteristics of nighttime ionization. Thus, the idea is to maximize the degree of darkness at the station (and consequently, along the signal path from them to you) while they're on day power and pattern. The exception to this would be those cases where the power difference is small or nonexistent, but the nighttime pattern actually is more favorable to you.

At the same time, any station to the west that has a favorable nighttime signal in your direction (in other words, that has significant night power and no deep null antenna pattern aimed at you) is a potential sunrise target. *D*-layer absorption increases rapidly with direct sunlight, and east of you begins to ionize, while west of you is still dark and free of *D*-layer ionization. For a period of time around your local sunrise, the relative strength of stations to the west of you increases, while eastern stations will start to fade, allowing the western stations to emerge from underneath. On rare and exciting occasions, this period will last long enough for some western stations to go to their higher power and daytime pattern. Here, as with sunset, the time of month can also be critical, as the more darkness on the path, the better. As sunrise times get later in the fall, the end of the month is preferable. In the spring, the beginning of the month is better. The longest hours of darkness fall toward the end of December on the 21st.

However, the shortest day of the year is not the day when the sunrise is latest and the sunset earliest. The latest sunrise times at mid-latitudes are right around December 30, while the earliest sunset times are usually between December 5 and 10. This

The Ap Index And Understanding Propagation Terminology

The Ap index, or Planetary A index, is a 24-hour averaging of the Planetary K index. The Planetary K index is an averaging of worldwide readings of Earth's geomagnetic field. High indices ($K_p > 5$ or $A_p > 20$) mean stormy conditions with an active geomagnetic field. The more active, the more unstable propagation is, with possible periods of total propagation fade-out. Especially around the higher latitudes and especially at the Polar Regions, where the geomagnetic field is weak, propagation may disappear completely. Extreme high indices may result in aurora propagation, with strongly degraded long distance propagation at all latitudes. Low indices result in relatively good propagation, especially noticeable around the higher latitudes, when transpolar paths may open up. Maximum K-index is 9, and the A-index can exceed well over 100 during very severe storm conditions, with no maximum.

Classification of A-indices is as follows:

A0–A7 = quiet	A30–A49 = minor storm
A8–A15 = unsettled	A50–A99 = major storm
A16–A29 = active	A100–A400 = severe storm

Solar Flux (SFI): This flux number is obtained from the amount of radiation on the 10.7-cm band (2800 MHz). It is closely related to the amount of ultraviolet radiation, which is needed to create the ionosphere. Solar Flux readings are more descriptive of daily conditions than the Sunspot Number. The higher the Solar Flux (and, therefore, the higher the Sunspot Number), the stronger the ionosphere becomes, supporting refraction of higher frequencies.

Ionosphere: A collection of ionized particles and electrons in the uppermost portion of the Earth's atmosphere, which is formed by the interaction of the solar wind with the very thin air particles that have escaped Earth's gravity. These ions are responsible for the reflection or bending of radio waves occurring between certain critical frequencies, with these critical frequencies varying with the degree of

ionization. As a result, radio waves having frequencies higher than the Lowest Usable Frequency (LUF) but lower than the Maximum Usable Frequency (MUF) are propagated over large distances.

Sunspot Number (SSN): Sunspots are magnetic regions on the Sun with magnetic field strengths thousands of times stronger than the Earth's magnetic field. Sunspots appear as dark spots on the surface of the Sun. Temperatures in the dark centers of sunspots drop to about 3700° K (compared to 5700° K for the surrounding photosphere). This difference in temperatures makes the spots appear darker than elsewhere. Sunspots typically last for several days, although very large ones may last for several weeks. They are seen to rotate around the sun, since they are on the surface, and the sun rotates fully every 27.5 days.

Sunspots usually occur in a group, with two sets of spots. One set will have positive or north magnetic field while the other set will have negative or south magnetic field. The field is strongest in the darker parts of the sunspots (called the "umbra"). The field is weaker and more horizontal in the lighter part (the "penumbra").

Galileo made the first European observations of sunspots in 1610. The Chinese and many other early civilizations have records of sunspots. Daily observations were started at the Zurich Observatory in 1749; continuous observations were begun in 1849.

The sunspot number is calculated by first counting the number of sunspot groups and then the number of individual sunspots. The "sunspot number" is then given by the sum of the number of individual sunspots and 10 times the number of groups. Since most sunspot groups have, on average, about 10 spots, this formula for counting sunspots gives reliable numbers even when the observing conditions are less than ideal and small spots are hard to see. Monthly averages (updated monthly) of the sunspot numbers show that the number of sunspots visible on the sun waxes and wanes with an approximate 11-year cycle.

For more information, see <http://prop.hfradio.org>.

Optimum Working Frequencies (MHz) - For December 2004 - Flux = 86, SSN = 26 - Created by NW7US

UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
TO/FROM US WEST COAST																									
CARIBBEAN	18	14	12	11	11	10	10	10	9	9	9	9	9	9	13	17	19	20	21	21	21	21	21	20	
NORTHERN SOUTH AMERICA	26	23	18	15	14	14	13	13	13	12	12	12	12	12	16	23	25	27	28	29	29	29	28	27	
CENTRAL SOUTH AMERICA	25	22	16	15	14	14	13	13	13	12	12	12	12	12	18	23	26	27	28	29	29	29	28	27	
SOUTHERN SOUTH AMERICA	27	25	22	16	15	14	14	13	13	13	12	12	12	12	22	25	26	27	28	29	29	29	29	29	
WESTERN EUROPE	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	10	11	11	10	9	9	8	8	8	
EASTERN EUROPE	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	10	10	10	9	9	9	9	9	
EASTERN NORTH AMERICA	19	16	13	12	12	11	11	11	10	10	10	10	10	10	14	19	21	22	23	23	23	23	22	21	
CENTRAL NORTH AMERICA	11	10	8	7	7	6	6	6	6	6	6	6	6	5	5	8	10	11	12	12	13	13	12	12	
WESTERN NORTH AMERICA	6	6	5	4	3	3	3	3	3	3	3	3	3	3	2	5	6	6	6	6	7	7	7	6	
SOUTHERN NORTH AMERICA	20	18	15	12	11	11	10	10	10	10	9	9	9	9	16	19	20	21	22	22	22	22	21	21	
NORTHERN AFRICA	9	9	9	8	8	8	8	8	8	8	8	8	8	8	8	12	14	15	15	12	10	10	10	9	
CENTRAL AFRICA	11	10	9	9	9	9	9	8	8	8	8	8	8	8	8	11	13	14	14	13	12	12	11	11	
SOUTH AFRICA	17	13	12	11	11	11	10	10	10	10	10	10	10	10	14	18	19	20	21	21	21	20	19	19	
MIDDLE EAST	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	11	11	10	10	9	9	9	9	9	
JAPAN	17	17	16	15	13	10	10	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	12	15	17
CENTRAL ASIA	17	16	16	15	12	10	10	9	9	9	9	9	8	8	8	8	8	8	10	10	10	10	11	17	
INDIA	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
THAILAND	16	16	15	14	11	10	9	9	9	9	9	8	8	8	8	8	8	8	11	11	10	10	10	10	
AUSTRALIA	25	27	26	25	21	16	15	14	14	13	13	13	12	12	12	12	12	16	15	15	17	20	22	24	
CHINA	14	15	14	13	10	9	9	9	9	9	8	8	8	8	8	8	8	8	8	8	8	8	8	10	
SOUTH PACIFIC	27	28	27	24	20	16	15	14	14	13	13	13	12	12	12	14	16	18	20	22	24	25	26	26	
UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
TO/FROM US MIDWEST																									
CARIBBEAN	20	14	13	12	12	11	11	11	11	10	10	10	10	17	21	23	24	25	25	25	24	23	22	22	
NORTHERN SOUTH AMERICA	22	18	14	14	13	12	12	12	11	11	11	11	11	17	22	24	26	27	27	27	27	27	26	24	
CENTRAL SOUTH AMERICA	23	16	15	15	14	13	13	13	12	12	12	12	12	21	25	27	28	29	30	30	29	28	26	26	
SOUTHERN SOUTH AMERICA	26	22	17	16	15	14	14	13	13	13	12	12	12	15	22	24	25	27	28	28	29	29	28	28	
WESTERN EUROPE	9	8	8	8	8	8	8	8	8	8	8	8	8	10	13	15	14	14	13	12	9	9	9	9	
EASTERN EUROPE	8	8	8	8	8	8	8	8	8	8	8	8	8	8	11	13	14	12	10	9	9	9	9	9	
EASTERN NORTH AMERICA	13	10	9	9	8	8	8	8	8	7	7	7	7	8	13	15	16	17	17	17	17	17	16	15	
CENTRAL NORTH AMERICA	7	6	4	4	4	3	3	3	3	3	3	3	3	5	6	7	7	8	8	8	8	7	7	7	
WESTERN NORTH AMERICA	12	11	9	7	7	6	6	6	6	6	6	6	6	6	9	11	12	12	13	13	13	13	12	12	
SOUTHERN NORTH AMERICA	14	12	9	8	8	7	7	7	7	7	7	7	6	6	10	13	14	15	15	16	16	16	15	15	
NORTHERN AFRICA	10	10	9	9	9	9	9	8	8	8	8	8	8	13	15	16	17	18	18	17	13	12	12	11	
CENTRAL AFRICA	10	10	9	9	9	9	9	8	8	8	8	8	8	12	15	16	17	17	17	13	13	12	12	11	
SOUTH AFRICA	17	15	14	14	13	13	13	12	12	12	12	12	12	21	25	26	27	28	28	28	28	27	25	23	
MIDDLE EAST	9	8	8	8	8	8	9	8	8	8	8	8	8	9	13	15	16	13	10	10	9	9	9	9	
JAPAN	16	15	13	10	10	9	9	9	9	9	8	8	8	8	8	8	8	8	8	8	8	10	14	16	
CENTRAL ASIA	15	14	12	10	9	9	9	9	8	8	8	8	8	8	8	11	11	10	10	10	10	10	10	16	
INDIA	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
THAILAND	14	13	10	9	9	9	9	9	8	8	8	8	8	8	8	8	11	11	11	11	10	10	10	10	
AUSTRALIA	25	26	23	19	15	15	14	13	13	13	12	12	12	12	12	17	16	15	15	18	20	22	24	24	
CHINA	13	13	10	9	9	9	9	9	8	8	8	8	8	8	8	9	9	8	8	8	8	8	8	8	
SOUTH PACIFIC	28	26	23	17	15	15	14	14	13	13	13	12	12	12	17	16	16	19	21	23	25	26	27	27	
UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
TO/FROM US EAST COAST																									
CARIBBEAN	14	11	10	10	9	9	9	9	9	8	8	8	12	16	18	19	20	21	21	21	20	20	19	17	
NORTHERN SOUTH AMERICA	19	16	15	14	13	12	12	11	11	10	10	10	14	19	21	23	24	25	25	25	24	23	22	22	
CENTRAL SOUTH AMERICA	19	18	17	16	15	14	14	13	13	12	12	12	21	23	25	27	28	29	30	30	29	27	24	24	
SOUTHERN SOUTH AMERICA	23	20	18	17	16	15	14	14	13	13	13	12	19	21	23	25	26	27	28	29	29	30	29	27	
WESTERN EUROPE	8	8	8	8	8	8	8	8	8	8	8	8	13	15	16	16	16	15	14	13	11	9	9	9	
EASTERN EUROPE	8	8	8	8	8	8	8	8	8	8	8	8	10	10	10	10	10	9	9	8	8	8	8	8	
EASTERN NORTH AMERICA	5	4	4	4	4	3	3	3	3	3	3	3	6	7	8	8	8	8	8	8	8	8	8	7	
CENTRAL NORTH AMERICA	14	10	10	9	9	8	8	8	8	8	8	8	8	10	14	16	17	18	18	18	18	17	17	16	
WESTERN NORTH AMERICA	20	17	13	12	12	11	11	11	11	10	10	10	10	10	15	19	21	22	23	23	23	23	22	21	
SOUTHERN NORTH AMERICA	16	11	10	10	9	9	9	9	8	8	8	8	8	12	16	18	19	19	20	20	20	19	18	17	
NORTHERN AFRICA	11	11	11	10	10	10	10	10	10	10	10	10	15	19	21	22	23	23	22	21	18	13	12	12	
CENTRAL AFRICA	11	11	11	10	10	10	10	10	10	10	10	10	16	19	21	22	23	24	22	19	14	13	12	11	
SOUTH AFRICA	15	15	14	14	13	13	13	12	12	12	12	20	24	27	28	29	30	30	30	29	28	26	24	17	
MIDDLE EAST	10	10	9	9	9	9	8	8	8	8	8	10	15	16	17	18	18	18	13	13	12	12	11	10	
JAPAN	13	10	10	9	9	9	9	9	8	8	8	8	8	8	9	9	8	8	8	8	8	8	13	15	
CENTRAL ASIA	11	10	9	9	9	9	9	8	8	8	8	8	8	8	12	11	11	10	10	10	10	10	14		
INDIA	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
THAILAND	10	10	9	9	9	9	8	8	8	8	8	8	8	12	13	12	12	11	11	11	10	10	10	10	
AUSTRALIA	25	22	16	15	14	13	13	13	12	12	12	12	12	12	20	18	17	16	15	15	18	21	23	24	
CHINA	10	10	9	9	9	9	9	8	8	8	8	8	8	8	9	9	9	9	8	8	8	8	8	8	
SOUTH PACIFIC	25	22	16	15	14	14	13	13	13	12	12	12	12	14	18	17	17	18	20	22	24	26	27	28	

means that December can be viewed as an "autumn" month in terms of sunrise DX, but should be considered more like January for sunset DX.

High-Frequency Propagation

Because the Earth is closer to the sun during the winter, the density of ionospheric ionization in the Northern Hemisphere is expected to increase more rapidly after sunrise than during other seasons. At the same time, static and atmospheric noise levels will be at seasonally low values during the month. This is a recipe for stable HF propagation openings on the lower frequencies, as well as for short strong periods of propagation on the higher SW bands.

Fairly good DX openings are expected on 19 and 16 meters, remaining open towards the west during the early evening. Nineteen meters will be the hottest daytime band, while 22 and 25 meters will become a close second. These start with early morning openings in all directions until about an hour or two after sunrise, and then remain open into one place or another through the day until early evening. When conditions are good (days with low geomagnetic activity and higher solar sunspot activity), 22 through 16 meters are likely to remain open towards the south and west from early evening until about midnight.

The best bands for around-the-clock DX will be 31 and 25 meters. Twenty-five meters continues to be an excellent band for medium distance (500 to 1,500 miles) reception during the daylight hours, with longer distance reception (from 2,000 to 3,000 miles) should be possible for an hour or two after local sunrise, and again during the late afternoon and early evening.

From midnight to sunrise, 41 and 31 meters promise some of the hottest nighttime DX during December. The first DX openings should be toward Europe and the east during the late afternoon, then move across the south through the hours of darkness, while remaining open into most parts of the world. Just after sunrise, openings will be more in a westerly direction. Low seasonal noise will make DXing a pleasurable endeavor.

For short-skip openings during December, try 90 through 41 meters during the day for paths less than 250 miles, and 90 down to 120 meters at night for these distances. For openings between

250 and 750 miles, try 41 meters during the day, and both 90 and 120 at night. For distances between 750 and 1,300 miles, 22 through 31 should provide daytime openings, while 41 down to 90 will be open for these distances from sunset to midnight. After midnight, 90 meters will remain open out to 1,300 miles until sunrise. Try 31 and 41 meters again for about an hour or so after sunrise. For paths between 1,300 and 2,300 miles, openings will occur on 22 through 16 meters, with fewer on higher bands, during the daylight hours. During sundown to midnight, check 22 through 41 meters for these long-distance openings, and then check 41 down to 90 meters after midnight until sunrise. Try 41 and 31 meters again for an hour or so after sunrise.

DX openings on 120 and 90 meters during the hours of darkness and into the sunrise period, with considerably decreased static levels, are a sure bet during the longer hours of darkness in the Northern Latitudes. Look for openings toward Europe and the south from the eastern half of the United States and towards the south, the Far East, Australasia, and the South Pacific from the western half of the country. Ninety meters should peak towards Europe and in a generally easterly direction around midnight, then open in a generally western direction with a peak just after sunrise. The band should remain open towards the south throughout most of the night.

Propagation On VHF And Above

Quite a bit of meteor-shower (MS) activity is expected this month and should result in improved conditions for MS openings on the VHF bands for distances up to about 1,000 miles. When a meteor burns up in the atmosphere, its intense heat creates an ionized trail, making it possible for radio signals to propagate off of the ionized trail, much like they would off of the ionosphere. The annual Geminid meteor shower, which will appear from December 7 to December 17, will peak around December 13 at 2220 UTC. This is one of the better showers, since as many as 120 visual meteors per hour may occur. Geminids is a great shower for those trying the MS mode of propagation, since one doesn't have to wait until after midnight to catch this shower. The radiant rises early, but the best operating time will be after midnight local time. This

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shower also boasts a broad maximum, lasting nearly one whole day, so no matter where you live, you stand a decent chance of working some VHF/UHF signals off a meteor trail.

A secondary seasonal peak in sporadic-E ionization should also result in some short-skip openings on low VHF between distances of about 800 and 1,300 miles. A rare occurrence of aurora during

days of stormy geomagnetic activity is possible, providing some unusual short-skip openings on low VHF.

There is considerably less likelihood for transequatorial VHF openings during December, but look for a possible opening between the southern states and locations deep in South America. The best time to look for these is between about 8 and 11 p.m. local time.

Current Solar Cycle 23 Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for August 2004 is 41, down 10 points from July. The lowest daily sunspot value during August was recorded on August 31, with a count of 9. The highest daily sunspot count was 76 on August 13. The 12-month running smoothed sunspot number centered on February 2004 is 49, three points down from January. A smoothed sunspot count of 25 is expected for December 2004, give or take about 13 points.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-centimeter observed monthly mean solar flux of 110 for August 2004, down nine points from July 2004. The 12-month smoothed 10.7-centimeter flux centered on February 2004 is 115.5, continuing a downward trend. The predicted smoothed 10.7-centimeter solar flux for December 2004 is about 86, give or take about 15 points.

The observed monthly mean planetary A-Index (Ap) for August 2004 is 10, down from July's (revised since last month's report) 23. The 12-month smoothed Ap index centered on February 2004 is 17.7, less than one point down from January's 18.1. Expect the overall geomagnetic activity to be quiet during most days in December.

I'd Like To Hear From You!

You can join in with others in discussing space weather, propagation, and SW or VHF listening at <http://hfradio.org/forums/>. Be sure to check out the latest conditions as well as the educational resources about propagation, which I have put together for you at <http://prop.hfradio.org/>. I also provide a WAP/WML resource for wireless devices. If you want the latest propagation information, like the solar flux, Ap reading, and so forth using a cell phone or other WAP device, check out <http://wap.hfradio.org/>, the wireless version of my propagation site.

I hope to hear from you with your questions about radio propagation. Send a letter or an e-mail to me. I might not include your specific letter in the text of this column, but I do often take questions and use them as the topic of the month. Until next month, Good Listening and Happy Holidays! ■

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Kit-Building In The 21st Century!

We modern hams are certainly a spoiled bunch! We enjoy ham radio superstores, instant Internet access (to check out rig specs), toll-free telephone numbers (to order them), and compact transceivers that cover every conceivable band (and then some). And all for a fraction of what things cost in the good old days (towers excepted).

If you travel back in time a ham radio generation or two—before the Internet, the age of miniaturization, and probably toll-free numbers—commercial gear cost a mortgage-load of money, which forced many hams to build their own receivers, transmitters, tuners, and so on. Many intrepid and resourceful hams built stuff from scratch, but many more lovingly created kit-built electronic masterpieces in conjunction with companies such as Heathkit, Johnson, Knight, and Hallicrafters, to name just a few.

Today, of course, our rigs have every modern convenience. Digital displays track our operating frequencies to the nearest hertz, powerful DSP chips filter and massage our receiver audio, and a multitude of gadgets and handy “RF tweaking” controls are never more than a moment away.

Yet for many hams, despite the compelling performance of modern radios, the mystique and satisfaction that accompany building and using radio gear you’ve built yourself is in a class by itself. Believe me, when you make a contact with a transceiver you’ve assembled from raw parts, you’ll feel a thrill that’s hard to beat. And, unlike kit-builders of generations past, you won’t have to build “second-string” radios and accessories that offer fewer features and reduced performance when compared to the finest store-bought radio stuff. Quality amateur radio kits ranging from simple station accessories to powerful multiband transceivers are now the norm.



Introduced several years ago (and featured here every now and again!), Elecraft’s K2 multiband HF transceiver kit has already achieved cult status. With tons of state-of-the-art accessories and options, the K2’s basic radio performance shames most commercial rigs and trounces every other kit radio I’ve ever heard of. Whew! If you want the satisfaction of building a full-featured HF transceiver that offers options and performance not available in store-bought rigs, the K2 (100-watt version shown here) is the radio of choice. A veritable army of K2 enthusiasts posts pictures, war stories, mods, and detailed assembly hints on dozens of websites worldwide. Many K2 addicts build, sell, and build them again. Check out the madness at www.elecraft.com.

More than a dozen companies offer an amazing assortment of high-quality products. The Flagship of the bunch (for nearly a decade, now) is Elecraft’s K2 transceiver. If you’ve always wanted to build your own station hardware, now is a fantastic time to get started! Check out www.ac6v.com/kits.htm for a few dozen links to ham radio kit sites on the Web.

“I Did It Myself”

What about tools? Good news: most kits can be built using a soldering iron, wire cutter/stripper, pliers, a screwdriver or two, and some solder. If you don’t have a well-stocked toolkit, chances are good that one or more of your ham buddies do. So don’t be shy; building kits isn’t as difficult as it might seem. Even teeny surface-mount parts can be assembled with a magnifying glass and a little patience. Be sure to study the assembly guide and go through assembly steps one at a time and you’ll have few problems, if any.

Regardless of your kit and its manufacturer, the first step in building any kit is to lay everything out on a clean, uncluttered surface and check each part against the parts list. Make sure nothing’s missing and be sure the part values are correct! One trick used by veteran kit builders is to write each part’s value on a small piece of masking tape (remember to stick the tape to each part!). Spending a little extra time at this early stage can save headaches later.



It’s been 15 years since I wrote my first ham radio column for Pop’Comm, and in all of those years I’ve avoided using “cute kid with radio” photos like the plague—until now! JJ, daughter of Charles Vollum, N7BPT, is quite enamored with dad’s Elecraft KX-1 “backpacking” kit radio, which she uses to listen to “rocket ships” and “fairy radio stations.”

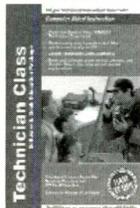
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Once you've made sure everything's okay, it's time to dive in and get started! Here are a few tips to help make your kit-building process successful.

- Always check off each step as you complete it. That way you won't duplicate your efforts.
- Keep your soldering iron tip clean and bright. Wipe it with a wet sponge to clean off the crud, and your solder joints will be consistently good. (According to kit manufacturers, poor solder joints are the main cause of non-functional units.)
- Always bend component leads away from foil pads and circuit traces on the underside of the printed circuit boards, and make sure to trim the leads of soldered components as close to the circuit board as possible. This will greatly reduce the incidence of nasty solder bridges.
- When attaching wires, tin each lead with a bit of solder. This keeps wires from fraying and helps make a strong mechanical connection.
- Although you may never need to use it, owning or borrowing a "solder sucker" (a small spring-loaded device to help you unsolder components) can make correcting bugaboos a snap. RadioShack and many parts jobbers sell these, and other

"de-soldering tools," for only a few dollars.

- Before powering up your new creation, double check the assembly instructions, look for bad solder joints and solder bridges, make sure there aren't any "left-over" parts sitting around, confirm the polarity of power supply wiring, and make other final checks.
- After inspecting your new kit, carefully apply power and follow any alignment and setup instructions.
- If your kit doesn't work after you've double-checked everything, ask a friend to take a look. I've been embarrassed a time or two when someone else instantly spotted a problem that had left me scratching my head!

What A Rush!

Now that your kit is working it's time for a hearty congratulations! Not only do you have a fine piece of ham radio gear that you made yourself, you're a little bit closer to experiencing the original magic of amateur radio—with a modern twist! Remember to send your questions, comments, and QSLs to me at "Ham Discoveries," *Popular Communications*, 25 Newbridge Rd., Hicksville, NY 11801. See you next month! ■

V.I.P. SPOTLIGHT

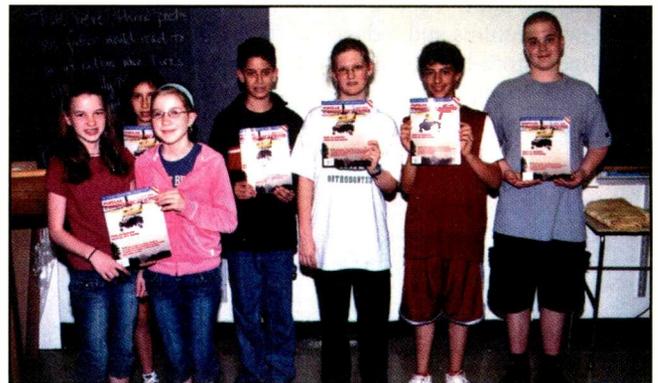
Editor's Note: In keeping with the holiday spirit, this month we're doing something different in the "VIP Spotlight" by honoring an after-school club, the *Jamesville-DeWitt Middle School Amateur Radio Club*, in upstate New York for their enthusiasm and hard work. I met John W. Luebs, N2PMQ at the Rochester, New York Hamfest and gave him some *Pop'Comms* and *CQs* for the club. Here's their story, in John's words:

The magazines were a hit with the kids. We had an after-school club meeting the following Thursday at which time I had an opportunity to explain about both publications and encourage them to look over the magazines. I really appreciate your helping us in this way. The kids didn't realize that there were other magazine options; their school amateur radio club is under the League's "Big Project" program so they're getting *QST*.

We're looking forward to having most of them come to Field Days and really get into HF. Several of the eighth graders have already earned their General ticket, but most are still No-Code Technicians. All are interested in doing projects that will enhance their use of the hobby, and both of your publications will be ideal for them.

The school instructor who started the middle school club, Mark Erickson, K2RME, was killed in an auto accident on May 26. He was an excellent teacher and loved by all of his students. The impact of his death threw a damper on their activities, but I am working with several other hams from both the Radio Amateurs of Greater Syracuse (RAGS) and the Liverpool Amateur Repeater Club to keep interest up and their program moving forward. They have already located another teacher to take on the sponsorship.

I'm now Past President of RAGS. The club has over 250 members and is the oldest club in upstate New York. I use my ham interests in many public service events and to operate military radios (HF and



Here are several seventh and eighth grade students of the Middle School Amateur Radio Club who are all working toward getting their licenses. Pictured (left to right) holding Popular Communications are Rachel Boll, Alexa Burkett, Suzanne Blackley, Joshua Anbar, Kathryn Martin, Jonathan Paduano, and Michael Jorgensen.

