Radio–Homeland Security–Computers & Radio–Family & Hobby Comms

45635

POPULAR COMMUNICATIONS

JUNE 2006

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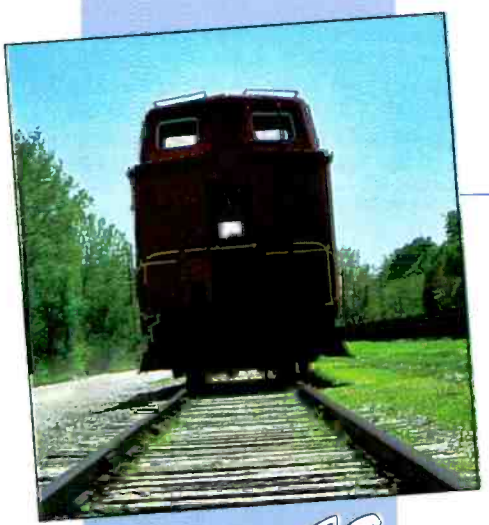

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On The Cover

Even though the Boston Acoustics Receptor Radio HD is reportedly flying off the shelves, there's a lot you need to know about HD Radio. Get the inside story on AM and FM digital radio in the USA in this month's Broadcast Technology column by Bruce Conti, titled, *"Here Right Now: Free AM And FM Digital Radio,"* beginning on page 24. (Photo by Larry Mulvehill)

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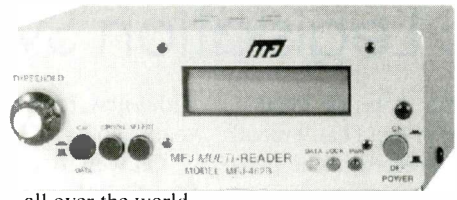

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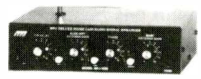

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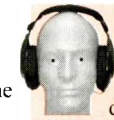

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by Harold Ort, N2RLL

Post Traumatic Legislation Syndrome

It's not often any government—federal, state, or local—changes a law for the better. As a matter of fact I can't recall any recent "change" that would be considered in the public's best interest, though on the other hand, it's easy for our lawmakers to enact those laws to swing in the *government's* favor. They'll *tell* you most laws are there to protect you, preserve freedom, and keep the bad boys and girls in line, but there are many laws that, well, in a nutshell, are just plain ineffective and never should have seen the light of day.

The ECPA (Electronic Communications Privacy Act) is one of those. Some states' legislation that make criminals of you and me for having a scanner in our possession while "mobile" or using a radar detector (nothing more than a radio receiver!) in your vehicle also come to mind.

Not to be outdone by other states and the Feds, the Michigan legislature, back in 1929—that's correct, 1929—passed MCL750.508b, what has become known as The Michigan Scanner Law. Simply put, that law said that it was a crime to have in a vehicle a radio receiver that could intercept police frequencies (it didn't specify Michigan's frequencies or Montana's or if that receiver was connected to power or could still be in the unopened box). It provided folks the option of getting a "Permit For Use Of Short Wave Receiver In Vehicle" from the Michigan State Police. (I got mine a few years ago. Pretty slick, except, of course, a scanner isn't a *shortwave* receiver, but then again that's only the tip of the lawmakers-not-being-very-bright iceberg).

The law also exempted amateur operators and law enforcement officials. Seems to me, though, that if you're going to allow amateur radio operators or others to have a scanner in a vehicle or allow other folks to get a permit to use a scanner in a vehicle, at least *call* it a *scanner* permit, not *shortwave* receiver permit!

The Michigan law also cost the state thousands of dollars a year and plus the salary of one full-time employee to administer it. And it cost several law-abiding hobbyists their equipment, which was confiscated by overzealous cops.

Recently, however, Michigan officials—at least Representative Kevin Elsenheimer—realized that issuing these so-called permits was a burdensome task, the law was a useless endeavor costing the Great Lakes state some real folding money, and that ordinary citizens traveling Michigan's beautiful highways listening to a radio weren't common criminals! So, Elsenheimer sponsored a bill, "...to make it illegal to use information intercepted from public safety communications systems to commit a crime."

Rep. Elsenheimer's bill said the law as written makes it "...a crime to equip a vehicle with a radio receiver that can intercept frequencies used by police unless the person first obtains a permit from the Department of State Police or unless the vehicle is owned or used by a police officer or licensed amateur radio operator." Elsenheimer also said it has, "...has proven problematic in implementation."

Now there's a bureaucratic phrase, "*problematic in implementation.*" I'll simplify that to "difficult to enforce" or "stupid to begin with, so now we'll waste more time and taxpayer money with a new, revised bill to do what the first one should have done years ago."

Oh well, better late than never, as they say. And to be sure, Rep. Elsenheimer is to be commended, as are Michigan's hams and others who kept hammering the state for action in changing the law.

So more than 77 years after being passed into law, effective May 31, 2006, Michigan now allows you—in theory at least—to pull up next to a patrol car with your scanner on, and windows down, without having to reach over and pull the plug for fear of a ticket because you either didn't know about the law or figured perhaps the officer was unaware of the statute. The requirement for a permit is also out the window.

Here's the official word from Michigan: Section 508 of Michigan's MCL 750.508 was amended and approved by Governor Granholm on March 2, as Public Act 39, which stated the following,

> A person who has been convicted of one or more felonies during the preceding five years shall not carry or have in his or her possession a radio receiving set that will receive signals sent on a frequency assigned by the Federal Communications Commission of the United States for police or other law enforcement, fire fighting, emergency medical, federal, state or local corrections, or homeland security purposes. This subsection doesn't apply to a person who is licensed as an amateur radio operator by the Federal Communications Commission.

The amended law continues,

> A person shall not carry or have in his or her possession in the commission or attempted commission of a crime, a radio receiving set that will receive signals sent on a frequency assigned by the Federal Communications Commission of the United States for police or other law enforcement, fire fighting, emergency medical, federal, state, or local corrections, or homeland security purposes.

What about punishment? The revised law provides for an imprisonment of one to two years and a fine of up to $2,000 (or both) depending on whether the person used the receiver in the commission or attempted commission of a misdemeanor or felony.

I always find it strangely intriguing that amateur operators are sometimes given the benefit of the doubt when it comes to having a scanner in their vehicle. (Please understand that the federal government does not address a scanner, but as we'll see in a moment, does discuss amateur *transceivers* used by licensed hams that receive out-of-band signals.)

Despite the fact that we amateurs are always there to help our fellow Americans in times of crisis—and therefore could conceivably *need* to hear law enforcement officials or the Feds in action—we must also realize that even *sometimes* amateur radio operators run afoul of the law. We're not perfect just because we're licensed. In an ideal world, yes, but not in reality.

There's nothing in the actual *amateur regulations (Part 97)* that addresses the right to possess a wideband *receiver* (most current amateur radios receive out-of-band signals) in a vehicle just because you're a licensed operator, just as there was nothing in the original CB rules and regs that said any-

(Continued on page 82)

by Harold Ort, N2RLL, Editor, and D. Prabakaran

News, Trends, And Short Takes

Gordon West, WB6NOA, Amateur Of The Year

When Hamvention 2006 opens in Hara Arena on May 19, three amateur radio operators will be honored for their contributions to the Amateur Radio Service. Gordon West, WB6NOA, a man responsible for helping to recruit many new hams, Riley Hollingsworth, K4ZDH, who helped bring improved enforcement to the ham bands, and Richard Illman, AH6EZ/W9, whose efforts helped develop a solution to BPL interference, have been named as recipients of this year's Hamvention awards.

Pat Johnson, KC8ZZO, Hamvention Awards Chairman said the committee had a tough task selecting the winners from among a number of worthy nominees. "We were impressed with the quality of the nominations. We believe the winners all represent excellence in service to the ham radio community."

Hamvention Chairman Jim Nies, WX8F, praised the winners, saying, "On behalf of the Dayton Amateur Radio Association (DARA) and Hamvention 2006 it is my distinct pleasure to congratulate this year's Award Winners. Please join me in recognizing each of these gentlemen for their outstanding contributions to Amateur Radio and their many years of devotion to the amateur radio service."

Gordon West, WB6NOA, was named Amateur of the Year for his efforts in recruiting and training many new amateurs, in addition to his lifelong involvement in ham radio. Starting in the late 1950s "Gordo," as he is known by many hams, began an active involvement with ham radio that included working for some of the big names in the field and helping to develop several innovative pieces of equipment. In the 1980s West and his wife Suzy, N6GLF, began teaching ham radio classes at college and marine venues and began writing the ham training books. He is, of course, also a columnist for *Popular Communications*.

West is a fellow with the Radio Club of America, recipient of the ARRL Instructor of the Year award, and active on ham bands from 75 meters through 10 GHz, spending at least a couple hours every day on the air helping new hams make friends on the many nets he runs.

West volunteers with the American Red Cross communications team in Orange County California, and regularly offers free kids classes and classes for cities to support their CERT (Community Emergency Response Teams) members.

"It's my give-back to a hobby that gives me the satisfaction of offering free classes for kids and emergency responders, and I thank all the ham operators who support our training program, and the ARRL for their continued support with the emergency communication web-based classes," West said.

Riley Hollingsworth, K4ZDH, received the Special Achievement Award for his efforts in helping eliminate some of the problems that had been increasing on the ham bands. As his nominator stated, he helped "reverse an almost decade and a half long period of Commission inattention and government apathy directed at our service. Hams across the U.S. credit Hollingsworth with helping to reduce—and in many cases to eliminate—malicious interference and other problem behavior, both on and off the air."

Hollingsworth is a Special Counsel for the FCC Enforcement Bureau's Spectrum Enforcement Division. He was given the responsibility for coordination of Amateur Radio Service enforcement after that program was transferred to the Enforcement Bureau in October 1998. His responsibilities also include interference resolution in the Land Mobile and Public Safety Services.

Hollingsworth was Co-Chairman of the FCC's PCS (Personal Communications Services) Broadband and Narrowband Licensing Task Force, for which he received a "Reinventing Government" Award in 1994, and managed the FCC's 800 MHz Task Force in which new 800-MHz spectrum was assigned in 13 cities. He also organized the FCC's enforcement program in which underutilized land mobile radio channels were recovered for reassignment in major cities.

Hollingsworth graduated from the University of South Carolina, and received a Law degree from Wake Forest University. An Amateur Radio licensee since 1960, he is a member of the Quarter Century Wireless Association and FISTS Club.

Richard Illman, AH6EZ, of St. Charles, Illinois, was selected for the 2006 Technical Excellence Award. His willingness to use his technical knowledge to be outspoken about an unpopular topic, Broadband over Powerline (BPL), was cited by the committee. He influenced his employer, Motorola, to deliver his patent-pending solution that has been proven at ARRL Headquarters and other deployments to not cause any interference to or from amateur radio. The ARRL has subsequently used the Motorola solution as an example to the FCC on how BPL can be designed without interference to amateur radio.

Illman, who has a bachelor's in electrical engineering and has worked at Motorola for 31 years, was instrumental in the inclusion of hardware notch filters in the Motorola equipment—an industry first—to protect amateur radio beyond the traditional technique of just turning off specific carriers.

His passion for ham radio began in high school. He earned a Novice class license in 1969 and has continued operating for over 37 years on all bands and all modes, including working satellites from moving Amtrak trains and demonstrating ISS contacts to Boy Scouts. An avid DXer he works over 200 countries each year, in part because of a friendly competition among his local ham club members of the Fox River Radio League in Aurora, Illinois. He has been their President for the last two years and was recognized with their Ham of the Year award three years in a row.

The Dayton Hamvention, the world's largest amateur radio gathering, brings more than 25,000 people to the greater Dayton area each year. The three-day event includes exhibits, a flea market, forums, and education sessions. For more information about Hamvention 2006 (scheduled for May 19 to 21), visit the website at www.hamvention.org or e-mail media@hamvention.org.

BBC Broadcasts To India Via WorldSpace Satellite Radio

The BBC World Service and WorldSpace satellite radio, which broadcasts to the Indian subcontinent, have announced a

(Continued on page 82)

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, Editor, Popular Communications, *25 Newbridge Road, Hicksville, NY 11801-2909, or send e-mail via the Internet to popularcom@aol.com.*

Thanks, Adolphus!

Dear Editor:

After reading the article on the Alaska Telegraph System, all I can say is, boy, what an education! Being here in Alaska for 20 years now, my comprehension of Alas Com is now much better. Can you tell me if Ft. Greely was named after Adolphus W. Greely?

Michael D. Williams, AL1A
Anchorage, AK

Dear Michael:

It is, as sure as Alaska is 2.3 times the size of Texas.

What Plan?

Dear Editor:

Well I am a little behind on my reading, as usual. I just read your December '05 column "So, Who is Responsible Today?" While we have disagreed sharply in the past, I must tell you that I am in near total agreement with your position. While you did mention state and local government failures, I might have highlighted them a little more. The biggest turf warrior juvenile in my opinion was the Louisiana governor. And can you just imagine the crying if the Feds came to a town and tried to get the mayor to write an emergency plan, let alone actually implementing it during an actual emergency?

The City of New Orleans knew better than anyone the potential danger they faced and their lack of planning is criminal. What plan they may have had remained unimplemented while the mayor fiddled and people died. I truly believe that the mayor of New Orleans should be tried and convicted for criminal neglect.

That being said, everything you wrote about the Feds was true, and more. "Brownie you're doing a heck of a job" my aching ass. Secretary Chertoff and Michael Brown ought to be in the same jail cell as Ray Nagin. There should be no one left in Homeland Security and FEMA management that was there before Katrina.

But, all this is now old news. Today, civil war seems imminent in Iraq (who'da thunk?), and we are arguing about whether it's a good idea to let a government who supported the Taliban run our major seaports. Talk about letting the fox guard the hen house.

I tell you, I have just about had it. I can't stomach the hypocrisy and the demagogy of the left, but lately the right-wing Kool-Aid has not quite been strong enough to keep me in lock step as a mind-numb Bush supporter.

Keep telling it like it is, man.

Dale D. Marshall, KE4ZRZ
Milton, FL

Sharp Reader

Dear Editor:

Last night and again this morning I discovered quite by accident that the 2.500-MHz WWV signal comes in very well on this old Sharp AM/FM clock radio using nothing but the radio's internal AM antenna. I suspect the local oscillator has enough of a fourth harmonic to mix with the 2.500-MHz signal for the 455-kHz IF of this 1960s vintage radio. This is the first time I have encountered this on a simple AM radio. By the way, this radio works on regular AM and FM as well! As far as I can tell the radio has never been modified.

I enjoyed the article "Does Anybody Really Know What Time It Is?" in the February 2006 *Popular Communications*.

Tom Byers, WB9YTG
Aurora, MO, via e-mail

Tom's unusual WWV receiver.

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Suggested list price $799.95/**CEI price $519.95**

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Frequency Coverage:
25.0000-512.0000 MHz., 764.0000-775.9875 MHz., 794.0000-823.9875 MHz., 849.0125-868.8765 MHz., 894.0125-956.000 MHz., 1240.0000 MHz.-1300.0000 MHz.

The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as Fire Tone Out Decoder. This feature lets you set the BCD396T to alert if your selected two-tone sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning. Close Call Radio Frequency Capture – Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Useful for intelligence agencies for use at events where you don't have advance notice or knowledge of the radio communications systems and assets you need to intercept. The BCD396T scanner is designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS, LTR and EDACS® analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. Dynamically Allocated Channel Memory - The BCD396T scanner's memory is organized so that it more closely matches how radio systems actually work. Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 3,000 channels are typical but over 6,000 channels are possible depending on the scanner features used. You can also easily determine how much memory you have used and how much memory you have left. Preprogrammed Systems - The BCD396T is preprogrammed with over 400 channels covering police, fire and ambulance operations in the 25 most populated counties in the United States, plus the most popular digital systems. 3 AA NiMH or Alkaline battery operation and Charger – 3 AA battery operation - The BCD396T includes 3 premium 2,300 mAH Nickel Metal Hydride AA batteries to give you the most economical power option available. You may also operate the BCD396D using 3 AA alkaline batteries. Unique Data Skip - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. Memory Backup - If the battery completely discharges or if power is disconnected, the frequencies programmed in the BCD396T scanner are retained in memory. Manual Channel Access - Go directly to any channel. LCD Back Light - A blue LCD light remains on when the back light key is pressed. Autolight - Automatically turns the blue LCD backlight on when your scanner stops on a transmission. Battery Save - In manual mode, the BCD396T automatically reduces its power requirements to extend the battery's charge. Attenuator - Reduces the signal strength to help prevent signal overload. The BCD396T also works as a conventional scanner to continuously monitor many radio conversations even though the message is switching frequencies. The BCD396T comes with AC adapter, 3 AA nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, SMA/BNC adapter, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO or ESAS systems. Order on-line at www.usascan.com or call 1-800-USA-SCAN.

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Suggested list price $399.95/**CEI price $214.95**

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Frequency Coverage:
25.0000-54.0000 MHz., 108.0000-174.0000 MHz., 216.0000-224.9800 MHz., 400.0000-512.0000 MHz., 806.0000-823.9875 MHz., 849.0125-868.9875 MHz., 894.0125-956.000 MHz., 1240.0000 MHz.-1300.0000 MHz.

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include Close Call Radio Frequency Capture – Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Dynamically Allocated Channel Memory - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but over 2,500 channels are possible depending on the scanner features used. You can also easily determine how much memory is used. Preprogrammed Service Search (10) - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine, racing and weather frequencies. Quick Keys - allow you to select systems and groups by pressing a single key. Text Tagging - Name each system, group, channel, talk group ID, custom search range, and S.A.M.E. group using 16 characters per name. Memory Backup - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. Unique Data Skip - Allows the BC246T to skip over unwanted data transmissions and birdies. Attenuator - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. Duplicate Frequency Alert - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. 22 Bands - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAH nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part #HF24RS for $29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.

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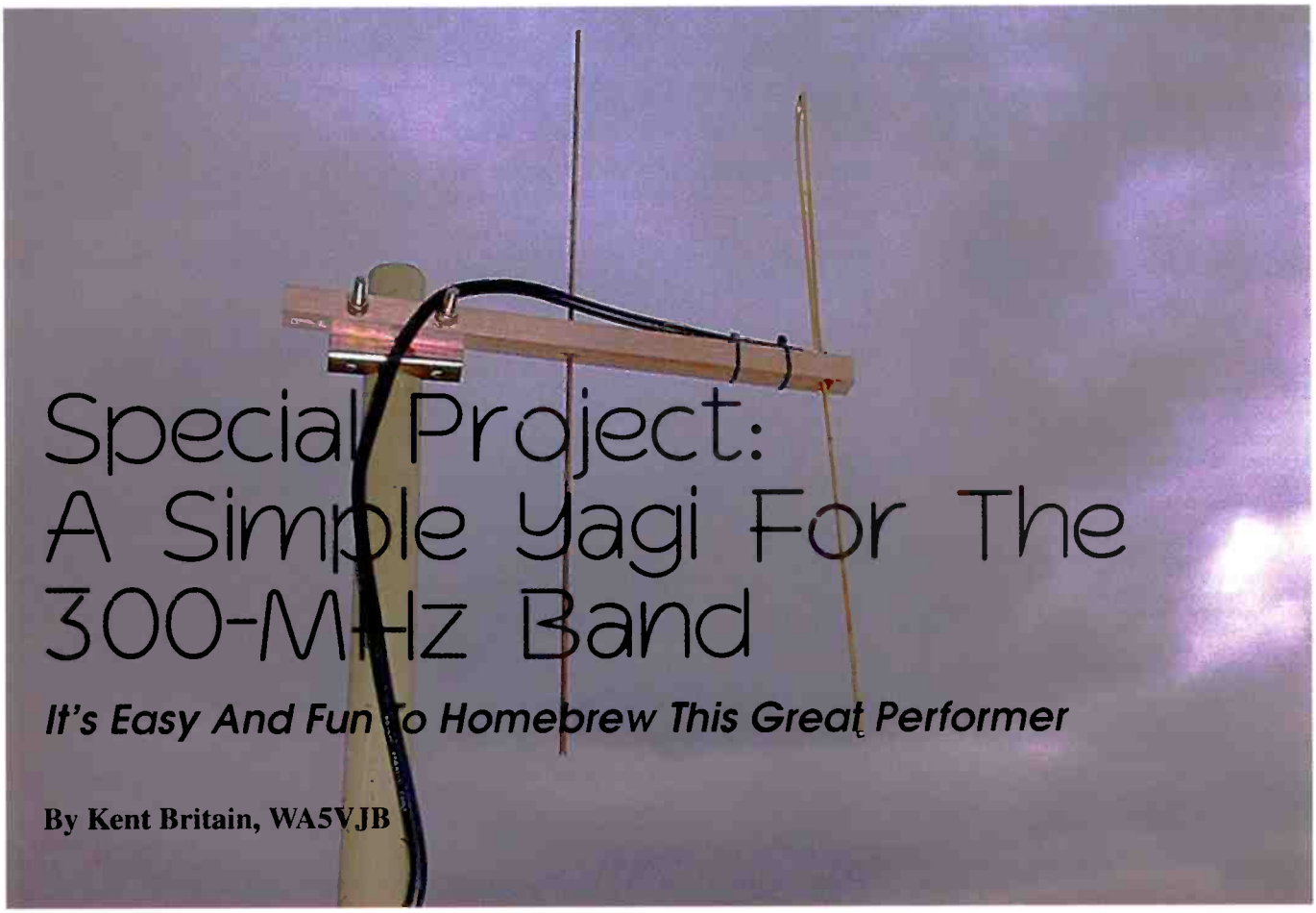


Special Project: A Simple Yagi For The 300-MHz Band

It's Easy And Fun To Homebrew This Great Performer

By Kent Britain, WA5VJB

The 300-MHz band has become one of the hotter areas for scanner enthusiasts, but proper antennas for the band are few and far between. It's time to change all that, so with a few easy-to-obtain parts and some good coax, you'll be tuning the mil-aviation band with a home-built antenna that'll knock your socks off!

These 300-MHz Yagis are from a family of "impedance-controlled" Yagis I've been designing for some years. Using advanced antenna design programs, and a few hours on the antenna range, a series of antennas using the structure of the Yagi itself for impedance matching have been the result. They're easy to build, inexpensive, and perform great!

We'll use 72-ohm coax because the higher impedance helps give the antenna a wider bandwidth, plus 72-ohm TV coax is cheap, plentiful, and offers lower loss than 50-ohm coax of the same size.

"Wood is the easiest boom material to use, but almost any non-metallic material can be used. If you need to mount your antenna outside, a coating of spar varnish, wood preservative, clear spray paint, or just plain old house paint will help it last for years."

Construction

Wood is the easiest boom material to use, but almost any non-metallic material can be used. If you need to mount your antenna outside, a coating of spar varnish, wood preservative, clear spray paint, or just plain old house paint will help it last for years. A 3/4-inch-square or 1/2 x 3/4-inch hardwood works best, but cheaper wood and even wood dowels have been used.

Fourteen years ago I mounted several similar antennas inside my attic, and they still work fine. Plastic water pipe *can* be used, but I'm not a fan of PVC antennas.

"I hold the elements in place with a drop of Super Glue or silicone adhesive."

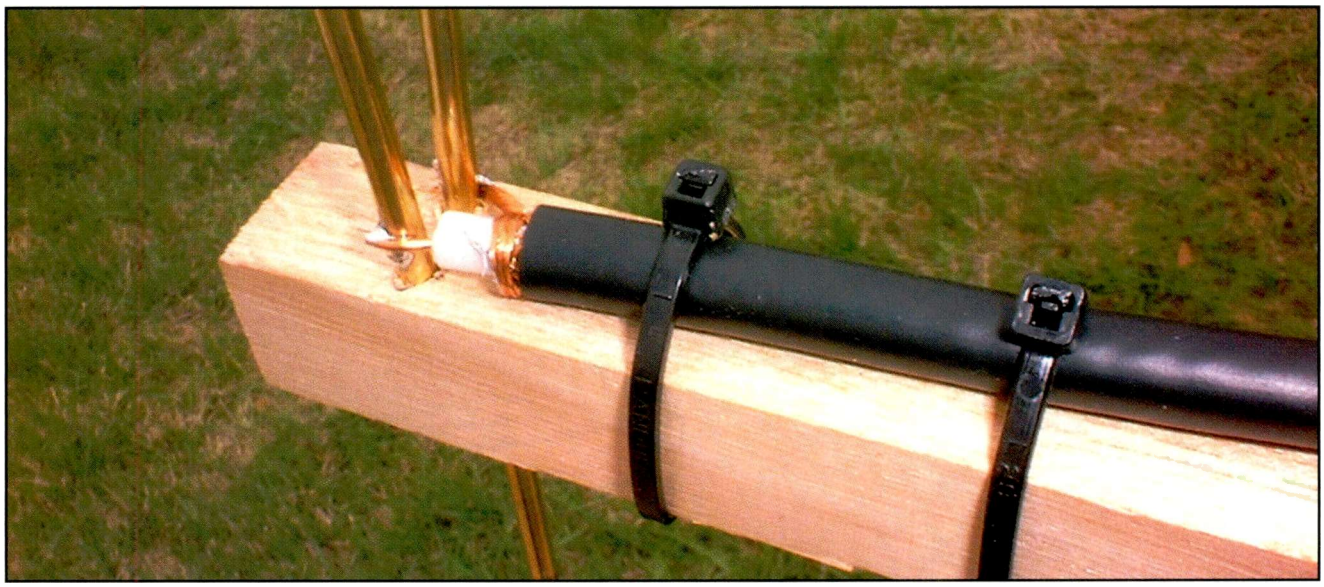
The Elements

The driven element works a lot better if you use something that can be soldered. My favorite is the Silicon Bronze Welding Rod, but No. 8 or No. 10 bare copper wire can also be used (see "Antenna Specifications").

For the reflector and director elements the cheapest wire to use is RadioShack's aluminum ground wire. A roll of 40 feet of this 1/8-inch diameter wire will cost you about $5. Welding rod, aluminum rod, and bare copper wire also work well. Always remember that you're looking for something about 1/8 inch in diameter.

I hold the elements in place with a drop of Super Glue or silicone adhesive.

The driven element can be thought of as a J-Pole antenna on its side, or as three-fourths of a folded dipole; I can assure you that these J driven elements work very well and are easy to make. The center of the driven element is a voltage null, and it's where



A close-up of the coax attachment.

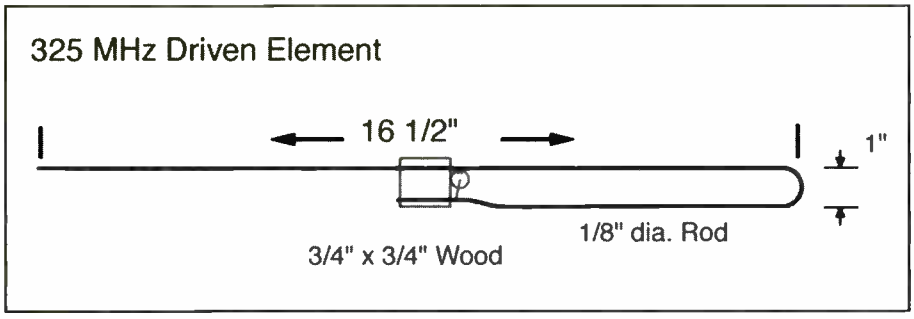


Figure 1. Dimensions of the driven element.

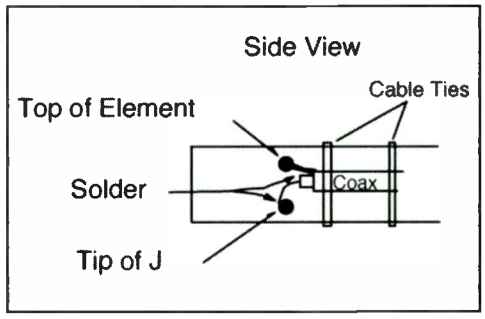


Figure 2. Attaching the coax to the antenna's driven element.

we solder the coax shield. The center of the coax goes to the tip of the J.

The coax can be RG-59 or RG-6. At 300 MHz these have far less loss than standard RG-58. Some RG-6 has aluminum shield, so look for some coax with a *solderable* shield.

Using The Antenna

A low-gain beam antenna is good when you know the general direction of your monitoring subject. The beam is still quite broad, and this antenna will give four or five times more signal than a discone or a tuned vertical.

I drilled my boom so that the antenna could be mounted vertically or horizontally, and so that it could go on a vertical or horizontal mast. The two-element antenna is centered for 325 MHz, but works well from 300 to 400 MHz. The three-element version picks up about 2 dB more gain with almost 20 dB of rejection off the back of the antenna, but this costs some bandwidth at the high end of the

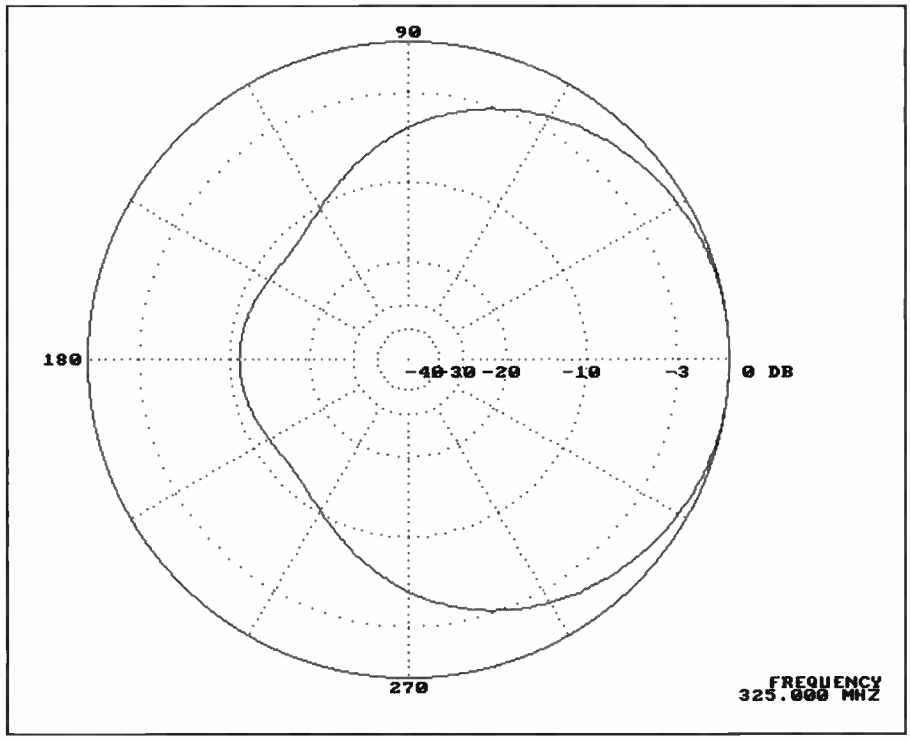


Figure 3. Pattern plot at 325 MHz of the two-element Yagi.

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- Weight: 12.2 oz.

† Features are subject to change

E10 $130*

AM/FM/Shortwave Radio

Intelligence meets performance in the E10. With 550 programmable memories, manual and auto scan, precision tuning and alarm clock features, the E10 provides the sophisticated tools for listening to news, sports, and music from around the world. The E10 even allows internal recharging of its Ni-MH batteries (charger and batteries included). With excellent AM, FM, and Shortwave reception, intermediate frequency shift and shortwave antenna trimmer—the E10 gives you the performance you want with the digital ease you deserve.

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- 550 programmable memories with memory page customization
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- Clock with alarm, sleep timer, and snooze functions
- Earphones
- Supplementary wire antenna
- Power Source: 4 AA Batteries (included) or AC Adapter/Charger (included)
- Dimensions: 7-1/2"W x 4-1/2"H x 1-1/2"D
- Weight: 1 lb. 1oz.

E100 $100*

AM/FM/Shortwave Radio

The E100 fits full-sized features into your palm or pocket. This little marvel is packed with all the latest radio features you want: digital tuning, 200 programmable memories, digital clock and alarm, plus AM/FM and Shortwave reception. And, it is small enough to fit in your coat pocket.

Features

- Shortwave range of 1711 – 29,999 KHz
- 200 programmable memories
- Memory page customization
- Manual and auto scan, direct keypad frequency entry
- Earphones
- Power Source: 2 AA Batteries (included) or AC Adapter (not included)
- Dimensions: 5"W x 3"H x 1-1/4"D
- Weight: 7 oz.

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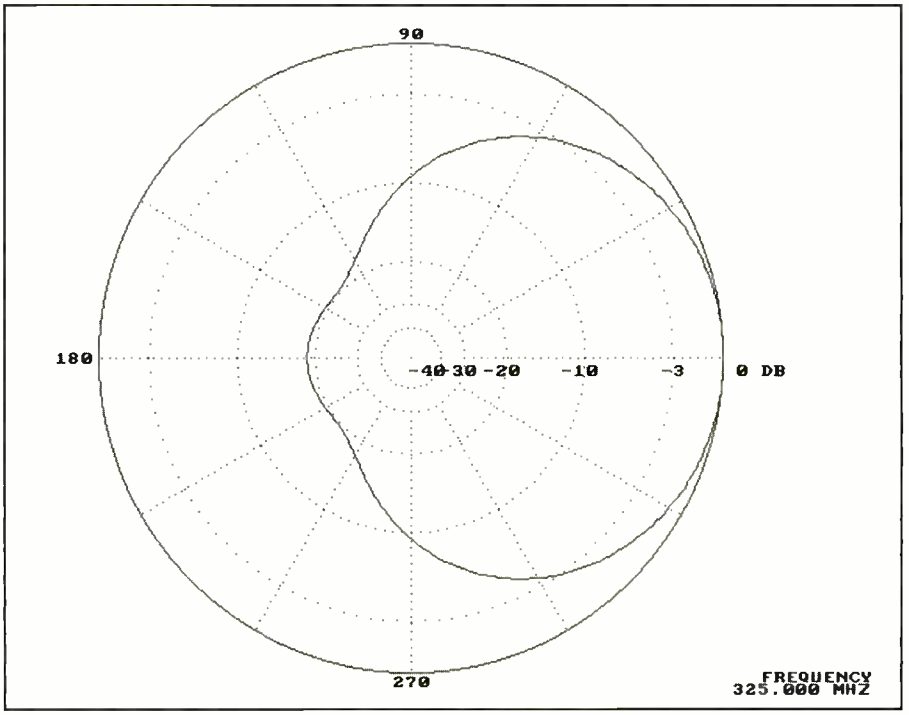


Figure 4. Pattern plot at 325 MHz of the three-element Yagi.

"If you're more interested in 325 to 400 MHz, just multiply the lengths and spacings by .93 for your new dimensions."

band. Performance is good from 300 to 375 MHz.

If you're more interested in 325 to 400 MHz, just multiply the lengths and spacings by .93 for your new dimensions.

Design Requests?

My editor has been doing some serious arm twisting to get me to develop 150-, 470-, and 850-MHz versions. If you can suggest any other frequencies I should be looking at, drop me an e-mail at wa5vjb@cq-vhf.com. If you're interested in amateur radio versions of these Yagis, my original paper with designs for 19 different ham versions is available for download from my website. Just look in the Reference section at www.WA5VJB.com.

Good luck, and enjoy those stronger scanner signals! ■

Antenna Specifications

Dimensions (in inches)

Component	Length	Spacing
Reflector	18.0	0
Driven Element	16.0	5.5 from reflector
Optional Director	15.0	11.5 from reflector

Gain

At 325 MHz	Gain	Front to Back
Element 2	6 dBi	10 dB
Element 3	8 dBi	19 dB

Here are the dimensions and gain information for our two-element 300-MHz band Yagi.

by Tom Swisher, WA8PYR, milcom65@yahoo.com

The Civil Air Patrol: History And Frequencies

One of several types of aircraft used by the Civil Air Patrol, this GA-8 "Airvan" served in disaster assessment and relief efforts after Hurricane Rita. (Photo courtesy U.S. Air Force via Air Force Link)

The largest military auxiliary organization in the United States today, the Civil Air Patrol (CAP), has an interesting and varied history, with duties ranging from civil defense during World War II to drug interdiction and Homeland Security today.

CAP had its beginning just before World War II, when local groups in New York and New Jersey formed the organization for the purpose of patrolling from the air. Getting into high gear after the attack on Pearl Harbor, CAP's initial purpose was patrolling our shores by air using civilian volunteers, with "sub-chasers" operating from bases along the U.S. East and Gulf coasts.

Formally organized as the Auxiliary of the Army Air Forces in 1943, CAP units continued to serve in the interest of civil defense, flying cover for airports, coasts, and borders in search of infiltrators, as well as patrolling power lines, forests, and other strategic assets. CAP planes also flew as targets for anti-aircraft gunner and searchlight trainees by towing target sleeves for gunners to shoot. They flew many courier missions and provided valuable search and rescue operations, looking for downed aircraft.

After the war, CAP became the Auxiliary of the U.S. Air Force when it was made a separate service in 1947. CAP continued its civil defense function during the Cold War, even serving as satellite tracking targets after the Soviet Union launched Sputnik in 1957. The search and rescue function begun during the war continued, and today it's CAP's most well-known service.

CAP Today

CAP today is a non-profit organization with over 58,000 members and 27,000 cadets. Divided into eight regions, CAP is headquartered at Maxwell Air Force Base, Alabama, as part of the U.S. Air Force Homeland Security Directorate. It regularly provides many of the same functions it has offered since World War II, with additional functions including aerial security for major events, drug interdiction, and transportation of time-sensitive medical supplies.

Using high-wing aircraft from a variety of manufacturers like Cessna, CAP can fly visual search patterns with direction-finding emergency locator beacon receivers and provide slow-scan video and digital images to ground units. These functions are also valuable for disaster response, traffic control during major events, or for homeland security purposes.

An Extensive Comms Network

CAP boasts the nation's most extensive communications network. Using frequencies allocated for government use, CAP assets vary, but they include over 1,000 HF radio stations (fixed, mobile, and portable), over 500 VHF repeaters (fixed, portable/mobile, and airborne), over 4,000 VHF radios, more than 200 emergency generators, and nearly 100 emergency command vehicles. In **Table 1**, you'll find a listing of nationwide CAP frequencies, condensed from an official CAP document available (until recently) on the Internet, listing all CAP frequencies and their uses.

As part of the NTIA-mandated narrow-banding of federal government radio systems, CAP is currently in the midst of a project to upgrade all of its communications systems to narrowband standards. To this end, it has been purchasing new E.F. Johnson Project-25 compliant radios. It is unknown if CAP will continue to use analog systems or will shift to use of P25 exclusively, so keep your digital scanners tuned.

CAP Frequencies—Classified?

An interesting recent development was the decision at higher levels to make CAP radio frequencies classified, protected information that will henceforth be withheld from public access.

Re_Inventing Radio through Design and Necessity

FR250 $50*
Multi-Purpose

Stay informed and prepared for emergencies with this self-powered 3-in-1 radio, flashlight and cell-phone charger — no batteries required.

- AM/FM/Shortwave Radio Reception
- Built-in power generator recharges the internal rechargeable Ni-MH battery (Included)
- Cell-phone charger output jack 3.5mm (various cell phone plug tips included)
- Built-in 2 white LED light source and one flashing red LED
- Dimensions: 6-1/2"W x 6"H x 2-1/2"D
- Weight: 1 lb. 3 oz.
- Power Source: Built-In Rechargeable Ni-MH Battery Pack; 3 AA Batteries (not included); Crank power alone; AC Adapter (not included); AC Adapter recharges built-in Ni-MH battery pack

FR200 $40*
Crank it Up

Without the need for batteries, this self-powered 2-in-1 radio and flashlight helps you stay informed and prepared for emergencies.

- AM/FM/Shortwave Radio Reception
- Built-in power generator recharges the internal rechargeable Ni-MH battery (Included)
- Built-in white LED light source
- 12 international bands
- Dimensions: 6-1/2"W x 5-3/4"H x 2-1/4"D
- Weight: 1 lb. 2 oz.
- Power Source: Built-In Rechargeable Ni-MH Battery Pack; 3 AA Batteries (not included); Crank power alone; AC Adapter (not included); AC Adapter recharges built-in Ni-MH battery pack
- Available colors: Metallic Blue, Metallic Red, Sand, Yellow

FR300 $50*
All-In-One

This all-in-one unit offers functionality and versatility that makes it ideal for emergencies.

- AM/FM/TV-VHF/NOAA Radio Reception
- Built-in power generator recharges the internal rechargeable Ni-MH battery (Included)
- Can be powered from four different sources:
  1. The built-in rechargeable Ni-MH battery that takes charge from the dynamo crank and from an AC adapter (AC adapter not included)
  2. 3 AA batteries (Not included)
  3. The AC adapter alone (AC adapter not included)
  4. The dynamo crank alone, even with no battery pack installed
- Cell-phone charger output jack 3.5mm (various cell phone plug tips included)
- Built-in 2 white LED light source and one flashing red LED
- Weather alert
- Dimensions: 6-1/2"W x 5"H x 2-1/2"D
- Weight: 1 lb. 3 oz.

S350 Deluxe $100*

High-Performance Field Radio

For S350 Deluxe devotees the deluxe model combines a sporty new exterior with the same unrivalled functionality.

- Highly sensitive analog tuner with digital display
- Large, full range speaker with bass & treble control
- Clock, alarm, and sleep timer
- Built-in antennas and connections for external antennas
- AM/SW Frequency Lock
- Set clock and alarm while radio plays
- Dimensions: 12-1/2"W x 7"H x 3-1/2"D
- Weight: 3 lb. 4 oz.
- Power Source: 4 D or AC Batteries (not included) or AC Adapter (included)
- Available colors: Metallic Red, Black

YB550PE $80*

Digital Expertise

Offering high-tech digital performance and portability, the YB550PE packs performance into a small radio. Palm-sized and only 11oz, the YB550PE can receive AM, FM, and continuous Shortwave across all 14 international bands.

- Shortwave range of 1711 – 29,995 Khz
- Autoscan, direct keypad, and scroll wheel tuning
- 200 customizable station presets
- Alarm and sleep timer functions
- AC adaptor and supplementary antenna inputs
- Dimensions: 3-1/2"W x 5-3/4"H x 1-1/2"D
- Weight: 10.5 oz.
- Power Source: 3 AA Batteries (included) or AC Adapter (not included)

eton®
www.etoncorp.com

U.S. Army soldiers using a typical backpack-style radio with a folded "tape" antenna while on a security patrol in Bosnia and Herzegovina. (Photo courtesy Department of Defense via DefenseLink)

This has led to a great deal of spirited discussion in the monitoring community, with adherents to both sides of the argument. One school of thought holds that "if it passes through my house/body/car/scanner and is unencrypted, it's fair game." Another school of thought holds that "we, as patriotic scannists should withhold the information and remove it from our webpages." This debate has been raging for years and now has a new dimension.

So, keep that in mind and keep your CAP frequency lists where you can find them. Even though there are still lists of these frequencies in many locations on the Web, they have already disappeared, or will disappear soon, from official CAP sites. It's also possible, although unlikely, that if someone at CAP really gets hot under the collar they could attempt to force private citizens to remove these frequencies from personal webpages. Stay tuned for more on this debate.

U.S. Army/Marine Corps Tactical Communications

Are low band frequencies vanishing from your area? Do you think that low band is out of style? Guess again.

While the most popular monitoring target for scannists is the UHF military aviation band, don't overlook low band. VHF low band is used every day by the military, especially for tactical communications by ground forces. Low band has certain advantages in that it shares characteristics of both the HF and VHF bands. Transmission range is typically greater than that found at 100 MHz and above, yet antennas are short enough to be practical for portability.

Low band has another interesting characteristic: signals travel considerable distances when atmospheric conditions are right. Commonly known as "skip," this characteristic of low-VHF radiowaves enables us to hear signals from quite a distance. It is not unusual to monitor low-VHF transmissions from as far away as 1,000 miles when conditions are right, and reception out to

Table 1. Civil Air Patrol Nationwide

2.37100	Voice/Data
2.37400	Voice/Data
4.46600	Voice/Data
4.46900	Voice/Data
4.50600	Voice/Data
4.50900	Voice/Data
4.58200	Nationwide Calling
4.58500	Voice/Data
4.60100	Voice/Data
4.60400	Voice/Data
4.62700	Voice/Data
4.63000	Voice/Data
7.34100	Data
7.63500	Nationwide Calling (Voice/Data)
7.92000	Voice/Data
14.9020	Voice/Data
18.2050	Voice/Data
20.8730	Voice/Data
26.6170	Voice/Data
26.6000	Search and Rescue (AM)
26.6100	Search and Rescue (AM)
26.6200	Search and Rescue (AM/USB)
38.5000	Aircraft Ops
41.7000	Aircraft Ops
119.3500	Calling (AM)
120.8500	Search and Rescue Intersystem (AM)
121.6000	Emergency Beacon Practice (AM)
121.7750	Emergency Beacon Practice (AM)
122.0000	Flight Watch Nationwide Channel (AM)
122.7000	Glider Ops (AM)
122.8000	Glider Ops (AM)
122.9000	Government Aircraft ops (AM)
123.1000	Search and Rescue (AM)
123.4500	Aircraft Calling (AM)
143.7750	Search and Rescue
143.9500	Search and Rescue
148.1250	F2 Operations Repeater (input 143.750)
148.1375	F3 Operations Simplex
148.1500	F1 Operations Repeater (input 143.900)
148.5375	Search and Rescue
148.9750	Search and Rescue
149.5375	F4 Operations Simplex
149.5375	Search and Rescue
149.9000	F1 Data (1200-baud Packet)
149.9250	F2 Data (1200-baud Packet)
163.1250	Flight Line
163.1500	Flight Line
419.6375	Urban Search and Rescue
419.6875	Urban Point-to-Point
419.9875	Low-power Point-to-Point

Note:
1. All HF frequencies are USB, others FM unless noted.
2. Frequencies noted as "Data" use either 300-baud (HF) or 1200-baud (VHF) packet.
3. Some frequencies may be shared with other government users.
4. VHF operations frequencies F1–F4 use CTCSS tone 100.0 Hz.

Table 2. Military Low Band

30–30.56 MHz
32–33 MHz
34–35 MHz
36–37 MHz
38–38.25 MHz
38.25–39 MHz
40–42 MHz
46.6–47 MHz
49.6–50 MHz

100 miles or more occurs fairly often. This kind of skip is generally best in June and December, with June being particularly good. However, don't think that you won't hear skip at other times as well—skip caused by tropospheric ducting can happen anytime.

Military Radios: Here's What They Use

Radios used by Army and Marine Corps ground units include handheld models with limited range (typically used for intersquad communications) and the well-known and often seen backpack radios with a range of up to 25 miles.

The most commonly seen model has been the PRC-77, which is an all-solid-state, synthesized transceiver with frequency coverage from 30 to 76 MHz in 50-kHz steps. Introduced during the Vietnam War, the PRC-77 was the standard tactical radio used by the U.S. military for over 30 years. Generally carried with a "tape" antenna, which can be unfolded to 30 inches or so, the PRC-77 remains in wide use around the world because it's rugged yet easy to operate. The PRC-77 and it's short-lived predecessor, the PRC-25, introduced the use of the 150-Hz CTCSS squelch tone (known as "new squelch") to reduce interference problems.

Although some PRC-77 models are still used by National Guard and Reserve units, they have mostly been replaced by the PRC-119 SINCGARS (SINgle Channel Ground and Air Radio System). SINCGARS radios offer the ability to frequency hop to avoid interception or interference, and newer models include digital encryption to provide further security. The PRC-119 covers 30 to 88 MHz in 25-kHz steps, with the same 150-Hz CTCSS tone as the earlier PRC-77 and 25.

Army ground units may also carry UHF backpack radios like the dual-band PRC-113, which covers both the 116- to 150-MHz and 225- to 400-MHz bands. These radios are used by Forward Air Controllers to communicate with aviation assets flying ground attack missions.

In addition to being carried backpack-style in the field, the PRC-77 and PRC-119 radios also have a variety of accessories, such as mobile mounts, longer antennas, and power amplifiers, that allow them to be used as mobile or fixed-station radios, with a corresponding improvement in range.

Table 2 contains the general frequency ranges in which military low-VHF communications are most often heard.

Got A Topic Idea?

That's all for this issue. Remember, if you have an idea or request for a specific military monitoring topic, drop me a line at the e-mail address above. See you again in August! ■

by Gordon West, WB6NOA, WB6NOA@arrl.net

"New" MURS Frequencies: Quite A Hit!

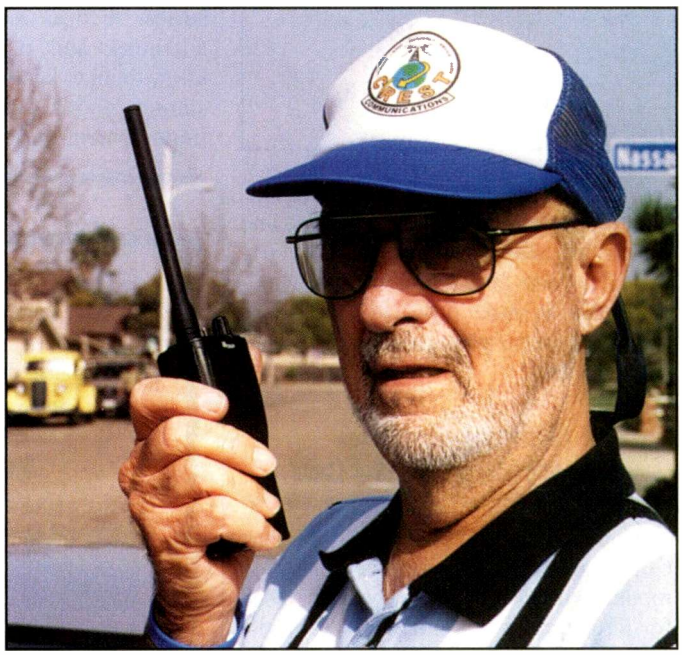
When the FCC released its Report and Order for the creation of MURS, (Multi-Use Radio Service), a new unlicensed VHF "Citizens Band" service, emergency responders were quick to investigate where these five "new" VHF channels (see box) came from.

The FCC's Report and Order reassigned these five low-power frequencies from the Land Mobile Part 90 service, and reassigned them to the Part 95 Citizen's Band Radio Service. No license would be required, and some interesting loopholes were found that would intrigue these emergency communicators, drawing them onto these five VHF channels. The personal radio steering group (PRSG) has some of the best chronology of all that occurred when the new MURS frequencies hit town. It's found at www.provide.net/~prsg/murshome.htm.

Some of the questions would-be users were asking included the following:

- Is interconnection to a phone patch okay?
- Is there unlimited antenna height?
- What is the effective radiated power?
- Are there continuous transmission capabilities?
- Are there 151/154-MHz repeater operations?

The FCC studied hundreds of such questions and comments regarding this new MURS service, and made some adjustments on what would be permitted and what would be disallowed.



Bob Leef, KB6DON, used the $69 MURS handheld over a two-mile solid copy path!

The Real Story!

In answer to these and other concerns, here's the scope:

- No phone connections are permitted in the MURS service.
- Antenna height limitations match 27-MHz CB radio; that is, 20 feet above a structure or 60 feet above ground as maximum.
- Maximum transmitter power (2 watts) measured at the antenna output.
- NO LIMITATION on gain of a directional antenna!
- Normal ±5-kHz deviation emission standards.
- Repeater operation is strictly prohibited, including time delay repeating.
- Continuous transmission strictly prohibited.
- New certification procedures to be implemented to identify radio model acceptance for use as a MURS station.

While the revised regulations were not earth shattering, the confusion about the MURS service kept equipment manufacturers at arms' length in addressing equipment specifically for the new five-channel allocation. And at this same time, the drive was on down at the local radio suppliers for FRS equipment and GMRS radios, all being offered at ridiculously low prices with much of the public having no idea that a GMRS license was required for the UHF band.

But unlike GMRS/FRS, with VHF MURS there is no limitation regarding business or commercial use, which, in addition to private, family, and point-to-point communications, could even include using MURS frequencies for remote control and telemetry, using nearly any type of emission that stays within the reasonable bandwidth limitations.

For the past year, though, just finding a 2-watt, *approved* MURS radio was a bit of a challenge. But leave it to well-known two-way radio specialist Bob Leef (www.rkleef.com)! He not only found an available VHF handheld capable of handling all five channels, he now offers the radios for *under* $69 each to emergency communicators or family members just wanting to stay in touch, or for business partners needing to communicate around a swap meet. They're called TruTalk and are ready to roll on two channels, right out of the box!

Bob's Thoughts On MURS

"MURS radios operate on license-free VHF frequencies and offer three or four times the power of FRS," says Leef. "The model I discovered has been sold by Midland Radio Corporation since 2001, and features 2 watts output, two-channel operation from five pre-programmed MURS frequencies, CTCSS encode/decode, drop-in charger, belt clip, and a heavy aluminum chassis."

This MURS radio equipment has not caught on like FRS, Leek believes, because most people don't see these MURS radios in the stores. "Out of sight, out of mind," he says.

"Six large power companies throughout the USA recently bought 50 MURS radios for each location, used as part of their simplex emergency communications system. The range exceeded their expectations," comments Leef, extolling the virtues of

The "New" MURS Channels

Frequency	Use
151.820	Interstitial (in between) business radio channels
151.880	Interstitial (in between) business radio channels
151.940	Interstitial (in between) business radio channels
154.570	Low-power business radio "blue dot" channel
154.600	Low-power business radio "green dot" channel

an uncomplicated radio with 2-watt output on VHF channels.

Our Tests

We tested the MURS radio extensively and it works as advertised, and with extremely loud audio. The antenna may be detached so you can use an external base antenna, or a magnetic mount antenna that will work from the reverse SMA antenna jack.

Initial testing involved a comparison of block-to-block coverage that we were having problems with in a community emergency response team callout. The little FRS radios would barely go a block; more powerful GMRS radios would maybe go 10 blocks. But the VHF MURS 2-watt radios easily penetrated 20 blocks, just using the supplied antenna system.

During our testing, we found that the two channels that turned on with the equipment were relatively quiet. When we went to a downtown shopping center, one of the two channels was indeed occupied; we finally traced it to a local fast food take-out stand. When we got back to the office, we looked into what it would take to switch out the factory-tuned two channels with the remaining channels pre-stored in memory.

Here's what we found:

Step1. Turn the radio on while holding the PTT and monitor bar simultaneously. The top panel LED lights orange. Release the buttons.

Step 2. Press the PTT bar alone and the LED changes from orange to red and you hear a beep. Move the channel switch to choose the channel you want to set up.

Step 3. Simply press the PTT bar for each channel number, a total of five.

To set the CTCSS tone, you go through a similar process, and with a little practice, you'll arrive at the tone you want for the specific two channels you have just put on the top-mounted Channel 1/ Channel 2 switch.

A Nice Niche

If this little radio were twice the price, I would call this channel assignment business a bit of a nuisance. But hey, at under $70 for a 2-watt, two-operating channel VHF, it's not bad. It takes only a few minutes to master the binary channel selection, which takes me back to the days of programming memory channels in scanners with ones and zeros! Sure, a five-position channel switch would be nice, and maybe that's why these radios are going out at such a ridiculously low price.

Bob Leef reports that many orders are coming in from community emergency response team members who were hooked on two-way radio comms but disappointed with the ultra-short range of FRS and GMRS. The cost and complexity of licensing GMRS equipment was also a deciding factor for many emergency groups in switching from UHF over to MURS—again, there's absolutely no license required and no "family members only" regulation.

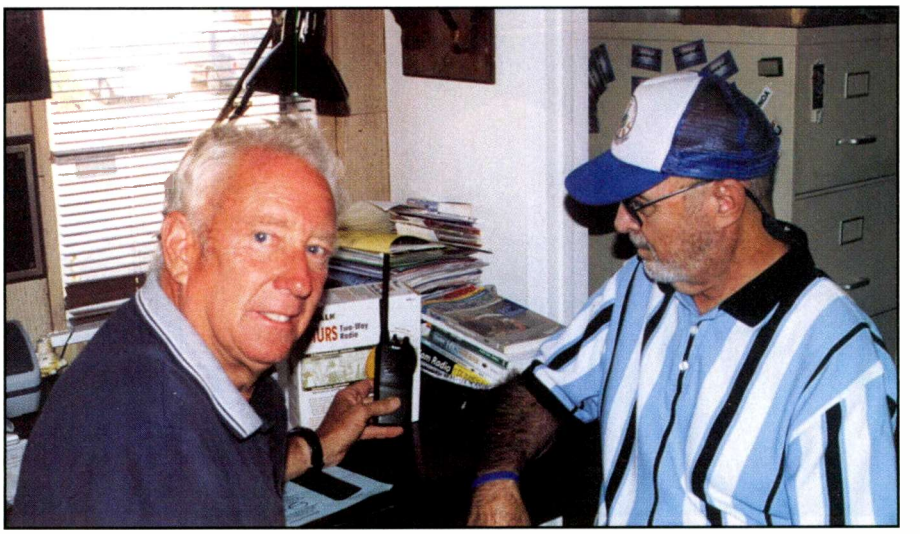
Plus, the radio is rugged. And when you issue a group of them to volunteers, the two-channel capability really makes sense, so you're not searching for members who've strayed away from the basic two-channel lineup.

Are the big radio manufacturers concerned that these radios will cut into their land-mobile business radio sales? You bet they are. But the FCC has made clear its desire to see a license-free radio service with moderate range available to those radio users who can discipline their operation on the five MURS channels and make the best use of low-cost equipment in the VHF radio service.

Mission To MURS

Let us know your experiences with MURS, and send along photos if you have them. We'll print your MURS stories right here in "Radio Resources"! See you again next month! ■

Here's the TruTalk 2-watt MURS radio for $69. It offers five channels with two active on the silver switch.



Gordo and Bob programming different MURS channels in the handheld.

You Load 16 Tons And What Do You Get?

Not Quite The Same As Loading No. 9 Coal, But Still A Real Task...

By Murray Green, K3BEQ

Those are the opening words to a song made famous by Tennessee Ernie Ford. Although recorded a long time ago, it can be compared to a recent project accomplished through the combined efforts of members of Washington, D.C. and Maryland local area amateur radio clubs.

The Green Mountain Repeater Association, the District of Columbia Metropolitan Amateur Radio Club, the Laurel Amateur Radio Club, and the Prince George's County (Maryland) ARES/RACES all pitched in when Keith Poptanich, KB3EGL, purchased a 700-pound crank-up tower from a local ham and the call went out for help. That call was answered by nine hams and one non-ham. The combined club member response, some planning, strong backs, and one heck of a driver got the job done.

The participants were Keith, KB3EGL; Jim, WI3N; HD, K3HDM; Ev, WA3DVO; Ken, KB3IIE; Cape, N3TTX; Jim, WA3NSI (being a sight-impaired ham did not deter Jim); Lee, KM3DR; Bob, KC3VO; Jim, KB3KHL, and non-ham Rick. These guys have a lot of talent in areas other than radio. It took some doing to plan, maneuver, carry, and drive those 700 pounds of steel across town, but as one of them said at the end of the job, "piece of cake." ■

Getting ready to lift 700 pounds of steel! (All photos by Murray Green, K3BEQ)

Nine hams and one non-ham on their way...then through the fence and around the bend to a waiting trailer hitched to a heavy-duty truck.

From here the tower was loaded onto the trailer and taken across town to the home of KB3EGL

by Kirk Kleinschmidt, NTØZ, kirk@cloudnet.com

Summer On Six: A Magical Place

Summer is sizzlin', or at least it will be when you receive this month's issue! And summer is the hot zone for 6-meter activity here in North America. Hot weather equals hot propagation at 50 MHz.

Not too many years ago, 6 meters was a lot less accessible than it is today, especially for beginners. With the advent of compact DC-to-daylight ham rigs, however, most new radios have 6 meters on the dial. If yours does, but you still haven't sampled the magic of VHF operation, there's no time like the present!

What's so special about six? Well, for starters, 50 to 54 MHz is an interesting, sometimes strange, VHF band that has some HF quirks thrown in for good measure. Propagation can be sporadic (pun intended), with no openings for a week, followed by strong openings to just about everywhere. Six-meter ops are universally friendly, and the equipment and antennas are physically small and easy to manage, whether at home or in the field. Once informally known as the "forgotten band" or the "TVI band," 6 meters is now lovingly known as "the Magic Band."

After a brief renaissance in the 1960s, 6 meters slipped into relative obscurity until the early '90s, when equipment for that band became plentiful and affordable. Because most new amateur radio transceivers (mobile rigs included) incorporate 6 meters, and because we know a lot more about how 6 meters works, now is the perfect time to get started there.

If you think 6 meters is good only for local communication, press your reset button now. Although 50 MHz supports reliable groundwave communications up to 100 miles with low-power, long-distance propagation on the Magic Band starts taking off in the spring and summer of just about every year.

It's Not Exactly Like HF

On the HF bands, signals are typically propagated via groundwaves or skywaves. According to lore, groundwaves travel a short distance before fading away, and skywaves—if we're lucky—reflect from the ionosphere to the ground, and back again, covering longer distances.

On 6 meters, the transition zone between HF and VHF, we have a veritable buffet of possible propagation modes. These include sporadic-*E* (also known as *E*-skip, or E_S), tropospheric ducting (tropo), field-aligned irregularities (FAI), backscatter, auroral propagation, meteor scatter (MS), trans-equatorial propagation (TEP), moonbounce, and more. If you're interested in learning about all these propagation modes in detail, or in finding great Web links to dozens of additional VHF resources, point your web browser to www.qsl.net/n2ffl/6meter.htm for more information. And, of course, be sure to regularly read Tomas Hood's excellent "Propagation Corner" right here in *Pop'Comm*.

Again, because summer is upon us, and because the sunspot cycle is relatively uncooperative, the most important mode for most of today's 6-meter ops is E_S, with a slight smattering of possible global F_2 propagation (used by HF operators to work the world).

E_S, which occurs throughout the solar cycle and does not depend in any way on sunspots, follows a seasonal pattern. When metallic ion clouds form in the *E* layer of the ionosphere, they act as large "floating radio mirrors" that reflect and refract 6-meter signals back to Earth. Because the ion clouds, which scientists think are formed from meteors and other sources, don't exactly form on schedule, we call this sporadic-*E* propagation.

Typical E_S contacts can span several hundred to 1,000 miles or more. When two or more E_S clouds are positioned correctly, "double-hop" contacts can take place over distances of 2,000 miles or more. This is how East Coast hams are occasionally able to work European hams on 6 meters when the sunspot cycle is bottomed out.

Most E_S action takes place between May and August, although winter openings in December and January are not

Ranger's RCI-5054DX-100, the updated 100-watt model, may be the perfect beginner radio for multimode work on 6 meters. Coming in at $350 factory direct (about $200 used on eBay), it won't break the bank, either. It offers VHF beginners and veterans alike AM, FM, SSB, and CW operation at 25- and 100-watt levels. The handy little rig runs on 12-VDC and is equally suited for home or mobile operation. Check it out at www.rangerusa.com/rci-5054dx.html.

uncommon. The hours from 9 a.m. to noon local time, and the early evening, seem to be the most active. Although E_S contacts can last for hours, brief openings are the norm. Distant stations will pop out of the noise, become quite strong, and then disappear just as quickly. This is exciting, and even a bit unnerving.

Six Meters: The New "Normal"

In the old days, decent 6-meter gear was practically nonexistent or terribly expensive. Today, however, 6-meter hardware is much more available and much more affordable. Most new HF transceivers offer 6 meters, and dedicated 6-meter multimode radios now sport attractive price tags.

My first 6-meter radio was an Alinco DX-70 mini mobile rig. It's actually designed for HF mobile applications from 160 through 10 meters, but because it includes 6 meters I'm able to get on that band with no additional expense. (Now that I have additional transceivers in the shack, my trusty Alinco is now a "dedicated" 6-meter radio.) Many first-time buyers experience similar benefits. Today's radios essentially throw in 6 meters for free!

Because I got my radio in the dead of winter (naturally), I encountered only two brief openings on the Magic Band until late spring/early summer, when the band was hopping. Unlike metropolitan areas, out here in the boonies, 6-meter operators are still few and far between!

And when it comes to antennas, 6 meters is an "easy access" band. A half-wave dipole is only 112 inches long, and a half-wave vertical totals just 56 inches. Full-size beams look like teeny television antennas! Rotators, masts, and antenna hardware of all sorts seem small by HF standards. Wire dipoles and full-wave loops work very well at 50 MHz and are easy to conceal, if necessary.

About the only antenna requirements that are more stringent on 6 meters are feed lines. If you use crappy, bargain-basement coax, you'll waste precious RF energy heating your cable. Coax losses at 50 MHz are about double those experienced at 10 meters. So do yourself a favor and spend a few more dollars on high-quality coax that's rated for use at 50 MHz or higher. You'll be glad you did!

Where And When

Because 6-meter activity seems to come in "waves," hams tend to use calling frequencies to find each other. Once contact has been established the operators can move up the band to clear frequency. The FM calling frequency is 52.525 MHz. On USB, listen to 50.125 MHz (veteran ops have been trying to get folks to use 50.2 MHz for years now, with mixed results).

Because 6 meters is closed more than it's open, hams use a variety of techniques to determine when conditions are good. A series of Morse code beacons can be found between 50 and 50.1 MHz (see the list of beacon frequencies at www.keele.ac.uk/depts/por/50.htm). If you can hear these low-power stations, you know the band is open between your part of the world and its part of the world (or that the beacon is down the street!).

Other "band opening" detectors include monitoring distant television and FM signals. TV Channels 2, 3, and 4 are just above the 6-meter amateur band, as are FM broadcast stations on the low end of that band (around 88 MHz). When TV stations from Austin, Chicago, or Kansas City show up on my TV in Minnesota, it's time to run for the radio!

During contests and band openings, 6-meter activity is plentiful in most parts of the country. The rest of the time, however, contacts can be scarce. To keep things moving, weak-signal operators have established a schedule of "activity nights," with each band getting its own night.

These schedules are subject to regional variation, so be sure to check things out in your area ahead of time. Traditionally, the 6-meter activity night is Sunday at 6 p.m. local time. To participate, check the FM and SSB calling frequencies at the appointed time and listen for other local or regional operators.

Unique Awards And Activities

In addition to 6-meter WAS (Worked All States) and DXCC (DX Century Club)—somewhat lofty goals for beginners—VHF ops have their own awards that can be pursued by just about anyone. Working "grid squares" is a primary pursuit. In a nutshell, the planet has been arbitrarily divided into thousands of grid squares based on small increments of latitude and longitude. The United States, for example, contains several hundred contiguous grid squares. Confirm contacts with hams in 100 of these little squares and you qualify for the ARRL's VUCC (VHF/UHF Century Club) Award.

The designators for each grid square have two letters and two numbers. When I lived in Connecticut I was in grid square FN31. Now that I'm in Minnesota it's EN25. When you hear 6-meter ops frantically exchanging grid squares during *E*- or *F*-skip QSOs, you'll know why. Grid square maps of the world and of the United States are available from www.arrl.org/locate/locate.html.