VHF) in Civil Air Patrol, where I am an instructor and Communications Unit Leader at Group level. My son, who just turned 21 on June 7, got his ham license when he was eight years old. I was a subscriber to *CQ* and sent in his photo, which subsequently appeared on page 76 of the July 1993 edition. He's now an Extra Class ham and VE team member as well as an electrical engineer.

Thanks again for helping me to better serve the kids in the Jamesville-DeWitt schools' Amateur Radio Club programs. I hope you can use the enclosed photos and information in some way. ■

Cobra's PR4250 WX microTALK FRS/GMRS Walkie-Talkie

It's small, but not quite as small as other FRS (Family Radio Service) and GMRS (General Mobile Radio Service) handheld transceivers. And, frankly, I prefer a slightly larger radio (or cell phone!). Those ultra tiny radios are just *too* small, usually making the LCD display window difficult to read. By contrast, the Cobra PR4250 WX has a good feel; it's just the right size. And the features are top-notch, as we'll see in a moment.

Priced at \$79.95 (when other companies—Cobra included—offer a pair of bubble-pack walkie-talkies for \$70 or less), we wanted to know what makes this FRS/GMRS combo unit worth the extra bucks. Out of the box, the radio looks impressive. I've used a few handheld radios over the years, and don't really like radios that look like toys. You and I know that in marketing any product there has to be mass appeal, which today is usually directed at young folks. Remember, kids today have more "disposable income" in their pockets at any given *moment* than many of us earn in a *week*! So it's only reasonable that companies would want to capitalize on that money that's just waiting to be spent. If you can sell kids on communicating among themselves and (heaven forbid!) their families at fairly close range, it's a natural sell.

I think it's important to realize this before dismissing all FRS/GMRS radios as the same toy-like products from manufacturer to manufacturer. The Cobra PR4250WX is not a toy, and you need a GMRS license (no test required!) to operate it on GMRS frequencies. You won't see the actual "frequencies" in the display window, but rather a channel number. There are 22 channels in this transceiver: Channels 1 through 7 are shared FRS/GMRS; Channels 8 through 14 are FRS only (on those channels by default—and it's not modifiable—the output power is limited to 500 mW); and Channels 15 through 22 are GMRS only, with power switchable to "low," "medium," or "high" (3-, 2-, or 1/2-watt power).

Performance

Cobra claims that the PR4250 WX has a range "up to" 10 miles. I suppose that's possible, if I were on one mountaintop and you were on the other, or if we were standing *outside* on the deck of two boats over open water with no obstructions between us, *AND* we were on a licensed GMRS frequency. Obviously, they're talking about ideal conditions, which, in the real world, rarely exist. Even with a couple of similar *5-watt amateur* handheld transceivers, simplex range between the two is typically only two to five miles, if you're lucky.

I realize "range" is one of those subjectives that will never be the same for two similarly equipped radio users, regardless of conditions, either ideal or real world. The bottom line is that my wife and I have used the Cobra PR4250s on the GMRS frequencies extensively over the past few months; with her sitting on the living room couch inside our wood-frame house we'll be able to communicate solidly up to a mile or so. I'm typical-



The Cobra PR4250 WX handheld FRS/GMRS transceiver is a full-featured radio that will keep you in touch around town or on the trail. You do need a license to operate on the GMRS.

ly doing my usual post office run or Dunkin' Donuts trip just to be sure everything's okay there and that no one has stolen the chocolate donut recipe. Depending on which route I take downtown, we may be able to talk the entire way. Remember, this is a typical suburban neighborhood, with trees, other wood-frame homes, cement/brick office buildings, utility poles, and so on. If you're using a pair of these transceivers in a more open area, your range will be much greater; it will also suffer if you're trying to talk in the canyons of a larger city.

The antenna on this transceiver isn't removable simply because it's not a full-fledged GMRS transceiver; the lower-power FRS frequencies make this two-way radio strictly a handheld (walkie-talkie). Yes, you can go to the expense of purchasing a GMRS-only transceiver, but at substantially more cost. But if you're looking for good range, great audio, and a host of features, the Cobra PR4250 WX is an excellent choice.

One of the things I like the most about this radio is that it stands up. Now that might seem a bit strange, but I just think all cell phones and other radios should have a flat bottom. If your vision is better than mine (even with glasses!) you can stand the thing upright and see what channel you're on with the radio on the end table. It beats me why some radios have a curved bottom and a big, beefy functionless belt clip; you place the radio down and it rocks like a radio on steroids and is prone to sliding all over the place. The Cobra PR4250 WX, on the other hand, has an excellent belt clip that's the right size for the radio; it's not too big and it doesn't clip onto your belt with such

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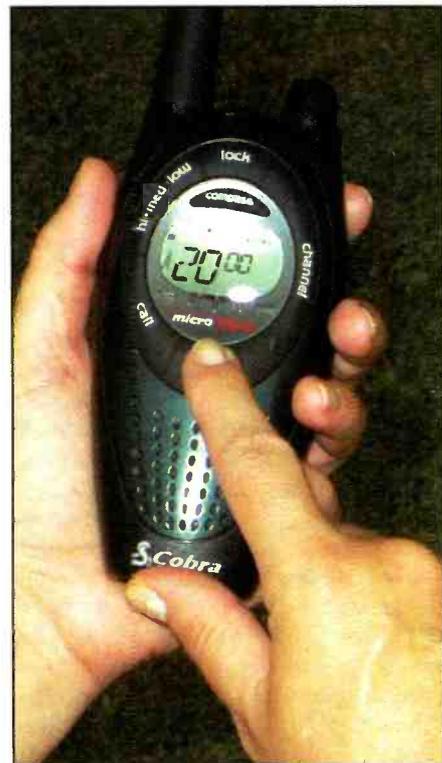
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brute force that you've got to remove your belt to use the radio! It's secure, alright, but not to the point of making you look crazed trying to remove it.

Using the transceiver is very straightforward. The manual is well written and includes well thought out, accurate illustrations to show each function's operation. You don't have to use the alarm, stopwatch, or other features, which include 10-channel memory, scan feature, Vox (voice operated), compass, or VibrAlert, (silent paging!), but they're there if you want them.

How slick is it to be able to toss your separate stopwatch and use that built-in feature on this radio? I think it's pretty forward thinking on Cobra's part. Let's face it, families who want to stay in touch at the ball field or park will use the radio function, but if you're getting into staying fit or encouraging your kids to start walking or running, that stopwatch function comes in mighty handy! I found the few simple steps required in setting the stopwatch and alarm functions very easy; after a couple of attempts, either could be set without reading the manual again.

The Vox is a superb feature of the Cobra PR4250 WX. In a couple of simple key presses, you switch from a push-to-talk radio to a voice-operated one. I found that Cobra's Vox feature operated quite well; on a scale of 1 to 10, with 10 being the top, I'd rate it an 8. Only once in a while would the Vox "clip" your first word, and most



With a single key press you can lock the radio's keypad to keep your current settings. The radio stores the "lock" even if you turn it off and back on again.

of the time you don't have to raise your voice to the point of yelling for the Vox to operate properly. Fact is, there's even a five-step sensitivity setting that allows you to adjust the Vox for your voice and oper-



Larger than most small FRS radios, the Cobra PR4250 WX still fits comfortably in your hand and even stands up on your table for easy viewing at arm's length.

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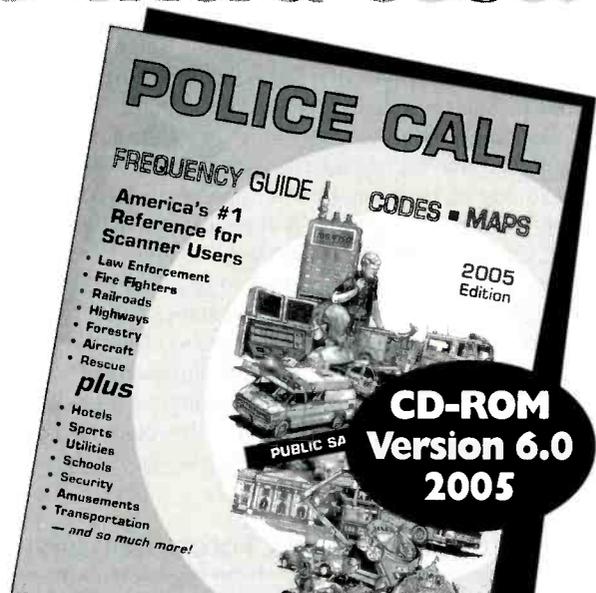
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ating conditions. (Many radios lack this control, with Vox either on or off).

The NOAA All Hazards Weather Feature

That's why the radio has the "WX" letters in the name, for "weather." Actually, NOAA now broadcasts more than weather warnings. Using this feature you'll get immediate warnings about a multitude of natural and manmade disasters. Of course, you'll always be able to receive weather and boating forecasts as well.

The weather feature is also easy, and you can use the radio for its main purpose—as a two-way walkie-talkie—even with the weather alert mode activated. This way you can communicate with your family or friends or call for help in an emergency while simultaneously having the radio in the "alert" mode, which will automatically turn on the NOAA alert broadcast when it receives the tone. This isn't the SAME (Specific Area Message Encoding) feature, found on tabletop NOAA weather radios and some scanners, that allows you to set the radio to receive emergency alerts for a very specific, narrow area that you've programmed into the radio. But you will have the additional benefit of having NOAA radio at your side wherever you go!

A Great Communications Tool!

All in all, I like the Cobra PR4250 WX walkie-talkie a lot and highly recommend it to you and your family. There's a lot of value in this particular Cobra model radio. For instance, you

get a keypad lock that keeps you on the same channel with the same settings, even when you turn the radio off and back on again. There's also a "roger beep" tone that sounds in your transmitted signal, alerting the other party when you've released the push-to-talk button (which, by the way, has a good "feel"—you don't have to look at the radio to see if your finger is on or near the PTT button on the left side of the radio), and much more.

The Cobra PR4250 WX operates on four "AA" batteries (not included) or the included NiMH batteries with the provided wall adapter/charger. In our extensive use of a pair of these radios, we typically got more than six hours' use from fresh alkaline batteries, and about five hours from the fully charged NiMH batteries. Keep in mind, though, that's like your vehicle's mileage; yours will most certainly vary, depending largely on how you use the transceiver, your talk time versus listening, and your power settings on the GMRS channels.

While the included earpiece/boom microphone with its inline PTT button is a good-looking accessory, I found the PTT button not unlike other ones I've used; the audio is adequate, but if you're in a noisy environment, you're better off using the radio as a conventional walkie-talkie.

The Cobra PR4250 WX transceiver weighs in at about five ounces (less batteries) and measures 7.6 x 2.6 x 1.75 inches (HWD). It carries a one-year warranty and is available from cobraelectronics.com or through authorized Cobra dealers. For more information, contact Cobra Electronics Corporation directly at 773-889-3087 or 8870. You can also write to them at Cobra Electronics Corporation, 6500 West Cortland Street, Chicago, IL 60707. Please tell them you read about the PR4250 WX in *Popular Communications!*

Jamming Cell Phones In LA

Authorities in Southern California are drawing up plans to jam cellular telephone calls during terrorism alerts. Calls made to cell phones at Los Angeles International Airport, the Rose Bowl, Universal Studios, and other high-profile landmarks could be jammed to help prevent terrorist actions. Los Angeles County Sheriff Lee Baca said such jamming helped prevent an attempted assassination of Pakistani President Pervez Musharraf last December. "We have to look at this very realistically," Baca said. "Public safety is more important than public convenience. We want to take the responsibility head-on and do the best we can, protecting people against terrorist attacks." Currently, jamming cell phones is illegal in the United States, and an FCC spokeswoman said it would be up to the agency's Washington office to decide whether to grant an exception to local law enforcement. The Secret Service uses cell phone jamming equipment when the president travels on Air Force One or in his limousine, and some federal law enforcement agencies use it during hostage situations. Some communications experts advised that caution must be used, noting that blacking out cell phone use in a certain area could keep emergency personnel from communicating with one another.

Spectrum Policy Task Force Website

The FCC's Spectrum Policy Task Force (SPTF) has launched a new Internet tracking tool to access information on FCC spectrum-related proceedings. The Internet tracking tool is part of the Task Force's efforts to improve access to information on the Commission's ongoing spectrum-related proceedings and initiatives. The listing is intended to provide the public, industry researchers, and other interested parties one place on the FCC's website where these proceedings and initiatives are listed, with one- or two-click access to public comments, Commission documents, and other related materials. To access the tracking tool, go to the link on the Task Force's homepage at <http://www.fcc.gov/sptf/> and click on the "Proceedings & Initiatives" hyperlink.

Hawaii Antenna Bills Vetoed

Governor Linda Lingle of Hawaii has vetoed two amateur radio antenna bills that would have provided limited opportunities for hams living under CC&Rs (Covenants, Conditions, and Restrictions). She stated the bill was objectionable and amounted to inappropriate and unacceptable governmental intrusion into the affairs of property owners.

Study Suggests Wireless Phone Users Are Safe In Cars

Okay, is it safe or isn't it? A recent study by AEI Brookings Joint Center for Regulatory Studies reported that drivers using wireless phones were no more likely to get into accidents than drivers without wireless phones. You may recall a similar 2001 study by the University of North Carolina (UNC) that reported only 1.5 percent of accidents could be traced to drivers using wireless phones while driving. The UNC report also found drivers were more likely to be involved in car accidents with chil-

dren in the car or while changing the radio. For any of us who have seen crazy driving by people talking on cell phones, these studies don't ring true.

4.9 GHz Under Fire

The 800-MHz spectrum controversy might be nearing an end, but the 4.9-GHz fight is just beginning. Public safety and wireless vendors are sparring over the proper emissions mask (standard predetermined levels so as not to cause interference to other radio users) for equipment operating in the newly allocated 4.9-GHz spectrum. The issue is whether or not the emission mask is tight enough to avoid interference or loose enough to allow public safety to use commercial off-the-shelf equipment. The FCC will be addressing the 4.9-GHz problem, but they're a little busy with 800 MHz right now. Stay tuned.

Only In New York: The Big Apple To Sell Lampposts For Wireless Antennas

The city of New York plans to sell space on top of lampposts to wireless carriers for \$21.6 million a year. T-Mobile, Nextel, IDT, and three other wireless carriers plan to purchase the space in order to increase network capacity. The plan must first meet New York City's Art Commission approval, requiring equipment to be the same color as the lampposts, have no logos, and meet size constraints.

Wireless Surveillance

The FCC has ruled that new technologies, such as push-to-talk wireless services, are subject to the 1994 Communications Assistance for Law Enforcement Act, or CALEA, allowing law enforcement agencies to conduct surveillance on wireless calls. Nextel Communications, which introduced push-to-talk technology in the early 1990s, is currently the only service provider that is able to wiretap push-to-talk conversations. The push-to-talk conversations of Verizon Wireless, Sprint PCS, and AT&T Wireless cannot currently be captured. The delay is due in large part to the push-to-talk network equipment providers, which are currently working to fix the problem.

Nighttime IBOC Concerns Canadians

The United States' northern neighbors are a bit concerned these days about potential interference to their analog AM and FM broadcasts along border areas and beyond as more U.S. stations go digital. In a letter to Industry Canada, the Canadian Association of Broadcasters and the Canadian Broadcasting Corporation stressed that "authorization of AM IBOC transmissions, especially at night, will very likely result in harmful interference to Canadian signals." Although Canada is using the Eureka-147 technology for digital radio on FM in six markets, it still relies heavily on analog in much of the country. Although the FCC states that such international issues are important, the two Canadian groups don't believe the United States is thinking about them early enough in the authorization process. Ibiquity COO Jeff Jury said he was aware of the comments and was confident that the FCC would address Canadian concerns and that rollout of HD Radio in the U.S. would not be delayed.

Tap into secret Shortwave Signals

Turn mysterious signals into exciting text messages with the 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 an easy-to-read LCD display.

You'll read interesting commercial, military, diplomatic, weather, aeronautical, maritime and amateur traffic . . .

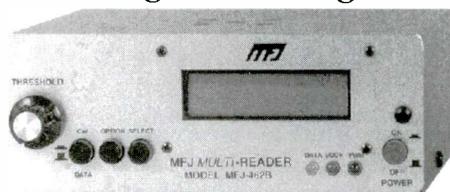
Eavesdrop on the World

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.

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



MFJ-462B
\$179.95

Printer Monitors
24 Hours a Day
MFJ's exclusive TelePrinterPort™ lets you monitor any station 24 hours a day by printing transmissions on an Epson compatible printer. Printer cable, MFJ-5412, \$9.95.

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

High Performance Modem
MFJ's high performance PhaseLockLoop™ 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 brushed aluminum 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"Wx2 1/4"Hx5 1/4"D inches.

No Matter What™ Warranty

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

Try it for 30 Days

If you're not completely satisfied, simply return it within 30 days for a prompt and courteous refund (less shipping). Customer must retain dated proof-of-purchase direct from MFJ.

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-30 MHz.

Receives strong, clear signals from all over the world. 20 dB attenuator, gain control, ON LED.

Switch two receivers and auxiliary or active antenna. 6x3x5 in. Remote has 54" whip, 50 feet

coax. 3x2x4 inches. 12 VDC or 110 VAC with MFJ-1312, \$12.95.

Indoor Active Antenna

Rival outside long wires with this tuned indoor active antenna. "World Radio TV Handbook" says MFJ-1020C 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 a preselector with external antenna. Covers 0.3-30 MHz. 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

Plug this compact MFJ all band active antenna into your receiver and you'll hear strong, clear signals from all over the world, 300 KHz to 200 MHz including low, medium, shortwave and VHF bands. Detachable 20" telescoping antenna. 9V battery or 110 VAC MFJ-1312B, \$12.95. 3 1/4"x1 1/4"x4 in.

Eliminate power line noise!

MFJ-1026
\$179.95

Completely eliminate power line noise, lightning crashes and interference before they get into your receiver! Works on all modes -- SSB, AM, CW, FM, data--and on all shortwave bands. Plugs between main external antenna and receiver. Built-in active antenna picks up power line noise and cancels undesirable noise from main antenna. Also makes excellent active antenna.

MFJ Antenna Matcher

Matches your antenna to your receiver so you get maximum signal and minimum loss. MFJ-959C
\$99.95

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

High-Gain Preselector

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. Push buttons let you select 2 antennas and 2 receivers. Dual coax and phono connectors. Use 9-18 VDC or 110 VAC with MFJ-1312, \$12.95.

Dual Tunable Audio Filter

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 inches.

MFJ Shortwave Headphones

MFJ-392B
\$19.95

Perfect for shortwave radio listening for all modes -- SSB, FM, AM, data and CW. Superb padded headband and ear cushioned design makes listening extremely comfortable as you listen to stations all over the world! High-performance driver unit reproduces enhanced communication sound. Weighs 8 ounces, 9 ft. cord. Handles 450 mW. Frequency response is 100-24,000 Hz.

High-Q Passive Preselector

High-Q passive LC preselector boosts your favorite stations while rejecting images, intermod and phantom signals. 1.5-30 MHz. Preselector bypass and receiver grounded positions. Tiny 2x3x4 in.

Super Passive Preselector

Improves any receiver! Suppresses strong out-of-band signals that cause intermod, blocking, cross modulation and phantom signals. Unique Hi-Q series tuned circuit adds super sharp front-end selectivity with excellent stopband attenuation and very low passband attenuation and very low passband loss. Air variable capacitor with vernier. 1.6-33 MHz.

MFJ Shortwave Speaker

This MFJ ClearTone™ restores the broadcast quality sound of shortwave listening. Makes copying easier, enhances speech, improves intelligibility, reduces noise, static, hum. 3 in. speaker handles 8 Watts. 8 Ohm impedance. 6 foot cord.

MFJ All Band Doublet

MFJ-1777
\$49.95

102 ft. all band doublet covers .5 to 60 MHz. Super strong custom fiberglass center insulator provides stress relief for ladder line (100 ft.). Authentic glazed ceramic end insulators and heavy duty 14 gauge 7-strand copper wire.

MFJ Antenna Switches

MFJ-1704
\$69.95

MFJ-1702C
\$24.95

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. Good to 500 MHz. 60 dB isolation at 30 MHz. MFJ-1702C for 2 antennas.

Morse Code Reader

Place this pocket-sized MFJ-461
\$79.95

MFJ Morse Code Reader near your receiver's speaker. Then watch CW turn into solid text messages on LCD. Eavesdrop on Morse Code QSOs from hams all over the world!

MFJ 24/12 Hour Station Clock

MFJ-108B, \$19.95.
Dual 24/12 hour clock. Read UTC/local time

New! at-a-glance. High-contrast 5/8" LCD, brushed aluminum frame. Batteries included. 4 1/2"Wx1Dx2H inches.

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and Nearest Dealer . . . 800-647-1800

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World News, Commentary, Music, Sports, And Drama At Your Fingertips

This listing is designed to help you hear more shortwave broadcasting stations. The list includes a variety of stations, including international broadcasters beaming programs to North America, others to other parts of the world, as well as local and regional shortwave stations. Many of the transmissions listed here are not in English. Your ability to receive these stations will depend on time of day, time of year, your geographic location, highly variable propagation conditions, and the receiving equipment used.

AA, FF, SS, GG, etc. are abbreviations for languages (Arabic, French, Spanish, German). Times given are in UTC, which is five hours ahead of EST, i.e. 0000 UTC equals 7 p.m. EST, 6 p.m. CST, 4 p.m. PST.

UTC	Freq.	Station/Country	Notes	UTC	Freq.	Station/Country	Notes
0000	4845	Radio Mauritanie, Mauritania	AA	0230	9780	Rep. of Yemen Radio	AA
0000	11665	Radio France Int., via French Guiana	SS	0230	7160	Radio Tirana, Albania	
0000	12040	Radio Ukraine Int.		0230	7155	Voice of Islamic Rep. of Iran	AA
0030	15748v	Sri Lanka Broadcasting Corp.		0300	7545	Radio Ukraine Int.	
0030	11690	Radio Vilnius, Lithuania		0300	15205	Adventist World Radio via UAE	RR
0030	13605	All India Radio		0300	9895	Radio Netherlands Relay, Madagascar	SS
0030	11725	Radio Cairo/Egyptian Radio	AA	0300	9980u	AFN/AFRTS, via Iceland	
0030	6175	Voice of Vietnam, via Canada		0300	5026	Radio Uganda	
0100	9715	Radio Tashkent, Uzbekistan	UU	0300	4800	Radio Buenas Nuevas, Guatemala	SS
0100	11705	Voice of America Relay, Sri Lanka		0300	5019	Ecos del Atrato, Colombia	SS
0100	9675	Radio Cancao Nova, Brazil	PP	0300	7110	Radio Ethiopia	vern
0100	9580	China Radio Int.		0300	7125	Radio Sawa, USA, via Morocco	AA
0100	4915	Radio Anhanguera, Brazil	PP	0300	11750	Voice of Russia, via Moldova	
0100	9870	Radio Austria Int.		0330	3350	Radio Exterior de Espana, Spain, via Costa Rica	SS
0100	11710	RAE, Argentina	SS				
0100	6000	Radio Havana Cuba		0330	3291	Voice of Guyana	
0100	4965	The Voice, Zambia		0330	3279	La Voz del Napo, Ecuador	SS
0100	4775	Radio Tarma, Peru	SS	0330	3250	Radio Luz y Vida, Honduras	SS
0100	7560	Radio Free Asia, via Albania	var	0330	7175	Voice of Broad Masses of Eritrea	vern
0100	11825	Voice of Russia, via Vatican		0400	4775	Trans World Radio, Swaziland	GG
0130	15230	Voice of America Relay, Northern Marianas	CC	0400	4910	Radio Zambia/ZNBC	unid
0130	11745	Voz Cristiana, Chile	SS	0400	11820	Radio Romania Int.	
0130	4960	Radio Federacion, Ecuador	SS	0400	4985	Radio Brazil Central	PP
0200	7305	Vatican Radio	SS	0400	4950	Radio Nacional, Angola	PP
0200	9790	Vatican Radio		0430	9580	Int. Radio of Serbia & Montenegro	
0200	9440	Radio Slovakia Int.	FF	0430	15120	Voice of Nigeria	
0200	11800	RAI Int., Italy	II	0445	5985	RTVC-Radio Congo	FF
0200	9570	Radio Budapest, Hungary	HH	0500	4815	Radio Burkina, Burkina Faso	FF
0200	11855	Radio Cairo/Egyptian Radio		0500	7185	Radio Sondergrense, South Africa	Afrikaans
0200	12050	Radio Cairo/Egyptian Radio	AA	0500	7275	RTV Algerienne, Algeria	AA
0200	12020	HCJB, Ecuador	PP	0530	9770	Channel Africa, South Africa	
0200	7345	Radio Prague, Czech Republic	SS	0530	12060	Radio Rossii, Russia	RR
0200	9925	Voice of Croatia		0600	15215	Channel Africa, South Africa	
0200	7155	Radio Liberty via Germany	RR	0600	9615	Radio New Zealand Int.	
0200	4810	Radio Transcontinental/XERTA, Mexico	SS	0600	4915	GBC, Ghana	
0230	12005	RT Tunisienne, Tunisia	AA	0600	7125	RTV Guineenne, Guinea	FF
0230	11855	BSKSA, Saudi Arabia	AA	0600	7255	Voice of Nigeria	
0230	11585	Kol Israel	HH	0600	5470	Radio Veritas, Liberia	
0230	7400	Radio Varna, Bulgaria		0630	11865	Trans World Radio, via Albania	
0230	10330	All India Radio	Hindi	0645	9870	Trans World Radio, via Monaco	
0230	15720	Radio New Zealand Int.		0700	13670	Radio Korea Int., South Korea	SS
0230	11920	RTV Marocaine, Morocco	AA	0700	9660	Radio Australia	
0230	11675	Radio Kuwait	AA	0700	6010	Radio Mil, Mexico	SS
				0700	6070	CFRB/CFRX, Canada	