VHF contesting can be a real blast, and a lot different from operating contests at HF. Because the equipment is so portable, contest operators frequently travel to hilltops and mountaintops. Some stations even remain mobile! These rover stations travel from grid square to grid square to "activate" various remote regions.

Feel The Magic

All in all, 6-meter operation puts a different twist on everything. Whether you're a first-time VHFer or an experienced HF operator looking for something new, 6 meters may be just what the doctor ordered! ■

Here Right Now: *Free* AM And FM Digital Radio

There's No Subscription Fee, And It's On Standard Analog Frequencies!

By Bruce A. Conti

AM and FM radio is available for free, with digital clarity and without a subscription. It's called HD Radio, and that's the message legacy AM/FM broadcasters are sending loud and clear through the advent of high-definition digital radio, coming soon to radio stations near you, if not already on the air. It's all in response to the growing popularity of subscription satellite radio.

FM radio stations are now multicasting with separate "HD2" secondary digital channels featuring commercial-free and unique music formats, such as lost oldies, disco fever, avant-garde jazz, and hardcore hip-hop, while providing a primary digital simulcast of the programming carried on standard analog frequencies. Digital technology also brings near FM-quality audio to AM, and near CD-quality audio to FM. It's HD Radio moniker is intended to piggyback on the public's familiarity with HDTV, and it's here now.

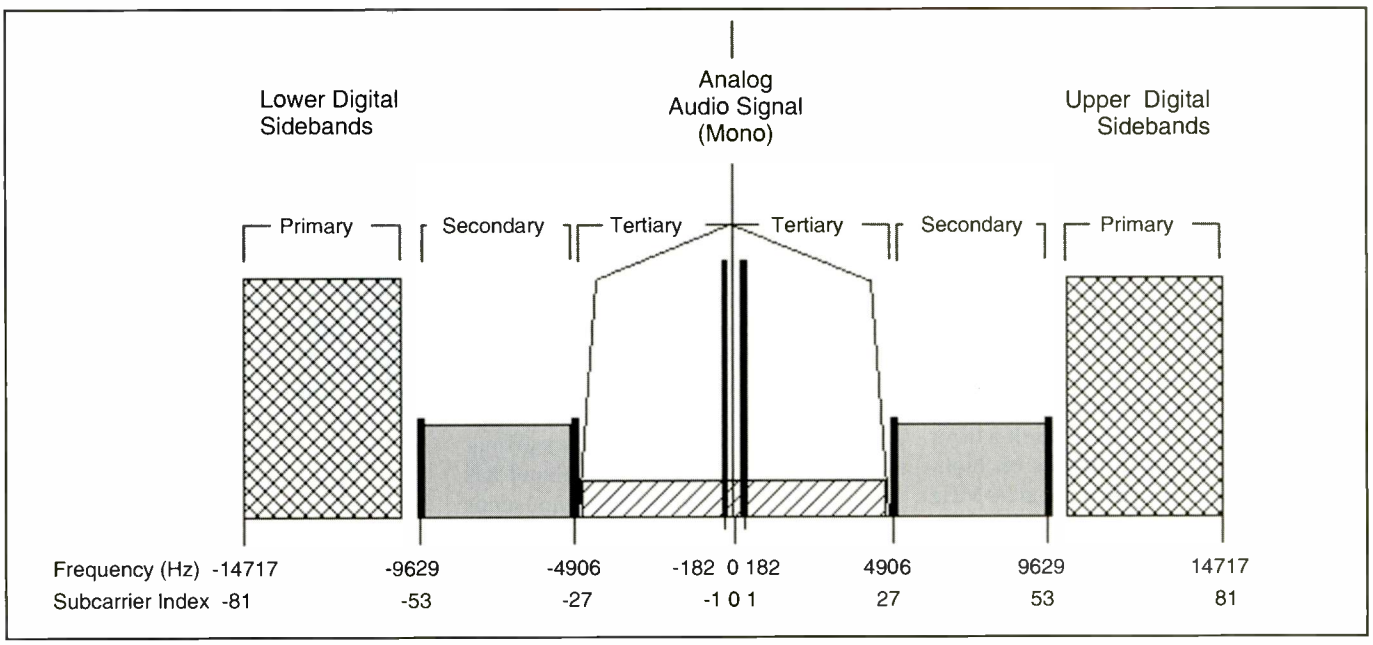
Brief History Of Digital Audio Broadcasting

Digital audio broadcasting (DAB) has been under development for well over a decade. At issue were a number of factors. What spectrum of radio frequencies was available for digital radio? What form would the digital signal take? What would happen to existing analog radio signals?

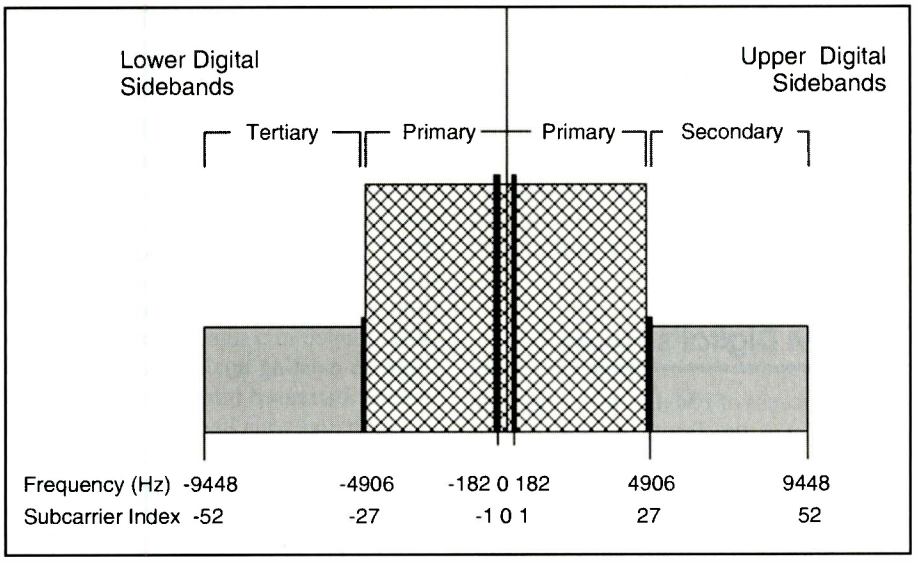
One ambitious model that surfaced early in the debate allowed for digital broadcasting within the AM and FM broadcast bands in coexistence with analog signals. The objective was to allow broadcasters to convert to digital in stages using their existing assigned frequencies without interruption of ongoing analog broadcasts. This would in effect bypass a lengthy application and reassignment process for digital frequencies in a new broadcast band, ultimately making the transition from analog to digital as smooth as possible for broadcasters and listeners alike.

The first major iteration of in-band AM/FM digital radio was developed by USA Digital Radio and demonstrated during the annual National Association of Broadcasters trade show in Las Vegas, Nevada, in 1995, some five years after the concept was first introduced. In that same year, DAB was successfully demonstrated on AM radio station 1660 KUSA, offering the promise of new high-performance music and data services "that are affordable, practical, backwards compatible with existing services and very low risk." (USA Digital Radio In-Band On-Channel Digital Audio Broadcast System Description, April 9, 1995.)

Fast-forward to 2001. Digital radio seemed clear for takeoff after opposing forces formed an alliance known as iBiquity Digital Corporation. Several revisions of the digital specifications



A look at the AM IBOC hybrid waveform. (All photos courtesy iBiquity Digital Corp.)



Here's an AM all-digital waveform.

led to something more closely resembling the European DRM in-band digital standard. However, not everyone was ready to accept the new DAB standard as the easy flight plan toward a digital destination. In-band, on channel DAB then won final approval by the FCC.

Digital's Dilemmas

There are two basic modes of AM/FM digital operation: hybrid and all-digital. In the hybrid mode, radio stations broadcast both the analog and digital signals on the same channel, or frequency, as the present analog-only transmission in the AM or FM broadcast band, hence the term "in band, on channel" (IBOC). While the original analog signal continues to be broadcast at its center frequency, a digital signal is simultaneously broadcast on the sidebands. This allows a radio station to begin digital broadcasting without losing its analog listenership, essentially making the initial conversion to digital transparent. The AM digital signal is pumped through the same transmitter as the AM analog signal, but a separate FM digital transmitter is interleaved with the FM analog transmission to handle the greater bandwidth of FM hybrid and an optional "extended hybrid" mode. In addition to the greater overall bandwidth used to carry both the analog and digital signals, the AM analog signal bandwidth is reduced to less than 10 kHz to provide more space for the digital signal.

Listeners using a wide bandwidth AM receiver will notice degradation in analog signal quality when a radio station is operating in the hybrid mode, most notably if the AM radio station was previously broadcasting a high-fidelity AM stereo signal. FM analog bandwidth, often already reduced to provide subcarrier information, can be further reduced for extended hybrid operation without noticeable analog signal degradation by other than the most discerning listeners.

By using the sidebands to carry the digital signal, the hybrid mode itself requires more bandwidth than the original analog-only signal, which has created some problems with transmission equipment and adjacent channel interference, especially for AM radio. Some AM/FM broadcast DXers have reclassified digital broadcasting as IBAC for "in band, adjacent channel" because the digital signal actually occupies adjacent channels, therefore making it not exactly confined to "on channel."

If you are within range of an AM or FM signal currently broadcasting in the hybrid mode, tune in to the channel or frequency at either side of the signal on an analog receiver to hear the digital hash. Interference on FM might be less obvious than on AM because FM has more space between channels, with a nominal bandwidth of 200 kHz versus the 10 kHz nominal AM bandwidth. For example, an FM hybrid signal at 89.7 MHz (say, WGBH Boston) can fill 89.5 to 89.9 MHz (0.400 MHz or 400 kHz wide) without spilling over to the next adjacent channel at 89.3 or 90.1 MHz, at least in theory.

Worse On AM

FM DXers have encountered digital spilling over wider frequency ranges; AM broadcasters don't enjoy the same luxury. Due to a nominal bandwidth of only 10 kHz, the AM hybrid signal must spill over *beyond* adjacent channels to accommodate the digital sidebands. So, for example, an AM hybrid signal at an analog center frequency of 710 kHz (like WOR New York) actually covers ± 15 kHz from 695 to 725 kHz for a bandwidth of 30 kHz, which causes harmful interference not only to the adjacent channels of 700 and 720 kHz, but also results in low-level interference at 690 and 730 kHz. In any case, the digital spillover isn't considered a problem for the average AM/FM *listener* who normally wouldn't attempt to receive signals adjacent to a local radio station, but for a *DXer* with specialized equipment capable of receiving signals on adjacent channels, the hybrid digital signal is a source of significant interference and perturbation.

Broadcast engineers also face challenges implementing IBOC digital. Older transmission equipment may not be designed to handle a wideband signal. Extensive modifications like "digital-ready" transmitter replacement may be required, especially for AM. Many AM radio stations use highly directional antennas to prevent interference with co-channel and adjacent signals due to the nature of distant groundwave coverage and skywave propagation on mediumwave frequencies. The directional signal is typically achieved with a phased array of antennas tuned to a very narrow bandwidth for maximum efficiency. A directional AM antenna array is easily identified by a cluster or row of tall antenna towers. Problems with overload, distortion, spurs, and other forms of interference may occur with such an array.

In some cases, AM signals are diplexed or multiplexed into the same antenna(s) to conserve real estate. In other words, more than one signal is transmitted via the same antenna(s). This leads to further challenges for engineers who must deal with interference between the coexisting digital signals, in addition to issues with analog inherent to multiplexing. For many low-power local AM broadcasters operating on tight budgets, often barely able to break even from month to month, conversion to IBOC digital is an expensive proposition that cannot be justified.

Although the installation of new transmission equipment is required for FM digital, upgrading hasn't been as problematic as with AM. Interleaving the FM digital sideband signal with the

analog has gone relatively smoothly in comparison to AM. Unlike AM, most FM antenna systems are omnidirectional because VHF reception is typically line of sight. FM signals only propagate over long distances under rare atmospheric conditions, and at such low signal levels that interference with local radio stations is unlikely. Probably most problems encountered by FM broadcast engineers have been in urban areas where FM antennas may interact due to being located in close proximity or sharing the same tower.

The All-Digital Mode—No Timetable...Yet

As the IBOC hybrid mode gains acceptance among broadcasters, manufacturers, and the public, the next step will be conversion to an all-digital mode. Although conversion to the all-digital mode is foreseeable, analog signals aren't expected to be phased out for a while. A timetable for mandatory conversion to all-digital radio remains undetermined.

In the all-digital mode, the analog portion of the hybrid signal is replaced entirely by digital, thus providing more bandwidth to maximize digital capabilities. The digital signal would then use the full power of the former analog signal for improved robustness and coverage area. Under current specifications, the overall bandwidth of the all-digital signal would be slightly *decreased* to reduce adjacent channel interference, because some of the extra bandwidth occupied by the fringe digital sidebands in the hybrid mode would no longer be necessary. However, all-digital AM and FM would still occupy at least a portion of adjacent channel bandwidth, so the slight reduction in bandwidth would be of little consolation to broadcast DXers.

AM Digital's Future?

The success of FM digital has become apparent, yet the future of AM digital remains clouded due to adjacent channel and nighttime skywave interference concerns. Right now, AM digital broadcasting is limited to daytime only, or "critical hours" between 6 a.m. and 6 p.m. during the shorter daylight of winter. AM broadcasts must revert to analog-only overnight. Full-time AM digital operation on a case-by-case basis is under consideration by the FCC, but still far from receiving final approval. So don't plan on mothballing your analog radios anytime in the near future.

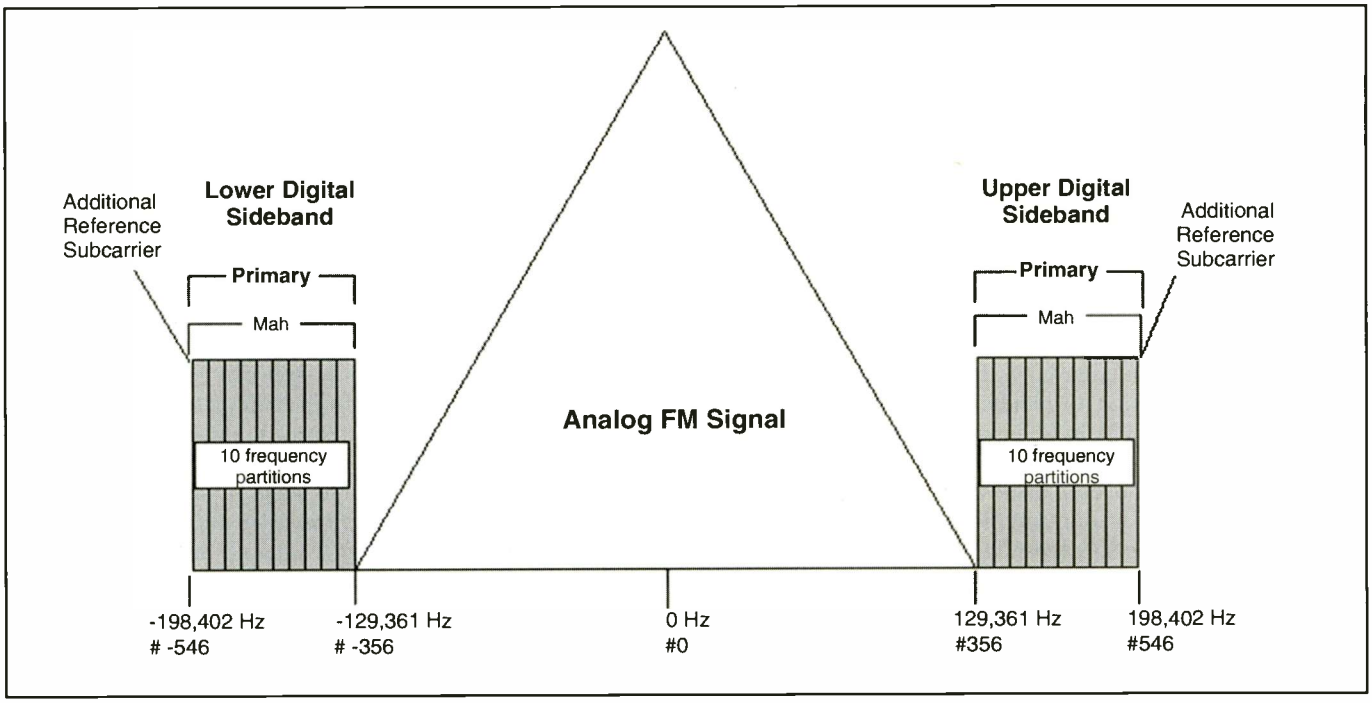
Meanwhile, radiowave interference isn't the only issue facing AM IBOC digital. Kahn Communications has filed suit in federal court against the implementation of AM digital. Details of the lawsuit could not be released prior to court proceedings, but it can be assumed to involve adjacent channel interference, and the exclusivity of a single digital standard approved by the FCC. This isn't the first time Kahn has attempted to stop AM digital. Kahn petitioned the Commisssion in 2003 to reevaluate approval of AM digital, citing increased interference and expenditures that would force independent rural broadcasters out of business, while rendering nearly a half-billion radios obsolete. Kahn offers its own solution, called Cam-D, to improving AM performance in a manner fully compatible with existing analog technology and without increased interference.

No matter what happens, the future of AM radio hangs in the balance between progress in the form of digital modernization and what radio stations like 1620 WNAR proudly broadcast in good old reliable "ancient modulation."

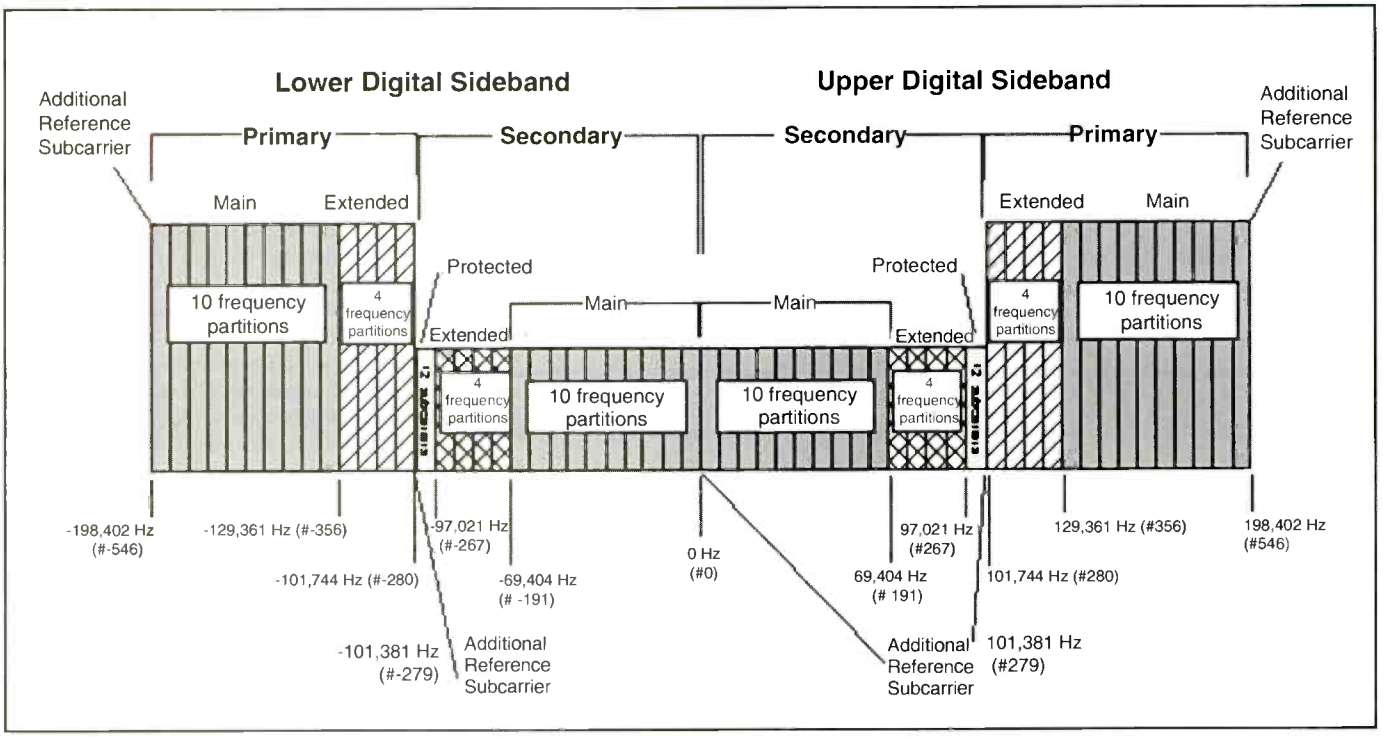
One more note for those interested in AM/FM digital radio, Boston Acoustics has dropped the price of its introductory Receptor HD Radio table model. The radio is reported to be flying off the shelves. Right now, this is the radio to get if you want to be among the first to experience digital radio. As HD radio takes off, we'll be bringing you more details right here in "Broadcast Technology." See you again next month!

Broadcast Loggings

AM "ancient modulation" DXers are receiving plenty of outstanding signals



The FM IBOC hybrid waveform.



The FM all-digital waveform.

with solar activity at its minimum. Here are a few selected logs. All times are UTC.

162 Radio France Inter, Allouis, France, at 0334 with a strong signal, French talk and music, heard on my Zenith Trans-Oceanic 7000, without using any external antenna. (Yost, MI)

183 Europe 1, Felsberg, Germany, at 0310 with French talk, the strongest signal I have yet heard from any longwave broadcast station. I could even detect it using my 80-meter vertical, at a moderate level, so I decided to see if I could hear it on my transistorized '70s vintage Zenith Trans-Oceanic Royal 7000, using only its internal ferrite rod antenna. I could. Incredible! (Yost, MI)

225 Polskie Radio, Solec Kujawski, Poland, at 0512 loud and clear with a man in Polish and pop tunes including Bryan Adams' "I Do It For You" and Sting's "Fields of Gold." (DeLorenzo, MA)

531 DRS Beromunster, Switzerland, at 0500 with polka music that sure didn't sound like Spain. Easily paralleled to the DX Tuners signal on an Irish receiver. Mostly under co-channel RNE Spain during the hour I listened, but that polka music cuts through very nicely. ID, "Hier ist Musigwall, good morgen," pips, then news in German. (Renfrew, NY)

550 KLLV Breen, Colorado, at 1655 faded in after I lost KFYI Phoenix, Arizona, which was running the "nearly famous Barry Young Show." All Christian programming, ID as K-Love. (Barton, NM)

570 KNRS Salt Lake City, Utah, at 0350 with Mike Reagan talk program. Good IDs at start of Fox News on the top of the hour. (Barton, AZ)

580 KMJ Fresno, California, at 1333 a tough copy mixing with two other stations, heard ID along with "News/Talk 580" slogan. (Barton, AZ)

585 Radio Nacional de Espana, Madrid, Spain, at 0245 with a great flamenco music program. Time pips at :00, then jingle into "Radio Nacional de Espana; Informativo" news. Very good on peaks with minor slop from adjacent signals. (Chiochiu, QC)

600 KOGO San Diego, California, heard at 1325 with a Dr. Dean Edell short take, then morning local area news. (Barton, AZ)

630 Radio Progreso, Pinar del Rio, Cuba, at 0422 heard with "Nocturno" program of adult contemporary music, mixing with CHLT Sherbrooke and WPRO Providence, parallel 640 and 890 kHz. 890 had the best signal. Rare! (Chiochiu, QC)

710 Radio Rebelde, Cuba, at 0445 with news summary of the day. This was the dominant signal on 710, and not co-channel WOR New York which only from time to time topped the frequency later in the night. (Chiochiu, QC)

720 RDP1 synchros, Portugal, at 0422 a Portuguese vocal, then fast talk; occasionally over the CHTN, YVQE, and WGN mélange. CHTN reducing its signal this way has made 720 a much more viable transatlantic channel. (Connelly, MA)

927 VRT Radio Een, Wolvertem, Belgium, at 0200 a brief German newscast, then several alternative rock and pop/cabaret style vocals. Material possibly included Laurie Anderson, Tori Amos, and Dido. Belgium not listed on at this time per the *European Medium Wave Guide*. After hearing this with a good signal, I checked DX Tuners. Same station noted on the Waterford, Ireland and Folkestone, UK receivers but surprisingly not dominant on Stuttgart, Germany, which had a 3-station mix. Bruce Conti mentioned Belgium on air outside of listed schedule hours. Local 1510 WWZN wiped out chances to see if 1512 was parallel. (Connelly, MA) At 0350 good with a French pop vocal, then a Radio Een ID into a rock vocal, later Melanie "Candles in the Rain" parallel www.radio1.be streaming audio. New. (Conti, NH)

999 Voice of Russia/RMR, Maiac, Moldova, at 2215 good with news in Russian, then pop music, following a now familiar format of music with news breaks every 15 minutes, over COPE Spain futbol play-by-play. (Conti, NH)

1026 SER synchros, Spain, at 0259 with a Cadena Ser promo, 5+1 pips at 0300, "Cadena Ser, Servicios Informativos" ID, time check, "son las cuatro, las tres in Canarias," new. (Renfrew, NY)

1080 WVCG Coral Gables, Florida, at 0348 with urban contemporary gospel music and a choppy signal underneath WKJK Louisville, Kentucky, for the most part, but it would cover WKJK at times. IDs as "Newstalk 1080, WVCG" and "Radio One...The People's Station." (New, GA)

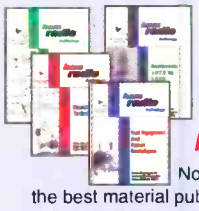
1140 KNWQ Palm Springs, California, at 0515 with "Marshall and Stone" talk show discussing Riverside County bomb hoax , usual ID only as "K-News" and mentions of "1140 and 970 AM." (Barton, AZ)

1380 KHEY El Paso, Texas, at 0445 with sports talk, spots for El Paso-area businesses, ID and news at the top of the hour, faded out after that with local sunset. (Barton, AZ)

1490 WPCI Greenville, South Carolina, at 2303 with blues music fading in and out of the static, and a decent signal as the station identification was announced, only to then fade into the static, "This is WPCI, Greenville, AM Stereo for 1490." (New, GA)

1540 WOGR Charlotte, North Carolina, at 2330 with gospel music and a decent signal in and out of the static; "You're listening to WOGR Charlotte... Word of God Radio." (New-GA)

Thanks this month to Rick Barton, Bogdan Chiochiu, Mark Connelly, Marc DeLorenzo, Bert New, Jim Renfrew, and Scott Yost. 73 and Good DX! ■



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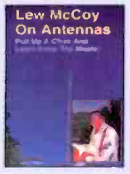

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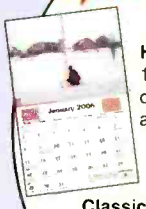

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by Bill Hoefer, flacap388@hotmail.com

Pirates Of The Air, And Orlando International Airport

Interference to radio and television has been a problem since the early days of wireless. We get it from storms, power lines, the aurora, automobile engines—and sometimes other radio operators. Here in St. Pete, I've heard *malicious* interference on both 2 meters and 20 meters.

Interference on *aviation* frequencies is there, too. It's nothing new but, amazingly, reports abound of malicious interference to our aviation frequencies. However, for the first time I can recall, there's now a case of interference to air traffic from, of all things, a pirate radio station in Miami.

The mainstream media has recently reported that a pirate radio station, calling itself "Da Streetz" (107.1), had been periodically interfering with planes departing Miami International Airport (MIA). Kathleen Bergen, a spokeswoman for the Federal Aviation Administration, stated it was "...intermittent. Not all day, everyday." The signals were traced to a nearby warehouse. Radio equipment, three computers, and a compact disc player were confiscated from the warehouse, but no disc jockey was found. The broadcasts, however, have continued on the Miami ATC frequency. Fortunately, pilots change to alternate frequencies in order to speak with ATC.

Federal laws, of course, prohibit anyone from transmitting over the radiowaves without a license. Florida also put an anti-piracy law into effect in 2005 that forbids anyone from interfering with a public or commercial station. In July 2005, the state shut down a pirate station in Fort Lauderdale and arrested two men. Also in the same month, it shut down a second station in Jacksonville. In all, the Florida Department of Law Enforcement (FDLE) has investigated six cases of radio interference. Those caught violating the state law face third-degree felony charges, up to five years in jail, and a $5,000 fine. *Federal* law is much harsher.

Seven years ago the FCC reported, "The FAA requested assistance 75 times to address such matters as unknown sources of interference on air traffic control frequencies and locating and silencing unauthorized transmissions on frequencies used for aircraft radar identification systems. In a few cases, individuals were intentionally jamming communications between the tower and aircraft, thereby jeopardizing the safety of landing or departing aircraft."

In an official FCC Compliance and Information Action in March 1998, the Commission announced it had, "...located and shut down an unlicensed radio broadcasting operation in Sacramento, California, that was reported by the Federal Aviation Administration (FAA) to be causing interference to safe air traffic control communications at Sacramento Executive Airport. The FCC said that "after investigating FAA complaints about interference at the airport on four different frequencies, it identified the source as an unlicensed radio station operating on 107.2 MHz...in a letter the FAA told the FCC the unlicensed radio operation was 'creating an unsafe condition in our National Airspace System.'"

It's also not the first time ATC frequencies have been interfered with in Miami. In October 1997, the FCC "obtained vol-

Glossary Of Terms And Acronyms

ARTCC (Air Route Traffic Control Center)—A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace, principally during the en route phase of flight.

ATC (Air Traffic Control)—Means what it sounds like.

FSS (Flight Service Station)—Air traffic facilities that provide pilot briefing, en route communications and VFR search and rescue services. They also assist lost aircraft and aircraft in emergency situations and relay ATC clearances. Similar is *AFSS (Automated Flight Service Station).*

ICAO (International Civil Aviation Organization)—Headquartered in Montreal, Canada, this agency of the UN develops the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth.

IFR (Instrument Flight Rules)—A set of rules governing the conduct of flight under instrument meteorological conditions.

ILS (Instrument Landing System) Approach Plate—Diagram published by the FAA and privately that depicts the procedure pilots need to follow to execute an ILS approach.

NAVAID (Navigational Aid)—Transmitter that helps pilots navigate from one point to another.

NOTAM (Notices To Airmen)—A notice of information that contains timely data concerning the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System) which is essential to personnel concerned with flight operations.

UNICOM—An aeronautical advisory station primarily for private aircraft.

VFR (Visual Flight Rule)—A set of regulations that a pilot may operate under when weather conditions meet certain minimum requirements. They are to be followed when there is sufficient visibility for aircraft to be seen and avoided.

VORTAC—The VOR system is the backbone of air navigation in the US and most other countries. It is composed of usually round buildings, about 30-feet in diameter, with a cone sticking out of the top. Many are painted in a red and white checkerboard pattern. VOR is an acronym for Very high frequency Omni Range. VORTAC is the same with TAC, standing for TACAN, a military designation for its distance information on a VOR signal.

WSI (Weather Services International)—Headquartered in Andover, Massachusetts with offices in Birmingham, England,WSI provides weather-related products and information to professionals in the energy, aviation, and media markets, as well as multiple federal and state government agencies.

Control tower at the Orlando Airport.

Orlando Air Frequencies

UNICOM:	122.95
ATIS:	120.525 121.25
WX ASOS:	PHONE 407-855-5235
ORLANDO GROUND:	121.8 275.8
ORLANDO TOWER:	118.45 124.3 253.5 118.45
ORLANDO APPROACH:	119.4(181-310 5500 & BLO) 120.15(181-359 ABOVE 5500) 121.1(311-060 5500 & BLO) 124.8(000-180 ABOVE 5000) 127.325(061-180 5000 & BLO) 284.7(181-359 ABOVE 5500) 307.0(000-180 ABOVE 5000) 351.9(311-060 5500 & BLO) 123.85 125.55 134.05 339.8
ORLANDO DEPARTURE:	119.4(181-310 5500 & BLO) 120.15(181-359 ABOVE 5500) 120.525 121.1(311-060 5500 & BLO) 124.8(000-180 ABOVE 5000) 127.325(061-180 5000 & BLO) 284.7(181-359 ABOVE 5500) 307.0(000-180 ABOVE 5000) 351.9(311-060 5500 & BLO)
CLEARANCE DELIVERY:	134.7 341.7
(RY 17/35):	118.45
(RYS 18L/36R & 18R/36L):	124.3
AR OPS:	148.8 41.5
ARR:	121.25
CLASS B:	119.4(181-310 5500 & BLO) 120.15(181-359 ABOVE 5500) 121.1(311-060 5500 & BLO) 127.325 (061-180 5000 & BLO) 284.7(181-359 ABOVE 5500) 351.9(311-060 5500 & BLO)
EMERG:	121.5 243.0
IC CLASS B:	124.8(000-180 ABOVE 5000) 307.0(000-180 ABOVE 5000)

Spot The "Not"

One vehicle I thoroughly enjoy is the Volkswagen Beetle. In the last 36 years my wife and I have owned nine—that's right, nine—VWs. I even have a collection of nearly 450 toy VWs We just purchased a 1970 Beetle Cabriolet, which is pseudo-German for rag-top or convertible. By the way, I'm trying to figure how to put a scanner and/or a 2 meter radio in it!

Anyway, and in honor of my fetish, can you spot the NAS fix that isn't real in the following?

VOLKS WAGEN SUPER BEETL SAMBA RABIT THING GOLLF DUNNE BUGGY

I'll give you a hint: there are five of these 10 that are NOT real fixes. You may be surprised.
SUPER is 75 miles WSW of San Francisco CA (SFO)
RABIT is 19 miles SSE of Alabaster AL (EET)
THING is 4 miles N of Corsicana TX (CRS)
GOLLF is 13 miles NW of Princeton MN (PNM)
DUNNE is 10 miles SW of Jefferson NC (GEV)

untary shut down of two separate unlicensed operations interfering with air traffic control frequencies at Miami International Airport and West Palm Beach International Airport."

The bottom line is that radio interference of this type can prove life threatening. While interference can come from many sources, when it comes from a pirate station, it's very troublesome, indeed. We must be even more vigilant since September 11 and report all illegal radio activity to the authorities.

Orlando Bound?

I wasn't born in Orlando, but I did grow up there, graduating from high school in 1970. My first real job was as a "sanitation engineer" (read janitor) for the Civil Defense unit in Orlando. The training facility was on Rosalind Avenue to the west of Herndon Airport, now Orlando Executive Airport (ORL). But even as far back as November 1962, when the Cuban missile crisis saw the entire U.S. military on the highest alert in decades, I was already hooked on aviation. I can still remember watching the fighters and bombers from around the country fly into McCoy Air Force Base (MCO) on the south side of the city, in preparation for a possible nuclear strike against Havana.

McCoy AFB is long since closed, but the airport is still active. In fact Orlando International Airport (MCO), its current incarnation, is one of the busiest airports in the entire country.

A Proud Military History

Like the airports I described in the last column, MCO got had beginnings during WWII, as Orlando Army Airfield Number Two. It was later named Pinecastle Army Airfield and housed the B-17 Flying Fortress. Later still it was renamed Pinecastle Air Force Base and serviced B-29s and P-80 jet fighters. Shortly after the war the base was deactivated, and I have no idea what it was used for between its closure and subsequent reopening in April 1952 during the Korean conflict.

Air Training Command took over the field with the primary job of fighter pilot training. A year later the 321st Bombardment Wing was activated and, by June 1954, was fully operational under the Strategic Air Command, though different bomber and transport units would come and go. In 1958 Pinecastle AFB was renamed McCoy Air Force Base in honor of the first commander, Colonel Michael N. McCoy, whose life was lost during the annual Strategic Air Command Bombing Navigation and Reconnaissance Competition in November 1957. Also in 1957, the 76th Fighter Interception Squadron arrived. The 76th was the descendent of the WWII Flying Tigers. Finally in 1961 the base's B-47s were replaced by B-52 Stratofortress bombers, which this year are celebrating 50 years of service to the USA!

As already mentioned, McCoy was a major military staging area for the Air Force, Navy, and Marine aircraft during the Cuban crisis. But after the end of the Vietnam War the top brass in the Air Force determined that the base was no longer needed or required, so in 1975 the base, with its adjoining land and buildings, was given to the city of Orlando. It was not until 1984 that the first scheduled international service was inaugurated.

Handling Busy Airspace

From 1984 to 2004 the airport hosted over 30 million passengers passing through the terminal. Two additional towers have been built and two more runways have been added. Fortunately the two new runways—17L/35R and 17R/35L—are far enough to the east that traffic using them does not interfere with Orlando Executive Airport (ORL), just a scant six miles due north of MCO.

Before the new runways were built airliners landing at MCO had to cross the ORL VORTAC (located at Orlando Executive) at a height of 2,500 feet or higher and then had to do a slam dunk, so to speak, to land on runways 18L or 18R. Aircraft departing 36L or 36R had to be able to cross the VORTAC at or above 2,500 feet or make a hard turn left or right to avoid violating ORL's airspace.

The current tower was, until the new Atlanta Hartsfield Tower that was just commissioned, the tallest tower in the United States. Of the 826 average flights handled daily, 92 percent are air carriers and air taxis.

If You're In The Area...

So if you're headed to Orlando make sure you bring along your scanner and our handy frequency chart, "Orlando Air Frequencies." Enjoy your vacation this summer in sunny Florida! See you again in August. ■

by R.B. Sturtevant, KD7KTS

Radio Fun And Going Back In Time

Q. Who was the first President of the United States to own a radio of his own?

A. Warren G. Harding, 29th President, got a radio of his own in September 1920 while he was running for the presidency. First for the primaries and again in November for the general election, he tuned in along with thousands of radio enthusiasts. They all, through their earphones, heard that Harding had rolled over Cox with a great majority. Harding's radio was the first to carry the word of victory to a newly elected President.

Q. How does GPS interface with radio and whose idea was it?

A. The Schneider Trucking Company was the first to install GPS transponders in their 400,000 trucks. Each vehicle constantly broadcasts its location, serial number, and load information. The system and the coded software that goes with it allows the management to locate any vehicle, driver, or load using GPS gear on the truck at anytime, anywhere in the nation.

The military found out about this system and applied it to their needs. Now commanders in the field can locate and identify every combat vehicle on the battlefield, tell who it belongs to, and if it is friendly or not. This has reduced the number of friendly fire deaths in Afghanistan and Iraq tremendously.

Q. Who invented the rectifier tube and when?

A. Like a lot of things this was a joint venture that happened a great deal by accident. Thomas Edison was working on the electric light bulb in 1883. Without explaining what he was up to, he instructed the glass blower who made his light bulbs to put a piece of metal in the end opposite the filament. That piece of metal was to be connected to the outside of the bulb by a small wire.

When the battery was attached to the bulb it was found that current would flow if the extra wire was attached to the positive side of the battery. If attached to the negative side of the battery no current flowed. This convinced Edison that a cloud of electrons (negatively charged) would flow through the added wire to the positive side but not if attached to the negative side. This was known as the "Edison effect," but it was promptly forgotten about because it did not have application in the project at hand. It was noted, however, that the tube would change AC to DC, or rectify the current.

In 1907 another American inventor, Lee de Forest, was working on ways of controlling the current going through a tube. He added a grid between the filament and the plate, as the metal piece at the opposite end of the tube was now called. De Forest found that by attaching a negative current to the grid no current would flow, even with a relatively high voltage going through the tube. By slowly reducing the negative charge going to the grid some current would begin to flow, going from a negative charge to a neutral one, then to a positive one. The remarkable thing was that small changes in the grid power would produce large changes at the plate power. This tube, called a triode, resulted in amplification of the signal going through the tube. This made radio as we know it today, possible.

Looking Back...

Five Years Ago In *Pop'Comm*

If we must say, there was another great *Pop'Comm* cover from June 2001. It shows the *Rudolf Egelhofer* when it was part of the former East German Navy and coincides with our feature, "Monitoring The German Navy" by Joe Cooper. Critters and chemicals are everywhere it seems, and writer Pete Bertini recognized that fact in his "Wireless Connection" column with a special article in June 2001 on how to keep them from ruining your antique radio day!

Ten Years Ago In *Pop'Comm*

The latest and greatest news from ICOM was its superb IC-R8500 receiver that covered a load of the RF spectrum. And the quote of the day is found on page 28 of our June '96 *Pop'Comm* in a photo caption accompanying some "folks" with weapons: "The Soviet-Afghan war has been over for years but politically, things still are unsettled..." Amen.

Twenty Years Ago In *Pop'Comm*

There was a full-page color ad from Benjamin Michael Industries showcasing the company's Nitelogger automatic tape recorder activator. Remember BMI? Today we checked its website and there was no mention of the Nitelogger, but they've got a few clocks that would work quite well in your shack! And there he is on page 39 of our June '86 magazine—Gordon West, WB6NOA, using a D-104 mic!

Pop'Comm June Survey

I typically do the following with my copy of *Pop'Comm*

Read through it and keep it for a few days	1
Read through it and keep it only until I get the next issue	2
Keep it a month or so	3
Keep it less than a year	4
Keep it more than a year, but less than three years	5
Keep it indefinitely	6
Give it to a friend	7
Tear out an article or two and keep it for reference	8

The cover photo that I like the *most* is:

Military	9
Public safety; police and EMS	10
Firefighter or firefighting photos	11
Commercial aircraft in flight or on runway	12
Military aircraft, including cockpit photos	13
Commercial station antennas	14
Commercial broadcast studios	15
Disaster photos	16
Other hobbyists using radios	17

I would prefer to see:

Longer articles/columns and less photos	18
Shorter articles/columns and more photos	19
More hands-on antenna projects	20
More frequencies	21
Less frequencies, but more in-depth articles/columns	22
More GMRS and alternative two-way radio articles	23
More photos/articles on mobile radio installations	24

by Rich Arland, K7SZ, richard.arland@verizon.net

CB Radio: Good For Emergency Comms?

This month we're going to explore Citizens Band (CB) radio. It can be a vital part of emergency communications (EmComms), and there's quite a bit of ground to cover, so let's dive right in.

Waaaaaay back in 1958, the FCC decided to "give away" the 11-meter portion of the amateur radio bands and form the Citizens Radio Service. Up until that time, if you were a private individual and wanted to engage in radio communications you had limited choices. You could obtain an amateur radio (ham) license, with which you could not discuss business or commercial interests under any circumstances, *or* you could apply for a business band license, which meant paying very high prices for relatively low-power VHF FM equipment and a hefty licensing fee. Until the FCC set up the Citizens Radio Service there was no middle ground.

Being the FCC, and firmly believing in the bureaucratic process, the Commission proceeded to establish an all-encompassing set of rules and regulations in the form of Part 95. Licenses were required, callsigns were assigned according to various districts around the United States, and power limitations and antenna height restrictions were set in place. Initially the RF output power could not exceed 5 watts *input* to the final amplifier of the radio, and antenna height was restricted to 20 feet above the tallest manmade object.

In all, Part 95 of the FCC Rules & Regs was very much in keeping with Part 97, which governs the Amateur Radio Service. Licenses were issued for a small fee (around $5, if I remember correctly) and callsigns were meted out. After about six to eight weeks of waiting, your shinny new callsign arrived in your mailbox. Then you were "street legal" and able to get on the air on 11 meters. Strict radio discipline was expected and woe unto the Cursed Infidel who dared not adhere to Part 95!

Back in the late 1950s through the mid 1970s the FCC was a very powerful, sometimes vengeful, organization that struck fear into the hearts of even the most calloused individuals. They were the Radio Gods and their word was *Law*! Period! Dare to defy them and you *would* suffer the consequences.

My, How Times Have Changed!

My first exposure to 11-meter CB was in 1963 in Potlatch, Idaho, where a local farmer, Dave Walker, needed a summer hand on his ranch. Mom and Dad gave me the okay, and I went to work for Dave hauling hay, driving a bulk truck, and whatever else he needed. One thing about Dave, he was a forward-thinking individual. He had jumped on the CB bandwagon early on and had a vacuum tube CB transceiver installed in every vehicle he owned, one at his home as a base station, and one on his tractor and another on his combine. In a word, Dave was "radioactive!"

Having been involved in shortwave listening for many years and being in the middle of studying for my Novice class ham license, pairing up with Dave Walker was for me akin to Robin meeting Batman! We had a ball with the trucks, combine, hay bailer, and the radios! Dave's callsign was 14Q0387 and I quickly became 14Q0387 Unit 2.

Here's the EF Johnson Messenger One, offering 5 watts input power and five crystal-controlled transmit/receive channels. With its superhet receiver it can easily be converted to 10-meter AM by replacing the channel crystals and retuning the radio. (Courtesy www.retrocom.com)

After a few weeks of working on Dave's ranch, I cautiously brought up the subject of CB radio to my Dad, who managed the Arland Motor Company. The company, started by my Grandfather, George Arland, in 1903, was the oldest International Harvester dealership west of the Mississippi River (it closed its doors only in 1976). Back in the early '60s, International Harvester had gotten into bed with the Raytheon Company, which coincidentally, manufactured 11-meter CB sets! Talk about an opening.

Dad, being a bit of a techno-junkie himself, decided that obtaining a few of these Raytheon CB sets (Ray-Tel TWR-2) might be a great idea. Soon there were five brand new TWR-2 transceivers sitting on the shelf. Of course, we put one on the air at the store (KFJ-0879), one in the company pickup truck, another in Dad's car (a 1958 Buick Century), and a fourth at our house. That left one to sell! It went out the door with a local farmer about 10 days after it came in from Raytheon, and Dad had to order more. Oh, gosh, what a tough job, but somebody had to do it! Over the next few years the Arland Motor Company sold many CB sets to local farmers and ranchers who had jumped on the CB bandwagon. In short order a local CB club, the Palouse Hills CBers, was formed, and, of course, dad and I became charter members.

When I left Palouse to attend college in Yakima, Washington, I obtained an ECI Courier 23 CB base station to use in my room. This was a great-looking and great-sounding set. Once I got my new callsign, KLD-1928, I was always on the air chatting with many of the locals in and around Yakima who were also hams. That Courier 23 was a great asset to a young college student majoring in electronics engineering. People on CB at that time used callsigns, proper operating etiquette, and were quite pleasant on the air. None of the profane, hateful, vengeful language and exchanges that proliferate on the CB bands today. Times have certainly changed.

This is a picture of the ECI Courier 23 vacuum tube crystal controlled CB base station (left). An early crystal-plexed synthesizer, it will take a major effort to convert it to 10-meter AM. This unit is exactly like the one I used in college in the mid to late '60s. The Globe Star (right) is another great candidate for conversion to 10-meter AM. This rig is built like a tank.

Here is another vacuum tube CB in my basement. Eventually this one will be converted to 10-meter AM along with my EF Johnson Messenger One. These old rigs are great projects for the intermediate builder/homebrewer—not too complicated but enough of a challenge to be a lot of fun. The end result is a good radio on a useable band that won't fold up if there's a nuclear detonation. (Courtesy www.retrocom.com)

Why are we taking this trip Down Memory Lane (DML)? For one thing, to reassure the newcomer to the radio hobby that CB did have a great beginning and was a viable communications service early on *and* can be again. Second, there are a lot of old tube-type CB sets out there in cellars, attics, thrift shops, etc. just begging to be put back on the air. Now before you think I've totally flipped out, let me explain a virtue of vacuum tube equipment. For this, we'll have to journey about half way around the world to Japan. The date, September 6, 1976.

I was in the 5th Air Force Tactical Operations Center (TOC) doing some "communications things" one afternoon when suddenly the klaxon went off, alerting the battle staff that something of magnitude was in progress. The place was quickly secured and my cohort and I were told to stay put; we would be allowed to leave in due course.

What happened? Why all the fuss? It seems that a Russian pilot by the name of Lt. Viktor Ivonavich Belenko had hijacked a MiG-25P (Foxbat-A) Russian fighter aircraft from the 513th Fighter Regiment based in Sakharovka, Siberia, and had proceeded to fly it under the radar, almost the entire length of Japan, looking to defect! He landed at Hakodate Airport just north of Tokyo with only 30 seconds of fuel left in his tanks! WOW! How about that piece of history?

Of course, this was not a big hit with the Japanese Air Self-Defense Force (JASDF) or the United States Air Force. Here you have a front-line fighter/deep-interdiction aircraft capable of Mach 2.3 penetrating the island defense systems of Japan and nobody caught on until he was almost two-thirds of the way to his target destination! Had he been fully armed and bent on "being bad," Lt. Belenko could have caused havoc on Honshu (hmmm....sounds like the title of a country western song). As it was, his surprise arrival at Hakodate had everyone in a tizzy. Since the runway at Hakodate was short, he overran the end by about 800 feet, stopping in the dirt.

To make a long story short, Lt. Belenko landed and surrendered to the Japanese police on the airfield taxiway. Almost immediately, the 5th AF deployed a team of technicians and photojournalists to the location. The Japanese had already erected a cover over the MiG-25 to keep prying Russian satellite eyes from seeing what we were doing. Foreign Technologies Division (FTD) personnel from Wright-Patterson AFB (right outside of Dayton, Ohio) were flown in and Lt. Belenko stood by to show everyone where the anti-tamper demolition charges were placed to keep unauthorized hands off the critical portions of the aircraft. Several of my good friends were photojournalists at Yokota Air Base and were involved in photographing and documenting the dismantling of this aircraft.

Vacuum Tube Radios?

Two things that puzzled many people involved with this mission were this front-line Russian fighter's lack of titanium, depending instead on steel for the airframe, and its reliance on vacuum technology. The transistor and the associated solid-state technology were firmly entrenched in modern electronics equipment, so why had the Russians decided on vacuum tubes in this airframe?

One of the FTD team members explained to the assembled masses that vacuum tube technology was almost impervious to electro-magnetic pulses (EMP), like those given off when a nuclear device is detonated. In essence, this MiG-25 (and most probably every other piece of aircraft hardware in the Russian inventory) was able to operate in a nuclear environment without any retrofitting, hardening of solid-state components, or massive re-tooling of production runs. Suddenly, the USAF folks on site with the MiG-25 became painfully aware of how ready the USSR was to fight a nuclear war and how inadequate the United States was to answer the challenge.

Thirty Years Later...

Why would any serious EmComm volunteer or radio hobbyist today be worried about obtaining and using a tube-type CB set? Esoteric collections and restoration of classic CB gear aside, there seems to be virtually no place at the table for a five-channel vacuum tube CB set in today's EmComm environment. Well, read on.

If you've been involved with CB radio in the recent past you're aware of the 40-channel AM only rigs that cost under $75 and the high-end SSB/AM models that cost upwards of several hundred dollars. These radios are all solid-state machines, meaning that they incorporate transistors, integrated circuits, memory modules, and all sorts of digital bells and whistles only available with "sand-state" technology. The one thing these state-of-the-art transceivers *won't* do is stand up to an EMP of several hundred thousand to several *million* volts! What would happen to them? The delicate solid-state circuits would be "fried," rendering the radio useless. After an EMP strike, you'd have a very nice state-of-the-art paperweight, complete with a microphone!

For many years I believed that the United States had little to fear from super-power countries like the old USSR or China. Conversely, I've always had the sense that the good old USA is ripe for a nuclear terrorist attack. With our thousands of miles of borders and the seeming inability of the U.S. Border Patrol to stem the tide of illegal immigrants (one need look no further than the recent "Minute Man" escapades on the Tex-Mex boarder), the stage is set for some very unsavory folks to smuggle in several suitcase nukes and detonate them across the country!

You and I can't even begin to imagine the consequences of such an act. One localized attack, albeit horrible, would be survivable. A dozen nuclear devices detonated across the country in a coordinated attack, like the airliner attacks of 9/11, would virtually stall FEMA's efforts just from the sheer scope of the disaster. If you don't think this could happen, just look at FEMA's stellar response to Hurricane Katrina's devastation.

One of the first things to happen would be an executive branch declaration of martial law. Airports, railways, and interstate highways would be shut down. Nobody would be going anywhere. The Posse Comitatus statute (prohibiting the use of the armed forces for law enforcement) would be suspended and the National Guard along with various military reserve units would take over law enforcement duties and monitor *everyone* everywhere within the United States.

Most Comms Would Be Useless

Then there's the communications debacle that would occur. Forget cell phones, EMS/police/fire department repeater systems, and trunked radio systems—they all rely upon solid-state electronics. Your trusty FRS/GRMS radio along with your transistorized CB set and ham gear would be useless, because they, too, depend upon solid-state technology. Telephone service would be totally disrupted or non-existent, because Ma Bell likes transistors, too. No Internet, no e-mail, no commercial power, no air conditioning, and no heat since the power grid across our nation depends upon computers to handle the various loads and distribute power.

It's not a pretty picture. It's one thing to say, "we're going to bomb the Taliban back into the Stone Age," but hell, they are already there! However, totally disrupt basic services in the United States, and you have a *real* problem. Riots would immediately follow. A feudal mentality would take over and the "Golden Rule" would be in effect (he who has the guns also has the gold and makes all the rules!). In short, it would be far worse than any survivalist fiction ever written!

With a total disruption of communications, how would we, as EmComm volunteers, be able to do our jobs? To say it would be difficult is an understatement. With the lack of ham repeater coverage over most of the affected areas, 2-meter and 70-centimeter FM traffic handling would be relegated to simplex frequencies. Those hams with some vacuum tube equipment could certainly get back on the air in a hurry, as long as they had 120-VAC power available. Ditto for the vacuum tube CB sets.

The Answer Right There In Front Of Us

So, is it really all that strange to think about obtaining a used tube-type CB set or two, getting them back into working order, and from time to time, trying them out to make sure everything still works? Absolutely not! As a matter of fact, there is nothing wrong with converting one or more of these old CB radios to 10-meter frequencies (29.0 MHz is the main 10-meter AM calling frequency, with 29.1 MHz a secondary calling frequency). With the increase in sunspot activity in the next few years, 10 meters will be in prime shape for some serious DXing and contesting, too. If you have a converted CB rig on 10-meter AM, you'll definitely have someone to talk to!

There have been articles in past editions of *CQ Amateur Radio*, *73*, *Ham Radio* and *QST* regarding converting these older vacuum tube sets over to 6-meter AM also. Now there's a real challenge! Or how about using the CB set as a tunable IF strip for a series of up/down converters that will get you on other ham bands? After all, this electronics pastime is defined as a technical hobby, so get to work! Heat up the old soldering iron and get on with it!

Wondering where to get a used vacuum tube CB set? If you have the stomach for it, try eBay. I've picked up several radios there at reasonable prices. Word of caution: *DO NOT GET CAUGHT UP IN BIDDING WARS!!* Do some research and find out what the sets you're looking to buy cost at ham radio flea markets and on eBay. Put that amount plus a couple of extra bucks in as your top bid and wait. If you pay over $35 to $40 for *any* tube-type CB radio set (the Browning Golden Eagle excepted), you've paid too much!

Interestingly enough, prices on eBay are cyclic, with lower prices being the norm shortly after the first of the year. I just bought an ECI Courier 23, a Johnson Viking Messenger One, and a Johnson Messenger 132 for less than $100 (for all *three* rigs), which included shipping on three heavy old boat anchor CB sets! Now that's not a bad deal.

The best deal of the bunch was the Messenger One, with five crystal sets, the original Astatic brushed aluminum mic, and in working condition (only $15.50 plus $13 shipping/handling). This unit started life as a 10-meter AM rig in the late 1950s. Johnson pressed them into the CB service by dropping the RF input to under 5 watts, which gave them an immediately competitive CB set with which to corner the market.

There are a whole slew of these old "whiteface" Messenger Ones out there waiting for a good home and conversion back to 10 meters. By decreasing the value of the final amp screen resistor, you can increase the power back up to about 10 watts. The modulator does not have the gain to fully modulate the radio at the 10-watt level, so this is one modification that might be left alone! Once the radio is working on the bench, add crystals for your favorite 10-meter frequencies (29.0, 29.1, 29.025, 29.050, and 29.075 MHz), retune the receiver and peak the transmitter, and you'll have a nice little 10-meter AM rig! Of course, you can leave well enough alone and use the Messenger One as a CB rig, but remember to keep the *output power* at or below 4 watts to be legal.

Be aware that not all CB sets are capable of being changed over to 10 meters, however. It depends upon the synthesizer scheme and how much money and effort you want to put into the project. My personal advice: stick with the older, vacuum tube CB sets that are crystal controlled. All it takes is the proper crystals being inserted into the unit and a retune for "maximum smoke" on the new band.

Synthesized/crystal-plexed rigs like the Johnson 132 and the Courier 23 can be converted by changing out one or more of the crystals in the synthesizer network. Lou Franklin at CB City International has all sorts of information regarding converting CB units for ham use. Check out his website and the books he has available for us "screwdriver-challenged hobbyists" and you will find a bunch of info on conversions.

Another great source of information on CB sets can be found in the Howard W. Sams *PhotoFact CB* books. Each book covers between five and eight CB sets, with all the specs mapped out, schematic diagrams of the circuits, tune-up procedures, etc. They can be found on eBay for between $3 and $5 each plus s/h. Lou's website has a Sams PhotoFact master index to aid you in obtaining the proper CB book for your rig. His books contain all sorts of mods, tune-up tips, and tricks to get the max out of these older rigs. Lou even offers kits for improving IF selectivity, adding speech processing, and (just for hams) add-on/stand-alone linear amplifier designs, parts kits, pc boards, etc. (*NOTE: These linear amps are not authorized for use on the CB frequencies, but will work well on HF ham freqs, as long as you follow instructions during fabrication, use proper shielding, and include the necessary low pass filters for the various HF bands.*)

Have A CB At The Ready

Well, what are you waiting for? A disaster to strike before you get off your duff and do some vacuum tube CB set restorations? I certainly hope not! With the summertime hamfest season in full swing, now is the time to procure that old boat anchor CB rig, plop the correct crystals in it, get it working again, and align the sucker.

See you on 10 meters AM soon. In the meantime, remember: Preparedness is not optional. ■

by Richard Fisher, KI6SN

Capitol Hill And FCC Actions Affecting Communications

APCO International Disappointed In FY 2007 Budget

Noting a "lack of adequate funding for dedicated first responder interoperable communications grant programs," the Association of Public Safety Communications Officials (APCO) expressed disappointment in the President's fiscal year 2007 budget.

"APCO International is concerned that there is no 'dedicated' [Department of Homeland Security] grant program for improving first responder interoperable communications" in the fiscal plan, the organization said in a statement on its website in February.

Officials also noted their "disappointment in the Administration's intent to eliminate the Community Oriented Policing Services (COPS) Interoperable Communications Grant program, despite the program's success."

APCO called on the Bush administration to:

- Provide $100 million for the COPS Interoperability Communications Grant program;
- Provide $1 billion "in dedicated funding for emergency communications grants from the [DHS] to local governments";
- Increase direct funding for the SAFECOM program

SAFECOM is "a communications program within the Office for Interoperability and Compatibility (OIC) that provides research, development, testing and evaluation, guidance and assistance for local, tribal, state, and federal public safety agencies working to improve public safety response through more effective and efficient interoperable wireless communications," according to testimony before Congress.

"There are solutions and remedies to improving emergency communications during natural and manmade disasters," the APCO statement added. "It is clearly time to provide focused grant programs for emergency communication needs independent of any other funding efforts."

Radio Amateurs Called "True Heroes" On House Floor

Contributions of wireless operators during the Hurricane Katrina disaster were recognized in a February 8 address from the floor of Congress by one of the two licensed radio amateurs in the U.S. House of Representatives.

Rep. Mike Ross (D-AR), who holds the callsign WD5DVR, said that "citizens throughout America dedicated to this hobby—a hobby that some people consider old fashioned or obsolete—were true heroes in the aftermath of Hurricane Katrina as they were often the only line of communication available into the storm ravaged areas." Ross's remarks were carried in *The ARRL Letter*, a publication of the American Relay League.

Although amateur radio is frequently pushed aside "in favor of flashier means of communication," communities in the hurricane-damaged areas discovered that other technologies can be "highly vulnerable" in severe storms, Ross said.

"Ham radios, entirely self-contained transmitters, require no cell towers or satellites—simply a battery and a strip of wire as an antenna," he added. Many lives were saved with the "critical intervention" of radio amateurs across the United States.

"The dedication displayed by ham radio operators in the aftermath of Hurricane Katrina sets a tremendous example for us all," Ross said. "The people whose lives were rescued as a result of the tireless dedication of ham radio operators will forever be grateful to these selfless public servants."

U.S. Rep. Greg Walden (R-OR) is also a licensed radio amateur with the callsign W7EQI.

Communications Failures Further Cited In Wake Of Katrina

"Katrina laid bare the sorry state of emergency communications—now what?" asks an article by David Perera in *Government Executive* magazine headlined "Missed Signals," February 1, 2006.

Perera painstakingly details many of the communications failures and challenges in the wake of the hurricane and concludes, "There are many lessons to be learned from how emergency communications performed, or failed to perform, in the wake of Katrina," and that the debate "is burdened by a weighty status quo, bureaucratic politics, and the inescapable fact that emergency response most often is a local function," divided between more than 60,000 state, county, and city entities across the nation.

He added,

Today, public safety land mobile radio systems operate on nine different frequency bands, with additional frequency in the 700-MHz range likely to become available once a nationwide switch to digital television is complete. Members of the 9/11 commission chided Congress late last year for not speeding up that process. But no one perfect frequency exists for all emergency communications; firefighters prefer the brick-and-concrete-penetrating abilities of lower frequencies, for example. No single frequency band can meet the public safety demand.

To see the full article on line, visit www.govexec.com/features/0206-01/0206-01s2.htm.

Delta Airlines' *Sky* Article Lauds Disaster Communications Volunteers

In the "Role-Playing" section of Delta Airlines' *Sky* magazine, radio communications volunteers who helped during Hurricane Katrina were praised in an article by Timothy Harper, entitled "Frequency Fliers." The story describes the efforts to save lives in the Mississippi Delta region by radio amateur volunteers and coordination with governmental agencies. To view

the full article, visit www.delta-sky.com/2006_02/RolePlaying/index.html.

Raytheon Awarded Contract For Helicopter Radio Systems

A $312-million, five-year contract has been awarded to Raytheon Co., by the U.S. Army's Communications and Electronics Command to provide ARC-231 radio systems for the service's fleet of helicopters. In a press release on the company's website, the radio is described as "a very high frequency, ultra high frequency, line-of-sight, demand assigned multiple access and satellite communication system. It is designed by Raytheon in Ft. Wayne, Ind. and manufactured in Largo, Fla."

The agreement is in support of the MARS (in this instance short for Multiple-band Avionics Radio Suite) program, embedding "the latest multi-band radio technology into today's Army aviation platforms." Raytheon will also provide mission support as part of the contract, the company said.

"The ARC-231, a state-of-the-art, software-programmable system used by the U.S. military, is currently deployed in Iraq and Afghanistan on Army helicopters and on Navy and Air Force aircraft," Raytheon said. "This contract award provides radio systems for much of the Army's helicopter fleet. Over time, more than 1,100 aircraft are expected to be fitted with the ARC-231."

The system "significantly and immediately improves the quality of voice and data radio communications, providing the Army with a mission-critical communication capability it needs today and a clear migration path to the future," said Wayne Iurillo, director, Raytheon Integrated Communications Systems. "It fully supports the Department of Defense's efforts to upgrade its communications architecture for the 21st century and beyond."

National Incident Management System Training Required By DHS

All first responders, including disaster volunteers, are being required by the Department of Homeland Security by 2007 to complete training in the National Incident Management System. A FEMA independent study course, designated IS-700, is available on the Internet or can be downloaded and completed off line.

"It shouldn't take more than three hours in any case," wrote John Amos, KC6TVM, in the ARRL's ARES E-Letter. "There's a final exam on line, but it isn't going to cost much sweat," he said—or money, as all of the courses are free. "After passing the final, the student will get notification by e-mail or regular mail."

Amos suggests that Web visitors "look at the rest of the course offerings on the FEMA training web site. They represent a wealth of knowledge, organized so that us 'real people' can get through them and actually learn something. They aren't rocket science, just good stuff [radio amateurs need to know."