UTC	Freq.	Station/Country	Notes	UTC	Freq.	Station/Country	Notes
0800	4991	Radio Apinte, Suriname	vern	1400	7355	KNLS, Alaska	CC
0900	4876	La Cruz del Sur, Bolivia	SS	1430	11750	BBC Relay, Thailand	
0930	7507u	AFB/AFRTS, via Puerto Rico		1500	12045	Radio Japan, via Singapore	JJ
0930	4814	Radio Buen Pastor, Ecuador	QQ	1500	17870	Radio Rhino Int, Germany - to Uganda	cland/EE
0930	4785	Radio Brazil	PP	1500	11520	Vatican Radio	
0930	6190	Radio Senado Federal, Brazil	PP	1500	11930	Radio Marti, USA	SS
0930	6025	Radio Amanecer, Dominican Republic	SS	1530	11690	Radio Jordan	
0945	4905	Radio La Oroya, Peru	SS	1530	9635	VOIRI, Iran	
0945	6135	Radio Santa Cruz, Bolivia		1600	21570	Radio Exterior de Espana, Spain	SS
0945	4925	Radio Difusora Taubate, Brazil	PP	1600	17595	Deutsche Welle, Germany	
1000	4940	Radio Amazonas, Venezuela	SS	1600	17560	BSKSA, Saudi Arabia	AA
1000	4955	Radio Cultural Amauta, Peru	SS	1600	15100	Radio Pakistan	
1000	4965	Radio Santa Monica, Peru	SS	1600	15190	BBC, England	
1000	9530	Radio Japan, via French Guiana	SS	1600	17485	Radio Prague, Czech Republic	
1000	6060	Radio Nacional, Argentina	SS	1600	17670	Radio Farda, USA, via England	Farsi; to Iran
1000	6250	Pyongyang Broadcasting Station, North Korea	KK	1630	11735	Voice of Korea, North Korea	
1000	9965	KHBN, Palau	CC	1630	17705	Voice of Greece, via USA	GG
1000	6105	Radio Panamericana, Bolivia	SS	1630	15235	Adventist World Radio, Guam	
1030	5019	Radio Horizonte, Peru	SS	1630	17620	Radio France Int.	FF
1030	5765	AFN/AFRTS, via Guam		1630	15475	Africa No. One, Gabon	FF
1030	4781	Radio Oriental, Ecuador	SS	1630	17670	Voz Cristiana, Chile	SS
1100	4890	NBC, Papua New Guinea	EE/Pidgin	1700	17535	Kol Israel	
1100	9895	Radio Netherlands		1700	17635	Radio Jamahiriya, Libya, via France	AA
1100	4780	Radio Cultural, Guatemala	SS	1700	15140	Radio Sultanate of Oman	AA
1100	9900	Deutsche Welle, Germany, via Irkutsk, Russia	GG	1700	11800	RDP Int., Portugal	PP
1100	3260	Radio Madang, Papua New Guinea	Pidgin	1730	17810	United Nations Radio, via Ascension Is.	
1100	3275	Radio Southern Highlands, Papua New Guinea	Pidgin	1800	9960	Voice of Armenia	GG
1100	4895	Radio Malaysia, Sarawak		1800	13650	Radio Free Syria, via Germany	AA
1100	6185	Huay PBC, China	CC	1830	11730	Radio Pilipinas, Philippines	various
1100	7280	Voice of the Strait, China	CC	1930	15505	Radio Kuwait	AA
1130	3976	RRI, Pontianak, Indonesia	II	1930	15445	Voice of America Relay, Botswana	
1130	3325	RRI-Plangkaraya, Indonesia	II	2000	15455	Voice of Russia	
1200	11500	Voice of Russia, via Tajikistan	Hindi	2000	17800	Voice of Nigeria	
1200	9760	Voice of America Relay, Philippines		2000	15475	Radio Nacional Archangel, Antarctica	SS
1200	11650	KFBS, Northern Marianas	RR	2030	9420	Voice of Greece	Greek
1200	11680	KCBS, North Korea	KK	2100	9460	Voice of Turkey	TT
1200	9930	KWHR, Hawaii		2100	11635	Radio Jamahiriya, Libya	AA
1200	11655	Radio Rebelde, Cub	SS	2100	9325	Radio Farda, USA, via Sri Lanka	Farsi
1200	5020	Solomon Is. Broadcasting	BBC	2130	15285	Radio Romania Int.	
1230	12120	FEBC, Philippines		2130	11715	All India Radio (Goa)	
1230	11740	Radio Japan, via Singapore	CC	2130	15445	Voice of America Relay, Morocco	
1230	12130	Trans World Radio, via Guam	CC	2130	9915	BBC, via Cyprus	AA
1230	11875	China Music Jammer		2200	13610	Radio Damascus, Syria	
1230	11835	CPBS, China	CC	2200	11635	Radio Vlaanderen Int., Belgium, via Bonaire	
1230	13625	Voice International, Australia		2230	15600	Radio Taiwan Int., via Florida	
1300	11605	Radio Taiwan Int.	unid	2230	17705	Radio Havana Cuba	SS
1300	9560	Radio Thailand	ABC	2300	9700	Radio Bulgaria	
1300	17800	Deutsche Welle, Germany, via Rwanda	unid	2300	11935	Voice of America Relay, Kuwait	
1300	17630	Africa No. One, Gabon	FF	2330	6060	RAI Int., Italy	II
1300	9535	Voice of Indonesia	pgms	2330	5995	RTVM, Mali	FF
1300	17625	YLE/Radio Finland	Finnish	2330	5815	World Music Radio, Denmark	
1300	17880	China Radio Int., via Mali	FF	2330	6005	Deutschland Radio, Germany	GG
1300	7245	Voice International, Australia	various.	2330	9875	Radio Vilnius, Lithuania	
1330	15395	Emirates Radio, Dubai, UAE	AA	2330	5865	Voice of Greece	Greek
1400	6150	Mediacorp Radio, Singapore		2330	6190	Deutschlandfunk, Germany	GG
				2330	6090	Radio Bandeirantes, Brazil	PP
				2330	17795	Radio Australia	
				2330	11785	Radio Guiaba, Brazil	PP

We respectfully ask that when you contact a company about a product highlighted in "Power Up" you always tell them you read about it in *Popular Communications*. In the unusual case where they're not familiar with *Pop 'Comm*, please direct them to us at popularcom@aol.com. Your help in spreading the word about your magazine is greatly appreciated!

Sports Radio Play-by-Play Directory From Montgomery Publishing

Now you can find out where your favorite sports team radio broadcasts are—anywhere in North America—thanks to *Sports Radio Play-by-Play Directory*! Bob Montgomery (www.montgomerypublishing.com) tells us that this "comprehensive directory includes all of the major leagues and most of the minors." Sports included are baseball, basketball, football, soccer, hockey, and lacrosse. The printed version of *Sports Radio Play-by-Play Directory* is \$19.95 plus \$5 shipping in the U.S. It's also available as a PDF version for \$14.95 and can be e-mailed directly to you at no extra charge. To get a copy on CD, add \$5 shipping in the U.S. For international orders or for more information, visit Bob's website.

New MFJ 24-hour Clock Offers Five Time Zones At A Glance!

MFJ's new 12-inch world time quartz clock, the MFJ-135, lets you see UTC, Local, Honolulu, Tokyo, and Moscow time, with five independently settable dials. This wall clock's display is highly visible and easy to read, and with its black outer trim, gold inlet stripe, gold hands, black numbers, and white face, it's an attractive addition for any hamshack or other room in your house. It's covered by MFJ's one-year *No Matter What* limited warranty. To order the new MFJ clock, which sells for \$39.95, or for information on your nearest MFJ dealer, contact MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759; Phone: 800-647-1800; Web: www.mfjenterprises.com; Fax: 662-323-6551.



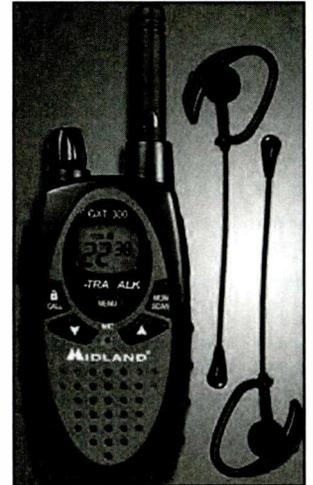
MFJ Enterprises' new MFJ-135 wall clock shows five time zones at a single glance.

New Midland GXT 300 VP1 GMRS Handheld Radios

They're small, pocket-sized, and convenient, especially with the additional value of working with those tiny FRS transceivers everyone's using. Included in this "value pack" (\$69.95 direct from Midland Radio) is a pair of radios that boast 3 watts power, 22 channels, 38 sub-channels per channel, Vox, call tones, scan, keylock, roger beep tone, high/low power option, auto squelch,

Midland's new GXT 300 VP1 handheld package is \$69.95 direct from Midland.

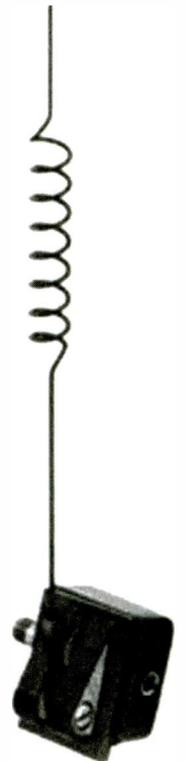
belt clip, and even standard headsets. The GXT 300 VP1 GMRS walkie-talkies operate on four "AA" batteries or the Midland AVP-3 rechargeable battery pack. Please note that you need a no-test FCC license to use a GMRS transceiver (visit www.fcc.gov), while the FRS frequencies used by this transceiver are license-free. The new Midland GXT 300 VP1 includes a three-year warranty and is available from www.midlandradio.com.



Andrew Corporation/Antenna Specialist's APR143 On-Glass Mount Antenna

Andrew Corporation/Antenna Specialist's APR143 is great for mobile scanner use and transmitting on 2 meters! With a 21-inch whip and 15 feet of RG/58U cable terminated with a PL259 connector, you'll be transmitting and receiving through your vehicle's glass in minutes. The hardware is stainless steel and the whip is made of black Dura-Coat. The whip is also easily removable for garage or car wash entry. The antenna, designed for 138/174 MHz, requires no ground plane and has long-lasting holding power. Removal and cleanup is as easy as the initial installation. For more information on the APR143 (suggested retail \$78.25), contact Andrew Corporation/Antenna Specialists, 31225 Bainbridge Road, Solon, OH 44139; Phone: 800-321-9977. Web: www.antenna.com.

Antenna Specialists' APR143 on-glass mobile antenna is perfect for transmitting on 2 meters or as a mobile scanner antenna.



Voice Of America—A History By Alan L. Heil, Jr.

In his new book, Alan Heil, Jr., tells it like it is and why we still need the Voice of America, the nation's largest publicly funded broadcasting network, despite the cutbacks made by the Broadcasting Board of Governors. Heil, former deputy director of VOA, chronicles its remarkable transformation from a fledgling shortwave propaganda organ during World War II to a global multimedia giant, encompassing radio, the Internet, and 1,500 affiliated radio and television stations across the globe to reach more than 90 million people worldwide in over 50 languages. Using transcripts of radio broadcasts and numerous personal

Alan L. Heil, Jr., is the author of the new book, *The Voice of America—A History*. Heil worked for VOA from 1962 until his retirement in 1998, holding various positions there, including foreign correspondent, Chief of News and Current Affairs, and Deputy Director of Programs.



anecdotes, Heil gives the reader a front-row seat to the greatest events of the past 60 years, from the Cold War and Vietnam to Watergate and the Lewinsky scandals, from Neil Armstrong's first steps on the moon to ethnic strife in the Balkans and Rwanda, and from the outbreak of HIV/AIDS to the terrorist attacks on September, 11, 2001. Heil also relates the story of a perennially under-funded organization struggling against the political pressures, congressional investigations, massive reorganizations, and leadership purges that have attempted to shape—and, in some instances, control—VOA programming. This in-depth history of VOA, from its founding to its 60 anniversary, is a vivid portrait of the people who made it great, depicting a news network that has overcome enormous challenges to steadfastly and faithfully report the most important news stories of our time. *Voice Of America—A History* retails for \$37.50 and is published by Columbia University Press, New York City, NY.

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VOA Staff Up In Arms!

About half of the Voice of America staff has signed a petition urging Congress to investigate the Broadcasting Board of Governors (BBG), the independent entity that oversees America's international broadcasting efforts. The signers complain that Radio Sawa, Radio Farda, and other non-VOA U.S. radio and TV broadcasts are the reason for recent cutbacks in VOA's Arabic and English schedules. The complainants also question the effectiveness of broadcasts, such as Radio Sawa, which are directed towards a youth audience and thus air far more music than news. As you'd expect, management at these other services deny the accusations.

Little Radio Tirana has acquired a couple of 100-kW short-wave transmitters, which should be in use already. Another new 100-kW unit should go on the air soon at Bangladesh Betar. These folks could certainly do with a hefty dose of "ooomph" in their signals! Maybe this will help.

And in the Congo the government's Radio Television Nationale Congolaise (RTNC) has obtained a 10-kW transmitter, which will be activated from Sud-Kivu in the Eastern part of that country. Depending on the schedule and frequency they pick, this one could be a good target for North American DXers.

A few months ago we reported the end of the Voice of the Mediterranean, programmed in Malta but mostly funded by Libya. Radio Netherlands Media Network reports that the station was on the agenda at a meeting between the Maltese Minister of Foreign Affairs and Investment Promotion in Tripoli and Colonel Khadafi's son, Mohammed. So maybe we haven't yet seen the last of this station.

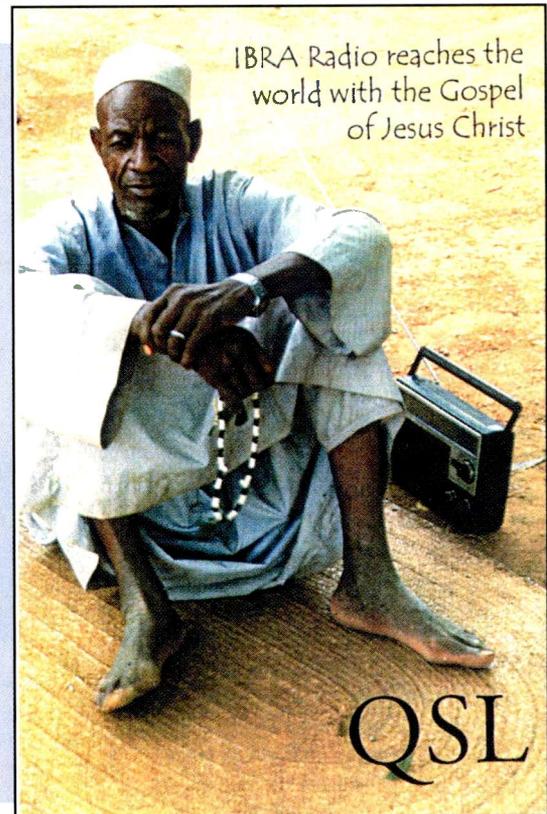
Voice Of The New Sudan

As of this writing we've neither heard nor seen any reports of activity on **9310**, although a few test broadcasts have supposedly taken place. Whatever. By the time you read this, broadcasts by the Sudan People's Liberation Movement's Voice of the New Sudan should have begun on that frequency from a 50-kW transmitter in the Southern Sudan. Keep checking.

Target: Cuba?

Some months from now Commando Solo (the airborne broadcasts by the U.S. Military, most recently active during the Iraq war) will acquire at least one 10-kW shortwave transmitter, which may well be directed at Cuba. "Solo" is reportedly already airborne and being used to broadcast the Marti services to Cuba, at least on TV and mediumwave.

For a while there, the Maldive Islands were seeing coups and revolutions at a near Bolivian rate. Apparently, there are other people who would like to be the ones in charge of things on that small collection of islands in the Indian Ocean, because a new anti-Maldives program has begun broadcasting to the Islands. Minivan (Independent) Radio, an effort by an organization calling itself Friends of Maldives, is now airing a daily program via Julich, Germany, from 1500 to 1600 on **13855**. E-mail reports to admin@friendsofmaldives.co.uk. Or, you can write them at Friends of Maldives, 64 Milford St., Salisbury SP1 2BP, United Kingdom.



IBRA Radio, based in Sweden, broadcasts over DTK transmitters in Germany and also supplies programming to other religious broadcasters. Rich D'Angelo got this QSL for reception on 12025.

Zimbabwe clandestine SW Radio Africa, formerly on **4880** has now moved to **6145** and increased its schedule to 24 hours a day, which should give us a better shot at it late in the afternoons or late evenings.

You might want to check **5910** or **5915** for a new additional channel for Colombia's La Voz de su Conciencia that is supposed to activate a new transmitter here any time now.

Radio Slovakia International was facing its demise a few months ago. Then it got a one-month extension, which then led to funding that will see it through to the end of the year. RSI is trying to find the funds it needs to continue operations in 2005.

Radio Miami International (WRMI) has received permission to operate on **6870** and, indeed, is already active on that spot during our evening hours.

Remember we welcome your shortwave broadcast loggings. Please be sure you list them by country and include your last name and state abbreviation after each log. We also have a never-ending need for illustrative material, whether QSLs (good copies or originals you don't need to have returned), general station news and information, pennants, or schedules, etc. And, last but not least—a picture of you (yes, you!) at your monitoring station.

Here are this month's logs. All times are in UTC, meaning 0000 equals 7 p.m. EST, 6 p.m. CST, 5 p.m. MST, and 4 p.m. PST. Double letters (SS, RR, AA, PP, etc.) are language abbreviations.

viations (Spanish, Russian, Arabic, Portuguese, respectively). If no language is specified, the broadcast is assumed to have been in English (EE). For other abbreviations see the sidebar elsewhere in this column.

Now let's see what's behind *this* door:

ALBANIA—Radio Tirana, **6115//7160** heard at 0226 with IS, ID, schedule, and news. (Burrow, WA) Trans World Radio, **11865** at 0640 with IS and "Family Bible Hour" from 0645. (Burrow, WA)

ANGOLA—Radio Nacional, **4950** at 0055 with jazzy vocals. Still good at 0247 check. (Strawman, IA)

ANGUILLA—Caribbean Beacon, **11775** with Gene Scott sermon heard at 1235. (Brossell, WI)

ANTARCTICA—Radio Nacional San Gabriel, **15475** at 2020 with pop ballads, but muddy studio audio made it difficult to follow. Obliterated by Voz Cristiana sign on at 2059:30. RNSG went off heard at 2103. (Strawman, IA)

ARGENTINA—Radio Nacional, **6060** in SS with news at 0955. (DeGennaro, NY) RAE, **11710** in SS at 0107. (Charlton, ON)

ARMENIA—Voice of Armenia, **9960** in GG at 1817, IS at 1824 and into EE at 1825 with news at 1827. (Burrow, WA)

ASCENSION ISLAND—BBC Relay, **15400** with news at 1108. (Jeffery, NY) UN Radio relay, **17810** with news and current events at 1730. (Barton, AZ)

AUSTRALIA—Radio Australia, **6020** in EE/Pidgin at 1024 with ID at 1025. And **9560** with ID for "Radio Australia Asia Pacific" at 1101. Also **9580** with day's schedule at 1005, then a singer from Fiji. (DeGennaro, NY) **9475** with a book reading at 1216. Also on **9590** and **11660**. (Brossell, WI) **9660** and **13630** with sports at 0700. Also **15515** with Pacific news at 2100. (Rossetti, MA) **9830** at 1418 with "Report on Innovation." (Burrow, WA) **15515** at 2125. (MacKenzie, CA) **17795** at 2334. (Charlton, ON) ABC Northern Territory Service. Tennant Creek, **2325** at 1548 with call-in program on problems of the work force. (Foss, Philippines) Voice International, **11955** at 0937 on finding the right man to marry. (Foss, Philippines) **13635** at 1256, Website and ID at 1300. (Brossell, WI)

AUSTRIA—Radio Austria Int., **9870** with area weather at 0118. (Charlton, ON)

BELGIUM—Radio Vlaanderen Int. (via Bonaire), **11635** with "Music From Flanders"

at 2215 and **11730** in Flemish at 2250. (Charlton, ON)

BOLIVIA—Radio Santa Cruz, **6134.8** at 0953 with SS anmts, IDs, commls, promos, jingles, and local music. (Alexander, PA)

BOTSWANA—VOA Relay, **15445** at 1930. (Paradis, ME)

BRAZIL—(Note: all in PP) Radio Difusora Amazonas, Manaus, **4805** at 0931. (DeGennaro, NY) Radio Rural, Santarem, **4765** with music, commercials, talk at 0925. (DeGennaro, NY) Radio Difusora Roraima, Boa Vista, **4805** at 0940 with music. (DeGennaro, NY) Radio Nova Visao, Santa Maria, **11735** with religious message at 1015. (DeGennaro, NY) Radio Senado, Brasilia, **6190** with talk show at 0941. (DeGennaro, NY) Radio Cancao Nova, **9675** at 0105. (Strawman, IA) Radio Brazil, Campinas, **4785** with music at 0928. (DeGennaro, NY) Radio Brazil Central, Goiania, **4985** with music and talk at 0137. (Jeffery, NY) 0418. (DeGennaro, NY) **11815** at 0237. (Brossell, WI) Radio Educacao Rural, Tefe, **4925** with sign on at 1000. (DeGennaro, NY) Radio Difusora. Taubate, **4924.5** with talks and commercials at 0945. (DeGennaro, NY) Radio Bandeirantes, San Paulo, **6190** with live futbol coverage at 2330. (DeGennaro,

Abbreviations Used In This Month's Column

(p)	—	presumed	ISB	—	lower sideband
(t)	—	tentative	LV	—	La Voz
//	—	parallel	NBC	—	National Broadcasting Corporation (Papua New Guinea)
AA	—	Arabic	ORTB	—	Office de Radiodiffusion et Television du Benin
AFN	—	Armed Forces Network	PBS	—	People's Broadcasting Station (China)
AFRTS	—	Armed Forces Radio TV Service	PP	—	Portuguese
AIR	—	All India Radio	PSA	—	public service announcement
anmt(s)	—	announcement(s)	QQ	—	Quechua
anncr	—	announcer	RCI	—	Radio Canada International
AWR	—	Adventist World Radio	Rdf	—	Radiodifusora, Radiodiffusion
BKSXA	—	Broadcasting Service of the Kingdom of Saudi Arabia	REE	—	Radio Exterior de Espana
CC	—	Chinese	RFA	—	Radio Free Asia
co-chan	—	co-channel (same) frequency	RFE/RL	—	Radio Free Europe/Radio Liberty
comml	—	commercial	RNZI	—	Radio New Zealand International
CRI	—	China Radio International	RR	—	Russian
DD	—	Dutch	RRI	—	Radio Republik Indonesia
DJ	—	disc jockey	RTBF	—	RTV Belge de la Communaute Francasie
DW	—	Deutsche Welle/Voice of Germany	s/off	—	sign off
EE	—	English	s/on	—	sign on
f/by	—	followed by	SIBS	—	Solomon Is. Broadcasting Corp.
FEBA	—	Far East Broadcasting Association	sked	—	schedule
FEBC	—	Far East Broadcasting Company	SLBC	—	Sri Lanka Broadcasting Corp.
FF	—	French	SS	—	Spanish
GBC	—	Ghana Broadcasting Corp.	TC	—	time check
GG	—	German	TOH	—	top of the hour
HH	—	Hebrew	TT	—	Turkish
HH	—	Hungarian	TWR	—	Trans World Radio
HOA	—	Horn of Africa	unid	—	unidentified
ID	—	identification	USB	—	upper sideband
II	—	Italian; Indonesian	UTE, ute	—	utility station
Int	—	International	v	—	variable
IRRS	—	Italian Radio Relay Service	vern	—	vernacular (local language)
IS	—	interval signal	VOA	—	Voice of America
JJ	—	Japanese	VOIRI	—	Voice of Islamic Republic of Iran
KK	—	Korean	ZBC	—	Zambian Broadcasting Corp.



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Fax: +357 3-722858
Email: nradio@cytanet.com.cy

Cyprus 21st May, 2004

Dear Richard,

I can confirm your reception of the Radio Napa Christmas Broadcast via the Merlin Transmitters on 25 December 1998 from 1100 to 1158 GMT of 9.915 kHz.

I must firstly apologize that it has taken so long to respond to your report, which matches our master recording of the programme.

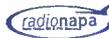
Radio Napa is the independent commercial radio station serving south-east Cyprus on 106.3 FM and 90.9 FM; we are also the local relay station of the BBC World Service.

Many thanks for your report and best wishes from the Republic of Cyprus, which is now a member of the European Union!

Kindest Regards,

Nathan Morley

Nathan Morley
Programme Controller



NATHAN MORLEY
PROGRAMME CONTROLLER

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Rich D'Angelo caught and QSLed a broadcast from Radio Napa—an FM station in Cyprus—via one of the Merlin shortwave transmitters.

NY) Radio Anhanguera, Goiania, **4915** with futbol match at 0007. (DeGennaro, NY) 0126 with talk and music. (Jeffery, NY) Radio Nacional da Amazonia, Brasilia, **11780** at 0104. (Charlton, ON) 0235 with vocals. (Brossell, WI) 1056 with interview with government official. (DeGennaro, NY)

BULGARIA—Radio Bulgaria, **9700/11700** at 2300 with IS, ID, schedule, and news. (Burrow, WA) 9700/11700 on Bulgarian economy at 0225. (Brossell, WI) 9700 at 2315 in EE and **15700** in Bulgarian with songs at 1145. (Charlton, ON) **13600** in SS at 1109. (DeGennaro, NY) Radio Varna, **7400** at 0245 in BB with talk by woman, mention of Bulgaria, pop vocals. Off abruptly at 0258. This is UTC Mondays only. (Paszkiwicz, WI)

CHILE—Voz Cristiana, **6070** with religious talk in SS at 0951. (DeGennaro, NY) **11745** in PP at 0230. (Brossell, WI) 11745 in SS at 0111 and **17670** in SS at 1637. (Charlton, ON)

CHINA—China Radio Int., **6145**, via France at 2300 with news, "CRI Roundup." (Rossetti, MA) **7190** in CC at 2109. (Foss, Philippines) **9580** in EE at 0110 and **11750** at 1139 with mention of coming visit of "Disney on Ice." (Charlton, ON) **11640** via Mali at 2000. (Paradis, ME) **17880** in FF at 1318. (Brossell, WI) Xizang PBS, Lhasa, **7170** at 2000 sign on with music, CC ID and slow instrumental music. (Foss, Philippines) CPBS, **11835** in CC at 1243. (Brossell, WI) China Music Jammer, **11825** over VOA Philippines at 1240 and **15795** at 1300 possibly against AIR. Also **11875** at 1240 against CBS-Taiwan. (Brossell, WI)

CLANDESTINE—Radio Liberty, **7155** in RR at 0205. Also **13795** in unid Asian language at 1306. (Brossell, WI) Radio Farda (to Iran) **17670** via England in unid language at 1627. (Charlton, ON) Radio Rhino International, **17870** at 1506 with EE talk against Ugandan government, mostly talk about government corruption in Uganda. Weak but in the clear until VOA sign on at 1529. Rhino is on UTC Monday-Friday. (Alexander, PA)

CONGO—RTV Congolaise, **5985** heard at 0432 abrupt sign on with FF talk. "Radio Congo" ID, local music, FF talk. Fair to good over a weak WYFR, which went off at 0445, but Congo was completely covered when WYFR returned at 0455. Best time to hear RTVC is during the 0445-0455 WYFR break. (Alexander, PA)

COSTA RICA—University Network, **9725** with religious talk at 0015. (Charlton, ON)

CROATIA—Voice of Croatia, **9925** via Germany in Croatian at 2336. (Charlton, ON) 0200 in EE with schedule, ID. (Burrow, WA)

CUBA—Radio Havana Cuba, **9820** at 0112 condemning the U.S. restriction on travel to Cuba. (Charlton, ON) **11760** at 1123 with diatribe on evils of U.S. (DeGennaro, NY) **17705** in SS at 2250. (MacKenzie, CA) Radio Rebelde, **11655** with SS talk at 1223. (Brossell, WI) 1315 with peppy tunes in SS. (Barton, AZ)

CZECH REPUBLIC—Radio Prague, **7345** in SS at 0217. (Brossell, WI) **9415** with report on Czech monument, IS, ID, and close at 2256. (Burrow, WA) **17485** "Celebrating Swedish Week" at 1612. (Charlton, ON) **21475** at 0925 "You are tuned to Radio Prague, the international service of the Czech republic." (Foss, Philippines)

DENMARK—World Music Radio, Karup, **5815** at 2330 with pops, multi-lingual ID anmts at 2350. "WMR" and "World Music Radio" IDs. (Alexander, PA) 2356 with songs in EE and other languages, EE ID. (DeGennaro, NY)

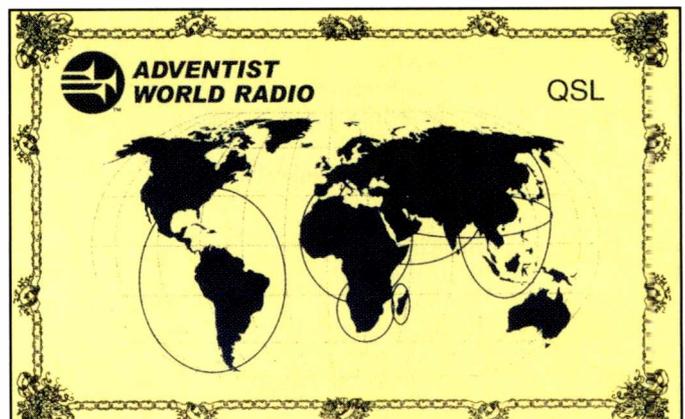
ECUADOR—HCJB, **6010** in GG at 0933 to South America on American/German areas in Paraguay. (DeGennaro, NY) **11920/12005** with Christian pops at 0020. (Barton, AZ) 12005 with religion at 1141. (Charlton, ON) **12020** in PP at 0204. //11920 which had QRM from Morocco. (MacKenzie, CA) La Voz del Napo, Tena, **3279** with local news in SS at 0344. (DeGennaro, NY) Radio Buen Pastor, Saraguro, **4814** in QQ with religious talk at 0935. (DeGennaro, NY) La Voz del Upano, Macas, (t) **5040.4** with SS and Andean-style flutes at 1201. Very strong signal but very low, muddy audio. (Strawman, IA)

EGYPT—Radio Cairo/Egyptian Radio, **9900** in EE with music and songs in AA at 2148. (DeGennaro, NY) **11725** in AA at 0048. (Charlton, ON) **11855** at 0203 with ME music, ID, biography of an Egyptian diplomat. (Burrow, WA) **12050** in AA at 0200, lost shortly after tune in. (MacKenzie, CA)

ENGLAND—BBC, **7140** in AA at 0206. (Brossell, WI) **9915** via Cyprus in AA at 2154. (DeGennaro, NY) **11835** via Florida at 0224 with options for Bolivia's lack of access to the sea. Also **13745** in RR at 1820 (MacKenzie, CA) **15180** in AA with classical music at 1038. (Jeffery, NY) **15190** with golf scores at 1609 and **21470** via Seychelles heard at 1615. (Charlton, ON)

FINLAND—YLE/Radio Finland, **17625** in Finnish at 1320. (Brossell, WI)

FRANCE—Radio France Int., **4890** via Gabon, in FF at 0408. Also **11845** in FF with ID and news at 1100 (DeGennaro, NY) **7135** in possible Italian at 2018. (Foss, Philippines) **15505** with news in EE at



One of Adventist World Radio's recent QSLs, issued from their UK headquarters.



How's this for fancy? It's a shame that Sudwestrundfunk (7265) will soon be gone from shortwave. (Courtesy Rich D'Angelo)

0715. (Rossetti, MA) **17605** in EE at 1706 and **17620** in FF at 1632. (Charlton, ON)

FRENCH GUIANA—Radio France Int. Relay, **17620** in FF at 1632. (Charlton, ON)

GABON—Africa No. One, **15475** in FF at 1626. (Charlton, ON) **17630** in FF at 1320. (Brossell, WI)

GERMANY—Deutsche Welle, **9440** with EE talk program at 2143. (Jeffery, NY) **9900** to Asia via Irkutsk with news in GG at 1116. (DeGennaro, NY) **17595** on human rights at 1617. (Charlton, ON) Deutschland Radio, **6005** with talk and discussion in GG at 2349. (DeGennaro, NY) Deutschlandfunk, **6190** in GG at 2336. (DeGennaro, NY) Sudwestrundfunk, **7265** with talk in GG at 0210. (Brossell, WI) (*Due to close at the end of the year.—gld*)

GREECE—Voice of Greece, **5865** in Greek at 2353. Also **9420** at 0016 with delightful music program. (DeGennaro, NY) **7475** with Greek songs at 0220. (Brossell, WI) **9420** in Greek at 2030. (Paradis, ME) **17705** via Delano in Greek with ID at 1631. (Charlton, ON)

GUAM—KTWR/Trans World Radio, **12130** in CC at 1249. (Brossell, WI) KSDA/Adventist World Radio, **11980** in EE at 2133. // **11850**. (MacKenzie, CA) **15235** in EE but very faint at 1658. (Charlton, ON) AFN/AFRTS, **5765 USB** at 1034 with NPR news. Also **13362** at 0322 with baseball. (Foss, Philippines)

GUATEMALA—Radio Cultural Coatan, **4780** in SS with religious music at 1045. (Barton, AZ)

GUYANA—Voice of Guyana, **3291** with U.S. country heard at 0348. (DeGennaro, NY)

HAWAII—KWHR, **9930** with prayer line and religious music at 1209. (Brossell, WI)

HUNGARY—Radio Budapest, **9570** in presumed Hungarian at 0220. (Brossell, WI) **9590** with “Hungary Today” heard at 0104. (Charlton, ON)

ICELAND—AFN/AFRTS, **9980** at 0238 with “The Car Show.” // **10320**-Hawaii. (Brossell, WI)

INDIA—All India Radio, Bangalore, **9425** in Hindi at 0019. (DeGennaro, NY) **10330** in presumed Hindi at 0235. (Brossell, WI) **11715** Panaji, Goa, in EE at 2135. (Strawman, IA) **13605**, Bangalore, in EE at 0038. (Charlton, ON)

INDONESIA—RRI-Palangkaraya, **3325** in II with domestic music at 1531. (Foss, Philippines) RRI-Gorontalo, **3266.5** at 1023 with vocals in II. (Foss, Philippines) RRI-Pontianak, **3976** with local music and II at 1038. (Foss, Philippines) RRI-Serui, **4604.9** with long II talk, amazing S9 signal at 1147. (Strawman, IA) Voice of Indonesia, **9525** at 1315 with II talk, gamelan music, EE ID and website, pop vocals. (Paszkiwicz, WI)

IRAN—VOIRI, **9635//11650** with music, EE news and comment, ID at 1604. (Burrow, WA)

ISRAEL—Kol Israel, **11585** with music, HH announcer at 0030. (Barton, AZ) 0229 in HH. (Brossell, WI) **17535** in EE at 1703. (Charlton, ON)

ITALY—RAI Int., **7235//9875** at 0433. In on bird IS, weak anthem and narrative at 0435. Anthem again at 0445 and into EE. (Burrow,

WA) **6060** in II at 2344. (DeGennaro, NY) **11800** at 2239 with IS, ID, news in II. (Charlton, ON) 0202 with talk and vocal music. (MacKenzie, CA) 0245 in II. (Brossell, WI)

JORDAN—Radio Jordan, **11690** at 1540 with pops, EE news at 1600. RTTY QRM, usually right on top, was on the low side this time. (Alexander, PA)

JAPAN—Radio Japan/NHK, **9530** via French Guiana in SS at 1000 with ID, news. (DeGennaro, NY) **11740** via Singapore with CC talks monitored at 1231. (Brossell, WI) **12045** via Singapore in JJ at 1508. (Strawman, IA) 1528. (Barton, AZ)

KUWAIT—Radio Kuwait, **11675** in AA at 0230. (Brossell, WI) **15505** in AA at 1830. (Paradis, ME) 1925 in AA with ME music, what sounded like phone-in requests. (Barton, AZ)

LIBYA—Radio Jamahiriya, **11635** with “Voice of Africa” segment in EE at 2125–2130 when off abruptly in the middle of the news. (Alexander, PA) **15315** in AA at 2020, **17635** in AA at 1720. (Charlton, ON) **15660//17635//17880** in FF at 1750 with “Voice of Africa” segment in FF. (Burrow, WA) (*All frequencies via France.—gld*)

LITHUANIA—Radio Vilnius, **9875** at 2330 with program preview, IDs, and news. (Burrow, WA) **11690** at 0040 in EE on taxing political parties. (Charlton, ON)

MADAGASCAR—Radio Netherlands relay, **9895** with SS ID and news in SS at 0300. (Brossell, WI)

MALI—RTVM, **5995** at 2325 with FF talk, local music, off with national anthem at 0002. Parallel but weak on **4782.4** and 4835. (Alexander, PA)

MAURITANIA—Radio Mauritanie, **4845** with two men talking in AA at 0011. (DeGennaro, NY)

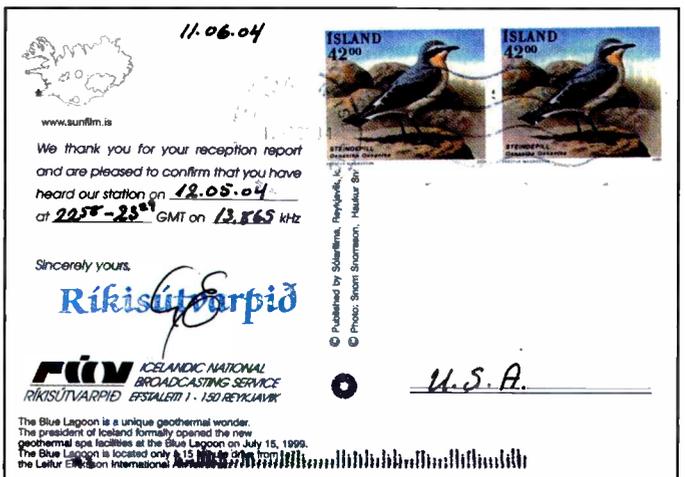
MONACO—Trans World Radio, **9870** at 0643 with IS, “Family Bible Hour.” (Burrow, WA)

MOROCCO—RTV Marocaine, **11920** with AA talks at 0240. (Brossell, WI) VOA Relay, **15455** with “World of Music” at 1930. (Paradis, ME) 2138 with “Best of Bobby Vinton” program. (MacKenzie, CA)

NETHERLANDS—Radio Netherlands, **9845** with Beethoven music at 0051 and **17810** (Bonaire) at 2043 mentioning armed guards will be on board Dutch planes. (Charlton, ON) **9895** to Southern Europe in DD at 1109. (DeGennaro, NY)

NEW ZEALAND—RNZI, **9615** with news items at 0605. (Barton, AZ) **9885** with sign on at 0959. (DeGennaro, NY) **11725** at 2048. Moves to better **15720** at 2050 with IS, ID, New Zealand news. (Barton, AZ) 15720 with Pacific Island news at 2115. (MacKenzie, CA) 0215 with talk and music at 0215. (Jeffery, NY) 0250 with lecture on Captain Cook. (Brossell, WI)

NIGERIA—Voice of Nigeria, **15120** at 0456 with theme, IS, ID and news at 0500. (Burrow, WA) **17800** at 0246. (Charlton, ON)



INBS (or Ríkisútvarpið if you're a good speller) still issues nice cards with attractive stamps—a lost art for many stations these days. (Courtesy Rich D'Angelo)



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Dear Richard

We congratulate you on being one of the first listeners to our very first test transmissions on short wave from transmitters in the United States on THURSDAY 1st JULY 2004 between 0000 and 0200UTC.

Our transmitter QTH is 67.49W 46.20N - Monticello, Maine, United States. The frequency used was 7,415kHz with a TX power of 50KW omnidirectional. Programmes were line fed to the transmitter from our studios in Glasgow, Scotland.

We are delighted to confirm your reception report from: Wyomissing, Philadelphia, USA

TONY CURRIE
Programme Director
radio six international

Scotland-based Radio Six International has had some broadcasts over WBCQ-7415, one of which was caught and confirmed by Rich D'Angelo.

15120 in EE at 2135 to 2259 close, also at 0609 to past 0700. And 17800 at 2005 to 2300 close, all EE. Strong but poor, muddy audio. (Alexander, PA)

NORTH KOREA—Voice of Korea, **9975//11735** at 1631 with revolutionary story, ID, feature on Kim Jung Il's tomb. (Burrow, WA) **11710** in EE with news at 1308. Parallel **13760** beamed to Europe was far clearer. (Brossell, WI) 11735 at 1502 with sign on and national anthem. Low audio and splatter from much stronger Radio Japan on 11740. (Strawman, IA) **15245** at 1630. (Barton, AZ) KCBS, **11680** with talks in KK at 1225. (Brossell, WI)

NORTHERN MARIANAS—KFBS, **11580** with CC talks at 1224. Also 11650 in RR at 1225. (Brossell, WI) VOA Tinian relay, **11805** in CC at 1312. (Brossell, WI) **15230** in CC barely audible at 1048. (Jeffery, NY)

PAKISTAN—Radio Pakistan, **15100** heard at 1558 with IS, music bridge, ID, time pips, ID again and into news. (Burrow, WA)

PAPUA NEW GUINEA—NBC, **4890** in EE and Pidgin with local news at 0944. (DeGennaro, NY) 1155 with island and pop music. (Barton, AZ)

PERU—Radio Horizonte, Chachapoyas, **5019** in SS and QQ with children singing at 1013. (DeGennaro, NY) Radio La Oroya, La Oroya, **4904.7** with Bible talk in SS. (DeGennaro, NY) Radio Santa Monica, Cusco, **4965** at 0947 with OA music, anmts, ID, commls, bird chirps. (Alexander, PA)

PHILIPPINES—FEBC Int., **12120** with religious songs under

RTTY QRM at 1347. (Brossell, WI) VOA Relay, **9760** with talk on coming elections in Georgia at 1212. (Brossell, WI) **15160** in CC at 1028. (Jeffery, NY)

PIRATE—WHYP, **6925 USB** at 0050. Poor in QRN with mainly a KJPM parody in which a woman takes over a man's life by controlling him with root beer. Off at 0118. (Zeller, OH)

PUERTO RICO—AFN/AFRTS, **7507 USB** with AFN News at 0230. QRM from KTBN-7505. (Brossell, WI) 0950. (DeGennaro, NY)

ROMANIA—Radio Romania Int., **9590/9645/11940** at 2305 with newscast. Also **11820/15140/15235** at 0400 with IS, ID, news. (Burrow, WA) **9690** with news at 0109. (Charlton, ON) **15285** to Europe with news at 2130. (Rossetti, MA)

RUSSIA—Voice of Russia, **7140** at 1925 with "News and Views." Also **21790** with news to 0711. (Foss, Philippines) **9660** with EE commentary at 0223. (Brossell, WI) **9665** (via Moldova—*glad*) in EE at 0117 and **11825** in RR at 0116. (Charlton, ON) **15455** at 2000 with Joe Adamov's mailbag program. (Rossetti, MA) Yakutsk Radio, **7200** at 2051 with slow pops and RR talk. (Foss, Philippines)

RWANDA—Deutsche Welle Relay, **11865** at 2100. (Paradis, ME) **15205** at 2034. (Charlton, ON) **17800** in unid African dialect at 1315 with RCI-Sackville underneath. (Brossell, WI)

SAUDI ARABIA—BSKSA, **11855** in AA at 0249. (Brossell, WI) **17560** with Koran recitation at 1616. (Charlton, ON)

SERBIA-MONTENEGRO—Radio Serbia-Montenegro Int., **9580** heard at 0009 reporting on trial of Milosevic. (Charlton, ON) 0430 with IS, ID, news. (Burrow, WA)

SINGAPORE—Mediacorp Radio, **6150** at 1433 with news, local traffic and weather, ID "You are listening to News Radio 9-3-8, a station of Mediacorp Radio." (Barton, WA)

SLOVAKIA—Radio Slovakia Int., **9440** in FF heard at 0215. (Brossell, WI)

SOUTH AFRICA—Channel Africa, **9770** at 0538 with an item about a small business conference. Also **15215** at 0613 with sports report, ID, program contents. (Burrow, WA)

SOUTH KOREA—Radio Korea Int., **5975/9870** at 1638 with music, ID, features on Korea. (Burrow, WA) **13670** in SS at 0726. (Foss, Philippines)

SPAIN—Radio Exterior de Espana, **3350** via Costa Rica in SS at 0330. (Barton, AZ) 0351 with news in SS. Also **9765** via Costa Rica with news in SS at 1113. (DeGennaro, NY) **15290** with sports news in EE, ID and a "Look at Spain's Newspapers." (Burrow, WA) 15290 with "Africa Today" at 2036 and **21570** in SS at 1628. (Charlton, ON)

SRI LANKA—Deutsche Welle Relay, **15470** with Urdu service at 1510. (Strawman, IA) VOA Relay, **11705** with Middle East news at 0111. (Strawman, IA) SLBC, **15748** at 0029 open. Very weak at sign on but slowly improving. Time pips at 0030 and possible news in EE i/by oldies music. (Alexander, PA)

SYRIA—Radio Damascus, **13610** heard at 2026 with Middle East news, talk at 2030, music, news again at 2037, more music to clear ID at 2045. (Burrow, WA) 2211 with poor audio. Off heard at 2212. (Charlton, ON)

SWAZILAND—Trans World Radio, **4775** with religious message in GG at 0404. (DeGennaro, NY)

TADZHIKISTAN—Voice of Russia via Dushanbe, **11500** at 1221 in presumed Hindi. (Brossell, WI) RR lessons in EE service at 1540. (Strawman, IA)

TAIWAN—Radio Taiwan Int., **5950** via WYFR at 0730. (Rossetti, MA) **7105** replacing former **7445**, opening at 1100. (Barton, AZ) **11605** at 1300 in unid Asian language. (Brossell, WI) **15600** via Florida at 2239. (Charlton, ON)

THAILAND—Radio Thailand, **5890** via Greenville at 0057. (Charlton, ON) **9560** (p) at 1327 with Radio Australia program but not parallel to Radio Australia itself. I have known Thailand to carry RA programming. (Paszkievicz, WI) BBC relay, **11750** with World Service at 1450. (Strawman, IA) **17760** at 1315. (Brossell, WI)

TURKEY—Voice of Turkey, **9460** in TT with music and woman anner at 2150. (Jeffery, NY) 0029 with music and talk in TT. (DeGennaro, NY) 0215 with TT talks. (Brossell, WI) 0352 with IS and TT, IDs and possible anthem at 0355 and into TT Talk. (Burrow, WA)

This Month's Book Winner

To show our appreciation for your loggings and support of this column, each month we select one "Global Information Guide" contributor to receive a free book. Readers are invited to send in loggings, photos, copies of QSL cards, and monitoring room photos to me at *Popular Communications*, "Global Information Guide," 25 Newbridge Road, Hicksville, NY 11801, or by e-mail to popularcom@aol.com. The e-mail's subject line should indicate that it's for the "Global Information Guide" column. So come on, send your contribution in today!

Our book winner this month is Brian Alexander who, when he isn't on the road attending drum and bugle corps competitions, is at his big rig logging many of the neat things that show up in these pages most months. Brian gets a 2005 edition of *Passport to World Band Radio*, courtesy of Fred Osterman and the gang at Universal Radio, home of the biggest and best catalog of radio "stuff" you'll find anywhere. To get your free copy of the catalog, just call Universal at 614-866-4267, or e-mail them at dx@universal-radio.com, or drop a note to them at 6830 Americana Avenue, Reynoldsburg, OH 43068.

TUNISIA—RTT Tunisienne, **12005** with AA music at 0240. (Brossell, WI) 2056 to abrupt sign off at 2058. (Foss, Philippines) **15450** in AA with traditional music at 1530. (Paradis, ME)

UKRAINE—Radio Ukraine Int., **7545** at 0319, weak with talks and mentions of Ukraine. Clear ID at 0339. (Burrow, WA)

UNITED ARAB EMIRATES—Emirates Radio, Dubai, **12005** in AA at 0213 with man/woman talk and some music. (MacKenzie, CA)

15395 at 1330 with continual AA music, // **21605**. 15395 also at 1600-1625 with AA music and talk, // **13675** and **21605** silent. 15395, **ex-15400** also at 0320. // 12005, 13675. Still looking for EE at 0330 but only hear continuous AA music. (Alexander, PA) AWR via UAE, **15205** with RR service and classical music. (Strawman, IA)

UNITED STATES—Radio Africa Int., via Germany, **15715** with religious program in EE. (Charlton, ON) (*This has closed, or will shortly.—gld*)

UZBEKISTAN—Radio Tashkent, **7190** with ethnic songs at 0127. Also **9715** in Uzbek at 0108. (Charlton, ON) **11905** at 2029 with IS, ID, schedule, ID and news. (Burrow, WA)

VATICAN—Vatican Radio, **7305** heard in SS at 0213. (Brossell, WI) **9790** at 0158 with ID, IS; "Laudate Jesu Christi" at 0115. (Charlton, ON)

VENEZUELA—Radio Amazonas, Puerto Ayacucho, **4939.7** with music selections at 1004. (DeGennaro, NY)

YEMEN—Republic of Yemen Radio, **9779.4** at 0252 with solid signal and AA vocals. (Strawman, IA)

ZAMBIA—Radio Zambia/ZNBC, **4910** in unid language with talk at 0411. (DeGennaro, NY)

And that writes *finis* on things for this time, except to pass out a huge package of thank-yous to the following folks who did the good thing this time, namely: Marty Foss, Guinayangan, Philippines; Bruce Burrow, Snoqualmie, WA; Jerry Strawman, Des Moines, IA; Stewart MacKenzie, Huntington Beach, CA; George Zeller, Cleveland, OH; Bob Chandler, Windsor, ON; Dave Jeffery, Niagara Falls, NY; Robert Brossell, Pewaukee, WI; Lou Rossetti, Arlington, MA; Ray Paradis, Pittsfield, ME; Ciro DeGennaro, Feura Bush, NY; Rick Barton, Phoenix, AZ; Brian Alexander, Mechanicsburg, PA; and Sheryl Paszkiewicz, Manitowoc, WI.

Thanks to all of you and, until next time, good listening! ■



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Mobile Radio Installation 101

The December issue of *Pop'Comm's* "On The Go" marks my entry into the *Popular Communications* family. Back in the October issue of *Popular Communications*, a story about my Toyota 4Runner and its extensive radio and communications equipment was presented. I have many hours and dollars invested in that vehicle, so this month I thought it would be appropriate to give the readers a first-hand look at what it took to make a communications installation like that possible. I'll also offer some information on doing an installation in your own vehicle, including the proper selection of cables, mounts, antennas and radio placement, the choice of power and ground wires, fuses (fuse types and ratings), and other factors that go along with your project.

The first thing you need to realize is that installing a radio or scanner is much more than just drilling a couple of holes under the dash and placing an antenna up on the roof. Much more planning and preparation should go into the project at hand. You must ask yourself a few questions: what kind of communications device am I putting in the vehicle? How many devices am I using? Where is a practical place to mount my antenna(s)? And where will I locate and use a 12-volt power source?

The Power Source And Grounding

Installing ham, GMRS, CB equipment, or some other type of transceiver requires a careful selection of the power source. Almost all radios, transceivers, and scanners (unless specifically designed for 110 volts) will operate on 12 volts. The standard accessory power port will provide 12 volts, but will usually only allow a 4- to 6-amp current draw. This is fine for CBs and scanners, but is no good for anything that puts out more than 15 watts of power. I also avoid using the accessory connector (even though most vehicles have two or three of these) as I need it for other things, such as my mobile phone charger or my coffee cup warmer (a must for any road trip).

A good source of power for transceivers rated at 60 watts or less is the fuse block; you might have to install a junction block that connects to the main fuse block. Many fuse blocks have additional accessory slots for optional equipment that would allow a current draw of up to a 20-amp limit. You won't use that much current unless you're operating about 100 watts of power; most 50- to 60-watt radios will draw about 10 to 13 amps of current. The fuse block is also a good place to locate a power source that lets you select the option of turning power on and off with the ignition or having it on all of the time (you'll need to remember to turn the radio off as some transceivers will draw current even if they are only receiving). I prefer to have my radios wired up for power even when the ignition is off. Consult your vehicle owner's manual for a good location on the fuse block to use as your power source.

Now that we have a power source, we need a place to connect the ground wire. I usually locate a place on the inside of the vehicle on the firewall. A metal screw or small bolt that is firmly secured will do fine. Unscrew the connection and take your ground lead, which has a ring or spade connector on it. I prefer



Gary Pearce, KN4AQ, editor of the *SERA Journal*, uses an outbacker HF antenna attached to the rear section of his vehicle by an L-bracket. This type of antenna utilizes taps that allow the user to easily select various frequency ranges from VHF to HF. Gary told me that his current antenna set-up works great and he gets good signal reports.

a ring type that also has an inner-toothed washer. This serves two purposes: the first being that a ring terminal will not come off unless the screw comes completely loose; the second is that an inner-toothed washer ensures a solid "bite" into the metal.

After locating the proper placement for power and ground wires, the next thing to focus on is what type of power wire to run and where to run the wire. The size of the wire depends on the amount of power running through it. Another relevant factor is the length of the wire you're using (the longer the run, the thicker the wire needed). Since most vehicle applications use wire lengths of 15 feet or less, it really isn't a critical factor here. A 10-amp current draw will need a wire size of about 10 to 12 gauge. I always use at least a 10 gauge on my 50-watt radios and an 8 gauge for any 100-watt radios. It's better to be safe with a thicker wire.

While most public safety personnel keep the radio chatter to a minimum, many hams will carry on long conversations. I have heard a few guys time out some of the repeaters in my area (and they are set for a two- or three-minute timeout). So, remember to build your power source connections with carrying on a good chat in mind.

Next, you need to get the power wires from the radio to the power source. Make sure you don't run the wires next to speaker wires. This can lead to noise going into the stereo or transceiver speaker. Always make sure to run the speaker and power wires apart from each other.

Along with every power lead connection, you should also have a fuse installed. I also have my ground leads fused. Most radio owner's manuals will include fuse rating along with other



This type of mobile antenna requires a sturdy mount. The mount can be secured to either the frame of the vehicle or a receiver hitch-type bracket. Either will provide a strong support for the high wind load that this antenna will surely encounter.

vital information regarding electronic accessories. Make sure you have your fuse assemblies in accessible places as well. By this I mean don't place the fuse holder inside a dash assembly when putting together a complex installation (I have seen it done). Fuses will blow every now and then, so keep some spares handy and the holders in a good location. Whether you use spade or glass type, the important thing is to fuse everywhere a power lead is used.

Location, Location, Location!

Now that we have our power source in place, it's time to select a location for the transceiver, or a combination of radios. Some people will have a CB, scanner, and a ham transceiver in their vehicle. Of course, some vehicles are better than others when it comes to having adequate space for placing various pieces of equipment in the driver's view.

Some things to consider include the gear shifter, air bag location, microphone placement, cup holder interference, and

display readability. The most important thing to remember about operating a mobile station is that you must focus on driving first and playing radio second. Set the radio display where it is readable with a quick glance. I also like to get various stations, repeaters, and channels set *before* I drive off, that way I am spending less time fooling with knobs and switches and more time paying attention to my driving.