For further information, visit the website at www.training.fema.gov/EMIweb/IS/crslist.asp. ■

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
0000	9820	Radio Havana Cuba	SS
0000	11680	Voz Cristiana, Chile	SS
0000	7160	Radio Republica, Opposition - Cuba	SS
0000	9375	Voice of Greece	Greek
0000	9490	Radio Sweden, via Canada	Swedish
0000	6160	CKZN, Canada	
0030	7455	Radio Tirana, Albania	Albanian
0030	9700	Radio Bulgaria	
0030	7345	Radio Prague, Czech Republic	Czech
0030	9875	Radio Vilnius, Lithuania	
0030	11980	RDP Int., Portugal	PP
0030	7325	Radio Austria Int.	
0100	4780	Radio Cultural Coatan, Guatemala	SS
0100	4052.5	Radio Verdad, Guatemala	SS
0100	11800	RAI, Italy	
0100	6973	Galei Zahal, Israel	HH
0100	9905	VOIRI, Iran	SS
0100	4819	La Voz Evangelica, Honduras	SS
0100	9760	Radio Sultanate of Oman	AA
0100	5910	Radio Ukraine Int.	
0100	7811	AFRTS, Florida	USB
0100	11815	Radio Brazil Central	PP
0130	4915	Radio Nacional Macapa, Brazil	PP
0130	11765	Radio Tupi, Brazil	PP
0130	11925	Radio Bandeirantes, Brazil	PP
0130	6120	VOIRI-V of Justice, Iran	
0130	3340	Radio Misiones Int., Honduras	SS
0130	7180	Voice of Russia, via Moldova	
0130	7300	Voice of Turkey	TT
0130	4885	Radio Clube do Para, Brazil	PP
0200	11710	RAE, Argentina	
0200	6200	Radio Prague, Czech Republic	
0200	4800	Radio Buenas Nuevas, Guatemala	SS
0200	7320	Radio Jamahiriya/Voice of Africa, Libya via France	AA/EE
0200	4965	The Voice-Africa, Zambia	
0200	5545	Radio San Andres, Peru	SS
0230	6090	Caribbean Beacon, Anguilla	
0230	5025	Radio Rebelde, Cuba	SS
0230	3279	La Voz del Napo, Ecuador	SS
0230	6175	Voice of Vietnam, via Canada	
0230	7210	Radio Slovakia Int.	SS
0300	5840	Radio Canada Int., via Sweden	AA
0300	4919	Radio Quito, Ecuador	SS
0300	4780	Radio Djibouti	FF
0300	3250	Radio Luz y Vida, Honduras	SS
0300	9730	Voice of Korea, North Korea	
0300	3320	Radio Sondergrense, South Africa	Afrikaans
0300	4810	Radio Transcontinental, Mexico	SS
0300	5010	RTV Malagasy, Madagascar	Malagasy
0300	7110	Radio Ethiopia	Amharic
0330	4930	Voice of America Relay, Botswana	
0330	6020	China Radio Int., via Albania	CC
0330	5010	Escuelas Radiofonicas, Ecuador	SS
0330	4910	Radio Zambia	
0330	5950	Radio Taiwan Int., via Florida	
0330	3240	Trans World Radio, Swaziland	vern
0400	6140	Radio Lider, Colombia	SS
0400	6190	Deutschlandfunk, Germany	GG
0400	4976	Radio Uganda	
0400	6015	Radio Tanzania, Zanzibar	Swahili
0400	4960	Voice of America Relay, Sao Tome	
0400	7390	Channel Africa, South Africa	FF
0400	6940	Radio Fana, Ethiopia	Amharic
0400	5500	Voice of the Tigray Revolution	Tiginya
0430	5985	Radio Congo, Congo (Rep.)	FF
0430	6165	Rdf. Nat. Tchadienne, Chad	FF
0430	6280	Kol Israel	
0430	4770	Radio Nigeria	
0430	5915	Radio Zambia	
0430	6010	Radio Mil, Mexico	SS
0430	4775	Trans World Radio, Swaziland	GG
0430	4386	Radio Imperio, Peru	SS
0500	5005	Radio Nacional, Equatorial Guinea	SS
0500	4777	Radio TV Gabonaise, Gabon	FF
0500	7255	Voice of Nigeria	
0500	6185	Radio Educacion, Mexico	SS
0500	7275	RTT Tunisienne, Tunisia	
0500	6612	ZBC, Zimbabwe	harmonic
0530	5030	Radio Burkina, Burkina Faso	FF
0530	6055	Radio Exterior de Espana, Spain	SS
0600	4760	ELWA, Liberia	
0600	4845	Radio Mauritanie, Mauritania	AA
0600	5996	RTV do Mali	FF
0600	7125	RTB Guineenne, Guinea	FF
0600	11640	Trans World Radio via South Africa	

UTC	Freq.	Station/Country	Notes
0600	4915	Ghana Broadcasting Corp.	
0700	6070	CFRX, Canada relay of CFRB MW	
0800	6075	Kamchatka Radio, Russia	RR
0800	9595	Radio Nikkei, Japan	JJ
0800	6020	Radio Victoria, Peru	SS
0800	9885	Radio New Zealand Int.	
0930	6135	Radio Santa Cruz, Bolivia	SS
0930	6120	Radio Singapore	Malay
0930	5980	Radio Tikhy Okean, Russia	RR
1000	4796	Radio Mallku, Bolivia	SS
1000	3291	Voice of Guyana	
1000	4775	Radio Tarma, Peru	SS
1030	4746	Radio Huanta 2000, Peru	SS
1100	4955	Radio Cultural Amuata, Peru	SS
1100	6105	Radio Panamericana, Bolivia	SS
1130	5054	Faro del Caribe, Costa Rica	SS
1130	6010	La Voz de su Concencia, Colombia	SS
1130	7590	AFRTS, Iceland	USB
1130	9430	FEBC, Philippines	CC
1130	3315	Radio Manus, Papua New Guinea	Pidgin
1200	4830	China Huayi Broadcasting Co. China	CC
1200	4920	Xizang Tibet Peoples Bc Station, China	CC
1200	9740	BBC Relay, Singapore	
1200	7295	Radio Malaysia	
1200	4790	Radio Republic Indonesia, Fak-Fak	II
1200	9525	Voice of Indonesia	various
1200	4890	NBC, Papua New Guinea	
1200	9325	Voice of Korea, No. Korea	KK
1230	13675	China Radio Int., via Cuba	
1230	4900	Voice of The Strait, China	CC
1230	13865	Rikistvarpid, Iceland	Icelandic
1230	9650	KBS World Radio, South Korea, via Canada	
1230	9920	Far East Bc. Co., Philippines	unid
1230	7185	Bangladesh Betar	
1230	3275	Radio Southern Highlands, Papua New Guinea	Pidgin
1230	5075	Voice of Pujian, China	CC
1300	11660	Radio Australia	CC/EE
1300	15300	Radio France Int.	FF/CC
1300	11650	KFBS/FEBC, Saipan, No. Marianas	RR
1300	6150	Mediacorp Radio, Singapore	
1300	6155	China Business Radio	
1300	7310	Voice of Hope, Taiwan	CC
1330	11700	Radio Bulgaria	BB
1330	11690	HCJB, Ecuador	SS
1330	9820	All India Radio, Panaji (Goa)	Hindi
1330	13715	YLE/Radio Finland Int.	Finnish
1330	9940	Radio Nederland, via Russia	unid
1330	15240	Radio Sweden	
1330	9335	Trans World Radio, Guam	CC
1330	6075	Radio Rossii, Russia	RR
1330	5985	Voice of America Relay, Thailand	unid
1400	15140	Radio Sultanate of Oman	
1430	17495	Democratic Voice of Burma, via Madagascar	BB
1530	11690	Radio Jordan	
1600	12065	Adventist World Radio, Guam	
1600	17535	Kol Israel	SS
1600	15205	BSKSA, Saudi Arabia	AA
1630	9970	RTBF, Belgium	FF
1630	11690	Radio Okapi, Congo (Dem. Rep.) via S. Africa	
1630	11990	Radio Kuwait	AA
1700	15120	Voice of Nigeria	various
1700	15285	Channel Africa, South Africa	
1700	11615	Radio France Int.	
1800	9965	Voice of Armenia	Armenian
1800	9915	BBC Relay, Cyprus	
1800	15345	RTV Marocaine, Morocco	AA
1800	11805	Family Radio via Madagascar	
1800	15355	Radio Japan/NHK, via Gabon	
1800	11735	Radio Tanzania-Zanzibar	Swahili/EE
1800	15125	Radio Exterior de Espana, Spain, via Costa Rica	SS
1830	15475	Africa No. One, Gabon	FF
1830	11500	Radio Farda, Opposition - Iran	Farsi
1830	15205	Deutsche Welle Relay, Rwanda	AA
1830	11820	BSKSA, Saudi Arabia	AA
1900	12050	Radio Cairo, Egypt	AA
1900	12005	RT Tunisienne, Tunisia	AA
1930	9760	RAI, Italy	
1930	11625	Vatican Radio	PP
1930	11885	Adventist World Radio via South Africa	
2000	9405	Voice of the Diaspora, Opposition - Gambia	
2000	15540	RDP Int., Portugal	PP
2030	13680	Radio Nacional, Venezuela, via Cuba	SS
2030	9680	Radio Exterior de Espana, Spain	
2100	11960	Star Radio, Liberia, via South Africa	
2100	7450	RS Makedonias, Greece	Greek
2100	9830	Adventist World Radio via Australia	
2130	7340	Radio Minsk, Belarus	Byelorussian
2130	9630	YLE/Radio Finland Int.	Finnish
2130	12133.5	AFRTS, Florida	USB
2130	9580	Africa No. One, Gabon	FF
2130	9780	Republic of Yemen radio	AA
2200	9990	Radio Cairo, Egypt	
2200	9760	Cyprus Bc Corp.	Greek; wknds
2200	15220	Radio Japan/NHK	JJ
2230	17785	Radio Australia	
2230	9675	Radio Cancao Nova, Brazil	PP
2230	9615	Radio Cultura, Brazil	PP
2230	5470	Radio Veritas, Liberia	
2300	11780	Radio Nacional do Amazonas, Brazil	PP
2300	9800	China Radio Int.	SS
2300	17675	Radio New Zealand Int.	
2300	9855	Radio Kuwait	AA
2300	5960	Voice of Turkey	
2330	9870	Radio Austria Int.	
2330	7285	Voice of Croatia, via Germany	
2330	9626	CBC, Canada	
2330	9445	All India Radio	Hindi
2330	7325	Radio Vilnius, Lithuania	
2330	9610	Radio Romania Int.	
2330	7335	Vatican Radio	
2330	9905	Radio Free Asia, via Palau	unid
2330	9330	Radio Damascus, Syria	AA
2330	5890	Radio Thailand via USA	
2330	5880	Radio Ukraine Int.	EE/UU

by Harold Ort, N2RLL

New, Interesting, And Useful Communications Products

MFJ's New BiasTee DC Power Injector

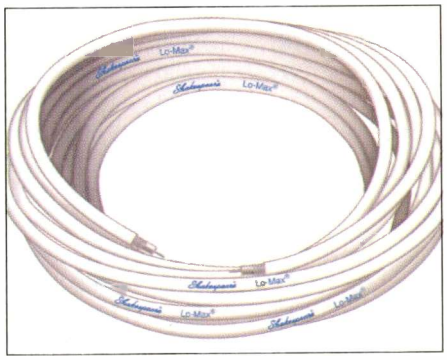
Now you can send up to 1 amp DC/50 VDC through your coaxial line cable to power your electronic equipment (automatic antenna tuner, remote antenna switch, relay box) without running a separate cable. Use one MFJ-4116, priced at $24.95 each, on each end of coaxial line to inject DC power and to retrieve DC power. It works with 1 to 60 MHz, has SO-239 connectors, and measures only 2-1/2 x 2-1/4 x 1-1/4 inches (HWD). You can buy a pair of 4116s by ordering the MFJ-4116P for $47.95, or get the MFJ-4117 at $29.95; that's like the MFJ-4116, but it has a switch to turn remote equipment on and off.

The new MFJ-4116 BiasTee DC Power Injector lets you send up to 1 amp DC/50 VDC through your coaxial line cable to power your electronic equipment without running a separate cable.

All are protected by MFJ's *No Matter What* one-year limited warranty. To order, get a free catalog, or for your nearest dealer, call MFJ at 800-647-1800; or write to MFJ, 300 Industrial Park Rd., Starkville, MS 39759; visit www.mfjenterprises.com; or fax them at 662-323-6551.

Shakespeare's Lo-Max Extra Low-Loss Coax

The choice of cable used for an antenna can make the difference between a clear signal and no signal at all. Shakespeare is now offering Lo-Max extra low-loss coaxial cable to provide superior performance for maximum range. Its low line-loss characteristics approach RG-8-AU and RG-213 cables, but without the extra weight and rigidity. Lo-Max cable is appropriate for marine VHF, CB, and other installations requiring 50-ohm cable. Available in lengths of 30, 50, 100, and 1,000 feet. Lo-Max cable is supplied with both ends pre-stripped and prepared for standard PL-259 connectors. Adapters and connectors, including Shakespeare's new gold-plated line, are available separately.

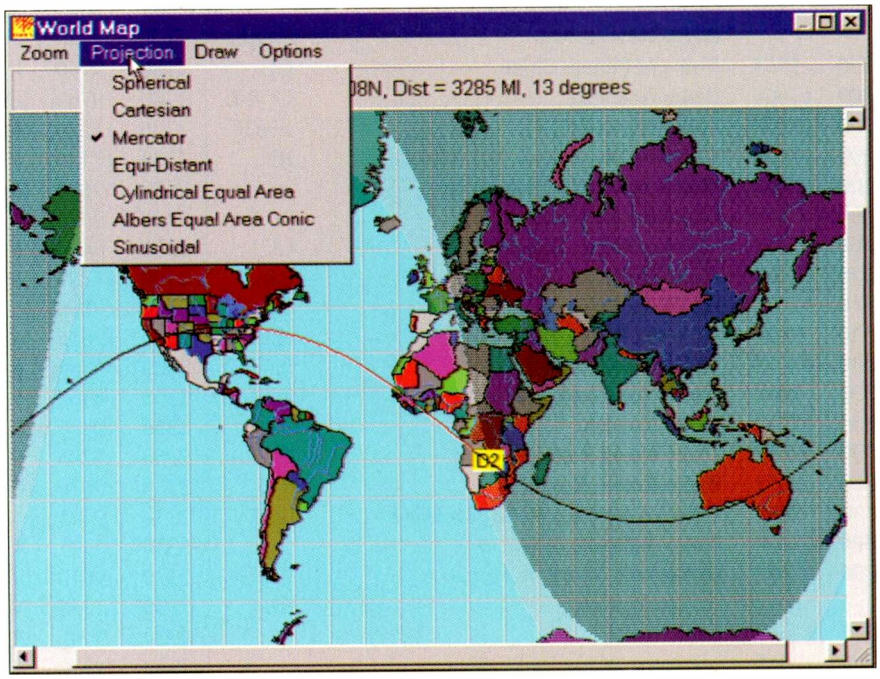


Shakespeare's Lo-Max cable works for marine, VHF, CB, and other installations requiring quality 50-ohm coax.

Pricing for Shakespeare's newly trademarked Lo-Max extra low-loss cable starts at $29.95 for a roll of 30 feet. For more information or copies of Shakespeare's catalogs of marine antennas and electronics products write to Shakespeare Electronic Products Group, 3801 Westmore Dr., Columbia, SC 29223, or call the company at 803-227-1590.

New DX4WIN V.7 Logging Software

New from Rapidan Data Systems is the DX4WIN V.7 logging software that, according to the company, is "easy to use, yet a powerful logging program ideal for every ham." This software features direct support for MMTTY (a sound card-based amateur teletype program). You can use MMTTY within DX4WIN and work both the teletype and log in real time.



Here's a screen shot of Rapidan Data Systems' DX4WIN V.7 showing a world map with day/night terminator.

With this software you can do as little or as much as you want to do, from simply put data in a logbook or use it to do a multitude of tasks. With a few simple keystrokes you're up and running the DX4WIN V.7 program.

For more information on the DX4WIN V.7 program, priced at $89.95, contact Rapidan Data Systems at 540-854-9160 or online at www.dx4win.com. Please be sure to tell them you read about it in *Popular Communications.*

Cobra's New Lithium-Ion-Powered GMRS Two-Way Radios

A decade after Cobra Electronics first entered the two-way radio market the company is helping people stay in touch with greater power in a smaller package. Cobra recently introduced ultra compact, high-powered lithium-ion GMRS two-way radios, the LI 6000-2WX VP and LI 3900-2 DX VP. These new Cobra two-way radios easily fit in a pocket.

The LI 6000-2 WX VP and LI 3900-2 DX VP include up to 2,662 privacy combinations as well as Cobra's other signature features, such as VibraAlert for silent paging and SCAN to allow users to quickly locate conversations. The radios are being offered as value packs, which include a dual port desktop charger and lithium-ion battery packs, at an MSRP of $79.95 and $69.95.

Cobra's new GMRS handheld transceivers are being offered as value packs that include a dual port desktop charger and lithium-ion battery packs at a MSRP of $79.95 and $69.95.

Along with adding the lithium-ion-powered models to its 2006 lineup, Cobra is enhancing its existing line of GMRS radios with what Cobra calls "extended ranges of up to 6, 10, 12, and 15 miles." Competitively priced and sold as value packs with the charger and batteries, the new line of radios offers a full spectrum of options for consumers. The 2006 products are currently available at major retailers. For more information on Cobra's new GMRS transceivers, contact Cobra Electronics directly at www.cobra.com.

Boston Accoustics' new Receptor Radio HD sells for $299 from Boston Accoustic's dealers.

Boston Acoustics' New Recepter Radio HD

The new Recepter Radio HD by Boston Acoustics, Inc., is a compact receiver that's packed with more than a dozen new features and refinements.

New features of the Recepter Radio include a satellite speaker for stereo imaging; handy credit-card size remote control; large LCD display; headphone out line that doubles as a high-quality line output, allowing it to serve any component audio system as an HD radio source; and a stereo input for iPods, MP3 players, and other external audio sources. Other enhancements include HD radio technology from iBquity; HD radio microprocessor; an extra channel of amplification for the new satellite stereo speaker; an advanced multi-line data display featuring a 132x64-pixel screen showing dynamically changing information, including 4 fields of HD data; ability to receive free-form text information from the Radio Broadcast Data System (RBDS), not just station call letters; and a user-friendly, high-quality tuner.

The Recepter Radio HD is available from authorized Boston Acoustics' dealers at a suggested price of $299. For more information, visit www.bostonacoustics.com/rrhd.

by Harold Ort, N2RLL, Editor

Alinco's DR-635T Mobile/Base VHF+UHF Transceiver And Expanded Range Receiver

When I received Alinco's DR-635T for review my first intention was to give it a comprehensive, in-depth look with an emphasis on the many excellent *ham* aspects of this compact transceiver. I wanted to examine its cross-band repeater function, typical simplex range, signal quality, and how it stacked up against other mobiles I've recently used. But then it occurred to me that while these are important, there are many other features and aspects of this outstanding transceiver that warrant coverage here. Specifically, I mean the actual mounting of the radio in a vehicle as well as its extended frequency coverage (108 to 173.995 MHz, 335 to 479.995 MHz, and 87.5 to 107.995 MHz), which includes a sizeable portion of the VHF public safety band and standard FM broadcast band, plus a large chunk of the military aviation band! Talk about a versatile little dualbander!

We'll still look at some of its two-way ham aspects, but I believe there's a lot more to this rig than just amateur operation. Let's check it out!

The Alinco DR-635T out of the box and ready to check out.

What You Get

Out of the box you get the EMS-57 illuminated remote control handheld microphone, DC power cable, bracket and mounting hardware, ACC port cable, and instruction manual. Oh, yes, and the radio! It only takes a few minutes to familiarize yourself with the basic operation of the 635T, even though there are a lot of goodies in a small (1.6 x 5.5 x 7.3-inch HWD) package.

The manual is clear and concise. Unlike some radio manuals I've seen, it's free of mumbo-jumbo and was obviously professionally proofread before it went to the printer! While it's not perfect, especially in the area of cross-band repeater operation, the 635T isn't the type of radio you need to spend an afternoon with in order to use!

For hams, you get a max output of 50 watts on 2 meters and 35 watts on 70 centimeters, three transmitter power settings (VHF: 50/25/5; UHF: 35/20/5 watts), 200 memory channels, alphanumeric display (you can even change the color to violet, amber, or blue; the default setting is violet in standby mode, blue in receiving mode, and amber in transmit).

One of the features I like best about the 635T is that the front panel easily detaches so you can turn it around to best suit your personal needs; for instance, you can have the speaker on the main body face up or down depending on your specific mounting situation! I kept the 635T in the top-firing position. (For this review I didn't have the Alinco ESD-9

Alinco DR-635T Features At A Glance

- VHF/UHF full duplex operation includes V/U and U/V modes.
- Cross-band repeater function (where permitted: standard on DR-635T)
- 200 memory channels
- H/M/L power output settings (VHF: 50/25/5W UHF: 35/20/5W)
- Large six-character alphanumeric display
- Selectable display color illumination (blue, violet, or amber)
- Internal duplexer; single antenna connector
- Power supply voltage display
- Theft alarm feature
- Optional 1200- and 9600-bps packet operation with optional EJ-50U
- Digital voice communications with optional EJ-47U
- Optional illuminated DTMF EMS-57 microphone (included with DR-635T) allows direct VFO frequency entry and remote control of transceiver
- CTCSS & DCS encode and decode plus four different tone bursts
- CTCSS tone and DCS scan
- Programmable VFO and memory scan modes
- Time Out timer
- Cable clone feature
- AM aircraft band reception (DR-635T only)
- Temperature-compensated crystal oscillator
- Ignition key activated power on/off feature

It's a fairly snug fit in our vehicle, mounted on the angled end of an old plastic car vac and a small piece of fabric.

The rear of the 635T showing the perfectly adequate cooling fan.

separation kit that allows mounting the main body of the transceiver about 16 feet away, but we'll be checking out the kit and reporting to you how it works in an upcoming *Pop'Comm*).

Checking Out The Memory

How's your memory? I remember many years ago having to carry a small laminated card around with me so I could remember what repeater was where and which club it belonged to. Of course, those days are long gone with alphanumeric displays.

The 635T's alphanumeric display is large and easy to read, plus it's easy to use. From the memory mode you simply select the channel to be programmed, press the H/L key along with the FUNC key, rotate the dial until you see the character you want, then press the "band" key which enters that character. It's straightforward, intuitive, and painless!

As for the 635T's memory, you press one button (V/M) to put the radio in memory mode, then press the "function" button, then use the large tuning knob to select the channel number to which you want to assign your parameters. Then press the original V/M key and it's done.

The Nitty Gritty

My preferred mounting method is a piece of plastic (wood also works fine) homebrewed mount placed in the small tray of our Sonata. Admittedly it's not the perfect arrangement, but there just aren't many mounting options in today's vehicles. Remember, we'll be taking a look at the Alinco ESD-9 separation kit, which will help tremendously!

In the meantime, I fashioned a small 4 x 4-inch piece of plastic from the end of an old car vac attachment; if cut carefully with a utility knife or Dremel tool it'll work quite well as a temporary small radio mount. For now my other option would be to use a heavy-duty hook and loop fastener, but with the 635T weighing in at over two pounds, it's not the best option.

I rarely use high (or even medium) power settings on VHF or UHF, so using a fused heavy-duty cigarette lighter plug with

The control head separated from the main body; we'll have more on that aspect in an upcoming Pop'Comm!

Thieves Beware!

It's unfortunate, but you don't have to live in a big city to be the victim of theft. And if you've got an antenna or two and a couple of radios in your vehicle your chances of being ripped off dramatically increase. So Alinco put a unique anti-theft alarm feature used in the 635T.

To use the Theft Alarm, you must have the 635T connected to your vehicle's battery, constantly receiving power, and the unit's ACC ON/OFF feature must be disabled. It's a simple process to insert the small cable provided into the CN10 connector on the bottom of the 635T. (You can modify and insert a 3.5-inch stereo plug into the rear speaker SP jack; it disables the speaker, but allows for easier removal of the cable, your choice of connection.) With the alarm cable looped around the steering wheel, set SCR-ON in the "setting" mode, turn off the unit, and the alarm is activated. It will beep for 10 minutes if the transceiver is improperly removed!

You can even set the alarm starting time to delay by 20 seconds. Either way, it's a great feature. Congratulations, Alinco!

the 635T works fine on low power. And using that low-power setting on 146.52 simplex is usually more than enough RF to reach my ham friends in Monmouth and Ocean County, New Jersey, and it's perfect for traveling with the 635T. Holding the mic about three inches away, I received audio reports of "excellent" and even "superb" from one nearby ham.

A neat feature of the 635T is that it reads the power supply voltage. While it's not designed to be a supremely accurate voltage indicator, it certainly gives you a very good idea of your vehicle's voltage at the radio or, if using the 635T at home, your power supply's volts. Remember, for the best reading, use a calibrated meter.

Here's the 635T as a base radio. In this case, I used it as a receiver to monitor nearby Newark International Airport. My power supply of choice is the excellent MFJ MightyLite 4225 MV switching power supply. This compact, lightweight power supply is a great companion to the 635T, offering 25-amp max current (22 continuous) with dual lighted meters

Extended Receive!

Let's face it, many ham transceivers feature some extended receive outside the ham bands, but the Alinco DR-635T also includes civilian air band, standard FM broadcast band, and frequency coverage from 335 to 480 MHz. Now, that's quite a chunk of spectrum, so I decided to give the 635T a spin beyond the ham bands (which it receives and transmits on very well, indeed).

First stop, the civilian air band. I'm just a few air miles from Newark, Teterboro, and a couple of other airports. Reception using an outdoor Cubex antenna (not on a rotor, but in a fixed north direction) was outstanding; all the tower comms and common aviation frequencies came in loud and clear. The same was true while mobile using an on-glass antenna designed for 2 meters!

Public safety monitoring—and scanning, using the radio's scan function—was equally impressive in the VHF band and even in the UHF band using the same antenna while mobile and base. I could easily hear New York City's transit system communications as well as its public safety comms from my New Jersey location. And add the NOAA weather channels to the list of frequencies you get (the 635T doesn't include an alert function with NOAA reception, but the fact that I can put one or more of those NOAA lifesaving frequencies in my mobile transceiver works for me!).

Minus AM On UHF

A sizeable portion of the frequencies received by the 635T (335 MHz to just below the federal band that begins at 406 MHz) is the military aviation band (the complete mil aviation band is 225 to 400 MHz), where transmissions there are mostly *AM mode*. Only thing is, the radio defaults to an *FM mode* and I was unable to change the mode to AM by pressing the FUNC key and TS/DCS key while in the VFO mode, as per the instructions.

I asked Alinco about this, and here's what I was told:

> The AM mode is usable only in VHF up to 174 MHz on the Main band. This is because the IF IC used for the DR-635 can receive AM only on the VHF side. The UHF IF IC does not support AM. The SUB side RX utilizes the UHF circuitry, therefore the signal does not pass through the VHF IF IC. This is not a defect, but a part of the circuit design to make a high performance, cost-effective radio for the amateur bands.

So the 635T receives—and displays—AM mode for the civilian air band (118 to 137), but any AM in the 335- to 480-MHz range (actually up to about 406 MHz) you won't hear for these reasons. It's quite a portion of that UHF air band that you can't monitor in AM with the 635T, but remember that the radio isn't a scanner. On the major plus side it has remarkable audio and plenty of civilian air and public safety action to offer in addition to both 2 meters and 70 centimeters.

Lotsa Dipoles

All in all, I'll give this very respectable entry into the amateur and monitoring market a hearty four dipoles up out of five rating. Remember you can always use this wideband rig to monitor the bands—ham and others—while you study for your license. And remember to tell the folks at Alinco (www.alinco.com/usa.html) that you read about the DR-635T (with an MSRP of $499.95) in *Pop'Comm*. ■

by Ken Reiss, radioken@earthlink.net

On The Right Track: Scanning Trains Across The USA, And Floating Frequencies!

Many radio users have frequencies within the spectrum dedicated for their use. This is particularly apparent with the aviation band of 108 to 137 MHz, which is also in the AM mode, but there are some others. Over the past several years, many of the "hard-and-fast" frequency allocations have been blurred considerably in an effort to shift frequencies from services where they were not being well used to services that were overcrowded in a particular area. This reallocation has been highly geographical in nature and depends entirely on what services are in your area and what frequencies might be available.

With some careful searching and research, frequency coordinators have been able to license many frequencies that are outside their "service," making it more difficult for those of us trying to find those new frequencies. No doubt the refarming efforts that we discussed a couple of months back will complicate this as well.

One place where this has *not* yet happened, at least to any great extent, is the railroad service. The railroads' allocated VHF frequencies have been in use for many, many years. While there was a proposal to move the railroads to another band at one time, it was dropped because of strenuous objections from the railroad industry itself. The cost of new equipment for different bands on a nationwide basis would have been staggering.

Case in point: The aviation service is currently under siege as the entire air traffic control system is evaluated for upgrades. I would expect, however, that it will be many years—if ever—before any changes actually occur for either aviation or the railroad service.

I have read in several places that there is another push to move the railroads to trunked radio. The problem is that the railroads have a lot of territory to cover. Putting up repeaters and trunking controllers along the thousands of miles of railroad track would be a tremendous undertaking. Perhaps some compromise solution, such as satellite-based radio or the public cel-

Frequency Of The Month

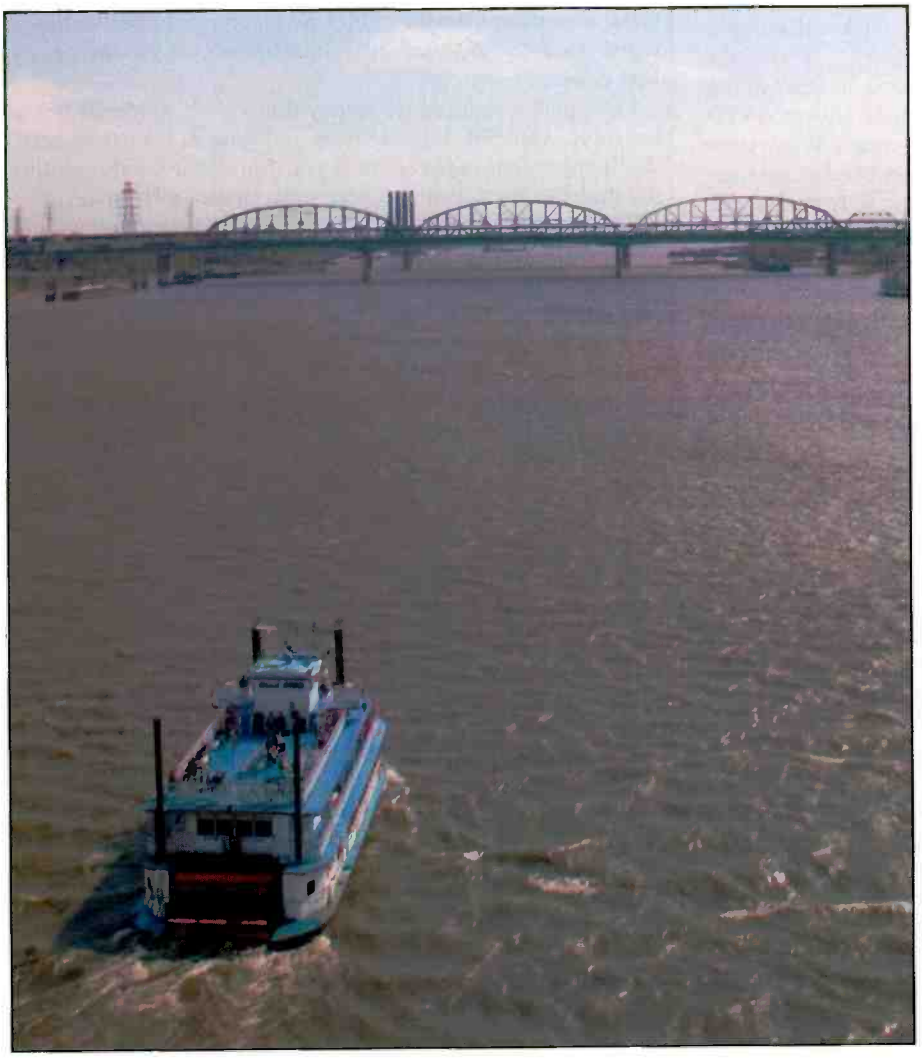
Each month we ask our readers to let us know what they're hearing on our "Frequency Of The Month." Give it a listen and report your findings to me here at "ScanTech." We'll pick a name at random from the entries we receive and give the lucky winner a free one-year gift subscription, or extension, to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

Let's pick a railroad frequency this month, since we're on the topic. **160.590**. Have a listen and send in what you hear. We'll enter your name (even if you don't hear anything) into the drawing for a free one-year subscription to your favorite radio magazine (as long as that's *Popular Communications*, of course!). Send your loggings to radioken@earthlink.net, or via snail mail to Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126.

You don't see many of these on real tracks any more, but there are lots in museums. Automated radio systems and other track monitoring systems have taken over many functions on the modern locomotive. Communications systems are often linked over a wide geographical area, so you may hear activity from a long distance if something major is happening.

Table 1. American Association of Railroads (AAR) Channels

Ch.	Freq.	26	160.500	45	160.785	63	161.055	81	161.325
7	160.215	27	160.515	46	160.800	64	161.070	82	161.340
8	160.230	28	160.530	47	160.815	65	161.085	83	161.355
9	160.245	29	160.545	48	160.830	66	161.100	84	161.370
10	160.260	30	160.560	49	160.845	67	161.115	85	161.385
11	160.275	31	160.575	50	160.860	68	161.130	86	161.400
12	160.290	32	160.590	51	160.875	69	161.145	87	161.415
13	160.305	33	160.605	52	160.890	70	161.160	88	161.430
14	160.320	34	160.620	53	160.905	71	161.175	89	161.445
15	160.335	35	160.635	54	160.920	72	161.190	90	161.460
16	160.350	36	160.650	55	160.935	73	161.205	91	161.475
17	160.365	37	160.665	56	160.950	74	161.220	92	161.490
18	160.380	38	160.680	57	160.965	75	161.235	93	161.505
19	160.395	39	160.695	58	160.980	76	161.250	94	161.520
20	160.410	40	160.710	59	160.995	77	161.265	95	161.535
21	160.425	41	160.725	60	161.010	78	161.280	96	161.550
22	160.440	42	160.740	61	161.025	79	161.295	97	161.565
23	160.455	43	160.755	62	161.040	80	161.310		
24	160.470	44	160.770						
25	160.485								



Both inland and ocean-going vessels rely on radio communications. Just because you're not near a large body of water, don't write off this band. You may be surprised at what you hear! (Photo by Ken Reiss)

lular system (which is much more likely to have continuous coverage than a private, built-from-scratch system), will eventually be reached.

I wouldn't hold my breath for that either, though. The recent events with the hurricanes in the Gulf Coast region, and in particular the complete failure of communications in New Orleans, might give some communications managers pause about dedicated controller-based systems. If it doesn't, it should! They have their place and can be a wonderful thing, but some work is needed on the back-up plans.

Outside The Band

There are, however, some railroad frequencies outside the official railroad band. These are used by railroad police, yard workers, and others in instances where they do not have to communicate with the trains or other people running the "operations" side of things. Most of these out-of-band allocations are really nothing more than business band licenses in another part of the spectrum. You can look for these channels in the UHF and in other VHF portions of the spectrum, particularly in large metropolitan areas where there is likely to be a lot of auxiliary operations. As with all businesses, lots of rail communications are being conducted over cell phones, too.

One easy thing to look for is the radio alarm detectors, or RADs. These are automated systems that watch a train as it passes, looking for problems and then broadcasting their findings on the radio.

You'll sometimes hear a count of the axles, an alert of defective wheel boxes or items hanging down from the train that shouldn't be there, and frequently the speed of the train in a mechanical, though not "robotic," voice. The crew will usually acknowledge these broadcasts as well.

If you're close enough to hear one of these detectors, it will tell you two things: One, you're close enough to railroad operations to hear any traffic that might be passing by; and two, there IS a train close by!

If you can't hear a RAD transmitter, don't despair. You may still hear plenty of activity from other railroad operations (such as a yard) close by, or just routine traffic on long-haul trains that pass within radio range of your location. They don't talk a whole lot on the open road, however, so you may have to listen for a while if you don't have a major operation nearby. You may decide that railroad monitoring isn't for you, if that's the case.

Plugging In To The Action!

Another frequency to plug in to your scanner is **457.9375**. This is a nationwide frequency used by most railroads for EOT (end of train) telemetry modules. Since there are no cabooses on trains any longer, this device monitors the status of air pressure and other things at the far end of the train and transmits a signal approximately every 40 to 45 seconds, even if the train is not moving. They only transmit data, so you won't want to actually listen to these things, but their presence does indicate a train close by. They operate at about 2 watts power, so you can hear them as far as four miles under ideal conditions. This distance can be severely limited by a number of factors, though, including buildings or trees between you and the tracks.