Several states and municipalities are enacting legislation to restrict using a cell phone while driving a vehicle. Common sense usage of mobile radio equipment might help keep away any legislation that could take away *our* right to communicate while in our vehicles. I know that operating a scanner while mobile (or even having one in the car) is against the law in some areas, but those laws are generally for law enforcement privacy, not for driving safety. My goal this month is to make your set-up as safe to operate as it is fun.

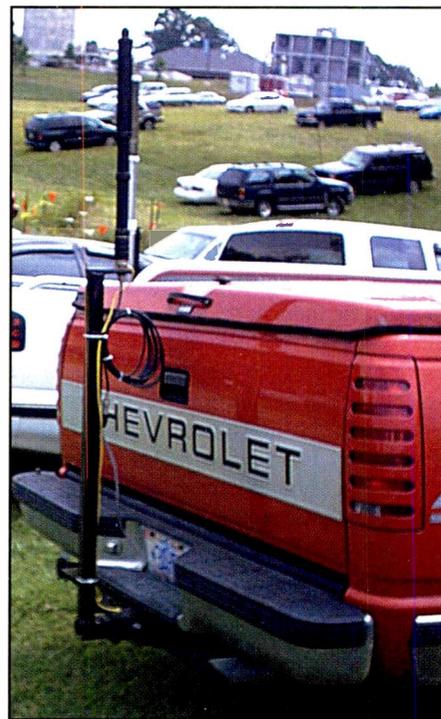
I prefer to use a remote head mount set-up for my personal vehicles. The downside to that is it usually costs a few extra dollars, but the upside more than offsets the cost. Mounting a control head only is usually simpler than installing a complete radio. Many of today's vehicles are small and have only limited space, so a control head set-up may be the only practical way to go. I used an old mobile cell phone mount to remotely place the control head of my Yaesu FT-900AT. The mount provides for movement in many different directions, allowing for various angles and elevations. My vehicle has both a five-speed shifter as well as a four-wheel drive selector lever. The levers must be allowed to move freely, so the more agile my mount, the more angles I can select.

Another big consideration in the placement of *any* type of equipment is the airbag. Both driver and passenger airbags must be free of any obstruction. If the airbag were to deploy and a piece of hard metal equipment (like a CB or scanner) were in the way, you'd have an object that will rip from the mount and become a high-speed projectile, creating a very dangerous situation. The bottom line is to keep the airbag covers free from any restriction.

The next item to consider is the placement of the microphone. This should be placed in a microphone holder, hang-up cup, or some other device that properly secures the mic when it's not in use. I can never understand why someone would

just have the microphone thrown on the floor or up on the console. I learned a valuable lesson from this when I set a radio mic down and forgot about it, set a notebook on top of it, and—you guessed it—right on the PTT. Luckily my car stereo gets a static noise when this occurs and I realized what happened. Never again have I just thrown the microphone down on the console.

Another thing to keep in mind is your drink holder. Does the control head or microphone interfere with the movement of the holder? Does the mount put the display in a position where a drink could spill on it? Road bumps and other driving conditions sometimes require sudden stops and lane changes that can cause a drink to spill. I've spilled a few drops of coffee on a control head and spent a few hours dealing with one stuck button. I had to remove the head, take it completely apart, and clean out various grooves and slots. Dried sugar can be a mess in any environment, especially one with small moving parts and lots of electronic components. If you've selected a remote head mount for your vehicle, you'll need a place to mount the radio body. Under the



This antenna mount has a special bracket that allows the entire antenna to be raised above the bed of the vehicle. The Yaesu ATAS-100 antenna system is microprocessor-controlled, thus allowing precise band matching when used in conjunction with Yaesu transceivers designed for this application.



Some basic tools you'll need for any installation.

ground leads that pass through metal. When placing coax near weather stripping, you need to be sure that it does not press it down in an area that can cause water to seep in. If coax must pass along any weather stripping, make sure it passes at a low point where water is not likely to cause any problems. I found this out the hard way one time and opened the trunk of my car to find a nice puddle of water. I quickly noticed my mistake and a simple re-routing of the coax fixed it right away. Also, when placing coax make sure there are no pinches on the cable. Pinching can lead to a contact between the shielding and the center-conductor, causing a short. Doorjamb, trunk brackets, and any other moving part can pinch, stretch, or pull coax—then you have to start all over!

As I said, I think antennas should be aesthetically pleasing, so I prefer to get my antennas from one manufacturer, if possible, or at least all the same style (either all black or all silver). To some people this may not seem worth worrying about, but appearance can also indicate functionality. After seeing some vehicles with bent whips, loose antenna mounts, rusty coils, and a host of other eyesores, you must realize that this also affects performance as well as looks. Rusty connections, loose mounts, and sloppy work equals sloppy transmit and reception performance. Check your equipment for any required maintenance as often as you check your car. Making this a part of your

seat or in the trunk are great places. Both are out of the sun and easily accessible.

The Antenna

I like my mobile installations to look good, and that includes hiding wiring, control head, and, most of all, antennas (after all, antennas are what the rest of the world sees while I'm driving my vehicle). You have several types of mounts and antennas to choose from. Some people prefer magnet mounts; others prefer a more fixed mounting option. Sometimes we have spouses who are not as appreciative of our mobile antenna farms as we would like them to be, so we have to compromise. A magnet mount is a good option here since no holes have to be drilled, and it allows quick placement and removal of the antenna as needed. Personally, I find it painful to start drilling holes in a vehicle I might have just paid 30 or 40 thousand dollars for.

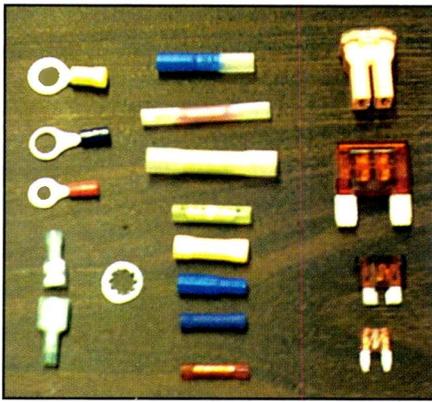
A more fixed/permanent approach includes using an L-bracket to mount an NMO-style antenna (a lip-type mount, which can use an NMO, a PO, a 3/8-inch, or a few others). Antenna adapters allow better antenna switching capabilities, so keep a few adapters handy to make this option available. An adapter that goes from an NMO to a PO mount is a good one. Many antennas use this platform, which also allows for a same-band antenna. It is always better to have an option than not have one.

Antenna placement is more critical when using a scanner for 800-MHz operation. Placement above the roofline provides best reception. Placing a VHF or UHF antenna above the roofline also allows for better reception, but is not as critical as it is for the 800-MHz band.

Along with your antenna you need to think about routing the coax. Any runs through metal must be done with a grommet to prevent damage to the coax. This is especially important for any power and



Notice how the power wires have been secured to the mounting bracket, preventing any movement of the wires that could cause a break in the connection. The coax cable is routed in an area free of moving parts.



Here are various fuses and connectors that you may be using with your installation. The largest fuse would be used in applications that require a rating of 35 amps or more.

schedule can help reduce problems in the future. Also make sure that everything is working to specifications before installing. Having to tear down a dash assembly or remove a coax cable due to a broken connection is a big hassle. That brings me to my next topic: having the right tools for the job.

Doing It Right The First Time!

Having the right tools for your installation is the key to quick, efficient, and thorough project completion. A must for everyone who does something like this is a digital multimeter. You don't need one that cost hundreds of dollars; a good multimeter from a hardware store can be had for about 50 to 75 dollars. You do need one that checks continuity and DC voltage. A continuity check is required for the coax to make sure the connection is good at both center tips and that a short is not present between the center tip and the sleeve which tightens the coax to the radio. The DC voltage setting is used to make sure voltage is present at the power source. Remember that this is not an amperage draw check (that's a whole other matter). I'll show you how to use a few simple components, along with your multimeter, to check for amperage draw (not more than about 5 amps) in an upcoming column. Of course, you'll also need your trusty SWR meter.

The other tools to keep handy are a Phillips screwdriver, flat screwdriver, small and large wire cutters, wire connector crimping device, wire stripper, multi-purpose tool, set of miniature screwdrivers (not jeweler's screwdrivers, as they are not insulated), and a basic set of wrenches. These tools are a small

investment for a hobby that is guaranteed to require them in the future.

After your installation is complete, check to make sure you're receiving and/or transmitting okay. Pick a locally used frequency and then one that's on a fringe area. Check the reception against a similar, known-good unit. Use an SWR meter to check both forward and reflected power (also called standing wave ratio, or SWR). If your antenna came with a cutting chart, cut as needed and then adjust accordingly. Better to cut not much at first, just slowing adjust down. Once the SWR is good, ask for a radio check over the air. For scanner installations, find a NOAA weather frequency that's on a fringe area and see how you receive it.

The Test Run

Now that you have your communications gear installed it's time to start enjoying your new gear. Turn on the radio and talk when you're mobile. Good friends and good company are to be found, whether it's on a GMRS unit, ham radio or CB. After the recent weather disasters in Florida, people have become more aware of the importance of having communications equipment handy. Cell phone sites are known to fail during weather disasters and communications are essential to having contact with the outside world. No matter what the situation—whether there's a wreck on the highway or a hurricane has just knocked out phone lines and communication a tower, or maybe you just need local information, directions, or the latest NOAA weather—being able to hear what's going on around us is always a comfort.

With that in mind, keep a list of common emergency frequencies for a scanner to so you'll have access to essential information in your car or home when

Mike's Tip Of The Month

When using an auxiliary section of the fuse block, make sure that that section is rated for the amount of current you intend to use. If you try to use a 100-watt radio that has a power lead connected to a block that's only rated for 10 or 15 watts, serious problems will arise. For that radio, make sure you connect to a least a 25-amp-rated section; for a 50-watt radio, make sure it's at least a 15-amp rating.

other communication media are down. Keep a list of local ham repeaters and frequencies close as these can also be invaluable for information. Keep tuned into State Police, State Department of Transportation, emergency management, and utility company frequencies as they can provide up-to-the-minute details on events as they happen.

Your Questions And Suggestions Are Welcomed!

After reading many of Alan Dixon's columns, I know I have to fill some pretty big shoes. I hope I offered useful information and interesting stories to the many readers of *Popular Communications*. I also hope you will let me know how I'm doing and if I can shed some light on a special "On The Go" communication concern or topic that you'd like addressed.

Until next month, I'll see you down the bands and down the log!

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Sharing The Mystery, Fun, And Challenge Of The Radio Hobby!

This issue marks the end of two years of my writing the "Homeland Security" column for *Popular Communications*. Where has the time gone? Over the past 23 columns we have discussed many topics of interest to the radio hobbyist who's oriented toward helping our country in time of need. I intend to keep the tiller centered on this course. However, I must remind all who read this column that this is *your* column. If you have some special interest that you feel will integrate well with the "HOMSEC" theme, I encourage you to contact me so we can present it to the multitudes.

Interestingly enough, the one column that produced the most reader feedback was the one where we explored the M/A Comm OpenSky digital trunked radio system currently being installed for the State of Pennsylvania. Readers wrote in from the east coast, as well as other areas of the United States, with comments regarding 800-MHz digital trunked radio systems in general, and OpenSky in particular. Several New York readers were quite vocal in their displeasure with the State of New York's plan to procure an OpenSky system. I can hardly say I blame them. In an upcoming HOMSEC column I will feature some of these comments along with an update on the progress that M/A Comm is making on implementing OpenSky in Pennsylvania. Stay tuned, as they say, for more "good stuff."

The Kulpville, Pennsylvania, Winterfest

Originally the idea of one Harold "Dr. DX" Cones, Ph.D. and some of the North American Shortwave Association (NASWA) folks over 17 years ago, the Winterfest held in March has grown from an initial group of 20 SWLs to over 200 radio enthusiasts who make the annual pilgrimage to Kulpville each year. This is no group of lightweight. No sir. Some of the biggest names in the radio hobby show up each year to enjoy camaraderie with their fellow radio hobbyists and a weekend of nothing but radio! For many of us this is a chance to recharge our batteries, so to speak, and have a lot of fun in the process, not to mention the possibility of hearing "The Voice of Poncho Villa," a world-renowned pirate broadcaster (yes, Virginia, there *really* is a **Radio Poncho Villa!**).

It had been eight years since I had last attended a Winterfest and I wanted to reconnect with the shortwave side of the hobby. As I walked into the hotel it was like I had never left. I renewed acquaintances and got right back into the swing of things. Life is good!

Among the main attractions for Winterfest attendees are the numerous forums covering almost every aspect of the radio hobby, from SW broadcast listening, utility monitoring, and classic receiver restorations to scanning. These forums are hosted and moderated by pillars of the radio hobby, whose expertise in their specific areas of interest are legendary.

The one forum I really wanted to attend was the one presented by The Scanner Scum (yes, it *is* a loose-knit organization of scannists, and the name *is* copyrighted, so scuttle your



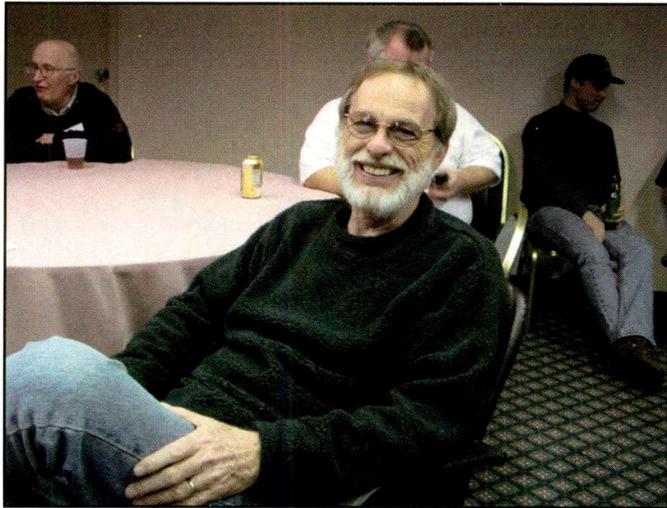
Two of "The Scum" speaking on the finer points of digital trunked scanning using the RadioShack PRO-96.

flaming e-mails and protracted whining letters because it's meant to be a fun hobby!). The Scum offered an information-filled hour-plus presentation on trunked scanning using the new RadioShack PRO-96 APCO 25 compliant handheld scanner. Eric Cottrell, WA1HBU, prefaced the Scum's presentation with a brief look at various trunking methods, how they worked, and how they sounded, including some WAV file sound bites of what these strange digital modes actually sounded like on the air. This forum alone was definitely worth the price of admission to the Winterfest. With the current trend moving away from traditional VHF/UHF radio to digitized trunked systems, anyone interested in following the action on the public service bands needs to be on top of this rapidly expanding technology.

Digital Trunked Scanning— Easy, Once You Get The Hang Of It

I came away from this forum with the impression that digital trunked scanning is rather easy rather once you get your bearings and assemble the proper equipment. There were several comments made regarding local RadioShack stores being awash in returned PRO-96 scanners. Why? No one took the time to explain to the new users how to properly program and set the parameters on these digital modes. The new scanner owner would get his PRO-96 home, and after reading the manual and making many aborted attempts, hear nothing and return the scanner to the store for a refund. What do you think the chances are that these disgruntled neophyte scannists will ever buy another scanner and learn how to properly work it? Personally, I think the probability is pretty low.

Wouldn't it make perfect sense for RadioShack to offer some in-depth training for their sales personnel to ensure that the peo-



“Dr. DX” himself, Dr. Harold Cones, WPE400, one of the originators and a “guiding light” of the SWL Winterfest.

ple who purchased these new trunking scanners received the necessary instruction to use them effectively? Sure it would, but it’s not happening. So, since the manufacturer/retailer won’t provide the necessary training for these newfangled scanners, might I suggest an option? How about contacting your local RadioShack store and providing your name and e-mail address as a point of contact (POC) for anyone who might need help with a new scanner? Sounds like a way we could take an active step in perpetuating the radio hobby! In the past RadioShack stores in my area have allowed local scannists to provide the stores with a set of fire/police/EMS frequencies of interest to new scanner users. Why not provide additional information about trunked scanning systems in your locale, along with POCs who would be willing to help new PRO-96 users out when they run into problems? Hey, it’s something to think about. Now get to work!

Final Digital Thoughts

The late communications writer Bill Cheek got into some serious trouble with the Feds for his efforts in digital algorithms and turning data from the airwaves into language your computer can understand. I’m concerned that attempting to scan and decode some non-APCO 25 compliant trunked systems and reverse engineer the software needed to detect and demodulate them puts one very close to the line between legal and illegal activities. Although technically not “encrypted,” all digital trunked signals use digital algorithms to produce the end product. Therefore, by trying to reverse engineer and “crack” these algorithms, the scannist/hacker is, in my humble opinion, treading on *very* thin ice. Depending upon how the Feds interpret your activities in this age of counter-terrorism, you might be in for a nasty time trying to prove your efforts are “harmless” and part of a hobby. In addition, there have been stories circulating within the hobby regarding police departments that have “gone digital” just to provide a semblance of security for their operations and to foil scanner users’ attempts to eavesdrop on their communications. So, tread carefully. These are murky waters for sure.

On the other side of the coin, however, it is only right and proper that the people who pay the taxes that pay the salaries

and purchase the equipment for these governmental agencies are not excluded but are privy to the workings of their government and the various agencies within it. As a citizens we cannot allow deeds done in darkness to go unchallenged. The same goes for local, county, and state agencies. One must ask exactly what do these agencies plan to accomplish by adopting non-APCO 25 compliant systems: public security, communications security, operations security—what? If the radio traffic is *that* sensitive, use a digital cell phone, wired landline, or spring for DES encryption devices for the radio gear.

While we’re at it, we might as well address interoperability issues when it comes to marrying several trunked systems together during a disaster or large-scale emergency. Unless some forethought is provided *before* the various agencies go online with their digital trunked systems, in all likelihood one agency will not be able to talk with another directly within the same geographical area. This puts us back to having a dispatcher manually relay information from one system to another, drastically slowing the transfer process and adding the possibility of human failure into the equation. With all the emphasis being placed on interoperability issues in the name of Homeland Security, it seems unfathomable that communications planners are neglecting this basic issue by procuring and implementing non-APCO 25 compliant systems.

Elmer? Who’s Elmer?

“Who’s yer Elmer?” (not to be confused with “who’s yer daddy?”). No, seriously, who helped and guided (“Elmered”) you when you first started in the radio hobby? We *all* had an Elmer. I had three: George Comstock, W7CJ, Mike Brabb, K7TWR, and his mom, Jessie, K7TWS. These three people were responsible for my first baby steps in the radio hobby, from erecting my first dipole antenna for 80 meters to helping me debug a poorly built Knightkit T-50 transmitter that got me my first (and only) FCC “pink slip” (but that’s another story).

One summer afternoon George, W7CJ, dropped by the house to ask if I wanted to drive to Spokane with him. He needed to conduct some business and was planning on stopping by H CJ Electronics before coming home. Since I had just received my Novice ticket at the tender age of 16, I was excited about seeing the hallowed halls of H CJ Electronics.



George Zeller, world-renowned pirate radio guru and an unnamed Pop’Comm journalist having dinner. I can assure you that there was absolutely NO alcohol involved!

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HCJ Electronics was our local ham emporium. Owned and operated by Ralph Farano, W7HCJ, on Sprague Avenue in Spokane, HCJ Electronics was *the* place to go for new and used ham gear. There was even a bottomless coffeepot along with a Coke machine in the display room. Hams from all over the area found their way to HCJ each week. Ralph had much of the latest gear set up for trial. If you decided on a used piece of gear, he could fire it up on an antenna so you could actually try it out before purchasing. HCJ Electronics was the Inland Empire's "Mecca," and making the pilgrimage was always fun.

Did I want to go? Does a bear poop in the woods? I hopped into George's Olds 98, complete with a set of Gonset Twins and a Webster Bandmaster HF antenna, and off we went to Spokane. In 1963 AM hadn't quite lost the battle to single sideband. The chromed Gonset Twins held me transfixed as we rocketed northward. Sensing my eager anticipation, George warmed the radio gear up and dialed in a 75-meter AM frequency that the hams at HCJ monitored. Handing me the mic, he said; "Go ahead, give HCJ a call, and don't forget to use my call sign. And Rich, relax, it's only a radio."



This is the original group from the very first SWL Winterfest 17 years ago, minus one...me. (I was taking the picture)! Motley crew, huh? (I didn't get everyone's name...oops!)

"W7HCJ, W7HCJ, this is W7CJ mobile, with KN7YHA at the mic, over," I sheepishly said, keying the big Gonset microphone.

"W7CJ, here is W7HCJ. You must be Rich. George said he might be bringing you along on this trip. We're looking forward to meeting you. How does it feel to be using phone instead of CW, W7HCJ?" came the immediate reply from the dash-mounted speaker.

At that precise instant in time my life changed forever. From that moment on I was hooked. Forty-one years later, I still marvel at this mystical medium we call radio. Had it not been for George, Mike, and Jessie, I would never have pursued a career in electronics, written five books on ham radio and the monthly QRP column in *QST* (not to mention the "Homeland Security" column right here in *Pop'Comm*), operated and DXed from several great foreign locations, made hundreds of friends and heard Port Moresby, Papua New Guinea, on 90 meters while eating breakfast in Hampton, Virginia. No, without the radio hobby my world would have been drastically different from what I now enjoy.

Virtually all of us who've been involved in the radio hobby for any length of time can dredge up similar memories, all thanks to our "Elmers." My question to you this month is what have *you* done to further the radio hobby in the last 12 months? Who have *you* helped or "Elmered"? What have you done to introduce some aspect of the hobby to a neophyte? This very question was posed to the Winterfest attendees during a luncheon program.

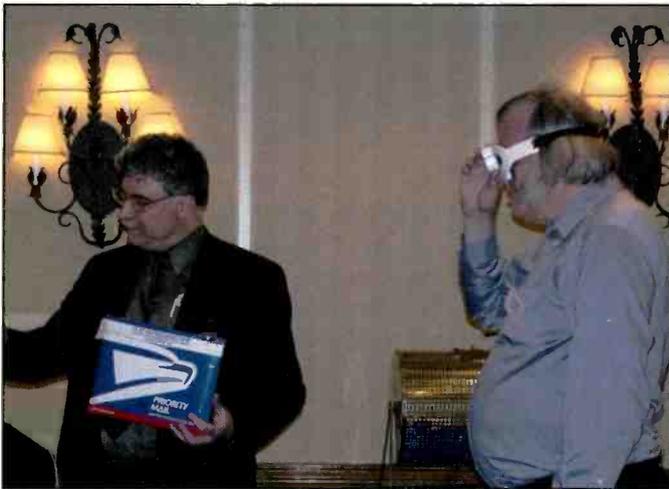
We all complain that our radio hobby is in danger of becoming extinct. The average age of the practitioner is the late 50s. Some say that young people are no longer attracted to the hobby, preferring instead to play on their video gaming machines, spend countless hours in front of their computers surfing the Internet or downloading CD tracks for their MP3 players. To be sure, today's young people are not afraid of technology, but they don't tend to gravitate to the radio side of the technical hobby in great numbers either. Without an influx of new blood our radio hobby is doomed. That much is certain.

Operation Christopher

Shortly after the 17th Annual SWL Winterfest my 11-year-old grandson Chris expressed interest in learning about shortwave listening! I was stunned. Quickly recovering, I told him that I had a spare SW receiver (an old Realistic DX-150A) and some beginner's books on the subject that I would gladly loan him to get him started. He was ecstatic, and so was I.

The DX-150A had just undergone a complete alignment and was working great. I included a basic book on SWL by Harry Helms, along with the NASWA countries list, a current copy of *Passport to Worldband Radio*, and some printouts I had lying about. I added 50 feet of wire for an antenna and we proceeded to his house to set up his radio monitoring station.

At one of the first Winterfests, I was the lucky (?) recipient of the dreaded "Barto Bag." This is the booby prize of the event, often consisting of lots of meaningless "stuff" that couldn't be



George Zeller receives the much feared "Barto Bag." Regarding the goggles...PLEASE, don't ask!



A screen shot of the WinRadio Digital Radio Mondiale-equipped internal PC board receiver. This is WinRadio's newest offering and it certainly works well. DRM audio is amazing, just short of FM quality!

given away or auctioned off during the event. My "Barto Bag" consisted of a R. Beijing bag (no, really...it was a real, live bag from R. Beijing!) full of SW station pennants. My wife had given this bag to Chris so he could decorate his room with the SW pennants. Chris, to my amazement, handed the bag back to me stating: "I'd like to earn these by logging each of these stations and then you can give me the pennant for that station." What's this? A kid who actually doesn't require instant gratification! Heavens, we may not be in as bad of a shape as I originally thought!

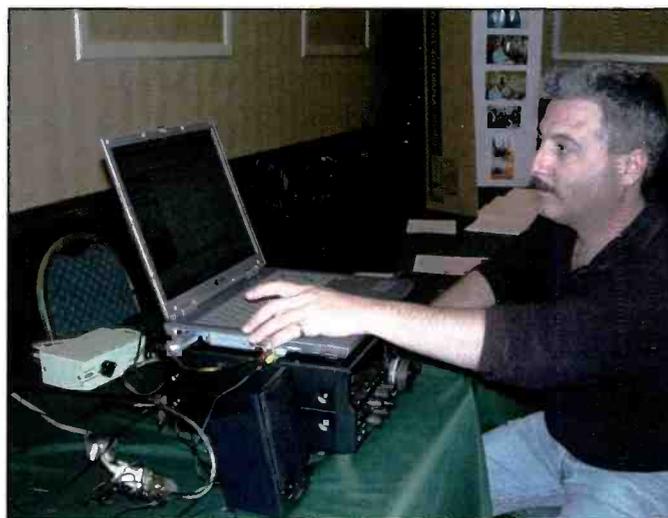
Presently Chris is knee deep in schoolwork but he hasn't lost interest in DXing the SW bands in search of international broadcast stations. I stand ready to answer his questions, just like my Elmers did for me. I only hope he finds as much mystery, fun, and challenge in the radio hobby that I have over the years. When he gains experience I plan on upgrading his receiver and helping him go after MILCOM and utility stations along with doing some "serious" DXing of the Pacific Rim and South/Central America. They are still out there, you know. All you have to do is look and listen—carefully.

What's Your Excuse?

Grab one of your kids or grandkids, nieces or nephews, and kindle their interest in radio. Don't beat them over the head, just be gently persistent and explain the fun and mystery of playing radio. Show them your collection of QSL cards from some of the prominent SW broadcasters. Emphasize that while radio is older technology, you can still hear first-hand about people from all over the world, all the while learning about current social events that are happening every day. Don't worry, once they get the hang of listening to the SW broadcast outlets, they'll become interested in the science of radio, and once that happens there is no turning back. Now go on. You can do it. Give it a try. Take one for the hobby.

Digital Radio Mondiale

During the annual SWL Winterfest I did manage to sit down in front of some really neat HF receivers and play around with the Digital Radio Mondiale (DRM) software that looks like it will revolutionize international shortwave broadcasting. I had a



Mark Fine of FineWare (www.fineware-swl.com) demos his Digital Radio Mondiale software. Mark's software interfaces a modified NRD-525 with a laptop to produce extraordinary audio.

go with the newest WinRadio offering, along with a modified NRD-525 running some Fineware DRM software. DRM is so different from what we HF listeners are used to that it's nothing short of amazing. Although it takes up 12 kHz of spectrum per HF SW channel, DRM audio quality is so close to Hi-Fi FM that it's downright scary. In an upcoming column we'll take a close look at DRM, how it works, and its expected affect on the world broadcasting scene.

In the meantime, mark your calendar for the middle of March, do an Internet search for "SWL Winterfest," and plan accordingly for the 18th annual SWL Winterfest. You will be glad you did. Hope to see you there!

Happy Holidays!

That is a wrap for this month, gang. Don't forget to send me your ideas and suggestions for upcoming "HOMSEC" columns. Happy Holidays and a Happy New Year. Stay safe and remember: Preparedness is *NOT* optional. ■

Radio Fun, And Going Back In Time

Q. Does Santa have a radio in his sleigh?

A. Of course he does! As a pilot of an airborne vehicle he is under a ground controller when landing. NORAD, the North American Aerospace Defense Command, has for years monitored his flights to and from the North Pole. If you don't believe me, check their website at noradsanta.org or you'll get coal in your stocking.

Q. President Ronald Reagan was called "The Great Communicator." How did he get his start?

A. Reagan interviewed for a job as a sports announcer with WOC in Davenport, Iowa. He said he knew about football, having played for eight years through high school and college. The interviewer said "Yeah, but can you make me see the game? Go in that other room and broadcast a game to me. But make me see it." Reagan entered the studio and began to "broadcast" the fourth quarter of a game between Western State University and Eureka College. The score was six to nothing at the start, but after 15 minutes of scrimmaging across the field Eureka won 7 to 6, and Reagan had the job.

Q. Is it difficult to pick up the enemy's radio transmissions in a combat area?

A. Usually not, if you can find the frequency. During World War II our radio operators in the Pacific had no trouble picking up the Japanese military traffic, which was transmitted in CW. With no knowledge of the Japanese language or how to send it, our radio operators would carefully listen to the sign off of a Japanese station. They would then try to mimic the sign-off as best they could. Often their prank would bring another Japanese station on the air with a very rapid transmission. They hoped it was some radio supervisor chewing out what he considered a sloppy telegraph operator. There is one in every outfit.

Q. When were the first police radios used?

A. Several cities claim to be first, but the best information I can find indicates that the radio station KOP in Detroit, which went on the air in April of 1928, was the pioneer. Communication was all one-way, with the dispatcher hearing from the officers on the street from police call boxes, which dated back to 1890. The frequency for KOP and other police agencies were located at the upper end of the AM dial, and listening to the police calls became a popular indoor sport in many cities during the '30s. Two-way FM transmissions started to show up in the early '40s on frequencies specifically assigned to the police. After that, police programs on the radio were all dramas.

Q. Before a pilot takes off in his plane he walks around it visually checking it over carefully. Shouldn't radio operators take similar precautions to prevent accidents and malfunctions?

A. In October 1950, a large convoy was moving from Seoul to Inchon along a mountainous route in war-torn South Korea. At about 2:00 in the morning, an enemy ambush took out the lead vehicle on the narrow road and trapped the entire convoy.

The detachment had an SCR-193 radio mounted in a jeep. The operator tried to raise another U.N. force to get assistance. The antenna would not load properly and no one could hear their desperate calls for help. When daylight came it was discovered that the antenna terminal was broken. The radio was a spare set, which was not operated very often. The antenna's condition had been clearly visible before the operation took place. Five hours of being pinned down under hostile fire and several dead G.I.s taught the signalmen the cost of careless maintenance. ■

Looking Back . . .

Five Years Ago in *Pop'Comm*

Back in December 1999, AOR was advertising their new AR7000 DSP Wide-Range Receiver with 1,500 channels, two VFOs, and color LCD video display. Even five years ago—like all throughout our hobby's history—we've heard that scanning was essentially doomed, and Ken Reiss' "ScanTech" focus was the future of scanning and, of course, how we seemingly always manage to be able to monitor the airwaves without much trouble! RadioShack had just released their 1,000-channel PRO-2052 scanner that follows Motorola I, II I/II, and GE/Ericsson (EDACS) trunked systems.

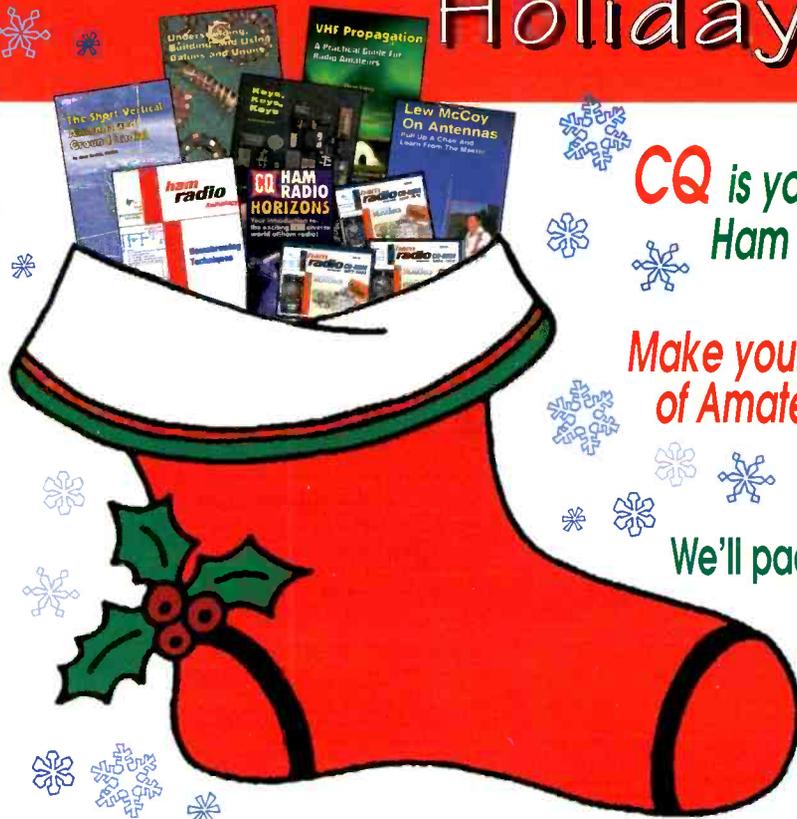
Ten Years Ago in *Pop'Comm*

Optoelectronics' Scout was the talk of the radio hobby; the pocket-sized "frequency scout" tuned 1 MHz to 2.8 GHz and sold for \$399. The company's OptoScan 456 computer-aided scanning system was also a hot item that worked in conjunction with The Shack's PRO-2005 and 2006 scanners, increasing scan speed to 50 channels per second! Back in 1994, the Far East Broadcasting Company closed down station KGEI in California, citing economics as the main reason.

Twenty Years Ago in *Pop'Comm*

There they are, on the inside Cover II's full-page ad—Kenwood's shortwave lineup for 1984: the R-2000, R-1000, R-600, and the new R-11 portable receiver. The R-2000 even offered an optional 118- to 174-MHz VHF converter. Alice Brannigan's photo on page 32 of the December issue caused quite a stir back then; folks reported that they saw her at ham-fests and wanted her phone number. Yes, we received all kinds of strange letters and calls about that at *Pop'Comm* HQ. Remember the Regency family of scanners? A full-page ad highlighted the new "Z" series of scanners, from the Z10 10-channel scanner to the Z45, which gave users 45 programmable channels and the aircraft band. Regency's Z60 offered 60 channels and added the FM broadcast band to its coverage! Interestingly, 20 years ago *Pop'Comm* talked about survivalist communications and being ready in the event of a widespread emergency, often reviewing radiation alarms and survival radio books. Sound familiar?

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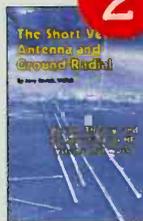


1
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by Jerry Sevick, W2FMI

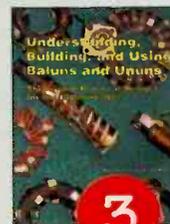


2
This small but solid guide walks you through the design and installation of inexpensive, yet effective short HF vertical antennas. With antenna restrictions becoming a real problem, this book could keep you on the air!

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Understanding, Building & Using Baluns & Ununs

by Jerry Sevick, W2FMI



3
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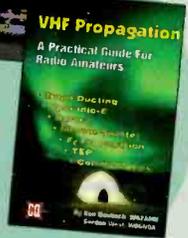
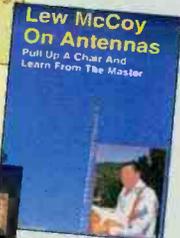
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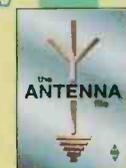
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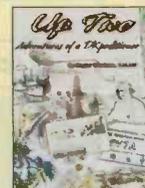
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The Big Radio Picture, And The Ultimate Intercept—Part II

My wife is an artist. Sometimes she asks me for my opinion on her paintings while they're still in the development stages. Sometimes she takes my advice, but most of the time she rejects it out of hand. Why? Because what I suggest may have nothing to do with *her* vision of what the painting is to be—already finished inside her head. Although I'm not an artist, I understand exactly where she's coming from.

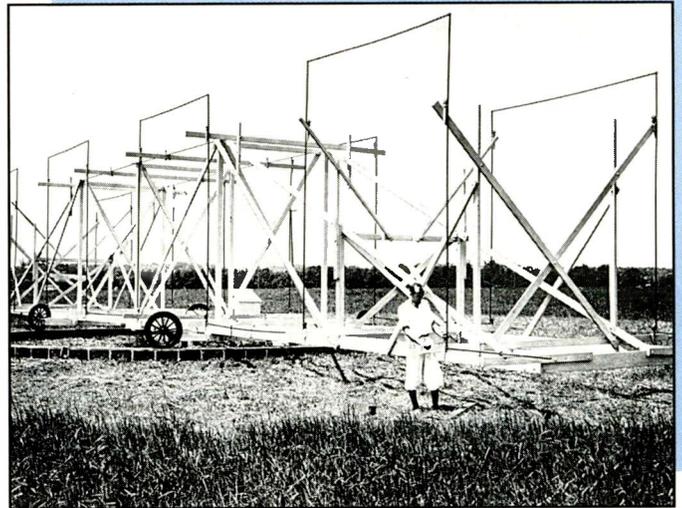
Critics of "Utility Communications Digest" have written me that the contents of this column may have strayed from the pure UTE monitoring path as of late. I must admit, articles about stealth aircraft, government UFO sky spies, and SETI are a bit *out there*, but they serve my purposes which are: to stir up renewed interest in radio monitoring and to entice a technology-jaded youth into embracing this unique and fascinating hobby.

Sometimes you have to make a big noise to get everyone's attention, especially the youth of this country who are constantly bombarded from every direction by Hollywood, Madison Avenue, and MTV media blitzes shouting at them about what they should eat, wear, watch, listen to, and (this is the scary part) what they should *care* about in their lives. Nowhere in their messages do I see radio monitoring mentioned as a positive pastime. As a matter of fact, in most popular media reports radio monitoring hobbyists are portrayed as being some sort of nefarious eavesdropping hacker-types, intent on listening in on phone calls and stealing credit card numbers.

As I've said before, when I took over this column I was faced with what I thought was a big problem. It seemed utility monitoring was going through a period of malaise, brought on by the mistaken opinion that, except for shortwave broadcasters, HF was dead, with most utility users abandoning the shortwave bands for higher frequencies, satellites, and digital modes that were more than difficult to monitor with any success. Sure there was still a solid core of dedicated HF utility monitors (as evidenced by the WUN mailing list), but as a whole it was evident that the few newcomers not chased away by old salts who think they invented the hobby were becoming far and few between.

Almost everyday I receive e-mails (most positive, some negative) regarding the direction the column has taken. Some of you relate your own monitoring adventures, pass on frequency and identifier lists, and there's even the occasional pat on the back for a job well done. Still others say the column borders on sensationalism and contains little if any technical or frequency information. Most critics are those old salts (the real monitoring experts who have forgotten more than I'll ever learn) and who aren't shy about telling me when I've made a technical error or when the subject matter seems to be straying from the true path of utility monitoring enlightenment. As much as a pain in the brain as these guys can be, I do depend on their expertise and advice in keeping the column on track.

But as I read my e-mail, follow the newsgroup postings, and lurk on various servers where monitoring news is posted, I sur-



Karl Jansky, working at Bell Telephone Laboratories in Holmdel, New Jersey, wanted to investigate using "short waves" (wavelengths of about 10 to 20 meters) for transatlantic radio telephone service. Jansky was assigned the job of investigating the sources of static that might interfere with radio voice transmissions. He built this antenna to receive radiowaves at a frequency of 20.5 MHz (wavelength about 14.5 meters). It was mounted on a turntable that allowed it to rotate in any direction, earning it the name "Jansky's merry-go-round." By rotating the antenna, one could locate the direction of any radio signal. Jansky used this antenna to identify radiation coming from the Milky Way that was strongest in the direction of the center of our Milky Way galaxy, in the constellation of Sagittarius. (Courtesy of NRAO/AUI)

mise my grand plan is having some success. Indeed, tongues are wagging; people (and not just UTE monitors) are engaged in heated debates and discussions, with more and more young people contacting me wanting more information on how they, too, can get in on the radio action.

Do You See The Big Picture Now?

If you bought your latest issue of *Popular Communications* off the newsstand, chances are you found it sandwiched in among hundreds of publications all vying for your magazine-dollars. Sure, you might be a long-time reader who would never miss an issue, but for this hobby to thrive it also needs an injection of new blood.

The next time you're at your local newsstand, take a second to take in the entire scene. What is the first thing to draw your attention to any magazine? If you said the cover, you'd be correct. Now imagine that you're 16 years old with a little cash to spend on reading material. You're mildly interested in radio electronics and you decide to see if there is anything out there that might make for an interesting read.

Is your eye drawn to the magazine with a mediocre shot of an antenna farm on someone's roof illustrating a story about the new shortwave broadcast facility on Timbuktu, or is it drawn to the dramatic photo of a tornado descending from a towering thunderhead with a tease reading, "A Pro's storm spotting plan that can save your life!"? Keep in mind, surveys have shown that you have only six seconds to get the magazine buyer's attention. I'm sure the story on Timbuktu is just fascinating, but it wouldn't persuade my nephews and nieces to buy a copy. Just how many of us will even attempt to listen to Timbuktu? Maybe some hardcore shortwave broadcast DXers might, but your average young minds, the same ones that are the future of this hobby, will not be interested in the slightest. To some of you this may seem a bit cynical, self-serving, and Madison Avenue, with the bottom-line being, well, *the bottom-line*. This is not at all the case. Don't get me wrong, I have great respect for shortwave broadcast DXers, but before you fry a fish, you've got to hook it, and a kid's brain is the slipperiest fish yet.

But it's not just our youth I'm trying to get into radio communications monitoring. I'm so rabid about radio that I'd stand on my head on the Statue of Liberty if it would get one more person involved in utility monitoring. But I'm also well aware that flashy covers are nothing without a good article to get the reader thinking "this is so cool, how do I get in on this?" A story also has to have substance and depth and deliver on what it promises or the reader will walk away unsatisfied, thinking they were ripped-off. It must speak to both the newbie and the old pro. This is the conundrum I face every month.

Let's assume you have been reading this column and my related cover stories over the past year. They have done their job. You are now hooked. You've decided that radio monitoring is the coolest hobby in the world and you can't wait to get in on all the action. Where does one get started, you ask?

And as a sly smile spreads across my face I say, "So, now that I have your attention..."

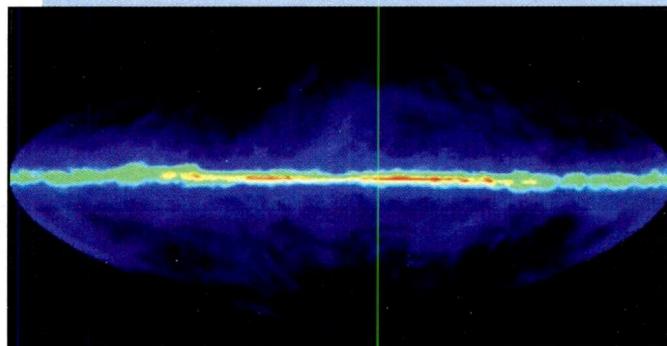
The Basics

"So we'll be talking about HF radios first, huh?" I seem to hear you say. Nope, we have some homework to do first. You don't buy a new car without knowing what you are going to use it for, right? It's the same in radio. What frequency bands do you think you'll want to monitor the most? What about modes? Do you want to jump right into the deep-end and buy the most expensive high-end gear on the market, or do you want to stick a tentative toe in the radio-water first? Do you even know what you want to listen to?

Here's the *short list* of what's on HF to monitor. Keep in mind that there's a real hodge-podge of users and modes on the HF (typically 1.6 MHz to 30 MHz) shortwave bands.

Shortwave Broadcasters: Typically these are HF powerhouses, such as Radio Moscow and the BBC, radiating news, entertainment, state-news, music, religion, and propaganda into the sky for anyone to receive. First-time monitors will have no problem listening in on most SW broadcasters, which radiate at such high-power levels that even cheap receivers costing less than \$50 can pick them up from thousands of miles away.

Amateur Radio: There are thousands of licensed (an unlicensed) ham radio operators on HF. Strewn across the globe, even in the most undeveloped corners of the world, you'll find them communicating on home-brew, bare wires, or commercially produced stacked beams. They transmit from the frozen



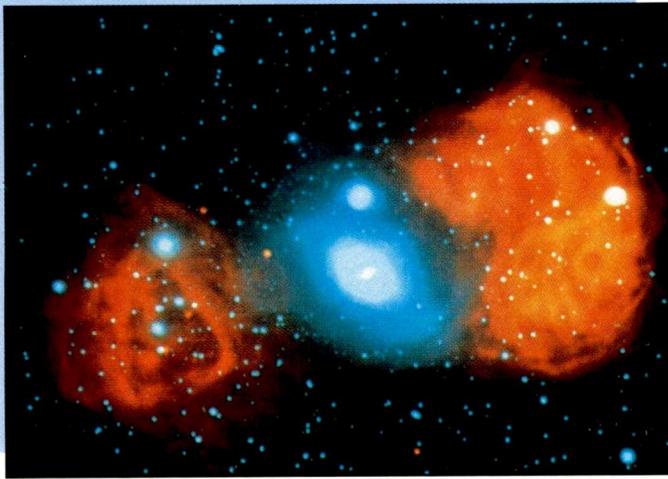
This image shows the distribution of atomic hydrogen at all locations in the sky. All of this hydrogen is in our galaxy. Red indicates directions of high hydrogen density, blue and black show areas with little hydrogen. The figure is centered on the galactic center; galactic longitude increases to the left. The data came from measurements of the 21-cm line of hydrogen by radio telescopes. Some of the hydrogen loops outline old supernova remnants. This image is a composite from many 21-cm surveys and includes data from the NRAO Green Bank, West Virginia 140-foot and 300-foot telescopes, the 85-foot Hat Creek telescope of the University of California at Berkeley, the AT&T Bell-Labs Horn-Reflector telescope at Holmdel, New Jersey, and the 60-foot telescope at the Parkes Radio Observatory in Australia. (Image courtesy of NRAO/AUI Investigators: J.M. Dickey and F.J. Lockman)

South Pole, from deep in the heart of the South Pacific tropics, and from down the block in suburban America. Ham radio operators have done more to advance radio technology than any other group of radio users. Not only do they love to *ragchew* (a ham term meaning chit-chat), but they also provide essential communications links in time of war, emergency, or natural (and manmade) disasters.

Utility Stations: The word "utility" is defined as *the quality or state of being useful for something, or something that serves a purpose*. In other words, utility stations exist for a reason, such as aeronautical en route stations tasked with providing essential communications for aircraft out of radio range of normal (VHF line-of-sight) air traffic control stations. Included under the utility designation are military stations, military aircraft, ships and ground units, marine stations (ships at sea) off-shore oil platforms, scientific stations, government and diplomatic stations, navigation stations, and rescue entities, such as the Coast Guard.

Clandestine Stations: Some of the more intriguing stations to monitor are those that don't *officially* exist, such as spy numbers stations (communications meant for undercover intelligence operatives working in foreign countries, terrorist-networks, smugglers, and the like). Most of this type of communications can be very difficult to monitor because they transmit sporadically and usually on many different frequencies, and almost always never on the same frequency twice. The exception to this, though, are spy numbers stations, which transmit on set frequencies at scheduled times. The content of their communications is not something one can decipher, however, and the meaning of the message is only known to the sender and receiver.

Miscellaneous Communications: The hodge-podge of other users on the shortwave bands range from CB radio enthusiasts, illegal *out-banders* (operating wherever they like without a license) navigation beacons, ship-to-shore marine communications, weather stations, time and radio propagation (solar activity) stations (such as WWV), and even taxi cabs!



The superposition of the radio emission of Fornax A (red) and surrounding optical field (blue-white). The radio source consists of two large radio lobes, each about 200 kiloparsecs across, which contain complicated patterns of emission. At the center of the optical field is the central dominant elliptical galaxy of the Fornax cluster, NGC 1316, with its barred companion NGC 1317 just above it. NGC 1316 is an optically peculiar galaxy, with many shells and ripples. Many observations suggest that this system is the remnant of two or more galaxies merging together approximately three billion years ago. The merging may have helped build up a super massive black hole in the center of NGC 1316. There is a faint pink feature in the center, which is the radio emission associated with this black hole. (Courtesy of NRAO/AUI)

There are so many users on shortwave that I'm sure I have left many of them out of my list. What interests you? Do you fancy MILCOM monitoring, or is your thing intercepting spy numbers stations? Maybe you're thinking about intercepting and decoding some of the new digital modes? In fact, in upcoming columns, we'll take a look at the many (non-voice) data and code modes used on HF.

The Ultimate Intercept— Part II

Last month we learned about the scientific *Drake Equation* that SETI (Search for Extraterrestrial Intelligence) scientists use to calculate where intelligent life may be hiding in the universe. We learned that yellow stars like our own sun are the best type to support life-sustaining planets. But we also learned how rare and how fleeting radio-capable intelligent societies may be because of natural and self-made threats to their long-term existence. Still SETI scientists are hopeful that some day they will make the ultimate intercept, the one that proves we are not alone.

In "The Ultimate Intercept—Part II" we'll be looking at the technology behind SETI and how scientists have calculated where on the radio frequency spectrum extra-terrestrials most likely can be heard transmitting into the void.

An Accidental History

Radio astronomy was discovered quite by accident in 1932 when a young engineer named Karl Jansky was working on a project for Bell Laboratories to determine the natural noise levels encountered in a new super-sensitive shortwave receiver

design. Jansky noticed the crude directional antenna array he had built seemed to be picking up some unidentifiable noise, possibly emanating from the sky, and in particular from a certain point in the sky. He was able to identify most of the noises he intercepted (crashes and crackles) as natural, caused by electromagnetic disturbances such as lightning and aurora, as well as those caused by man-made electronic machinery and power stations, but he still couldn't isolate the source of a steady white-noise-background hiss.

To Jansky's surprise, the hiss seemed to be coming from the Milky Way itself. It soon became evident that what Jansky had discovered was the radio noise emanating from the universe itself. To this day, radio astronomers use the term "jansky" to indicate the signal strength of a deep-space electromagnetic source. A powerful pulsar may give off the equivalent of "50 Janskys" or "J-units," a term very similar to S-unit, which is used by ham and shortwave hobbyists and radio professionals.

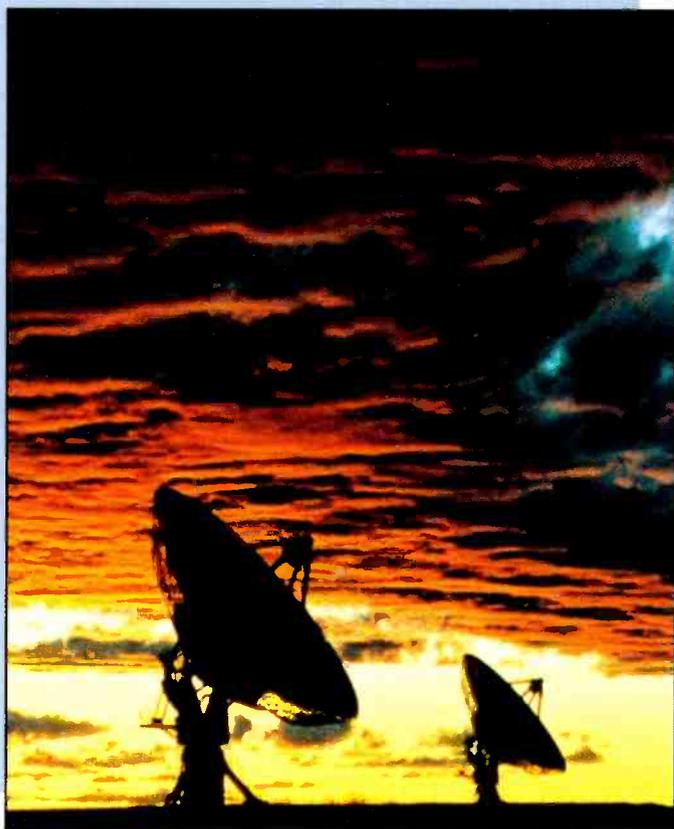
Jansky's discovery went virtually unnoticed until an amateur radio operator named Grote Reber learned of it and became very interested in seeing if he could duplicate (or improve on) Jansky's crude radio-sky measurements. Although Reber's first experiments met with limited success, he was able to detect on 60 centimeters the same type of space radiation that Jansky had discovered on 15 meters, thus making Reber the first "intentional" radio astronomer. Reber continued his radio survey of the sky, which resulted in the first radio chart of the heavens. Reber published his results just as World War II broke out and his work did not receive much attention since most of the world's scientists were engaged in developing war-related radio technology. During the war, however, radio technologists discovered that the sun also transmitted radio radiation on a wavelength of 1 meter and that, on some radars, meteor trails were responsible for phantom radar echoes that had puzzled radar operators.

After the war a radar scientist named J.C. Hey augmented Reber's work and, using a vastly superior designed antenna, drew a more precise and comprehensive radio chart of the northern sky. As a result of Hey's sky survey, the center of the Milky Way was confirmed to be the hottest radio feature in the universe. Coming in a close second was a point in the constellation Cygnus, which decades later was discovered to be the last radio gasp of stars being sucked into a huge black hole.

Since then radio astronomy has grown into as significant a science as optical astronomy and can reveal more about the makeup of the universe than visual data can ascertain. Huge radio telescopes, such as the big dish at the Arecibo Radio Observatory in Puerto Rico and the Very Large Array in New Mexico, are peering deeper into the heavens than earth-based telescopes ever could. You can learn more about these facilities at <http://www.naic.edu/about/ao/descrip.htm> (Arecibo) and <http://www.vla.nrao.edu/> (VLA).

Although the term radio telescope brings to mind huge parabolic dishes, in simplest terms they are just extremely sensitive radio receivers attached to antennas capable of capturing the very weak natural radio radiation emitted by stellar objects. The larger the antenna system the more radio energy it can collect, however this isn't the primary reason for using a large antenna.