Another set of nationwide frequencies used for data is **452.925/457.925** and **452.950/457.950**. These are used for locomotive speed control near some yard operations. Put them in your scanner and see what you come up with!

One final note about frequencies. The American Association of Railroads (AAR) channels in **Table 1** give both the channel designation and the frequency. Put the frequencies into your scanner, but be aware that the railroads will refer to the channels by *number*. Sometimes they'll use the channel number on the air (most railroads are using synthesized radios these days, which can cover all the channels in the band).

When using the synthesized radios, the channels are referred to in *pairs*: the first number is the transmit channel and the second is the receive channel. Often, these will be the same number, such as 3030, which means they are transmitting and receiving on channel 30. We'd simply call this "simplex" operation. This four-digit number is often referred to as the "window" number, meaning the number the operator sees in the window of his radio.

With 97 frequencies to monitor, you'll need at least a bank, but many railroad fans prefer a dedicated scanner. Put the frequencies in your radio and see what's there before you decide how serious you want to get about monitoring them. It can be fun, and it's certainly different from listening to another license plate check!

On The Water!

The maritime world also has a set of standard VHF allocations (see **Table 2**). Some of the frequencies, like Channel 16, have even been standardized as to their use. Channel 16 is the calling channel and the frequency is used by boaters and ship operators alike. Local operators, the Coast Guard, and other maritime services use other frequencies either by assignment or local agreement.

In larger ports, base operators are assigned a channel or, again, choose one by agreement. So if you need the services of that port operator, you'd call on that channel, or call on 16 and someone would direct you to the correct channel. In smaller ports, it can become almost a free-for-all to find an open channel. In addition to the maritime operators, many "pirate" operations are using maritime frequencies for land-based operations because of the ease and widespread availability of the equipment. Most maritime supply stores, and even many sporting goods stores and other outlets that sell just a few electronic products, have marine band handheld radios available for a modest price.

Family Radio Service Is Popular With Larger Ships

On larger ships, handheld radios are often used on a quiet channel for person-to-person communications within the

Table 2. Marine Frequencies

Ch.	Freq.	Use	Ch.	Freq.	Use	Ch.	Freq.	Use
6	156.300	Inter-ship Safety	21	157.050	Coast Guard	73	156.675	Port Operations
7	156.350	Commercial	22	157.100	Coast Guard	74	156.725	Port Operations
8	156.400	Commercial	23	157.150	Coast Guard	75	156.775	
9	156.450	Commercial	24	157.200	Marine Telephone	76	156.825	
10	156.500	Commercial	25	157.250	Marine Telephone	77	156.875	Oil Tankers
11	156.550	Commercial	26	157.300	Marine Telephone	78	156.925	Non-Commercial
12	156.600	Port Operations	27	157.350	Marine Telephone	79	156.975	Commercial
13	156.650	Navigational	28	157.400	Marine Telephone	80	157.025	Commercial
14	156.700	Port Operations	65	156.275	Port Operations	81	157.075	Coast Guard
15	156.750	Environmental	66	156.325	Port Operations	82	157.125	Coast Guard
16	156.800	Distress-Calling	67	156.375	Commercial	83	157.175	Coast Guard
17	156.850	State Control	68	156.425	Non-Commercial	84	157.225	Marine Telephone
18	156.900	Commercial	69	156.475	Non-Commercial	85	157.275	Marine Telephone
19	156.950	Commercial	70	156.525	Non-Commercial	86	157.325	Marine Telephone
20	157.000	Port Operations	71	156.575	Non-Commercial	87	157.375	Marine Telephone
			72	156.625	Non-Commercial	88	157.425	Commercial

The Future—Secure Network

Ambulance crews can benefit from all kinds of information. Everything from patient records to maps to the location can be handy at times. On-scene tools that allow wireless communications and telemetry provide hospital staff with that much more information while the ambulance is en route or still at the scene. Installing a wireless access point in the vehicle means that crews can use laptops for some distance and still be in touch with the world if necessary. AMR, a medical transportation company headquartered in Denver, Colorado, explained the following in a recent press release:

A technology considered too unreliable in the past, wireless networks and communications infrastructure innovations have evolved to allow business people to be more productive and now allow emergency response reliable and secure access to mission critical information. Cingular Wireless in conjunction with In Motion Technology is providing AMR with a secure and consistent network as well as a wireless gateway that extends Ethernet networking to remote and mobile locations.

American Medical Response (AMR) has begun deployments of In Motion's onBoard Mobile Gateway 1000 (oMG1000), a networking gateway designed to provide secure and robust LAN extension over the Cingular EDGE network, that will allow mobile access to multiple applications for field personnel. Initially, AMR is providing access to Automatic Vehicle Location and in-vehicle routing applications via the new gateway. The intention is to provide field personnel access to electronic patient care records by early next year.

Once again the cellular network becomes more indispensable as the deployment of mobile wireless access points for laptops and other instruments is made available through this black box. (Photo by AMR)

ship. Some of these operations are moving to Family Radio Service (FRS) radios since they are so widely available and affordable. But if the crew has need for legitimate communications with other maritime users, such as talking to dock personnel during docking operations, they may well use one radio for everything. Even large handhelds don't generate much over 5 watts, so the range will be limited, but you can hear some interesting conversations if you're close enough to (or on!) the ship.

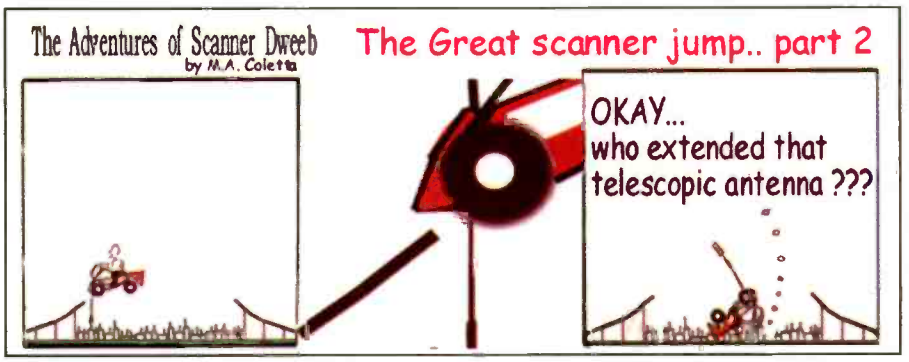
Another great place to hear lots of radio traffic is at a lock facility on a river. Being in St. Louis right on the Mississippi, there many locks within my range. Most of the traffic is routine operations, until something happens.

My advice for the marine band would be to put the whole load into your scanner and then see what pops up as active. Some of it you'll find interesting, and some you will not. Once you decide what's worth listening to, you can take out the rest, or leave them programmed in so you can check back a few times during the year. Maritime radio tends to be a very seasonal affair in many parts of the country, so what's dead today might very well be good entertainment tomorrow.

Don't think you won't hear anything until you try it. Even if there's no water within *miles* of you, there may still be some traffic to be heard. Illegal operations on the marine band were fairly common up until a few years ago when the General Mobile Radio Service (GMRS) and FRS radios became more widely available. Plug them in and see what you hear before you write off the whole band.

Share Your Finds

After you've made a few interesting rail or sea catches, give us a shout. Remember, we always look forward to finding out what you're hearing on these and other bands. Have a great summer! Until next month, good listening! ■



by Tomas Hood, NW7US, pc-prop-man@hfradio.org

It's All About The Noise—Part II

Last month, we took a closer look at atmospheric radio noise and its affect on radio signal reception. The original question asked was, "When will good propagation occur?" In the last two months, we considered the impact of noise, local and man-made, as well as atmospheric, such as lightning. At other times, this column has touched on some of the other factors that affect propagation, like radio circuit path length and orientation, frequency, diurnal effects, as well as the transmitter power and antenna gain and the parameters of the receiving station.

In our discussion last month, I mentioned radio propagation analysis and forecasting tools like WinCAP Wizard and ACE-HF. These can help you unlock the science of radio propagation at the high frequencies. More than ever before, with powerful computers available for reasonable prices, and with affordable tools like WinCAP Wizard and ACE-HF, any radio hobbyist can begin to make sense of all these factors that play a role in radio communications on HF.

A New Version Of ACE-HF—Designed For Shortwave Listeners!

Back to our lingering question, "When will good propagation occur?" Whether you're an amateur radio operator or a shortwave listener, noise is always a factor limiting what you can hear. But noise is only one aspect of HF reception. The varying ionosphere makes even powerful broadcast signals come and go, and it's hard to know what to expect when you settle down for an evening of shortwave listening. Of course, you can always tune to the frequency where you last heard a favorite station, but if there is noise yet no radio signal, what then? It's frustrating to just "listen in the blind."

ACE-HF to the rescue! If you're an amateur radio operator you've probably heard of the ACE-HF System Simulation and Visualization Software that was first released several years ago. This year, a much more powerful version, specifically designed for shortwave listeners as well as hams, is available. In this column I'll describe the general features of ACE-HF and discuss how it can be used to predict shortwave reception.

Sometimes called "the Cadillac of HF Propagation Programs," ACE-HF is derived from the professional ACE-HF NETWORK software for government and commercial HF network operators, which is used to simulate networks run by military and other groups. "ACE" stands for Animated Communications Effectiveness, the copyrighted technique for displaying both transmission and reception coverage on maps of the world. This key feature yields great insight into the coverage achieved by any HF station, but is especially helpful to see whether a particular broadcaster covers your listening post. You can also simulate a point-to-point circuit from any world location to your station and show the predictions graphically (useful, say, if you're planning an emergency support radio net, or a health and welfare traffic net). All ACE-HF charts may be animated, which is one of the hottest features of ACE-HF.

The new ACE-HF is designed for shortwave listening enthusiasts, those who are intrigued by the methods used by HF international broadcasters and who would like to optimize their HF listening experience. I'm certainly an enthusiast, so to investigate the new ACE-HF I began by simulating a shortwave circuit from the well-known WCR (Worldwide Christian Radio) station in Nashville, Tennessee. Just for fun, I pretended I was a wandering oil company worker stationed in Riyadh, Saudi Arabia, hoping to hear something from stateside.

I began my review session with the intuitive ACE-HF inputs screen shown in **Figure 1**, and I used some of the new features for shortwave listeners. There's a new HFCC (High Frequency Coordination Conference) database of over 640 international broadcast transmit sites that have a new sorting feature, so I was able to quickly select the WCR station.

I set WCR's transmit power at 100,000 watts and selected the CONST17.VOA antenna from the more than 660 HFCC antenna models now included in ACE-HF. This general purpose 17-dBi, omni-directional antenna is recommended by the Voice of America, but I could have selected another one of the HFCC mod-

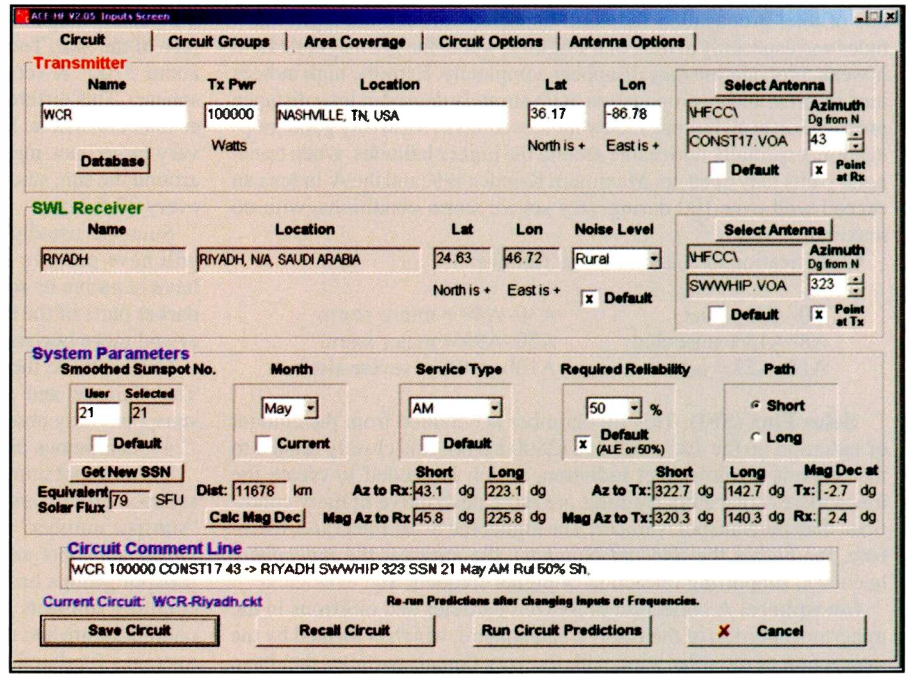


Figure 1. The Input Screen with adjustments for the WCR to Riyadh Circuit. (Source all figures: Tomas Hood, NW7US, running ACE-HF)

els, which include curtain arrays with up to 30-dBi gain. I assumed the SWWHIP.VOA antenna for my receiver, and I selected the AM service type, although I could have chosen the new IB service type for commercial quality HF reception.

The ACE-HF design assumes that the user employs international broadcasting schedules as posted on the Internet, where details such as transmit power, azimuth (main beam) angles, frequencies, and time schedules are readily available. Two good sources for this rapidly changing data are www.hfcc.org and www.ilgradio.com/ilgradio.htm. (Don't forget that I also have shortwave broadcast search tools at http://hfradio.org/swbc/).

All these adjustments take more time to read about than to set up, so I just clicked on Run Circuit Predictions to see the prediction charts for my circuit. I always look first at the SNR Summary Chart (**Figure 2**), and it wasn't surprising to see that this long circuit of nearly 12,000 kilometers favored the higher frequencies. This was confirmed by the MUF (maximum usable frequency) Chart (**Figure 3**), which showed a median MUF of about 16 MHz at the current time of day (about 2100 UTC). And finally, the SNR chart (**Figure 4**) for WCR's 15.82-MHz frequency predicted *good* connectivity at the current time.

Already, I was ahead of the game. I could now tune to 15.82 MHz with confidence, and the program should be heard loud and clear at my Riyadh listening post!

Area Coverage Predictions

Now my curiosity was aroused. Could I hear the WCR station from other locations? To answer this question, I created a series of worldwide area coverage predictions from the WCR transmitter at 10 frequencies and for 24 hours. (It only took a couple of minutes.) Now, I could see coverage at any world location and animate it by time. I selected the predictions for 15.82 MHz and started the animation (which will advance by one hour every hour, or can be run quickly like a movie). Wow! Suddenly the insight came flooding in as the variables of HF propagation became evident. No wonder WCR could only be heard at some times of the day. **Figure 5** shows just one snapshot of the area covered from Nashville at 2100 UTC and at 15.82 MHz.

Another handy technique is to animate the area display as a function of frequency. Just select a given hour (I picked 2100 UTC) and choose Select All Freqs. Now you can see exactly which HF bands can be heard as far away as Riyadh, or anywhere else for that matter. I can see that using these techniques and tools, along with a closer look at the schedules of international broadcasters, is a powerful way to hunt down stations I've hoped to hear but never seemed to be tuned to at the right time at the best frequency.

CIRAF Zones

International broadcasting schedules show the target CIRAF zones to be covered by each scheduled transmission. CIRAF stands for Conferencia Internacional de Radiodifusión por Altas Frecuencias and was a conference first held in Mexico City in the 1940s to define areas to be served by each shortwave broadcaster. Continuing HFCC meetings are held to refine such agreements. Each CIRAF target zone has a

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 (Kp > 5 or Ap > 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.

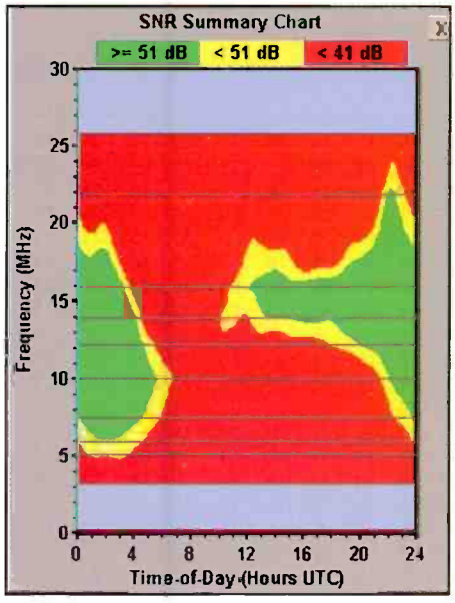


Figure 2. SNR Summary Chart for the WCR to Riyadh Circuit. The green area shows adequate SNR.

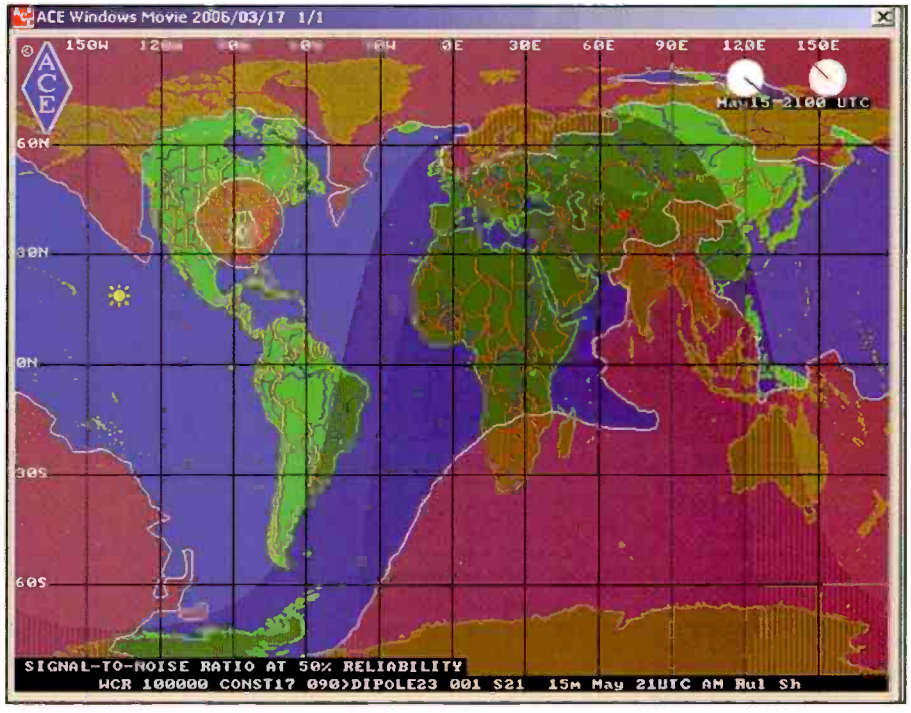


Figure 5. WCR area coverage, 2100 UTC, 15.82 MHz.

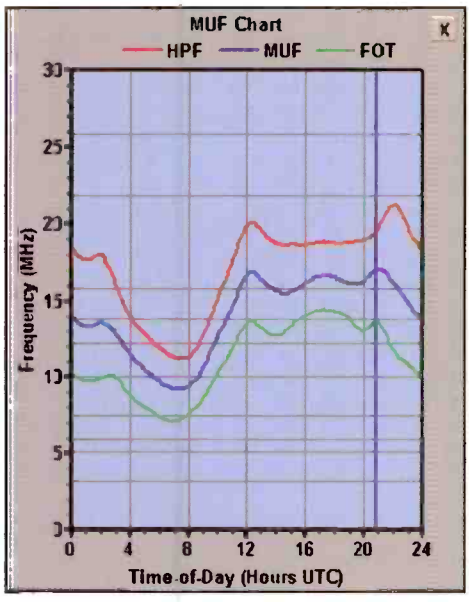


Figure 3. MUF Chart showing a median maximum usable frequency of about 16 MHz.

number, and the Internet schedules list those numbers. For example, in last winter's HFCC schedule for WCR's broadcast at 15.82 MHz, CIRAF zones 4, 9, 27, 28, and 37 to 39 are to be targeted between the hours of 1100 to 2200 UTC, and the station's antenna azimuth setting for those zones is 46°. Our circuit to Riyadh was on an azimuth of 43°, so we should be in good shape.

ACE-HF shows CIRAF zones on area coverage world maps, as shown in **Figure 6**. Just click the CIRAF Target Zones switch to show the zones and their numbers. Saudi Arabia is in Zone 39.

What else could I hear from my Riyadh location? ACE-HF can make Reception Area displays to show areas covered from your location; an example is shown in **Figure 7**. This figure shows 15.82 MHz at 2100 UTC, but the display can be animated over a range of frequencies or times of day. Since the receive location was fixed, the software, in its complex scientific number crunching, effectively moves the transmitter all over the world to create a display of reception coverage. In my review using an average up-to-date computer with 1.8-GHz processing speed, I ran 61 by 61 points, times 10 frequencies, times 24 hours. That equals 893,040 equivalent point-to-point circuit predictions, which only took a little over two minutes to complete.

Antenna Analysis

Antenna gains and patterns are always critical in HF communications, whether the system is for ham radio or international broadcasting on shortwave. ACE-HF now includes a great new capability for showing the effectiveness of HF antennas.

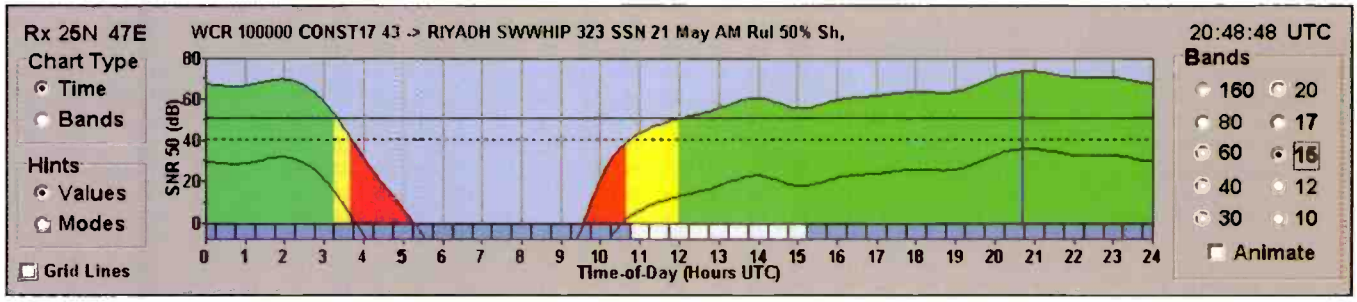


Figure 4. SNR vs. Time-of-day Chart for the WCR to Riyadh circuit.

Optimum Working Frequencies (MHz) - For June 2006 - Flux = 73, Created by NW7US

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

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

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

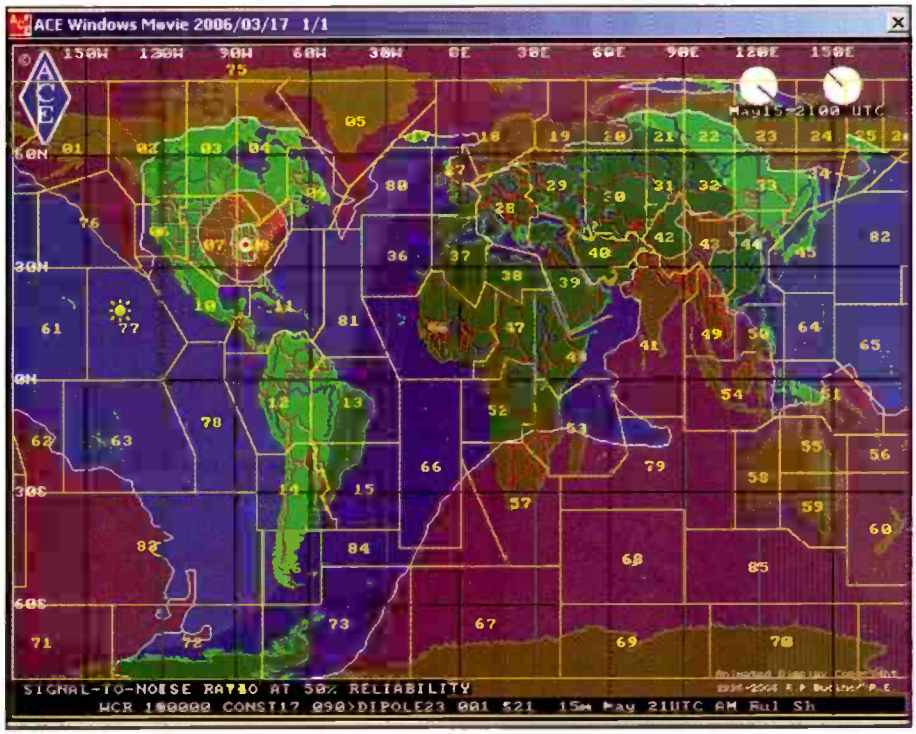


Figure 6. WCR area coverage with CIRAF zones.

An example chart is shown in **Figure 8**. For this chart, I selected a horizontal dipole array antenna that has four elements per row and four elements per stack—a typical curtain array. The antenna's design point is 7 MHz, and the chart shows the vertical gain pattern at that frequency, with a directivity gain of 22.1 dBi at the main lobe. The chart also shows the calculated range of elevation angles for the WCR-Riyadh circuit (the green line) indicating that this antenna is a good match for the propagation modes of this DX circuit.

Circuit Group Calculations

ACE-HF also has a special chart showing the predicted integrity of as many as 18 circuits. In ham operation, the chart is a great aid during contest activity as you can easily see when the bands are open at the current time to different target areas. Advancing the chart to a future time really helps during contest planning.

The same chart may be used for predicting reception from as many as 18 of your favorite shortwave radio stations. Again using the international broadcasting example, I defined circuits from 18 stations to Riyadh, using the generic CONST17.VOA antennas and specifying uniform transmit powers of 100,000 watts (but actual powers could have been taken from the HFCC schedule). Results for a time input of 0600 UTC are shown in **Figure 9**. I used the WCR frequencies, but average frequencies in the various bands could have been specified instead. The group chart shows that reception from WCR is fading at Riyadh as daylight approaches the path midpoint (as was seen in **Figure 4**), but European stations can still be heard, and reception from nearby stations is strong.

This chart is a great tool for the shortwave listener and will quickly become a favorite resource during your radio monitoring. The chart appears for the current time and automatically advances every hour, showing when different circuits are most likely to be heard—when the SNR (signal-to-noise ratio, remember that from last month?) predictions of the table are "in the green" (the blue cells indicate best frequencies). You can construct an unlimited number of such group charts for various scenarios and can save and recall them for future listening.

By the time you read this, ACE-HF V2.05 will be available for purchase at www.acehf.com. It's highly recommended for both hams and SWL enthusiasts. The price for new users is $99, and existing ACE-HF ham users will want to upgrade for a modest fee. If you have questions, contact Dick Buckner at RichardPBuckner@cs.com.

Next month we'll explore HF propagation effects in more depth and discuss how propagation programs like ACE-HF manage to produce reliable predictions in the face of a greatly varying ionosphere. Stay tuned!

HF Propagation For June

June is a month of typical summertime radio propagation on the high frequency

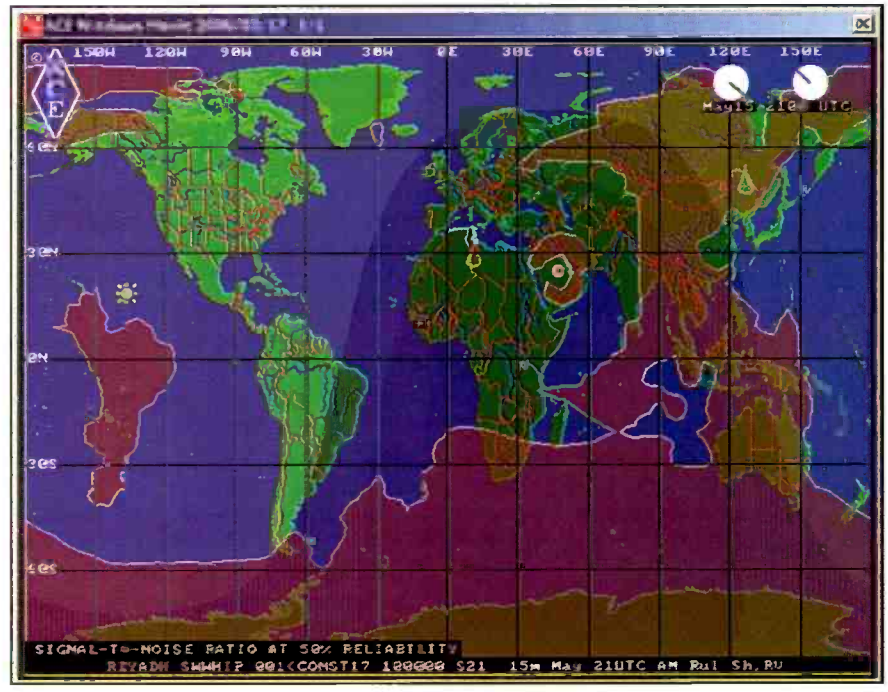


Figure 7. Riyadh reception area coverage.

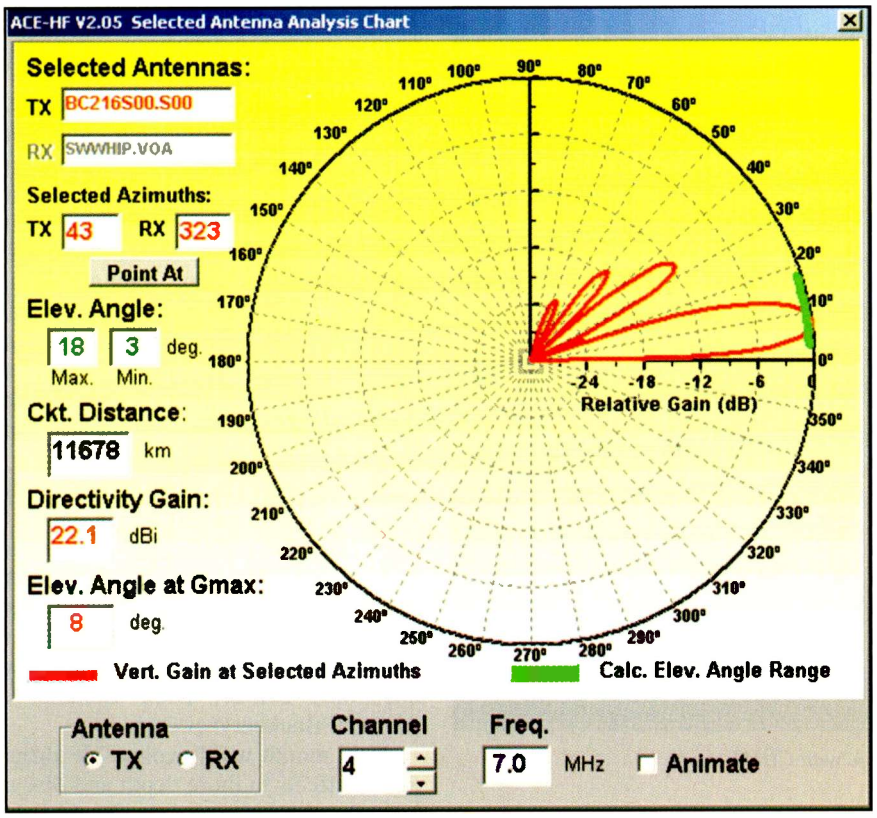


Figure 8. Antenna analysis of a typical curtain array antenna.

bands. Solar absorption is expected to be at seasonally high levels, resulting in generally weaker signals during the hours of daylight when compared to reception during the winter and spring months. Nighttime usable frequencies to most parts of the world are higher than at any other time of the year, while the daytime usable frequencies are generally lower than those during winter.

However, we are officially at the end of Sunspot Cycle 23 and are at the lowest level of solar activity since the cycle started just over 10 years ago. This is known as the Solar Cycle Minimum, the months when the sun has very few, if any, sunspot activity. Without the energy typical of the sun during the peak activity period of the sunspot cycle, the ionosphere is weak and generally cannot support refracting and reflecting radio signals at the higher end of the HF spectrum. This means that the 2006 summer listening season will be less active than summers would be during the peak years of the cycle.

At the highest end of the HF spectrum, propagation from DX locations east and west is a rare event, except via sporadic-*E* (*Es*) propagation, which can provide shorter-range openings. Openings via the *F* layer will unlikely occur, so worldwide east/west paths on the highest HF bands are dead.

North and south paths may open up on some higher HF bands, especially around sunrise and sunset. Nineteen and 16 meters will likely be the most reliable daytime DX bands, while 19 and 22 may offer weak nighttime openings.

Twenty-five and 31 meters will be fair in the evenings and mornings. At night, those paths that remain open will be marginal. The most reliable band for both daytime and nighttime should be a toss-up between these two bands.

Forty-one and 49 meters should offer good DX conditions during the night despite higher static. Look for Europe and Africa as early as sunset. After midnight, start looking south and west for the Pacific, South America, and Asia. Short-skip should be possible out to about 750 miles during the daytime.

Expect some openings on 75 and 90, similar to how 40 meters will behave. Fairly frequent short-skip openings up to 1,000 miles are possible during darkness, but expect very few daytime openings with all the static and absorption. Mediumwave and 120-meter propagation is rough in the summer due to the high static and higher overall absorption caused by the short nights and higher *D* layer ionization.

Thunderstorm noise increases considerably during June and the summer months. As we learned last month, this can degrade the SNR, masking exotic DX signals. This can make catching weak DX signals a true challenge.