Imagine two radio sources in the universe positioned relatively close to each other in the sky. A receiver using a small antenna system may be able to receive the radio waves emitted by both objects but would not be able to discern that they were



Two of the radio telescopes at the Very Large Array located in New Mexico. (Courtesy of NRAO/AUI)

indeed *two* objects. But a large dish would be capable of revealing that there were indeed two separate radio emitting objects due to its better resolving power, or, in other words, because it can (much like a powerful optical telescope) better zoom in on the stars in question to provide a closer and more detailed look.

If one had more than one large radio telescope (separated by a fair distance) the two can act somewhat like stereo binoculars and have even more resolving power. Now, if you build 27 steerable radio telescope antennas and can move them (on rails) in and out from a central point, you then have a system that works much like an optical zoom lens. This system is capable of making both wide-angle radio maps of the heavens and (when you bring them closer together) very detailed telescopic views of a single stellar object. This is the concept behind the many telescopes of the Very Large Array in New Mexico.

Special Receivers

By now you're wondering what the receivers radio-astronomers use must be like. It's very doubtful that they use off-the-shelf RadioShack scanners or even high-end commercial grade gear, but rather cutting-edge, specially designed and engineered million-channel receivers. Since any radiowave (or signal) from distant stellar objects would be incredibly weak (by local standards) immense amplification at the antenna and within the receiver would be needed to pluck out the target radiation from the massive amount of both earthbound manmade and natural interstellar background noise.

This is comparable to light leakage, from terrestrial sources such as our well-lit cities, which makes it difficult for amateur optical astronomers to locate even relatively bright stars. In radio astronomy, scientists not only have to contend with ambient radio noise, they have to deal with noise generated within the receiver system itself. Noise is the enemy and much of it is caused by heat generated by almost every electronic component inside a receiver. To combat heat (and to reduce noise to a minimum), huge amounts of shielding go into receiver component design. Critical electronic circuits are also encased in a bath of liquid nitrogen. This intense cooling helps make these Earth-based receivers some of the most noise-free and sensitive instruments in existence, rivaled only by intelligence gathering receivers at NSA listening posts or NASA.

Frequency Please?

So what frequencies do SETI scientists monitor? Since no one has published an *Encyclopedia Galactica* containing the frequencies used by extraterrestrial civilizations, scientists have had to do some deductive reasoning and have had to admit that the only chance of ever receiving a signal or communication from another planet is if extraterrestrial scientists think much like human scientists do. One has to ask is this even possible, or might an intelligent extraterrestrial society be so (and I hate to use this word) *alien* to our way of thinking that trying to logically deduce what they think is an exercise in futility? Or are there certain universal truths that dictate that no matter how different extraterrestrials' thinking might be, logic dictates that they will arrive at the same conclusions about the physical nature of the universe? If so, it is in these shared universal scientific deductions that we can arrive at what must be the only logical frequencies to use in any SETI search.

Most SETI scientists believe that to accidentally intercept, for example, the TV transmissions or broadcast transmissions (generated for local consumption) of an extraterrestrial society are rather slim. So don't look for a rerun of an alien *I Love Klatuu* episode to be the first indication that we are not alone in the universe. Instead, SETI scientists pin their hopes on extraterrestrial scientists wanting to make their society known and broadcasting a strong signal into the cosmos in the hope that it is picked up by, *well...* scientists such as themselves.

To deduce what frequencies an extraterrestrial society might use to broadcast an intergalactic hello, scientists only have to look to the known physical nature of radiowave propagation to decide where to listen. Since shortwave signals (below 30 MHz) are usually reflected and bounced around the Earth by an electronically charged ionosphere (except under certain rare conditions) they are ruled out as prime channels for hearing an E.T. broadcast. This leaves us with everything from VHF on up into the microwave realm. That narrows the search a bit, but even with using fast scanning million-channel receivers to search through the bands it would take many, many decades to even scratch the surface in SETI terms. Cosmologists surmise, however, that any race of intelligent beings bent on sending a message out into the cosmos must consider certain major factors. These include the frequency and intensity of the noise generated by their own life-giving sun and the frequency and background noise generated by the solar system and galaxy the beings live within. For instance, living in relatively close proximity to a quasar, pulsar, or a black hole would not be good since they're extremely radio active. Even very distant noisy stellar

phenomena that lie between or behind the sender and the receiver could make reception impossible on certain wavelengths.

Astronomers calculate that natural emissions from a yellow star such as our own, at a distance of 10 light years and allowing for galactic noise, could best be heard transmitting on a wavelength with the center frequency being 10,000 megacycles, or 1 GHz. In essence, E.T.s could be transmitting anywhere between 100 MHz and 1 GHz, or even a bit beyond. That's still a big chunk of radio spectrum to scan and it constitutes a huge undertaking when you have to listen for a long time on thousands of frequencies, aimed at one star at a time in a universe filled with billions of yellow stars.

Thank goodness scientists have deduced another way of reducing the number of frequencies that an extraterrestrial civilization might logically choose to transmit on. The great clouds of hydrogen that make up much of the matter in the universe emit radio emissions at 1420 MHz or 1.4 GHz. This fact must be well known to every technologically advanced society capable of radio astronomy. Since this frequency is that of the most common cosmic emitter (hydrogen), it is most likely the first natural radio emission frequency that any radio astronomer on any planet would discover and explore since it yields important information about the makeup of the universe. It's therefore logical to transmit a powerful signal on or near this frequency.

As an analogy, let's say it's 1960 and you're new to CB radio and are waiting to hear a signal from a friend who also has a CB radio. Let's also say you have no idea on what channel he will call you, you only have a one-channel radio and you must pick a crystal at the local RadioShack for the frequency you want to hear your friend on. What do you logically do? You tell the salesman (standing in for our SETI scientist) your dilemma and ask for his opinion. Since he has sold hundreds of crystals he tells you that busiest CB channel is Channel 19 since it's well known in CB radio circles that truckers and people on road trips use 19 as the call-in channel. Now it only seems logical that your friend may also be asking a salesman at his local RadioShack the very same question. Chances are good his salesman will also tell your friend that his best chances for finding you would be on Channel 19.

So now we know where to listen, but before you decide you'd like to try your luck in making the ultimate intercept, you'd better wait until next month to see if it's possible to build your own home-brew SETI station. We will also explore what kind of success SETI scientists have had in their search for the signal that will undoubtedly change humanity in very profound ways.

Readers Logs

I want to remind you that you can send in your MILCOM loggings above 30 MHz, including UHF aero band catches. Just do so in the format below. Many thanks to our ever-faithful UTE monitors who submit their logs every month. Maybe you'd like to be one of them? Regular contributors to this column should expect a token of our appreciation soon.

0000: (Frequency MHz): STATION, Anytown, USA, summary of traffic heard in MODE monitored heard at 0000Z. (monitor/ sometimes location)

3016.0: Gander (MWARA NAT-A): 0055 USB w/Alitalia 619 (not heard) w/SELCAL check. (RP)

4372.0: FOXTROT, DELTA, and ECHO in Link coordination net at 0208. (MC)

4500.0: AFA2GM Belleview, FL, AFA2CX Satellite Beach, FL, AAR4NBI, AAT3EI, NNN0TWT Citra, FL, in comms during hurricane Charley in what they call the 2SI ECOM Net at 0100. (MC)

4604.0: Red Robin 8 (Civil Air Patrol, Michigan): 0103 USB checking in various Red Robin stations on the Michigan Directed Net. (RP)

4625.0: TANGO FOXTROT, MIKE, and KILO in Link coordination net at 0156. (MC)

5088.5: USAIS1012 (U.S. Army Intelligence & Security Command, Ft. Belvoir VA): 1422 USB/ALE TO USACE1010 (U.S. Army Corps of Engineers). (RP)

5211.0: FMN CAMSLANT radio check with NMN0X and WGY912 (FEMA, Mount Weather, VA) during hurricane Charley at 0132. (MC)

5696.0: CG 2140 (HU-25) airborne from New Jersey en route Cape Cod establishes guard with OCEANA RADIO at 0156. (MC)

5711.0: KING 22 (HC-130) wkg ANGEL OPS at Moody AFB at 0141. (MC)

5717.0: RESCUE 323 (CC-130) p/p via HALIFAX MILITARY to RCC to coordinate Medivac with RESCUE 906 from vessel at 0156. (MC)

5732.0: JULIET 38 requesting guard from CAMSLANT. Airborne with 5 POV from Clearwater at 0155. (MC)

5847.0: HQ703N (possibly HQs, Nat'l Guard Readiness Center, VA): 1246 USB/ALE TO W050IN (Nat'l Guard unit, Wisconsin). (RP)

5088.5: USAIS1012 (U.S. Army Intelligence & Security Command, Ft. Belvoir VA): 1332 USB/ALE TO USAFC1250 (U.S. Army Forces Command (FORSCOM), Ft. McPherson GA). (RP)

6694.0: HALIFAX MILITARY wkg RESCUE 908 for message relay to RCC at 0044. (MC)

6694.0: RESCUE 323 p/p via HALIFAX MILITARY to RCC ref. vessel near St. Pierre at 0058. (MC)

6761.0: REACH 405 calling ETHYL 84 at 0101. (MC)

6985.0: USADA1010 (unidentified): 1338 USB/ALE TO USAIS1012 (U.S. Army Intelligence & Security Command, Ft. Belvoir VA). Also noted on 07448.5. (RP)

7448.5: USAIS1012 (U.S. Army Intelligence & Security Command, Ft. Belvoir VA): 1421 USB/ALE TO USACE1010 (U.S. Army Corps of Engineers). (RP)

7527.0: CG 1705 (HC-130) airborne from Clearwater en route to Great Inagua requests guard from CAMSLANT at 1214. (MC)

7632.0: NNN0KAG net control taking check-ins from AAR4IX, WWJ850, AAT3MA, AG6123, and NNN0BQB in SHARES Southeast RCS net at 1623. (MC)

7805.0: WPFJ625 (New Hampshire EOC, Concord NH): 1640 USB/ALE sounding. (RP)

8012.0: 046NHQCAP (Civil Air Patrol HQs, Maxwell AFB AL): 0121 USB/ALE sounding. Also sounding on 07602.0. (RP)

8037.0: CPSNY (Nat'l Guard unit, Cooperstown NY): 2027 USB/ALE sounding. (RP)

8171.5: KFMHNG (probably Det 1, 86th Med Coy MA NG, Otis ANGB MA): 1630 USB/ALE TO R23985 (UH-60 helo). Also on 09081.5. (RP)

8171.5: B7Z101 (7/101st Avn, Ft. Campbell KY): 2047 USB/ALE sounding. (RP)

8413.0: O/M (SS): 0123 USB w/O/M (SS). (RP)

8860.3: O/M (SS): 0135 USB w/O/M (SS). (RP)

8816.0: O/M (Arabic mixed w/FF): 0139 USB w/O/M (Arabic mixed w/FF). (RP)

8870.0: O/M (SS): 0142 USB w/O/M (SS). (RP)

8923.5: O/M (SS): 0143 USB w/O/M (SS). (RP)

8912.0: PANTHER wkg 19C. Passes them UHF freq for PANTHER 400 at 0038. (MC)

8971.0: PELICAN 71A (P-3C) wkg FIDDLE to report SPARE GROUP 2 and SPARE GROUP 4 at 1659. (MC)

8971.0: WOLF 02 (E-2C AWACS) wkg BLUESTAR for WX at the field at 0047. (MC)

8971.0: WAFER 20 (P-3C) with SPARE GROUP 1 report to

GOLDENHAWK at 1457. (MC)

8971.0: CARAVAN 28 wkg BLUESTAR at 2250. (MC)

8983.0: CAMSLANT with all stations call stating they are going down for fire evacuation at 2356. (MC)

9007.0: CANFORCE 1501 wkg TRENTON MILITARY for WX at Manchester, UK, Prestwick, Glasgow, and Keflavik at 0216. (MC)

9013.0: O/M (SS): 0032 USB w/O/M (SS) passing what appears to be aircraft/flight tracking data. (RP)

9022.0: GOLIATH ALPHA (E-3 AWACS) wkg unid station at 1756. (MC)

9025.0: DRAGNET UNIFORM (E-3 AWACS) ALE initiated call to RAYMOND 24 regarding maint. issues at 2337. (MC)

9025.0: FOXTROT 41 (HU-25 # 2141) ALE initiated call to CAPE AIR about problem with FLIR turret at 1825. (MC)

9031.0: Architect (RAF Flight watch): 0132 USB w/airfield color states. (RP)

9295.0: R26592 (UH-60L, 1/159th Avn): 1526 USB/ALE TO TIZ159 (1/159th Avn, Ft. Bragg NC). Also on 08171.5. (RP)

9295.0: SYRNY (National Guard, Syracuse NY): 1807 USB/ALE sounding. (RP)

9295.0: ALBANY (National Guard, Albany NY): 1859 USB/ALE TO JTNNY (National Guard, Johnstown NY). (RP)

10040.0: O/M Arabic: 0017 USB w/O/M (Arabic). (RP)

10007.0: O/M (Caribbean EE): 0032 USB w/Y/L (Caribbean EE). (RP)

10024.0: CENAMER (MWARA SAM-1): 0019 USB w/flight 0104 (O/M SS) w/position report. (RP)

10242.0: 51A with ops and position report to PANTHER at 0030. (MC)

10272.0: CORE7 (Military Region 7 Command, Venezuelan Army): 2306 USB/ALE TO CUFAN3 (Unified Command of Armed Forces). (RP)

10057.0: San Francisco (MWARA CEP-1): 0030 USB w/Aloha 494 w/position report. (RP)

10993.6: C7R wkg Sector Key West. Reports airborne from Great Inagua en route their search area at 1633. (MC)

11205.0: TEAL 57 (WC-130 Hurricane Hunter) calling SMASHER with No Joy at 1102. (MC)

11205.0: REACH B3S check-in with SMASHER. Departed Brasilia Aeroporto, Brazil en route to St. Croix at 2308. (MC)

11280.0: O/M (IT): 0027 USB w/O/M (IT). (RP)

11342.0: ARINC-San Francisco: 0042 USB w/wx broadcast. (RP)

11175.0: BOLT 43 (KC-135) p/p via Sigonella HF-GCS to LIGHTNING OPS at MacDill AFB to check on their receivers. OPS tells them both the A-10s and F-15s have cancelled at 0131. (MC)

11175.0: REACH 456 (C-5) p/p to Dover AFB CP and Meteo. Reports they are emer-

gency aircraft due to shutdown of #2 engine due to oil pressure at 2333. (MC)

11217.0: KLY 90 wkg unid station in SHARES net at 1807. (MC)

11232.0: SAM 7643 wkg TRENTON MILITARY for p/p relay for billeting arrangements at 2117. (MC)

11232.0: RAZOR 03 (E-8 JSTARS) p/p via TRENTON MILITARY to PEACH-TREE. Report they are RTB with mechanical problem at 2339. (MC)

11402.0: 044NCRAP (Civil Air Patrol, National Capital Region): 0717 USB/ALE sounding. (RP)

11439.5: B7Z101 (Coy "B," 7/101st Avn, Ft Campbell KY): 0114 USB/ALE sounding. (RP)

11494.0: USDAHQ1 wkg KNR43 in ALE USB at 1307. (MC)

12081.0: 022NHQCAP (Civil Air Patrol, Nat'l Ops Center, Maxwell AFB AL): 0110 USB/ALE sounding. (RP)

13475.0: MONTECANO (Venezuelan Air Defense site): 2128 USB/ALE TO CDDA (HQs, Venezuelan Air Defense Command). (RP)

13500.0: BNF (Venezuelan Navy Base "Falcon"): 1056 USB/ALE TO CGA (HQs, Venezuelan Navy). (RP)

13500.0: BNA (Venezuelan Navy Base "Amario"): 0958 USB/ALE TO BNF (Venezuelan Navy Base "Falcon"). (RP)

13927.0: TEAL 64 (WC-130 Hurricane Hunter) p/p via AFAIRE Maine for media interview about TS Bonnie at 2237. (MC)

13942.0: RJ1 (Brazilian Army, Rio de Janeiro): 2318 USB/ALE TO BR1 (Brazilian Army). (RP)

14420.0: DMAZIN (UN, Sudan): 2132 USB/ALE sounding. RP Army HQs, Brasilia). (RP)

14653.0: A090ZN (Nat'l Guard, Arizona): 1724 USB/ALE TO HQ705N (unidentified Nat'l Guard HQs element). (RP)

15094.0: KNY90 (SHARES station): 1633 USB/ALE TO KNY82 (SHARES station). (RP)

15867.0: 51A on final secures guard with PANTHER at 1716. (MC)

16077.0: MVD1 (Army Corps of Engineers, Mississippi Valley Division, Vicksburg MS): 2000 USB/ALE sounding. (RP)

16077.0: MVD1 (Corps of Engineers, Mississippi Valley Division, Vicksburg MS): 1723 USB/ALE sounding. (RP)

16338.5: HQ703N (possibly HQs, Nat'l Guard Readiness Center, VA): 1220 USB/ALE TO R010IN (Nat'l Guard unit, Rhode Island). Also noted on 05847.0 & 10816.5. (RP)

16338.5: C0800N (National Guard, Colorado): 2037 USB/ALE TO HQ703N (National Guard HQs unit, Arlington VA). (RP)

16355.0: SARBR (Brazilian Search & Rescue): 2257 USB/ALE sounding. (RP)

17982.0: HERMES (HQs, Brazilian Air Force): 1749 USB/ALE sounding. (RP)

19103.5: SKYWAT (Skywatch, U.S. Army Flight Watch Center, Soto Cano AB, Honduras): 2257 USB/ALE sounding. (RP)

19200.0: T81 (Replenishment Oiler "Ciudad Bolivar"): 2033 USB/ALE TO CGA (HQs, Venezuelan Navy). (RP)

19200.0: PR1 (River Patrol Craft "Lago1" PBR-1): 1244 USB/ALE TO CGA (HQs, Venezuelan Navy). (RP)

19200.0: 64B (LSM "Los Llanos," T-64, Venezuelan Navy): 2121 USB/ALE TO T63 (LSM "Gojaira"). (RP)

19709.0: ERMNAT (Brazilian Navy Radio, Natal): 1816 USB/ALE TO NEBRSL (Brazilian Navy Training Frigate "Brasil," U-27). Also noted on 15932.0. (RP)

22168.0: BTLCMC1 (probable Brazilian 1st Naval Marine Inf Bn): 2056 USB/ALR TO ERMNAT (Brazilian Navy Radio, Natal). Also noted on 16607.0 & 17010.0. (RP)

Contributors this month are Mark Cleary, Charleston, SC (MC), and Ron Perron (RP). ■

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Back To Basics: AC Safety!

Ed Engelken mentioned the potential risks associated with AC/DC receiver chassis in the October 2004 “Wireless Connection” column featuring his restoration of a National SW-54 SWL receiver (**Photo A**). Even more recently, a post in an Internet antique radio chat forum related the tragic electrocution of a young boy when he touched an outdoor water pump. Several years have past since we’ve discussed AC/DC receivers, so perhaps now’s a good time to review what you need to know to safely service and restore these sets. Line voltages can be deadly, so always treat any radio with respect, on or off the bench.

AC/DC Radios, What Are They?

AC/DC sets were designed to work on both AC and DC line voltages, and until fairly recently you could still find areas with DC power in larger cities. These sets used a tube lineup that was particularly suited for this service. For example, the typical 1950s AA5 tube lineup was a 12BE6 converter, 12BA6 IF amplifier, 12AV6 detector/first audio, 50C5 audio power amplifier, and 35W4 rectifier. These tubes were ideal sets using a series filament string that totaled near 110 volts, permitting them to directly operate from the AC or DC line voltage. Did you know that the “A” suffix on tubes meant they were specifically designed for series string operation? The filaments in A-suffix tubes were designed to withstand and share the initial start-up surge current at turn-on. Other variations of the AA5 added a sixth tube for an RF or second IF stage.

AA5: The All-American Five

These simple AC/DC radio were nicknamed the “All American Five,” or AA5 for short, in honor of the seven-pin miniature 150-mA tube lineups consisting of the aforementioned 6BE6, 6BA6, 6AV6, 50C5, and 35W4 vacuum tube lineup. Earlier AA5 radios incorporated an octal-based tube lineup, generally using a 12SA7 converter, 12SK7 IF, 12SQ7 det/first audio, 50L6 audio, and a 35Z5 rectifier. Purists argue—



Photo A. National’s SW-54 shortwave communications receiver is a good example of an AC/DC set that requires extra attention before it can be used safely! (Photo courtesy Ed Engelken)



Photo B. Heath’s IP-5220 variable AC supply is perhaps the most often used piece of test equipment on my workbench. We’ve looked at its varied uses and safety features in a previous column.

and probably correctly so—that only those sets using the earlier octal tube lineup are true examples of AA5 radios.

Besides being useable in areas with DC power lines, AA5s were cheap to make and own. Eliminating the costly, heavy and bulky power transformer made it practical to produce small, cheap, and lightweight table radios. Radio, at first relegated to the parlor in the form of a large piece of furniture, was now free to visit mom in the kitchen, travel along to a college dorm, or lull one to sleep in the bedroom. But safety concerns were less stringent 60 years ago, and these sets didn’t use polarized plugs. Indeed, the DC set required the user to experiment to find the correct plug orientation—a 50/50 proposition—lest the set not pass DC to the filter capacitors even though the tubes would light!

AA5 Safety Check List

Okay, you have your newly discovered AA5 radio in hand, and the first thing to do is a safety check.

Here’s what I look for:

1. Is the rear cover with the radio or is it missing, leaving the chassis exposed, with possible deadly AC voltages present?
2. Are the correct knobs on the radio, and do they provide proper insulation between the metal knobs shafts (potential AC voltages!) and the radio user?
3. Do the chassis mounting screws mount the chassis using nylon, Bakelite, or similar insulator blocks, or do they carry possible dangerous AC voltages to the bottom of the cabinet on the mounting screw heads? (I own several Emerson radios that have this potential shock hazard.)
4. Is the plastic or glass dial cover in place? If missing, are there exposed metal surfaces that might present a possible AC shock hazard?
5. Is it a metal cabinet AC/DC communications receiver? These would include the SW-54 National and S-38 Hallicrafters SWL receivers. It is vitally important that all of the manufacturer’s safety features are in place and functional! **If provided in a hot chassis set, the chassis-to-cabinet insulators must be in place and in good working condition.** Insulating back covers must be in place and secure. There’s a fellow reproducing the S-38 rear covers—if you need one, get one. The knobs must be correct and provide full insulation between the user and operator. By that I mean recessed Allen-head screws for mount-

ing knobs shouldn't have been replaced by screws with exposed screwdriver heads; yeah, I've seen it done.

Recognizing Safety Issues

Anything that might place you between the hot side of the AC line and ground represents an electrocution hazard; it has the potential (no pun intended) to kill or seriously harm you. Restoring vintage radios is a great hobby, but it also has risks and dangers. If you aren't comfortable or qualified to work with deadly voltages, you probably should leave chassis restorations to a qualified repair person. You're the best judge of your abilities.

Let's start by looking at the abbreviated schematic shown in **Figure 1**. This shows the basic series filament configuration and part of the 35W4 rectifier circuitry (for simplicity, I've eliminated most of the other circuitry unrelated to our discussion). These sets use non-polarized AC plugs, both for the reasons stated earlier and because polarized plugs predated early electrical codes. Most importantly, notice how one side of the AC line is connected *directly* to the chassis! Regardless of the AC plug's orientation in the wall socket, a deadly AC voltage can be present on the chassis. First, if the AC hot side of the socket is connected so it feeds filament pin 6 of the 35W4, the set will be fairly safe when the set is on. When on, the chassis is tied directly to the AC neutral return to the fuse/breaker box. When switched off, the chassis is hot because the AC hot side of the line voltage has a low-resistance return path through the tube filaments! Reversing the plug in the socket places the AC "hot" side of the line directly to the chassis, which presents a serious shock hazard regardless of whether the set is off or on.

One of the most important pieces of test equipment you can own is an isolation transformer! I've suggested the Heath IP-5220 (**Photo B**) as being the ultimate variable and isolated bench supply, but for those on a tight budget there are inexpensive units, too, like my VIZ WP-26A Isotap, shown in **Photo C**. The Isotap provides the same safety features for a fraction of the cost of the Heath unit, and it offers some voltage control as well.

A Solution

Figure 2 suggests a few modifications that'll help make these receivers safer to

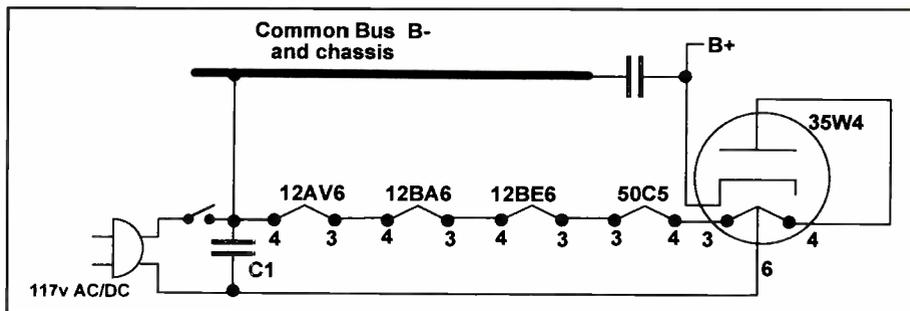


Figure 1. This partial schematic highlights the filament and rectifier sections of a typical AA5 tube radio. Note capacitor C1; this should be replaced with a UL-approved X- or Y-rated across-the-line bypass capacitor.

use. First, the off/on switch wiring is changed so it switches the hot side of the AC line, and not the chassis or neutral side of the line. Besides, modern electrical codes frown on switching the neutral side of the line! This requires replacing the original cord with one equipped with a molded polarized plug. The wider blade on the plug is for the neutral side of the line and is the side connected directly to the chassis. Don't guess; use an ohmmeter to ensure you have the neutral lead identified correctly! These cords typically have an embossed "ridge" on the neutral side insulation to assist in identifying the neutral lead. The hot side of the line is rerouted so the AC switch on the volume control breaks the AC path when the set is on. The switch is normally on the rear of the volume control. One caveat: take care how you dress the AC switch wiring, meaning try to keep it routed away from the volume control wiring so you won't introduce hum into the receiver audio.

I advise adding a small 1/2-amp fuse in series with the hot side of the line. The filament wiring in **Figures 1** and **2** is based on an example taken from a GE tube manual. This scheme uses the 35W4 filament tap between pins 6 and 4 as a fuse. If the B+ or a filter cap should short,

the 35W4 tube filament would flash open, killing the B+ voltage. Not all sets are wired following GE's example; often the rectifier tube filament tap is used for powering the set's pilot lamp.

Not A Cure-All

The solution offered in **Figure 2** is a good start, but it has limitations. First, it assumes that the available outlets are polarized, and it further assumes that all of the outlets are *properly* wired! Unfortunately, in the real world you'll find many outlets that have been wired incorrectly. Inexpensive testers, available at your local hardware store, should be used to test your outlets to verify that they're wired correctly.

Regardless, if a polarized plug is added, always go back to my safety checklist and correct defects and replace missing safety-related components!

Don't Do This!

Some restorers have added three-wire cords with plugs that have the AC ground pin along with the AC hot and neutral blades on AA5 radios. A suggested practice is to connect the AC neutral and

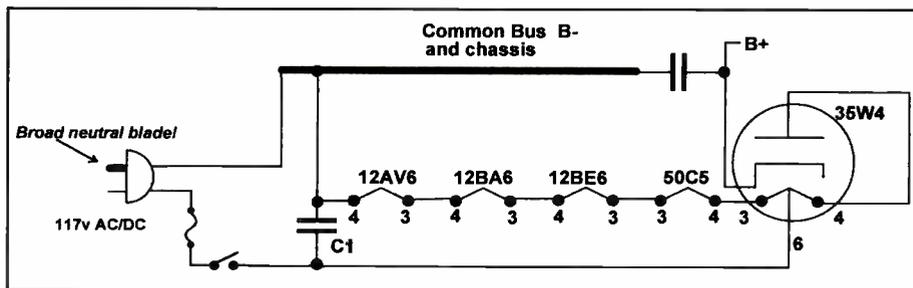


Figure 2. Besides replacing capacitor C1 with a modern UL-approved device, there are several other modifications that will make the radio safer to use. Adding a new line with a molded polarized plug, placing the switch on the AC hot side of the AC line, and connecting the chassis directly to the AC neutral leg are important steps.



Photo C. This VIZ model WP-26A Isotap is a basic isolation transformer featuring multiple sockets for both isolated and non-isolated direct AC power connections. Various taps on the transformer offer three voltage choices for each side: high, medium, and low. A switch permits further "fine tuning" for higher or lower voltage settings. The unit was purchased from a closing TV shop for \$20.

ground cord leads directly to the chassis. At first, this might seem to be the ideal solution for assuring the chassis is always at a safe potential—if the socket is wired wrong, the breaker or fuse for that AC circuit will trip. Here's the rub: the return current will be divided between the AC ground and neutral, thus creating unequal currents in the hot and neutral leads. This will trip any GFI (ground fault interrupter) the set might be plugged into. GFIs expect to see equal currents on the neutral and hot sides of the AC line; otherwise they sense the unbalance as being the result of a fault, and trip. It's never an acceptable practice to tie the AC neutral and ground returns together at any point, except for the ground busses in the fuse or breaker box.

Isolated Chassis AA5 Radios

Other AA5 radios, as shown in **Figure 3**, used a floating ground bus that isn't directly tied to the chassis. To provide RF coupling and stability, a capacitor couples the floating ground bus to the radio chassis. This task was usually relegated to a wax capacitor with a fairly large (typically .05-mFd) value. This is a step forward, but there are also problems. First, a .05-mFd capacitor will pass enough current at 60 Hz to give you a good jolt. Second, I've seen wax paper caps with voltage ratings as low as 200 VDC used as line bypasses. Whoa, way too low, and wax paper caps should never be used in these applications! It's a disaster waiting to happen. I've found many sets where the wax paper AC bypass caps have failed and blown apart. Going one step further, it's not too hard to imagine a vintage wax cap bypass overheating and catching fire, while dripping hot flammable wax onto a dry wooden cabinet!

AC Safety Caps

We're going to have to backtrack a bit here and talk about AC *across-the-line* and AC *line-bypass* capacitors. Capacitor

C1 in **Figures 1** and **2** is an example of an across-the-line AC safety capacitor. This means that if it fails shorted, it will not expose a potentially dangerous AC voltage to the radio operator. If C1 shorts in those sets, the AC line voltage will be shorted, hopefully tripping a fuse or circuit breaker. But, if capacitor C2 should fail shorted (**Figure 3**), it could possibly place AC voltages on the chassis. A line-bypass capacitor is defined as a capacitor that connects between the AC line and chassis and the failure of which could present a danger to the user. Thus, capacitor C2 must be replaced with a component approved for AC line-bypass service.

X And Y Capacitors

X-rated capacitors are rated for across-the-line service. *Y-rated* capacitors are intended for line-bypass service. These capacitors are rated and approved by Underwriter Labs (UL) and other international agencies, and will bear those agencies approval markings on the component bodies.

You can simply stock X1/Y2 dual-purpose ceramic disc capacitors to make things easier. The X1/Y2-rated caps will do for across-the-line and line-bypass applications and are available in maximum values of about .015 mFd. For the .05-mFd capacitor, you'd most likely use a film-dielectric Y2 line-bypass capacitor, available with maximum values of .047 mFd. AC-rated caps are flame resistant, self-healing (internal arcing will not cause shorts), and safety agency rated and approved. The numeric suffix denotes the test voltage for that capacitor. For our needs, the X1/Y2 dual-use ceramics will do for applications up to about .01 mFd; for higher values, Y2 films are available up to .047 mFd. The Y-rated caps can substitute for X-duty components, but never substitute an X-rated capacitor where a Y-rated capacitor is called for!

Safety capacitors are available from Panasonic, and the Panasonic line of AC safety capacitors is available from hobbyist-friendly Digi-Key Corporation.¹ My preferred source for all of my capacitor needs Dave Cantelon at JustRadios.² Responding to requests from fellow hobbyists, owner Dave started offering AC-rated capacitors several months ago. You'll find an excellent treatise on AC safety capacitors on Dave's website at www.justradios.com.



Photo D. Elmenco's dual-fused plug raises concerns because only the fuse on the AC neutral side might open, leaving the AC hot side of the line still active in the radio. Power switches and fuses should be placed on the AC hot side of the line, never on the neutral side.

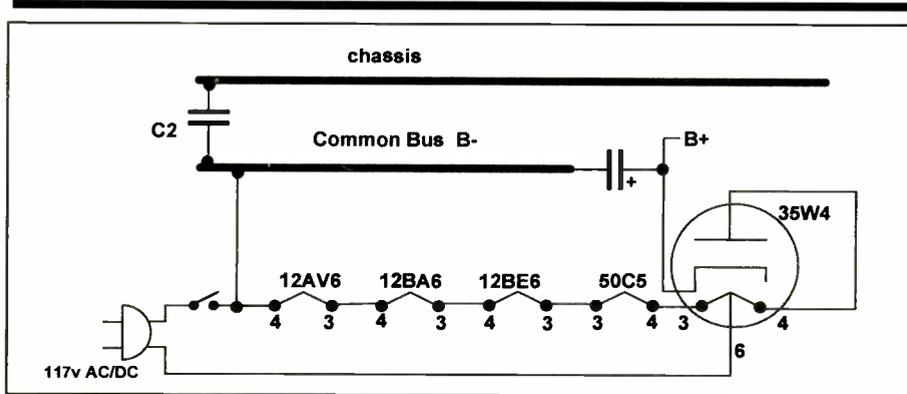


Figure 3. For sets using a floating ground bus that is capacitively coupled to the chassis, capacitor C2 should be replaced with a Y-type AC bypass capacitor.

Back To Our Radio

Getting back to our radio in **Figure 3**, capacitor C2 will have a typical value of .05 mFd, and should be replaced with a Y2-style line-bypass-rated .047-mFd capacitor. This will make the radio fairly safe, but you can still get a good jolt from the chassis if the AC Hot lead ends up connected to the switch and chassis as shown in **Figure 3**. Line-bypass cap values are usually .015 mFd or lower to limit the AC current.

Figure 4 shows how adding a polarized plug will lessen the shock hazard by keeping the ground bus on the neutral side of the AC line. **Figure 4** also shows how to add a three-wire plug with safety ground to these radios. As the chassis and ground bus are electrically isolated by the line-bypass capacitor, adding the ground wire is both safe and practical. Note that we've also moved the AC switch to the hot side of the AC line, and added a 1/2-amp fuse as an additional precaution. For **Figure 4**, either a Y- or X-rated will do if

the three-wire cord is used, while in **Figure 3** a Y-rated capacitor *must* be used. I'd personally use a Y2-rated Mylar-film line-bypass capacitor for either example to err on the side of caution.

Metal Cabinet AC/DC Radios

For metal cabinet AC/DC sets, start by referring to the safety checklist at the beginning of this month's column! I strongly suggest modifying the radio to follow the example shown in **Figure 4**, including the AC ground connection to the cabinet. Most restorers don't like using the three-wire cords since they "don't look original." Sorry, but *safety always overrides originality* for any radio that is going to be played. Most of these sets used an insulated chassis that was kept insulated and floating from the metal cabinet. Ensure that all of the insulators are in place and performing the intended task. AC line-bypass caps must be replaced with the UL-approved safety

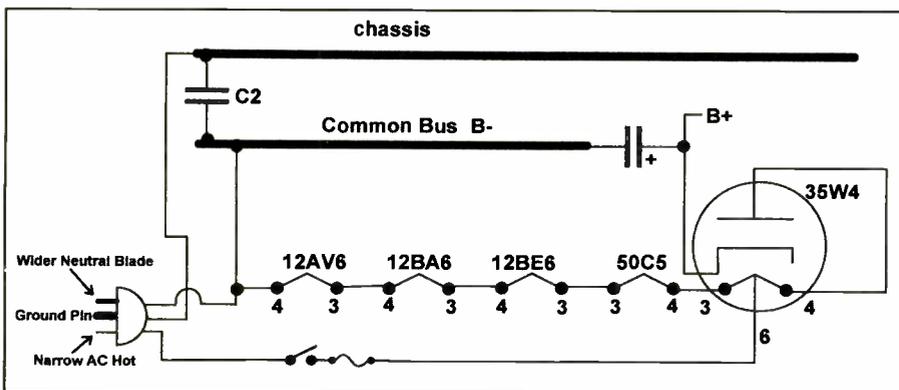


Figure 4. Adding a polarized plug and wiring the cord so the AC neutral ties directly to the ground bus reduces the stress on the line bypass capacitor C2. The wiring is such that the AC hot side of the line is switched and fused. For full protection, the chassis can be tied to the green (U.S. standards!) ground pin wire on a three-wire AC plug and cord.

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capacitors. Many of these sets end up being given to youngsters to get them interested in the hobby, so make sure the radios are safe for use in *polite society!*

Another often-overlooked hazard is present on many radio kits from the late '50s and '60s. **Photo D** shows an Elmenco fused plug. While these were often used on equipment during the '60s, today they are recognized as an often-overlooked safety issue. Power cords on some of the Heathkit amateur transmitters, including the popular DX-60, were equipped with them. What's wrong with using them? They are non-polarized plugs, and both sides of the AC line are separately fused in the plug body. If an overload occurs, there's no assurance that the fuse on the AC hot side will be the one that blows. What if only the AC neutral fuse opens? That leaves the hot leg of the AC line connected to the transmitter—a very undesirable condition when you're in there troubleshooting! Some folks will feel I'm nitpicking here, but you must be aware of safety issues that all too often go unnoticed.

Antenna Connections On AA5 Radios

Many AA5 radios had provisions to

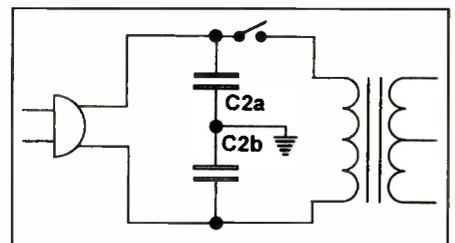


Figure 5. Transformer sets require similar care. Caps C2a and C2b are across-the-line and also serve as line-bypasses. These must be replaced with Y-type AC-rated safety caps.

connect an external wire antenna to the loop antenna assembly at the rear of the radio. Inside the set, there's a wax-paper coupling capacitor providing isolation between the antenna and radio. This cap must be replaced with a Y-type line-pass rated capacitor—another part that is often not thought of as being an AC safety device.

Transformer Sets

Figures 5 and 6 illustrate the before and after revisions I'd perform on these sets. Again, failure of either C2a or C2b will place AC line potentials on the chassis, and these must be replaced with Y2 or X1/Y2

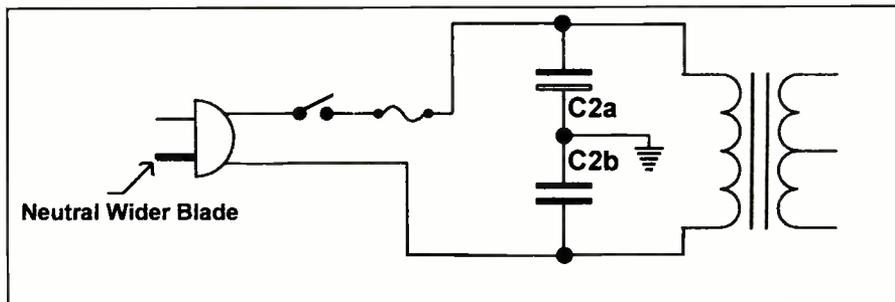


Figure 6. Besides changing the caps to UL-approved devices, adding a fuse and polarized AC plug allows switching and fusing the AC hot side of the line ahead of the bypass capacitors. When the radio is off, the capacitors are not subject to stressful voltage spikes on the AC line.

line-bypass AC safety capacitors! There are a few subtle differences between Figures 4 and 5. I've added a polarized plug, but note that the switch in Figure 5 removes the AC hot side from the line-bypass capacitors when the set is off. There's no need to subject these caps to failure-inducing transients when the set is off or not in use! Many early radios had these caps right at the AC cord terminals! Second, the caps form an AC voltage divider; you'd likely measure around 60 volts AC leakage current between the chassis and a nearby ground. This isn't a particularly dangerous situation, unless you're carrying the set and get zapped, causing you to drop it, or worse! I've also added a fuse for those sets that didn't include one at the factory.

The circuit in Figure 7 goes one step further by adding a three-wire cord and plug with the AC safety ground wire attached directly to the chassis. This eliminates the reactive voltage leakage at the juncture of the line-bypass capacitors on the chassis and provides a positive safety ground to the radio. These caps help improve reception by filtering any RF noise on the AC line before it reaches the RF and IF circuits in the radio. They also help reduce *tunable hum* by providing a ground reference to the chassis.

Otherwise, the full-wave rectifier (which conducts on each crest of the full AC cycle) could impart a 120-Hz modulation on received signals.

Please Send Your Comments

We're always interested in hearing from our readers, and I'm anxious to share your stories, or photos of your collection, or to spotlight your latest restoration or acquisition! Well, that wraps our December column, and as we move into a New Year, I'll take this opportunity to wish you the best for the Holidays, a Happy New Year, and World Peace and Harmony in 2005. ■

References

1. Digi-Key Corp., 701 Brooks Avenue South, Thief River Falls, MN, 56701; Phone: 1-800-344-4539; Web: www.digikey.com. No minimum, but a \$5 service charges applies on orders under \$25 dollars. Call or write for catalog.
2. JustRadios, Dave Cantelon, 42 Clematis Road, North York, Ontario, Canada, M2J 4X2. Web: www.justradios.com. JustRadios carries an extensive offering (including kits) of replacement capacitors at very attractive prices. A \$10 minimum order applies.

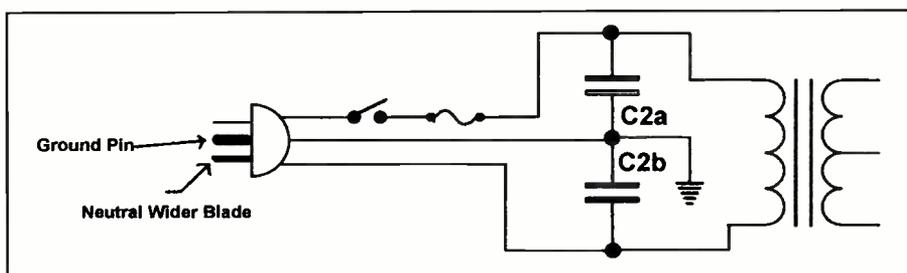


Figure 7. You may also add a three-wire cord with a plug equipped with a ground connection in addition to the neutral and hot leads. This ties the chassis directly to the AC ground reference in the fuse or breaker box, and it eliminates the residual low-current 60-volt AC on the chassis. This voltage results from the capacitive divider formed by caps C2a and C2b in series across the line and is measurable between the chassis and nearest ground.

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For Driving Safety, Mount High Up With A Remote Head!

Keeping in mind the lessons learned from the intense scrutiny on cell phone users by law enforcement, not to mention the accidents caused by the distraction of trying to read an incoming message, all of us in two-way radio need to address our *own* radio operating habits. Getting your radio equipment up near eye level should be an important consideration when choosing remote-head equipment and finding the best place to mount your new receiver.

The Important Considerations

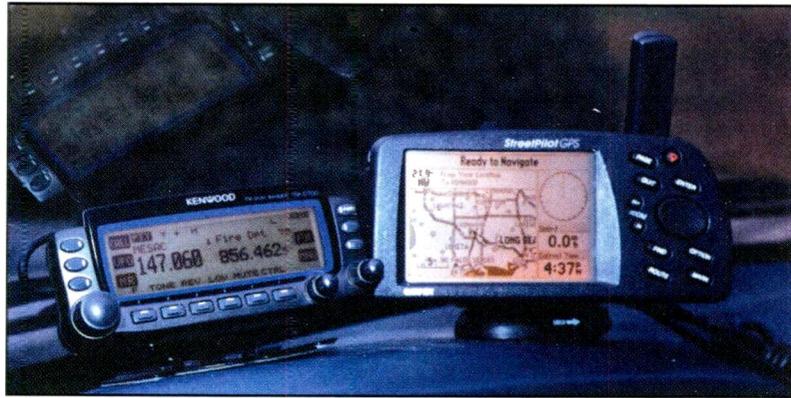
When installing communications equipment, your foremost consideration should be the safety of both the driver and passengers. Any eye-level mounting of equipment must be absolutely clear of your vehicle's air bag safety system; the last thing you want is a fender-bender and serious injuries resulting from the air bag deploying and sending the radio remote head rocketing toward your face. To remain safe in case of sudden stops, you also need to make sure that neither you nor your passenger can lurch forward and bang your noggin on the remote radio head. And make sure that any mounted equipment won't break loose and cause *further* injuries after a rollover or serious side-impact crash.

Okay, so now you've been warned about anything mounted near eye level. The next consideration is what type of equipment *can* be mounted safely within easy view of the driver. Unfortunately, mobile scanners don't have the capabilities of a remote head, and their relatively small size makes it tempting to place them *on* the dash. (You may also wish to review your state's scanner laws to ensure that the scanning equipment in your vehicle meets the regs.)

Good News For Scanner Enthusiasts— And Hams!

Ham radios are increasingly equipped with remote-head capabilities. Many scanner enthusiasts may purchase a dual-band or tri-band ham mobile radio that may double as a rather slow scanner, but a very hot receiver, on specific VHF and UHF frequencies. There is no law that says you have to be a licensed ham operator to *purchase* ham equipment for scanning. And, in another year, after the ham radio restructuring takes place, the revised entry-level amateur radio question pool will be a lot easier to study than the present 511zaaa—very old—Technician class question pool.

All major amateur radio manufacturers offer VHF/UHF remote-head equipment. Although the scanning speed on this equipment is nowhere near what you would get with a true-blue scanner, ham equipment, with its remote-head capabilities, may make sense to you nonetheless. Consider a black-and-white LCD readout, which offers the best visibility in the bright sun-



Here's an excellent on-dash radio and GPS installation.



Here's a good "up high" motorhome radio installation, but remember to always be careful not to get the mic cable tangled in the steering wheel when you drive!

light on your dash. Years ago Kenwood came out with a color LCD readout for a dual-band radio that was impossible to see in the daylight. The company ultimately switched out the LCD panels at no charge.

There are still ham radio manufacturers that offer remote heads that read out with a color LCD or color LED display. Again, these are tough to read in the sunlight, but at night look swell. But at night the black-and-white LCD panels are backlit, so again, white background with black letters makes the most sense.

If you wear polarized dark glasses, it's best to check if the remote head will look clear without having to tilt *your* head.



This remote head location is just too low for you to drive and change channels safely.



Be sure your remote-head cable doesn't get cut by power seats!



Here's N9ZGE's mobile installation with the remote head safely mounted high on the dash.



A convenient, yet still low, remote-head installation.

A lot depends on where the remote head is placed on the dash; I'm happy to say most manufacturers have now adopted a polarized screen that will agree with MOST polarized sunglasses and not turn absolutely black.

The Display

And speaking of turning black, another consideration for your remote head is how it will survive in direct sunlight on a hot dash. Nowhere in the specifications do manufacturers rate the hot sunlight survivability of an LCD display. This is where you want to find a fellow radio enthusiast who has the same equipment, and then ask the question, "Does your display turn black when the sun beats down on it on the dash?" Many radio operators will simply pull the remote-mounted display from the dashboard and hide it down below when they are out of the vehicle. It's great theft protection, and it's common sense to not bake the delicate LCD display.

Most radio remote heads don't have the speaker built in. Find out whether the speaker you intend to remote will plug into the radio body, or if it needs to plug into the head? If the speaker plugs into the radio body, your cable requirements are minimized. A well-designed remote radio head runs with a minimal interconnecting cable. Plan to put some RF chokes on the cable, just to make sure that no RF gets into the head and accidentally causes channels to change. Most remote-head equipment has a specific cable kit for the remote installation, sometimes it's part of

the package when you purchase the equipment new, and sometimes it's an accessory item that you will need to pay extra money for.

Where does the microphone plug in? If it plugs in only to the head, you will need to bolster how you have the head mounted so you don't accidentally pull the head from the dash when you yank the mic outside the vehicle. Some units have the mic running off the radio black box so you don't have the problem. Some manufacturers may offer remote-head equipment with the option of running the microphone off the head or off the radio body tucked under the front seat.

Most radio remote heads have plenty of cable for the interconnection. Most remotes also include some unique mounting assemblies, allowing you to place the head in nearly any position on the bracket. Some radio operators actually discard the bracket and go with double-sided tape, or a less permanent mounting with a hook-and-loop Velcro fastener. The latter mounting approach may cause the head to vibrate, so again, do some experimentation—always keeping in mind the location of the air bag deployment on the dash!

Forget The Hump And Keep Focused On Driving!

Get the radio off of the front floor hump. This places the equipment too low for a quick glance at your frequency. And while you might have found a clever mounting spot which gets the head nestled into a secret spot on the dash, the safety issue is whether or not you can easily see the equipment while also minding the road ahead. At 65 mph, a "quick" glance of just a couple of seconds down at the radio by your knee may gobble up hundreds of feet of road that you are not watching. Scary, huh?

Share Your Own Tips

So get your equipment up high, enjoy the radio visibility, and drive safely. Remember, we want to see *your* mobile radio installation and read about your tips and techniques for proper mobile radio operation. What works in your particular vehicle and doesn't work? Send your stories and photos to me at "Radio Resources," *Popular Communications*, 25 Newbridge Road, Hicksville, NY 11801, or via e-mail at WB6NOA@arrl.net. ■

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Live From The Master Control Room...

Because I own several small screwdrivers (and carry them in my shirt pocket), and because I otherwise am employed in an HPJIE,* I am often called upon to do things that I'm *completely* unqualified to do. Sometimes, that's flattering; to think that your employer thinks you might be more brilliant than even *you* think you are. But other times, it can be downright frightening to think that you're expected to do something that you don't know much about doing.

So it is with me and the operation of a television station, or in this case, the "Master Control" department of a television station. Fortunately for me, the station management, and both viewers, I am not employed by a broadcast television station with paying advertisers and bazillions of viewers. In fact, if I were certain that no one at the un-named place where I work would read this (it's on the west coast, near either Alaska or Hawaii, I can't be more Pacific than that) I could tell you of the time when we were "in black" (no picture, no sound) for about 17 minutes and no one even called. But someone might read this, so I'm admitting to NOTHING.

So they put me in Master Control, where there are five, six-foot tall equipment racks with computerized servers, tape decks of many formats, DVD players, time-base-correctors (I use them to set my watch), and processors, amplifiers, switches, relays, and more knobs than you can wave a tweaking tool at—if that's your idea of a good time (sorry, Groucho).

Oh, and then there's a tape library. That roughly translates into a couple rooms filled with video tapes of every format and subject known to man (er, "person") and at least one to fill in otherwise dead spots varying in duration from one minute, 30 seconds to a full 58-minute hour. These are called, aptly enough, "fillers."

Real broadcast stations don't use these, but when you're an educational station, your televised classes often don't run precisely to the top or bottom of the hour (see how I lapse into broadcast jargon at the drop of a hat?), so you need fillers to (are you ready for this?) *fill* those odd moments until you can begin a regular program at the top or bottom of the hour. Remember, we're not-for-profit, so we don't run commercials.

On the worst possible days, I'm called upon to "sign-on," which means I have the key and open the place up at some very dark hour of the morning, spill coffee several times, and am met with no fewer than one hundred knobs and switches, all of which must be placed in just the right position so that the first show of the day can begin at its set time.

I should pause here (to go and get a sandwich) and let you know that we have genuine, bona-fide Master Control operators who actually know how to do this stuff, and we have at least one part-timer who fills in and likewise knows pretty much what all the knobs do and when to press, tweak, twiddle, and otherwise operate the controls. I do not. There are several reasons for this. First, I am stupid when it comes to operating such things, and second, I only do it two or three times a year, which is not

enough to keep abreast of the changes, let alone remember the day-to-day operation of the place.

Between shows, we "put up a slide," which means we transmit a page from a pre-compiled character generator, which is sort of a visual place-holder, letting our viewer(s) know that it's indeed us that they're watching, and that something else is about to happen, maybe. During that time, we also play classical music. We choose classical music not because we're sophisticated (oh, how happy I am that there's not a picture of me to go with this article) but because we're *cheap*. We don't have to pay royalties on the classical recordings we use. They're called "royalty-free" recordings, which is a joke because a CD of this nature costs about \$45, and I keep telling these people I could download some stuff that no one would recognize and it wouldn't cost more than the price of a blank disc.

There are 1,784,297,064 pages of "slides" in our character generator. Only one is the correct slide for any given break between shows, and they are identified by a code, such as PQOWIEUR0987435HBGOPIW1475.3-0978E in the program log, which is a sort of instruction sheet telling Master Control operators what to play and when to play it. To date, I have never played the right slide in the 11 years I've been an "occasional" Master Control operator, which is really not such a big deal when you realize how many incorrect shows I've aired at so many incorrect times.

To be fair to me (something I'm always concerned with), I *have* occasionally played the right tape and made a beautifully smooth transition between one source and another, but alas, many more times I've made a beautifully smooth transition to color-bars and a screaming 1000-Hz tone that would wake up a hibernating grizzly bear, which is the rough equivalent of my boss, anyway.

Along with all the basic equipment that I don't operate very well, there are such things as "bugs," those little logos that all TV stations now put in the lower corner of their picture so that you have no doubt who you're watching. I have tried unsuccessfully to capture a bug from another station or network so that I might hide my identity while making all these mistakes, but as it is, I can barely figure out how to make our bug play in the proper corner and at the proper time. I once had it in the center of the screen for two whole hours and had no clue how to make it go away.

So this Friday, which will have come and gone by the time you read this, I will be forced to "sign on" once again as (blank blank blank TV) goes "On The Air" for another broadcast day on miles and miles of cable and fiber optic links to virtually millions of households, of whom at least seven are watching at any given time. With any luck at all, none will know the phone number of the management, and I might return to work for yet another day. *Sic Semper Herringbone, Vertical Interval Tyrannus.*

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all the action!

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Give & Receive This Holiday Season!



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