VHF Conditions

The summertime *Es* season for the Northern Hemisphere begins in force in May, with June seeing strong and frequent *Es* openings. Within the normal *E*-layer region of the ionosphere, regions of abnormally intense ionization are formed. Through June, you can expect to see 20 to 24 days with some *Es* activity. Usually these openings are single-hop events with paths up to 1,000 miles, but double-hop is possible during June. Look for *Es* on lower VHF frequencies throughout the day, but especially in the afternoon.

A seasonal decline in transequatorial (TE) propagation occurs by June, though an occasional opening may still be possible on the low VHF bands toward South America from the southern tier states and the Caribbean area. The best time to check for TE openings is between 9 and 11 p.m. local daylight time. These TE openings will be north-south paths that cross the geomagnetic equator at an approximate right angle.

It might be possible to catch a tropospheric ducting event. Watch for high-pressure weather systems, where ducting is most likely to develop. If the weather forecast maps show mean-sea-level atmospheric pressure in millibars, look for tropospheric possibilities when a stalled high pressure cell in your area reaches 1025 millibars over the path you're interested in. Of course, it's most likely to occur when this high-pressure cell develops over moist air. This is why the path between Hawaii and the West Coast has made possible communications on VHF with as little as 5 watts, over a path of 2,500 miles.

Advanced visual and infrared weather maps can be a real aid in detecting the undisturbed low clouds between the West Coast and Hawaii or farther during periods of intense subsidence-inversion band openings. This condition occurs also over the Atlantic.

If you know that conditions are favorable for tropospheric ducting in your area, try tuning around the 162-MHz weather

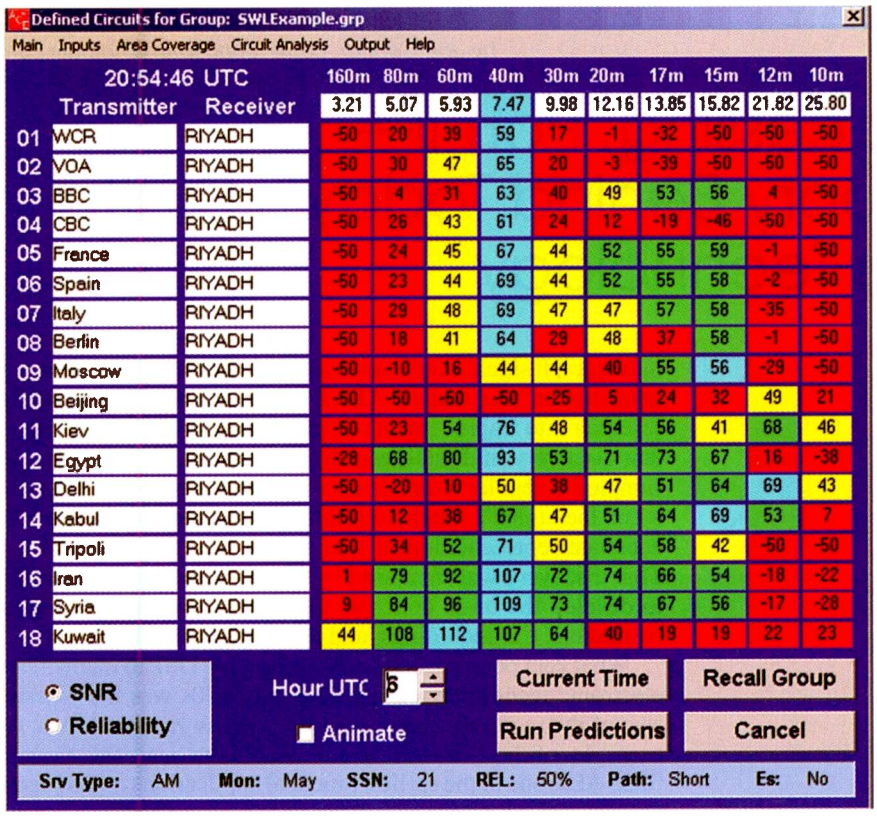


Figure 9. Group reception from 18 stations.

channels to see if you can hear stations way beyond your normal line-of-sight reception. It's possible to hear stations over 800 miles away. Amateur radio repeaters are another source of DX that you might hear from the other end of the duct.

These openings can last for several days, and signals will remain stable and strong for long periods during the opening. The duct may, however, move slowly, causing you to hear one signal well for a few hours, to then have it fade out and another station take its place, from another area altogether.

Current Cycle 23 Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-centimeter observed monthly mean solar flux of 76.6 for February 2006, down from January's 83.8. The 12-month smoothed 10.7-centimeter flux centered on July 2005 has been adjusted to 89.3, and the August 2005 figure was not yet released at press time. The predicted smoothed 10.7-centimeter solar flux for June 2006 is about 73, give or take around 13 points.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for February 2006 is 4.7, a huge dive downward from January's 15.4. This is the lowest number so far, clearly showing the arrival of Solar Cycle 23's minimum. The lowest daily sunspot value during February, with recordings from February 1 through 6, 12, and 20 through 26 was zero (0). The highest daily sunspot count was 15 on both February 15 and 16. The 12-month running smoothed sunspot number centered on July 2005 has been adjusted to 45.4, and the figure for August was not available at press time. A smoothed sunspot count of 9 is expected for June 2006, give or take about 9 points (yeah, that means it could be zero).

The observed monthly mean planetary A-Index (Ap) for February 2006 is 6, the same as for January. The 12-month smoothed Ap index centered on July 2005 has been adjusted to 12.2. Again, the August figure is not available at press time. Expect the overall geomagnetic activity to be quiet to active during most days in June.

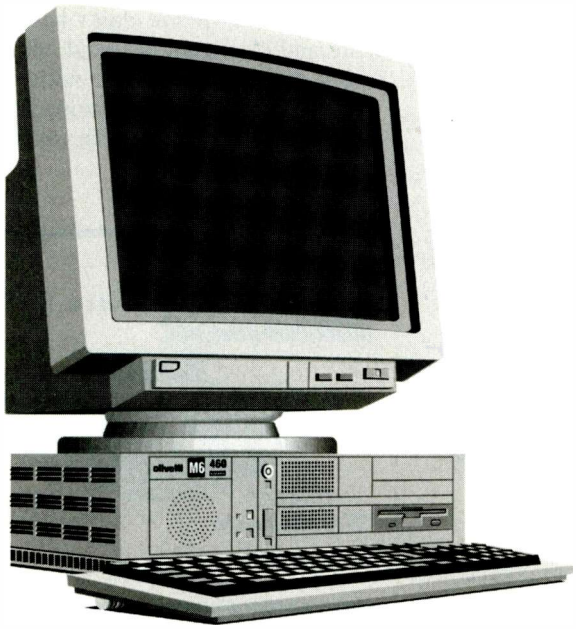
I'd Like To Hear From You

You can join in with others in discussing space weather, propagation, and shortwave 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, check out http://wap.hfradio.org/, the wireless version of my propagation site.

As always, please don't hesitate to write and let me know about any interesting propagation you've noticed. Do you have questions about propagation? I look forward to hearing from you. Happy signal hunting! ■

by Joe Cooper, carm_popcomm@hotmail.com

Digital Signal Processing, Part II—Learning The Theory Behind Today's Digital Communication Technology



No matter what type of modern communication technology you use today, whether cell phones, television, radio, PCs or CD players, all are becoming increasingly dependent upon digital signal processing (DSP). The same goes for software-defined radios (SDRs). All SDRs use DSP to produce the phased (I/Q) digital information characteristic of that technology. That phased signal is used to demodulate the intelligence contained in a digitized radio signal to turn it into usable information, such as voice or music.

I've touched on this topic before, for instance in the column on the set-up and operation of PC sound cards back 2002, as well as in 2003 when I outlined how to use those PC sound cards to digitally record audio signals. Even in the short time since I wrote those columns, there have been many improvements and refinements in the application of DSP, particularly in regard to radio-frequency applications.

DSP technology is itself not new at all. You can argue that it had its origins in the earliest forms of "the original digital": telegraphy. Right from introduction of telegraphy in the late 1700s, there were many attempts to improve the quality of the signal by processing it in different ways. The placement of telegraph signals on wires via electricity was the starting point of our current electronic-based DSP technology.

The Modern Era

Modern digital recording techniques had their origins in theoretical work undertaken in the 1920s to improve the reception of telegraph signals at distant locations. The most famous early contribution was that of AT&T scientist Harry Nyquist. His research into improvements in telegraphy led to a very important discovery in digital recording: an analog signal should be sampled at regular intervals over time and at twice the frequency of the signal's bandwidth in order to be converted into an adequate representation of that analog signal in digital form. That discovery was then used by Claude Shannon in the 1940s to develop the basic concepts that have led to today's digital computers, CD recordings, and data compression.

What kept people from actually applying DSP to mainstream electronic technology earlier than the 1970s was the massive size of the required analog devices, such as vacuum tubes. An example of how unwieldy this could be was the famous SIGSALY, one of the earliest practical applications of DSP technology. This digitally encrypted telephone system was developed by a team of Bell engineers led by A.B. Clark and used in World War II.

When it was first officially put into service on July 15, 1943, there were two terminals (one in Washington and one in London). Each was made up of 40 racks that contained a total of 384 model 2051 Gas Tetrode Thyratron vacuum tubes. The total weight of the equipment was approximately 55 tons, not including the air conditioning system required to keep it cool!

Each terminal was so complicated to operate and difficult to maintain that the 805th Signal Service Company was formed specifically to support SIGSALY. To give you an idea of the manpower needed to keep the terminals working properly, the 805th was made up of 81 officers and 275 enlisted men, divided into 12 detachments of five officers and 10 men to cover the 12 terminals that would eventually be in operation.

Because of the extreme importance of the SIGSALY project, the men of the 805th had the highest qualifications of any technical group in the signal corps. Each detachment was expected to keep each of the 384 vacuum tubes in each terminal working 100 percent of the time when the terminals were in operation. To achieve this, the detachments were expected to be available 24 hours a day, giving SIGSALY a service cycle of 16 hours of maintenance for every eight hours of operation. That cycle included testing all 384 vacuum tubes in the terminals every day and keeping 384 tube sockets in working order despite wear and tear.

However arduous the maintenance involved, this method of digital communication allowed military commanders in the United States to communicate with their British counterparts in a spontaneous way through telephone conversations. More importantly, this more natural way of communicating eliminated the time wasted in having written messages encrypted, transmitted, and then decrypted. In addition, the actual intelligence used in the SIGSALY transmissions was completely unde-

In 1943 two SIGSALY terminals were used to ensure 100 percent secure voice communication between military and political leaders in Washington and London. This system was the first successful use of DSP technology, comprising analog-to-digital sampling, signal processing, and data compression. It took a team of between 10 and 13 men to run SIGSALY and required 15 minutes just to start the equipment and synchronize the two terminals. (Photo courtesy National Security Agency)

tectable and undecipherable by the Germans and Japanese because they had no comparable digital technology to intercept the signals.

The transmission method was found sufficiently secure for President Franklin Roosevelt and Prime Minister Winston Churchill to use it to talk directly with each other by telephone, unlike the other wartime leaders who needed their messages encrypted by hand. In fact, SIGSALY technology was so effective as a means of encrypted voice communications that its basic methodology remained classified as a military secret until 1976, and it was not fully revealed to the public until 1983!

As you can see, a significant amount of research and development has gone into today's DSP technology. So in appreciation of the many people who were instrumental in its advancement, this month's column will take a closer look at why DSP technology has become so central to today's radio technology and how it operates at a theoretical level. By understanding how this technology works, you'll be able to make better use of its benefits in your radio monitoring. Let's begin by looking at why DSP technology is used in the first place.

What Is A Signal?

A signal is any disturbance that conveys an intelligent message. That can range from clapping your hands together to get someone's attention to communicating with a space probe at the edge of the solar system using radio signals. If you can't get someone's attention and have him or her react properly to the sound of your clapping hands, or get a space probe to respond to a radio signal that has traveled billions of miles, your signal has failed to convey intelligence. That failure could be because the signal was too weak to be heard by either the human ear or picked up by a spacecraft's antenna array. But maybe not.

"...The point is that no matter what kind of signal is being sent, its ability to convey intelligence always depends on its ability to overcome noise."

For instance, if you try to attract someone's attention in New York's Time's Square by clapping your hands, you'll be competing against other noises, like traffic, making it next to impossible for someone to recognize your signal. The same goes for our space probe's antenna; it may also be picking up cosmic noise, background radiation, and a host of other natural signal sources that create a kind of interstellar Time's Square. The point is that no matter what kind of signal is being sent, its ability to convey intelligence always depends on its ability to overcome noise. Obviously someone clapping his hands will increase his chances of success when there is little or no competing noise. Same with the space probe.

Noise in transmissions also affected early forms of visual telegraphy, where "noise" could take the form of rain, fog, smoke, or even darkness. Anything that could decrease that noise, including switching the transmission of intelligence from visual methods to an electrically based system over wires, would essentially be some type of signal processing.

The issue of signal versus noise is so central to any type of communication (again, this can be sound from a stereo, cell phone, TV, or radio) that the overall efficiency of a device is expressed by the signal-to-noise ratio it's capable of delivering. In fact, overcoming noise (defined as the background "hiss" created by vacuum tub technology) was such a significant part of the SIGSALY technology that 10 percent of the equipment used was specifically designed to eliminate it.

Signal-to-Noise Ratio

As with anything having to do with electronics there is a little math involved so bear with me. Most of the math is fairly simple, however, about at a high school level.

This is a photo of the first official use of the SIGSALY system on July 15, 1943. The conference call took place in an office located at the Pentagon. Shown are Lt. Gen. J. T. McNarney, deputy chief of staff, at right at the head of the table; Dr. O. E. Buckley, president of Bell Telephone Laboratories, at left end of the table; and Lt. Gen. Brehon Somervell, commanding general, Army Services Forces, using the phone while others listen on headsets. (Photo from the National Archives)

The ratio of signal to noise in an electronic device is usually measured in decibels (dB), which is based on logarithmic scale. Logarithmic scales are very useful to describe such ratios, particularly when large ranges of values are being measured which would be difficult to express using ordinary numbers.

Mathematically the signal-to-noise ratio (or S/N) is expressed as:

$$S/N = 20 \log_{10}(V_s/V_n)$$

Where V = signal strength measured in microvolts, V_s = signal level, and V_n = noise level measured in microvolts, with the result (S/N) measured in dB.

To illustrate how that ratio works, if $V_s = V_n$ then the result is S/N = 0 dB. There would be no intelligence conveyed in that signal since the noise would completely nullify it. More importantly, this would remain the case whether you started with 1 microvolt or 100 microvolts of energy.

As long as V_s is the same as V_n they will neutralize each other, along with the intelligence in the signal. However, if the signal were raised from 0 to 10 microvolts (as measured in an electrical circuit) and the noise remained at 1 microvolt, the result would be:

$$S/N = 20 \log_{10}(10.0) = 20.0 \text{ dB}$$

So any strategy that increases the signal voltage over the noise voltage will result in an increasingly positive S/N ratio.

To demonstrate:

3.01 dB = 2 times greater than 1 dB
10 dB = 10 greater
20 dB = 100 greater
30 dB = 1000 greater

An investment strategy that increases the S/N ratio from 10 dB to 20 dB will be rewarded by a hundredfold increase in intelligence. If you increase the S/N ratio from 20 dB to 30 dB, the payback will be *1,000* times more intelligence in the signal. As you will see, analog methods simply do not provide the same payback because of the effort required in making such improvements.

Limits Of Analog Technology

Once it was understood how noise affects signals, the engineering community involved in radio design turned its attention to improving radio through various investment strategies. Investment strategies used to increase the S/N ratio depend on the resources (time, money, skill) available in specific cases.

"An investment strategy that increases the S/N ratio from 10 dB to 20 dB will be rewarded by a hundredfold increase in intelligence."

In the very early days of radio, before we understood much about tuned circuits or even how radiowaves propagated, the primary investment strategy was to simply increase the power in the transmitter. As a result, huge spark-gap transmitters that used 1 million to 2 million watts of power were used to overcome the limitations of early receiver designs, which depended on tuned circuits, rather than vacuum tubes, for amplifying signals. This brute force method was not only expensive, it didn't guarantee a good S/N ratio at the receiver end—even under the best conditions. Designers then began investing in better antennas, improved methods of tuning, increased signal amplification (particularly with the introduction of vacuum tubes), and the creation of efficient diode detectors.

The most significant improvement, however, came with the invention in 1913 of the regenerative radio by Edwin Armstrong, followed by his invention of the super heterodyne radio during World War I. Both designs used significantly different strategies to achieve the goal of *boosting the signal voltage through amplification for an improved S/N ratio in the receiver.* That goal was achieved by either controlling the feedback in regeneration or by changing an input frequency to an intermediate frequency, then amplifying it.

The only drawback to this early method of improving the S/N ratio was the analog signal itself. In any analog circuit the degree of improvement in S/N ratio depended entirely on the strength of the original signal. That's because the original signal is always used to "drive" the final output of the analog circuit, where amplification or processing always includes some degree of added noise. A very weak signal will not "drive" the output to a level high enough to overcome the noise that is added during amplification and processing, no matter what measures are taken to suppress that noise.

This was especially evident in early vacuum tube technology, when you could actually hear the sound of the electrons rushing through the tube as you increased the audio volume, even without an external signal present in the circuit. Even today, some people still like to use "hollow-state" radios—it's hard to forget the "Niagara Falls roar" of a fully cranked tube amplifier when you're trying to dig a weak signal out of the background noise!

To give those of you who haven't worked with vacuum tubes an idea of what was inside SIGSALY, here's a photo of a model 2051 Gas Tetrode Thyratron vacuum tube. There were 384 of these inside of one terminal. Imagine how hot the equipment must have gotten when they were all working!

When solid-state devices, such as transistor amplifiers, were finally introduced people expected that noise to be reduced, if not eliminated. However, it turned out that even in the *best* designed solid-state circuits it was hard to reduce background noise entirely because of thermal changes taking place within the crystal structure of the silicon (and other semiconductor material) used in those early transistors. It was ultimately discovered that, in regard to processing analog signals, the more complex the technology, the more time, money, and energy had to be invested in support strategies to keep that technology working. Remember those SIGSALY efforts!

You can see a mock-up of a SIGSALY terminal at the National Cryptologic Museum, located adjacent to the National Security Agency's headquarters at Ft. Meade, Maryland. The museum is open to the public and free. Its collection is one of the finest in the world and contains artifacts dating back to the American Civil War. Check out its website at www.nsa.gov/museum/index.cfm for more information. (Photo courtesy National Security Agency)

As SIGSALY and other digital projects from the age of vacuum tube and transistor technology have shown, you *can* make analog technology support digital signals, but only when you have a support strategy in place that will allow it to work properly. However, analog technology suffers from the law of diminishing returns, and with each layer of complexity you add to your analog device you will experience increasingly greater levels of noise which become increasingly expensive to eliminate. The noise can always be traced back to one source: the traditional components (coils, resistors, capacitors and amplifiers) employed in processing an analog signal. No matter how well built those components are, their values and performance will always shift in and out of ideal settings because of environmental factors like temperature and vibration.

You're left with two choices: either you continue to invest in expensive technological strategies that will provide only marginal returns when applied to current analog technology, or you can try something entirely new.

Digital Strategies And Their Benefits

When it comes to new ideas about investment of time, money, and effort, sometimes it's the idea that appears to be the craziest that work the best. Consider the dilemma with analog circuits, where the components *themselves* are the cause of the problem (noise) that you're trying to eliminate.

For instance, what would you say to someone who comes along and says, "Well if the problem is the components, why not get rid of them?"

That may appear, at first glance, to be a nutty suggestion, but is it really that crazy? Consider what the definition of true craziness: doing the same thing over and over and expecting a different result.

So what's crazier? Using outdated analog technology and expecting it to perform miracles when it's obviously obsolete? Or moving on to true digital technology? Continuing to use the same old methods found in analog radio technology is just plain nuts when you know that the outcome will always be increasingly diminished returns on your investment.

This is where switching to digital technology makes sense. Since the advent of inexpensive digital technology in the 1980s and '90s, the improvement in the rate of return on investment, particularly when it comes to new strategies for increasing S/N ratio, has been significant. Each time you invest in a digital circuit design your results will be closer to an ideal solution than you can achieve with an analog circuit. This is because of three key characteristics of digitized circuitry: they can be operated at close to perfect tolerances; they do not depend upon a signal to "drive" signal processing; and they will never introduce any external noise when they process a signal.

What's more important is that when you use digital technology you literally *eliminate* circuits, thereby eliminating the problem inherent in such circuits. Certainly there are electronic circuits involved in digital technology, but they're not directly involved in the processing of radio signals. Instead, the electronic circuits are now used to simply transfer the digital information to a digital processor, where it is acted upon, and transferred back.

Furthermore, since the information is digital, there is absolutely no opportunity for noise to be introduced during the transfer. The key point is that because of digital technology's simplicity it's possible to achieve very large returns for relatively small investments of time and resources.

Next Month

Next month I'll take a close look at how traditional circuits have been eliminated through analog signal sampling using digital sampling devices. I'll show you how those digital signals are then processed with DSP software and then processed back into analog signals. Then we'll examine how DSP technology uses mathematical modeling to process digital signals more effectively than traditional coils and capacitors.

You can e-mail me with any questions at carm_popcomm@hotmail.com. While I can't answer general questions on computers, I'll be more than happy to help you with any issues raised in the columns.

As I mentioned last month, some people in the weather office are predicting up to nine significant hurricanes this summer, which is disquieting given that there are still many people who feeling the effects of other natural disasters. I would like to suggest that rather than waiting for a disaster to occur before contributing, you send a donation now to the American Red Cross (www.redcross.org/donate/donate.html) to help your fellow Americans in this time of trouble. However, there are many other good (and ethical) organizations that you can contribute to, so please use them if you wish, just don't give into "charity fatigue." If you have a job, a family around you, and live in a stable neighborhood, then show your thanks for that wonderful good luck by sharing with someone less fortunate, and do so regularly.

Let us also not forget our troops overseas who continue to need our visible support, particularly as tensions in the Middle East and Afghanistan continue to rise. Please refer to the U.S. Department of Defense's official web page, "Defend America." There's a section found at www.defendamerica.mil/support_troops.html with an amazingly wide range of practical and useful ways that you can directly help. If you are fortunate to live in the United States of America, please remember to give thanks for your personal blessings by remembering to pass on that blessing to others through regular acts of selfless sharing. See you again next month ■

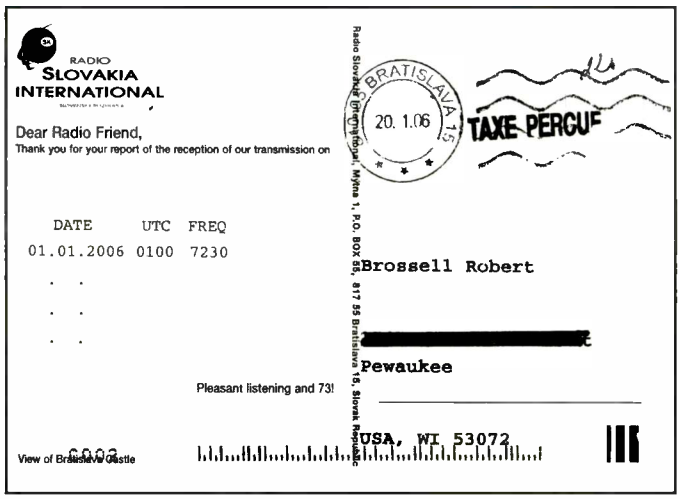
by Gerry L. Dexter, gdex@genevaonline.com

The International Broadcasting Bureau Monster Strikes Again!

The U.S. government's International Broadcast Bureau (IBB) calls the shots when it comes to things like language services, frequency choices, and transmitter operations for the Voice of America and other government-sponsored broadcast services. Lately the IBB has looked more like some terrifying creature out of a Stephen King novel, suddenly appearing through the fog of night to consume you while you're still alive and able to scream.

Last month we told you about the huge cutback they've made in VOA broadcasts, resulting in a long list of abolished languages, times, and frequencies. Now the monster has risen out of the muck and mire to strike again. This time it's the closing of the Rhodes and Kavala relay sites in Greece, effective with the B06 schedule in late October. Reason? Oh, it's the usual. Too expensive to operate. And an audience that is moving to other means of access (Internet, FM, TV). At the rate things are going the VOA will end up ranking behind Swiss Radio!

Also, we wonder what effect, if any, this will have on the Voice of Greece relays via Delano/Greenville.


RADIO SLOVAKIA INTERNATIONAL

Dear Radio Friend,
Thank you for your report of the reception of our transmission on

DATE UTC FREQ
01.01.2006 0100 7230

Pleasant listening and 73!

BRATISLAVA 20. 1.06

TAXE PERCUE

Brossell Robert
[redacted]
Pewaukee
USA, WI 53072

Radio Slovakia International may be struggling to survive but it still wasted no time getting a QSL into the eager hands of Bob Brossell (WI).

Radio Slovakia International—A Future?

Yes, no. Yes, no. Yes, no. Back and forth they go on the future of Radio Slovakia International. The latest word says the service is doomed and might even be gone by now. Such events are much regretted, not only for the loss but also for the shortsightedness of the governments responsible.

The Dominican Republic station which was active on variable 5010 three or four years ago is back in play, surrounded by the same past questions about its actual ID. Is it Radio Cristal? Or Radio Pueblo? Or maybe it uses both IDs? Radio Cristal IDs have been heard in the 5010 area off and on since the early 1960s

Another newly active returnee is XEXQ, Radio Universidad in San Luis Potosi, Mexico, on 6045, which you'll find is best heard in the local morning, before the band "drops out" in your area. XEXQ is a real old timer, having been around (off and on) for several decades.

RTV Algeria Update!

Less than two months after the rejuvenation of RTV Algeria, the transmissions, which were via France, have been taken off the air! But not really. Apparently the broadcaster's reappearance on shortwave was a test. Another phase of tests has been hinted at, so let's hope we're seeing a build-up aimed at a regular service. There's no info as to when all this may coalesce, so you may find it worthwhile to check for its signals now and then (5985, 7105, 7325, 9475, 9735, 9885, 11725, 11830, 12020, 13620, 13750, 15255, 17690, 17755, and 17840.) The broadcasts run in one- and two-hour blocks, and not all frequencies are used for every transmission. Recently we've noted them active again as early as 1900 on 11915 and, reportedly, in parallel on 17755. The broadcasts seem to be a simulcast of Algeria's domestic network.

From Bolivia To Madagascar

Radio Pio XII in Bolivia was off the air for a time after a vital piece of gear was stolen from its transmitter site. The station isn't often heard in North America because its 5952.5 frequency rubs shoulders with the Okeechobee, Florida, transmitter of WYFR on 5950, which also relays Radio Taiwan International at certain times of the day.

World Christian Broadcasting, operator of Alaska's KNLS, has taken the first steps toward putting a powerful shortwave station on the air from Madagascar, actually at a place called Mahajanga (get out your atlas!), a few miles inland from the Mozambique Channel on the northwest coast (about 80 miles southeast of the Comoros Islands). The station is to provide "blanket" coverage of Africa, the Middle East, South America, Russia, and Western China. We believe 100-kW transmitter(s) will be used.

Not Calling The Falklands

Over the past several decades, long-time SWLs have seen the flavor (call it "romance" if you like) of shortwave slowly dwindle. "Cycles" became "Hertz," and "Greenwich Mean Time" was forced to give way to the pretentious "Coordinated Universal Time" (UTC). Bandspread tuning dials disappeared as digital readout took over. And no more does the tympani sound "V" for victory on the BBC. Now the BBC has added to the depletion by canceling its "Calling the Falklands" program.

Tons Of Logs

The "Global Information Guide" consistently presents more shortwave broadcast loggings than any other monthly SW publication! (This month we processed **771 loggings**!)* Why not join your fellow SWLs, let us know what you're hearing, and also become eligible for our monthly shortwave book prize! Send your logs to "Global Information Guide," *Popular Communications*, 25 Newbridge Rd., Hicksville NY 11801-2953. Or e-mail them to Editor Harold Ort at popularcom@aol.com, or to your "GIG" columnist at gdex@genevaonline.com (please see the column text for basic formatting tips.) Come join the party—we look forward to hearing from you!

**Not all logs get used; there are usually a few which are obviously inaccurate, unclear, or lack a time or frequency.*

It can be better done over the Internet, don'tcha know. "Calling the Falklands" was a BBC feature for some 62 years!

Reader Logs

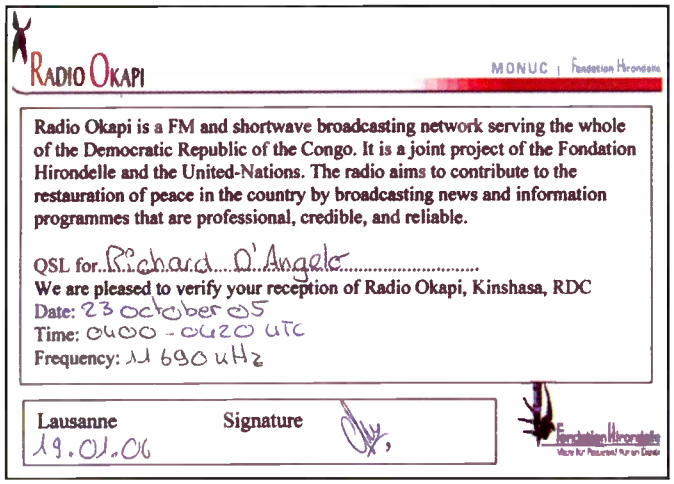
Remember, your shortwave broadcast station logs are always welcome. But please be sure to double or triple space items, list them by country, and include your last name and state abbreviation after each log. Also much wanted are spare QSLs you don't need returned, station schedules, brochures, pennants, station photos, and anything else you think would be of interest. And how about sending a photo of you at your listening post? Step right up and get your 15 minutes of fame!

Here are this month's logs. All times are in UTC. Double capital letters are language abbreviations (SS = Spanish, RR = Russian, AA = Arabic, etc.). If no language is specified, the broadcast is assumed to have been in English (EE).

ALBANIA—Radio Tirana, 7105 in Albanian to Europe at 0919,

Abbreviations Used In This Month's Column

*	— before or after a time (time the station came on or left the air)
(l)	— after a frequency (lower sideband)
(p)	— presumed
(t)	— tentative
(u)	— after a frequency (upper sideband)
v	— variable
//	— in parallel
AA	— Arabic
ABC	— Australian Broadcasting Corporation
AFN	— Armed Forces Network
AFRTS	— Armed Forces Radio TV Service
AIR	— All India Radio
Anmt(s)	— announcement(s)
Anncr	— announcer
AWR	— Adventist World Radio
BSKSA	— Broadcasting Service of Kingdom of Saudi Arabia
CC	— Chinese
Co-chan	— co-channel (same frequency)
Comml(s)	— commercial(s)
CP	— Bolivia, Bolivian
CRI	— China Radio International
DD	— Dutch
DJ	— disc jockey
DW	— Deutsche Welle/Voice of Germany
EE	— English
ECNA	— East Coast of North America
f/by	— followed by
FEBA	— Far East Broadcasting Association
FEBC	— Far East Broadcasting Company
FF	— French
GBC	— Ghana Broadcasting Corp
GG	— German
GMT	— Greenwich Mean Time
HH	— Hebrew, Hungarian, Hindi
HOA	— Horn of Africa
ID	— station identification
II	— Italian, Indonesian
Int	— international
IRRS	— Italian Radio Relay Service
IS	— interval signal
JJ	— Japanese
KK	— Korean
LSB	— lower sideband
LV	— La Voz, La Voix
NBC	— National Broadcasting Corporation (Papua New Guinea)
ORTB	— Office de Radiodiffusion et Television du Benin
PBS	— People's Broadcasting Station
PP	— Portuguese
PSA	— public service announcement
QQ	— Quechua
RCI	— Radio Canada International
Rdf.	— Radiodifusora, Radiodiffusion
REE	— Radio Exterior de Espana
RFA	— Radio Free Asia
RFE/RL	— Radio Free Europe/Radio Liberty
RNZI	— Radio New Zealand International
RR	— Russian
RRI	— Radio Republik Indonesia
RTBF	— RTV Belge de la Communate Françoise
Relay	— transmitter site owned/operated by the broadcaster or privately operated for that broadcaster
relay	— transmitter site not owned by the broadcaster
SCI	— Song of the Coconut Islands (transition melody used by Indonesian stations)
s/off	— sign off
s/on	— sign on
SIBC	— Solomon Is. Broadcasting Corp.
Sked	— schedule
SLBC	— Sri Lanka Broadcasting Corporation
SS	— Spanish
TC	— time check
TOH	— top of the hour
TT	— Turkish
TWR	— Trans World Radio
Unid	— unidentified
USB	— upper sideband
UTC	— Coordinated Universal Time (as GMT)
UTE, ute	— utility station
Vern	— vernacular (local) language
(via)	— same as "relay"
VOAS	— Voice of America
VOIRI	— Voice of Islamic Republic of Iran
WCNA	— West Coast of North America
ZBC	— Zimbabwe Broadcasting Corporation



RADIO OKAPI

MONUC | Fondation Hirondelle

Radio Okapi is a FM and shortwave broadcasting network serving the whole of the Democratic Republic of the Congo. It is a joint project of the Fondation Hirondelle and the United-Nations. The radio aims to contribute to the restauration of peace in the country by broadcasting news and information programmes that are professional, credible, and reliable.

QSL for Richard D'Angelo

We are pleased to verify your reception of Radio Okapi, Kinshasa, RDC

Date: 23 october 05

Time: 0400 - 0420 utc

Frequency: 11 690 uHz

Lausanne 19.01.06

Signature

Fondation Hirondelle

Rich D'Angelo (PA) received this QSL from Radio Okapi in the Democratic Republic of the Congo, which airs on shortwave via Meyerton, South Africa.

7110 in Albanian at 2140, 7455 in Albanian to North America at 0041 and 7465 in FF at 2010. (DeGennaro, NY)

ANGUILLA—Caribbean Beacon, 6090 with religious talks at 0241. (DeGennaro, NY)

ARGENTINA—Radio Nacional/RAE, 6060 in SS with talks and ID at 0953. Also 11710 in JJ at 1020. (DeGennaro, NY) 0255 in EE with IS, multiple IDs and into FF. (Paszkiewicz, WI) 0015 with SS songs and marimbas. Also 15345 in SS at 1815. (Maxant, WV)

Radio Armonia, 6214 with pgm of SS vocals and man anncr. ID at 0100. (D'Angelo, PA)

Radio Baluarte, 6214 Puerto Iguazu in SS and PP at 0927. (DeGennaro, NY)

ARMENIA—Voice of Armenia, 9965 in presumed Armenian at 1835. (Brossell, WI) 1930 in Armenian. (DeGennaro, NY)

ASCENSION IS.—BBC Relay, 7105 in FF at 0557. (MacKenzie, CA) 15105 in FF at 1820. (Jeffery, NY)

AUSTRALIA—Radio Australia, 5995//6080//7240//9475//9710//11660 at 1607. (Burrow, WA) 6020 at 1315. (Northrup, MO) 7240 at 1415. (Barton, AZ) 6020 at 1220, 9580 at 1252, 9590 at 1248, 9710 at 1036, 11660 in CC/EE at 1323 and 11880 at 0923. (DeGennaro, NY) 9710 at 1600. (Yohnicki, ON) 11660 at 2125. (Moser, IL) 9580 at 1910, 9690 at 1245, 15230 at 2320 and 17785 at 2315. (Maxant, WV)

AUSTRIA—Radio Austria Int., 5945 in GG to Europe at 2025, 6155 in GG to Europe at 0953, 7325 in EE to Central America at 0024, 13675 to WCNA at 1610 and 17855 in GG at 1340. (DeGennaro, NY) 7325 in SS/GG at 0030. (MacKenzie, CA) 0040 in EE. (Charlton, ON) 9870 at 2345. (Maxant, WV) 2354. (Wood, TN)

BELARUS—Radio Belarus, 7340 in Byelorussian to Europe with ID and sign on at 2130. (DeGennaro, NY)

BELGIUM—RTBF, 9970 in French at 1838. (Brossell, WI) 1040 in FF and 17570 with futbol coverage in II at 1632. (DeGennaro, NY)

BOLIVIA—Radio Pio Doce, 5952.5, Llallagua Siglo XX, monitored at 0952 with SS talk, anmts and ads. Brief flutes to ID and more talk. (D'Angelo, PA)

Radio San Miguel, Riberalta, 4903 at 0938 with long SS talk and ID, local music. (D'Angelo, PA) 0959. (DeGennaro, NY)

Radio Yura, Yura, 4716.8 at 1027 with SS talk and flutes. (DeGennaro, NY) 2318 with rustic vocals, multiple IDs and freq. anmts. (D'Angelo, PA)

Radio Santa Cruz, Santa Cruz, 6134.8 monitored at 0857 with local music, ID, talk. (Alexander, PA) 0922 with local vocals, ID, ads and more music. (DeGennaro, NY)

Radio Mosoj Chaski, Cochabamba, 3310 at 0920 with woman anncr in QQ, flutes, ID. (D'Angelo, PA)

Radio Mallku, Uyuni, 4796.4 at 0934 with rustic Bolivian music and SS talk. (D'Angelo, PA) 1014 in SS/QQ with woman talk, flutes. (DeGennaro, NY)

BOTSWANA—VOA Relay, 4930 at 0332 with news. (Brossell, WI) 17895 with pgm of world music at 1844. (Charlton, ON)

BRAZIL—Radio Rio Mar, Manaus, 9695 at 1101 in PP with talk, ID, vocals. (D'Angelo PA)

Radio Gazeta, Sao Paulo, 9685 with local talks at 1235. (DeGennaro, NY)

Radio Difusora, Taubate, 4924.5 with music and talk at 1045. (DeGennaro, NY)

Radio Anhanguera, Goiania, 4915 at 0835. (DeGennaro, NY) 11830 at 2314. (Charlton, ON)

Radio Nacional, Macapa, 4915 monitored at 0225. (Jeffery, NY) 0330. (Brossell, WI) 0336. (DeGennaro, NY) 0705. (Alexander, PA)

Radio Maurmby, Florinapolis, 9665 at 2141 with interview and alternating m/w anncrs. (DeGennaro, NY)

Radio Difusora, Roraima, 4875 with commentary on politics at 1036. (DeGennaro, NY)

Radio Gaucha, Porto Alegre, 11920 at 0105 with music and anmts services for Mato Grosso. (DeGennaro, NY)

Radio Senado, Brasilia, 5990 with domestic messages heard at 1004. (DeGennaro, NY)

Radio Difusora, Londrina, 4815 at 2250 with religious talks, choir. (D'Angelo, PA)

Radio Nacional Amazonas, Brasilia, 6180 at 0535 with Brazilian pops; //11780. (Alexander, PA) 6180 at 0858 and 11780 at 1845. (DeGennaro, NY) 2107. (Moser, IL) 2317. (Charlton, ON)

Radio Educacao Rural, Tefe, 4925 with local news and ads at 1041. (DeGennaro, NY)

Radio Clube do Para, Belem, 4885 with futbol heard at 0054. (DeGennaro, NY) 0208 with talk, ad string. (Taylor, WI) 0547 with music. (Wood, TN)

Radio Brazil Central, Goiania, 4985 with music, m/w anncrs at 0230. (Jeffery, NY) 0101 and 11815 at 0024. (DeGennaro, NY) 0107 with apparent news, jingle IDs, ad strings, TCs. (D'Angelo, WI) 0225. (Alexander, PA)

Radio Bandeirantes, Sao Paulo, 9645 with futbol at 2244 and 11925 with ad string heard at 0016. (DeGennaro, NY) 0132 with futbol. (D'Angelo, PA)

Radio Congohas, Congohas, 4775 at 2240 with man hosting romantic vocals. (D'Angelo, PA)

A Voz do Sao Francisco, Petrolina, 4945 with local items and commls at 0919. (DeGennaro, NY)

Radio Guaruja Paulista, Presidente Prudente, 5045 with music at 0904. (DeGennaro, NY)

Radio Capixaba, Vitoria, 4935 with religious message monitored at 0855. (DeGennaro, NY)

Radio Missoes da Amazonia, Obidos, 4865 with religious message at 1035. (DeGennaro, NY)

Radio Cairi, Porto Velho, 4785 heard at 1028 with music and commls. (DeGennaro, NY)

Radio Difusora do Amazonas, Manaus, 4805 with anti-drug anmt at 1030. (DeGennaro, NY)

Radio Cultura, Sao Paulo, 9615 with older music selections at 2235. (DeGennaro, NY)

Radio Rural, Santarem, 4765 heard at 1026 with local news. (DeGennaro, NY)

Radio Tupi, Curitiba, 11765 with music and talk at 0148. (DeGennaro, NY)

Radio Cancao Nova, Cachoeira Paulista, 4825 at 0630 with religious programming including a radio drama. (Alexander, PA) 0928 but quickly faded out. Also 9675 with religious message at 2247. (DeGennaro, NY)

BULGARIA—Radio Bulgaria, 5800 in GG at 2040, 7400 in EE to ECNA at 0037, 7500 in SS to LA at 0051, 9400 in BB to Europe at 2045, 9500 in SS to SA at 0018 9700 to NA at 0041 and 11700 in BB to Europe at 1348. (DeGennaro, NY) 7400 at 0012, //9700. (MacKenzie, CA) 0318. (Burrow, WA) 1705 on local political issues. (Branco, NY) 7400 in GG at 0050 and 7500 in EE at 2250. (Charlton, ON) 7400 at 0045 with ham radio pgm, also 9700 at 0003 with ID and news. (Wood, TN) 15700 in BB at 1320. (Northrup, MO)

BURKINA FASO—Radio Burkina, 5030 at 2030 in local language. FF ID at 2100. (Yohnicki, ON) 2352 with music and local anmts in FF. (DeGennaro, NY)

CANADA—Radio Canada Int., 5840 via Sweden in AA at 0324. (Brossell, WI) 6120 in FF to ECNA at 1228, 7240 via UK in AA to Africa at 2018, 9640 in SS at 0030 and 13650 in FF at 1935. (DeGennaro, NY) 11780 via S. Korea overpowering Brazil at 0040 (Clapshaw, WA) 17835 in FF at 1839. (Charlton, ON)

CBC, 9625 at 2345. Also 15180 at 2145. (Maxant, WV)

CFRX relaying CFRB, Toronto, 6070 with "Star Talk" pgm at 0619. (Wood, TN) 2215. (Maxant, WV) 2341. (Charlton, ON)

CHILE—Voz Cristiana, 9780 in SS at 0609. (Burrow, WA) 15485 in SS at 1913 and 17680 in SS at 1837. (Charlton, ON) 17680 in SS at 0003. (DeGennaro, NY)

CHAD—Radiodiffusion Nationale Tchadienne, 6165 at 2102 with two men in FF discussion, ID and talk by woman. Co-channel Croatia was stronger. (D'Angelo, PA)

CHINA—China Radio Int., 6020 via Albania in CC at 0335. (Brossell, WI) 6040 via Canada at 2339. (Charlton, ON) 6020 via Albania at 0021, 7180-Jinhua in Italian at 2108, 7190-Beijing in JJ at 1352, 7210 via Albania in SS at 2159, 7285 via Albania at 2036, 9440-Kunming in Chaozhau at 1143, 9560 via Canada in CC at 1227, 9570 via Cuba in CC at 1220, 9590-Kashi in SS at 0024, 9600-Kashi at 2006, 9685-Kashi in PP at 2252, 9745 via Bonaire in SS at 0022, 9760-Kunming at 1212, 9800-Kashi in SS at 2302, 11640 via Mali in PP at 1953 and 13630 via Mali in PP at 1932. (DeGennaro, NY) 7190 in JJ at 1330. (Barton, AZ) 7285 via Albania at 2037. (Moser, IL) 13675 via Cuba at 1245. (Maxant, WV) 15230 at 1315. (Northrup, MO)

CNR/CPBS, 3985-Geermu in CC at 1405. 5030-Beijing in CC at 1430. (Barton, AZ) 5030//6090-Geermu in CC at 1356. (Brossell, WI) 7260-Beijing, in CC to Taiwan at 1153 and same on 9170 heard at 1156. Also 9500-Shijiaghuang in CC at 1149 and 9710 heard at 2256. (DeGennaro, NY)

Xizang PBS (Tibet) 4905 in TT with flute music at 2355, //4920. (Paszkiewicz, WI) 4920 with apparent news in unid language at 1253. (Strawman, IA)

China Huayi Broadcasting Corp., 4830-Fuzhou in presumed CC at 1520, well after local sunrise. (Barton, AZ)

Voice of the Strait, 4900-Fuzhou pop music monitored at 1321. (Strawman, IA)

China Music Jammer, 9780 monitored at 1355 covering Taiwan. (Brossell, WI)

COLOMBIA—La Voz de su Concencia, Puerto Lleras, 6010 in SS at 1124. (DeGennaro, NY)

Radio Lider, Bogota, 6139.8 in SS at 1130. (DeGennaro, NY) 0415 with Latin tunes and news briefs. (Clapshaw, WA) 0630 with ID at 0630 and news with EE and PP translations into SS. (Wood, TN)

CONGO REPUBLIC—Radio Congo, 5985 at 1954 with vocals and woman anncr with FF ID prior to opening of WYFR at 2000. (D'Angelo, PA)

Radio Okapi, 11890 via South Africa at 1635. (Clapshaw, WA)

COSTA RICA—Faro del Caribe, 5054 in SS monitored at 0320. (Brossell, WI) 0555. (Wood, TN) 1150 with SS religious program. (Strawman, IA) 1206. (DeGennaro, NY)

CROATIA—Voice of Croatia, 6165 in Croatian to Europe at 2156, 7285 via Germany in Croatian to ECNA at 0038 and 9830 in Croatian to Europe at 0941. (DeGennaro, NY) 7285 via Germany in Croatian at 0108. (Charlton, ON) 0415. (Clapshaw, WA) 2330. (Maxant, WV)

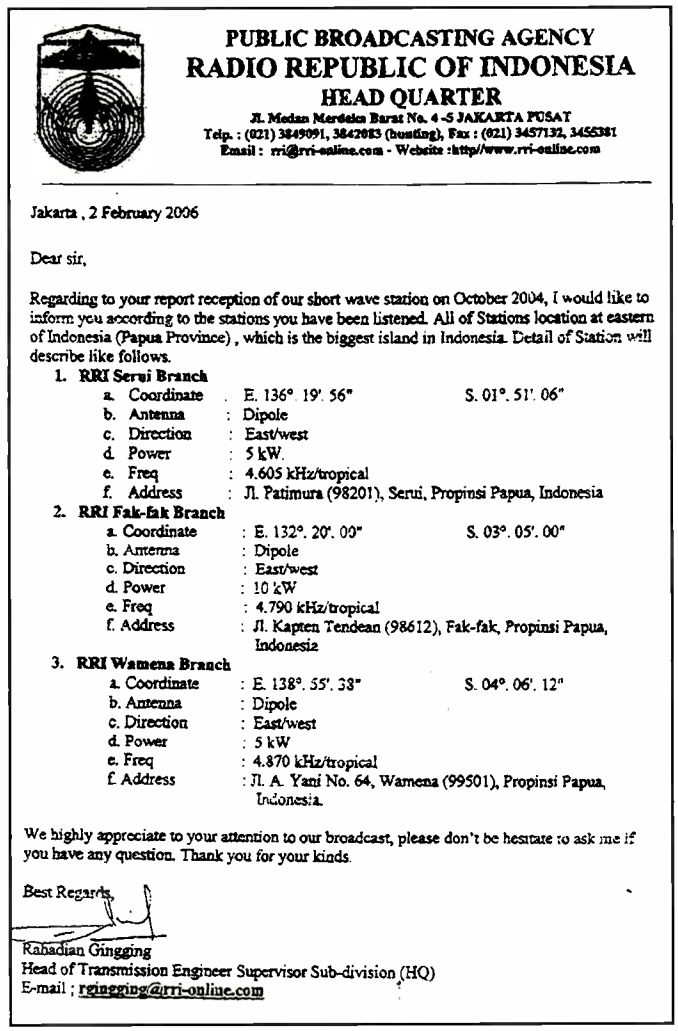
CUBA—Radio Havana Cuba, 6000 in SS at 1217, 9550 in SS at 1230, 11760 in FF at 2149, 11875 in SS at 0021 and 15230 in SS at 1231. (DeGennaro, NY) 6060 in SS at 0113. (Charlton, ON) 0615 in EE, also 9820 in SS at 2357. (Wood, TN) 0550 and 15230 in SS at 2305. (Maxant, WV)

Radio Rebelde, 5025 in SS at 1201. (DeGennaro, NY)

CYPRUS—Cyprus BC Corp., 9760 in Greek heard at 2225. (Brossell, WI)

BBC Relay, 5875 in unid language at 0246. (Jeffery, NY) 9915 in AA at 1807. (Brossell, WI)

CZECH REPUBLIC—Radio Prague, 5930 heard at 2345.



PUBLIC BROADCASTING AGENCY
RADIO REPUBLIC OF INDONESIA
HEAD QUARTER
Jl. Medan Merdeka Barat No. 4 -5 JAKARTA PUSAT
Telp. : (021) 3849091, 3842083 (hunting), Fax : (021) 3457132, 3456381
Email : rri@rri-online.com - Website :http//www.rri-online.com

Jakarta , 2 February 2006

Dear sir,

Regarding to your report reception of our short wave station on October 2004, I would like to inform you according to the stations you have been listened. All of Stations location at eastern of Indonesia (Papua Province) , which is the biggest island in Indonesia. Detail of Station will describe like follows.

1. **RRI Serui Branch**
   a. Coordinate : E. 136°. 19'. 56" S. 01°. 51'. 06"
   b. Antenna : Dipole
   c. Direction : East/west
   d. Power : 5 kW.
   e. Freq : 4.605 kHz/tropical
   f. Address : Jl. Patimura (98201), Serui, Propinsi Papua, Indonesia
2. **RRI Fak-fak Branch**
   a. Coordinate : E. 132°. 20'. 00" S. 03°. 05'. 00"
   b. Antenna : Dipole
   c. Direction : East/west
   d. Power : 10 kW
   e. Freq : 4.790 kHz/tropical
   f. Address : Jl. Kapten Tendean (98612), Fak-fak, Propinsi Papua, Indonesia
3. **RRI Wamena Branch**
   a. Coordinate : E. 138°. 55'. 38" S. 04°. 06'. 12"
   b. Antenna : Dipole
   c. Direction : East/west
   d. Power : 5 kW
   e. Freq : 4.870 kHz/tropical
   f. Address : Jl. A. Yani No. 64, Wamena (99501), Propinsi Papua, Indonesia.

We highly appreciate to your attention to our broadcast, please don't be hesitate to ask me if you have any question. Thank you for your kinds.

Best Regards,

Rahadian Gingging
Head of Transmission Engineer Supervisor Sub-division (HQ)
E-mail ; rgingging@rri-online.com

A "3-fer!" Bob Brossell got this three-in-one QSL confirming his reception of RRI stations in Serui, Fak-Fak, and Wamena, Indonesia.

(Maxant, WV) 6200 at 0400-0430. (Clapshaw, WA) 7345 in EE/Czech at 0028. (MacKenzie, CA) 2339. (Charlton, ON) 5930 in Czech at 0040, 6200 at 0227, 7345 in Czech at 0030 and 11640 heard at 1131. (DeGennaro, NY)

DJIBOUTI—Radio Djibouti, 4780 with 0259 sign on with local music, vern talk at 0300 and into HOA music. Koran at 0301, talks at 0308 and HOA music at 0319. (Alexander, PA) 0304. (Brossell, WI) 0313. (DeGennaro, NY)

DIEGO GARCIA—AFN/AFRTS, 4319u at 0020 with live sports and AFN Sports ID. (Paszkiewicz, WI)

ECUADOR—HCJB, 3220 in QQ at 1120, 6050 in SS at 1224, 11690 in SS at 1327, 12000 in SS at 2136 and 12025 in AA at 0133. (DeGennaro, NY)

Radio Quito, 4919 at 0045 with fast-paced futbol coverage and "Radio Quito—la voz de la capital" IDs. Also heard at 0332. (D'Angelo, PA) 0306. (DeGennaro, NY)

Escuelas Radiofonicas, Riobamba, 5010.3 in SS/QQ monitored at 0346. (DeGennaro, NY)

La Voz del Napo, Tena, 3279 in SS at 1128. (DeGennaro, NY)

EGYPT—Radio Cairo/Egyptian Radio, 7270 in SS at 0128, 9990 to Europe at 2122, 11665 in AA at 2205, 12050 in AA at 1907 and 15365 in AA at 1350. (DeGennaro, NY) 7270 at 0311. (Burrow, WA) 9990 at 2130. (Maxant, WV) 2220 with "Islam Focus" and 15810 in Asian language at 1348. (Brossell, WI)

ENGLAND—BBC, 3255 via South Africa at 0330, 5875 via Cyprus in Dari at 0107, 6195 via French Guiana at 1042, 7325 via Cyprus at 2028, 9740 via Singapore at 1215, 9915 via Cyprus in AA

China Radio International confirmed reception of its broadcast on 9650 last October for David Weronka, NC.

at 2125, 11680 via Cyprus in Romanian at 1228 and 15425-Rampisham in FF at 1213. (DeGennaro, NY) 5975 at 0030. (Maxant, WV) 6005 with "Science in Action" at 2015. (Yohnicki, ON) 15180 via French Guiana at 1340. (Brossell, WI) 15400 via Ascension at 1728 and 15420 via Seychelles at 1634. (Charlton, ON)

EQUATORIAL GUINEA—Radio Nacional, Bata, 5005 at 0551 in SS with Afropops. (Wood, TN) 2215 to 2256 close. (Alexander, PA) 2230 to 2256 close. (D'Angelo, PA)

ETHIOPIA—Radio Ethiopia, 9560.4 at 1600 with IS, ID and into EE broadcast. Weak. (Burrow, WA)

FINLAND—YLE/Radio Finland Int., 6120 in Finnish at 0853, 7195 in Finnish at 1541, 9630 in Swedish at 1546, 11755 in Finnish at 0955 and 15400 in Finnish to NA at 1359. (DeGennaro, NY) 9630 at 2140. (Maxant, WV) 13715 with Finnish songs at 1351. (Brossell, WI)

Scandinavian Weekend Radio, 11690 at 0958 in Finnish and EE. Off at 1000. (DeGennaro, NY)

FRANCE—Radio France Int., 5990 in RR at 0406, 6175 in FF at 1133, 7160 via South Africa in FF at 2122, 7315 in FF at 2033, 9790 in FF at 2135, 11845 in FF at 1357, 15300 in FF at 1225 and 17610 in FF at 1128. (DeGennaro, NY) 9730 with EE news at 1615. (Burrow, WA) 11705 with FF ID at 2050 and into EE. (Moser, IL) 15300 in FF at 1105. (Branco, NY) 1310 in FF. (MacKenzie, CA) 15365 with "Spotlight on Africa" at 1628. (Charlton, ON)

FRENCH GUIANA—Radio France Int. Relay, 15515 in SS at 1208. (DeGennaro, NY)

GABON—Africa No. One, 9580 in FF at 2132. (Wood, TN) 0505. (MacKenzie, CA) 9580 in FF at 2146, 15475 in FF at 1821 and 17630 in FF at 1151. (DeGennaro, NY) 15475 in FF at 1850. (Charlton, ON)

RTV Gabonaise, 4777 with 0457 open carrier, tail end of national anthem, woman with "Radio Gabon" ID and highlife vocals. (D'Angelo, PA) 0458 sign on. (Alexander, PA) 0530 with Afropops. (Wood, TN)

GERMANY—Deutsche Welle, 5905-Wertachtal, in RR at 0355, 6140-Julich in EE at 0950, 7175-Wertachtal in Serbian at 1043, 7400 via Irkutsk, Russia, in GG at 1144, 9545-Nauen in GG at 1153, 9655 via Rwanda in GG at 0036, 9735-Wertachtal in EE at 2015, 11970-Nauen in Romanian at 1106, 13780 via Rwanda in AA at 2121, 15320-Wertachtal in GG at 1223 and 15470 via Sines, Portugal, in EE at 1955. (DeGennaro, NY) 9555 in EE at 2312, 12025 with EE/GG lessons at 1915 and 15470 in EE at 1920. (Maxant, WV) 11690 in EE at 2113 and 12025 in EE at 2018. (Moser, IL) 11690 in EE at 2108 and 11865 via Portugal in EE at 1930. (Charlton, ON) 15325 in GG at 1325. (Northrup, MO)

Deutschland Radio, Berlin, 6005 in GG to Europe at 0941. (DeGennaro, NY)

Deutschlandfunk, Berlin, 6190 in GG at 0020. (DeGennaro, NY)

GUINEA—RTG Guineenne, 7125 at 2302 with man hosting highlife pgm in FF. (D'Angelo, PA) 2310 to 0001 (Alexander, PA)

GREECE—Voice of Greece, 5865 at 0241. (Jeffery, NY) 7475 at 0046, 9375 at 0007, 9420 at 0011, 9775 via Delano at 1207 and 12105 at 1113. (DeGennaro, NY) 7450 at 2200. (Wood, TN) 7475 at 2359. (MacKenzie, CA) 7475 at 2334. (Charlton, ON) 9420 at 1325. (Brossell, WI) (*all in Greek—gld*)

RS Makedonias, 7450 in Greek at 2106 and 9935 in Greek at 1225. (DeGennaro, NY)

Voice of America Relay, 7200 opening with EE ID at 0258. (D'Angelo, PA)

GUAM—Trans World Radio, 9355 with hymns in CC at 1355. (Brossell, WI)

Adventist World Radio, 9585//12065 at 1618 with religious programs. (Burrow, WA)

GUATEMALA—Radio Verdad, Chiquimula, 4052.5 in SS with hymns heard at 1139. (DeGennaro, NY) 0103 with man and woman SS talks over organ music. (Taylor, WI) 0523 with Tennessee Ernie Ford tune and inspirational talk. (Wood, TN)

Radio Cultural Coatan, San Sebastian, 4780 with 1028 sign on in SS. (Alexander, PA) 1206. (Brossell, WI) 0042. (DeGennaro, NY) 0203 to 0233 close. (D'Angelo, PA)

Radio Buenas Nuevas, San Sebastian, 4800 with impassioned SS speech monitored at 0307. (Brossell, WI) 1054 with children's choir. (DeGennaro, NY)

GUYANA—Voice of Guyana, 3291 at 0336 with funeral notices alternating with somber music. (D'Angelo, PA) 0400 with news. (Brossell, WI) 0455 with anmts and BBC news on the hour. (Maxant, WV) 1017 with music and woman anncr with morning show. (DeGennaro, NY)

HONDURAS—La Voz Evangelica, Tegucigalpa, 4819 with SS religious pgms at 1147. (DeGennaro, NY)

Radio Luz y Vida, San Luis, 3249 at 1124 with SS religious pgm with EE translations. (DeGennaro, NY) 0324 with hymns and EE sermon. (Brossell, WI)

Radio Misiones Int., 3340 at 0032 with continuous vocals to 0045 ID. (D'Angelo, PA)

HUNGARY—Radio Budapest, 3975 in II to Europe at 2136 also on 6025 with Italian at 2040. (DeGennaro, NY)

ICELAND—AFN/AFRTS, Grindavik, 7590u monitored at 1150. (DeGennaro, NY)

Rikisutvarpid, 13865 heard at 1236 with news in Icelandic. (DeGennaro, NY)

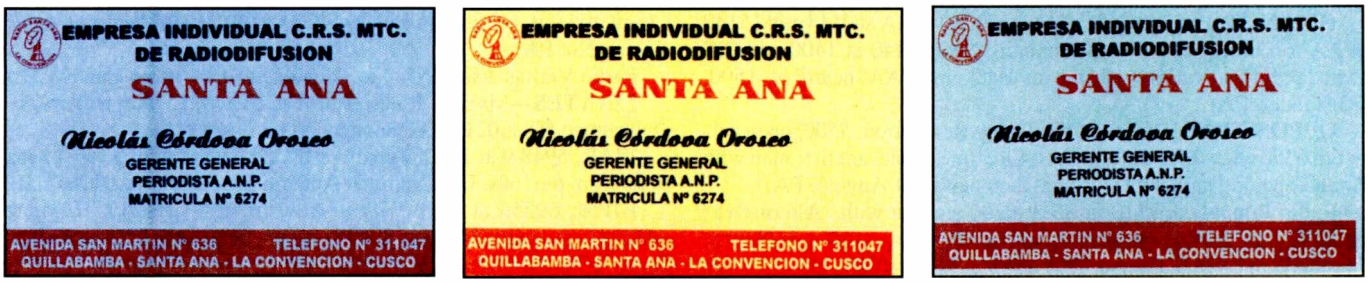
INDIA—All India Radio, 4860-Delhi in Hindi at 1309 and 9820-Panaji (Goa) in Hindi at 1344. (Brossell, WI) 7410-Delhi in EE at 2155, 9425-Bangaluru in Hindi at 2349, 9445-Bangaluru in EE at 2145, 9910-Aligarh in Tamil at 2357, 9950-Delhi in EE at 2152, 10330-Bangaluru in Hindi at 1718, 11585-Delhi in Sindi at 1008, 11620-Aligarh in Burmese at 1313, 11620-Bangaluru in Hindi at 2038 and 13605-Bangaluru in FF at 1947. (DeGennaro, NY) 9445-Bangaluru ending EE overseas service at 2230. (Alexander, PA) 9445 with general overseas service at 2115 and 10330-Bangaluru at 1240. (Maxant, WV) 11620-Aligarh at 2154 with news of India's high-tech industry. (Moser, IL) 2140 on fashion design. (Paszkiewicz, WI)

IRAN—VOIRI, 3945 from 0125 sudden sign on. Into Urdu at 0130 to close at 0227. (D'Angelo, PA) 6120 with Voice of Justice service from 0150 tune. Anti-American rhetoric. Off at 0230. //9665 was very weak. (Alexander, PA) 7235 in Bosnian at 2144, 9710 in Bosnian at 2140 and 9905 in SS at 0117. (DeGennaro, NY) 7330//9950 in EE at 1602. (Burrow, WA) 11870 in Farsi at 1324. (Brossell, WI)

In Times Past...

And now for some nostalgia. We'll give you a blast from the past here each month—perhaps a logging or a station tidbit from the *Pop'Comm* shortwave archives. Here's one to remember:

CLANDESTINE—A Voz de Verdade (Voice of Truth), 4950 in PP at 0329 on May 31, 1983. Operated by the UNITA opposition and guerrilla/army against Angolan government. (Dexter-WI)



The manager's business card (three of them!) accompanied a reply from Radiodifusion Santa Ana, Peru (4965.8), received by Rich D'Angelo.

ISRAEL—Kol Israel, 6280 with news at 0430. Also 11590 with EE news at 2010. (Maxant, WV) 7545 in HH at 0055, 11590 in FF at 2028 and 17535 in SS at 1620. (DeGennaro, NY) 7545 in EE at 2021, and switch to FF at 2030. (Moser, IL) 2355 in HH. (MacKenzie, CA)

Galei Zahal, 6973 in HH with U.S. rap at 0113. (DeGennaro NY)

ITALY—RAI Int., 6120 at 0435 and 9760 with birdcall IS, news and sudden off at 2010. (Maxant, WV) 6110 via Ascension in II at 0136, 7175 in II at 2114, 9690 in RR at 2000, 9760 in Swedish at 2004, 9840 in II at 0130, 11800 in II to North America at 0133, 11830 in II to NA at 1851 and 17780 in II to NA at 1407. (DeGennaro, NY) 9760 in unid language at 1955. (Burrow, WA) 11800 in ID at 2315. (Charlton, ON)

Italian Radio Relay Service, 5775 at 2235 with UN programming. Also 5785 carrying Brother Stair heard at 2235-2300 close. (Alexander, PA)

JORDAN—Radio Jordan, 11690 with pop selections at 1610 and "Radio Jordan 96.3 FM" ID. (Burrow, WA) 1647 with U.S. pop. (Charlton, ON) EE programs at 1539. Also 11810 in AA at 1545 and 15290 in AA at 1227. (DeGennaro, NY) 11810 in AA at 1323. (Brossell, WI)

JAPAN—Radio Japan/NHK, 6110 via Canada at 0550 and 11690 at 0615. (MacKenzie, CA) 6135 via Ascension in an African dialect at 0341. (Brossell, WI) 6145 via Canada in EE at 0045 and 15355 via Gabon in JJ at 1829. (Charlton, WV) 7200 with "Hello From Tokyo" at 1530. (Barton, AZ) 9530 via French Guiana in PP at 1033, 9660 via Skelton (UK) in GG at 1128, 11705 via Canada in JJ at 1330, 11710 via Skelton in RR at 1134, 11740 via Singapore in Thai at 1139, 11895 via French Guiana in JJ at 2228, 11905 in JJ via Bonaire at 0205, 15220 via Ascension in JJ at 2210 and 15355 via Gabon in JJ at 1817. (DeGennaro, NY)

Radio Nikkei, 3925 in JJ heard at 0730. (Clapshaw, WA) 9595 in JJ at 0610. (MacKenzie, CA)

KUWAIT—Radio Kuwait, 9855 in AA at 1935. (Maxant, WV) 2305 in AA and 15505 in AA at 2003. (DeGennaro, NY) 11990 in AA heard at 1650. (Charlton, ON)

LIBERIA—Radio Veritas, 5470 at 2205 with program promo, ID, choir. Benediction at 2259 f/by ID, frequency anmt and Lord's Prayer. (D'Angelo, PA)

Star Radio via Ascension, 9525 at 0730 with call-in pgm about pros and cons of Liberian constitution. (Maxant, WV) 11960 at 2111. (Charlton, ON) 2121 in EE/FF on Liberian sports. (Moser, IL)

ELWA, 4760 at 2155 with religious music, ID and sign off anmts at 2231. (D'Angelo, PA)

LIBYA—Radio Jamahiriya, 7320 in AA at 0205 f/by EE news and later into FF. (Taylor, WI) 7320 in AA at 0028. (DeGennaro, NY) 11615 in AA at 1845. (Maxant, WV) 11860 in AA at 1722. (Charlton, ON)

LITHUANIA—Radio Vilnius, 7325 with IS and ID at 2253. (Brossell, WI) 2330 with discussion on education. (Maxant, WV) 2341 with EE to ECNA. Also 9710 with EE to North America at 0945. Also 9875 monitored at 0031. (DeGennaro, NY)

MADAGASCAR—Radio Nederland relay, 9895 monitored in SS heard at 0115. (MacKenzie, CA)

Radio National Malagasy, 5010 from 0256 with open carrier, group vocal from 0257. ID by woman at 0300 and opening anmts in Malagasy. News by man heard at 0305. (D'Angelo, PA)

Family Radio/WYFR via Madagascar 11805 at 1850 in Swahili. (Brossell, WI) 11806.2 in Swahili from 1814 to 1858 close. (D'Angelo, PA)

MALAYSIA—Radio Malaysia, 7295 at 1603 with news, talk, "Traxx FM" ID at 1607. (Burrow, WA)

MALI—Radio TV du Malienne, 5995 at 0605 with guitar IS, man in FF with ballads and Afropops. (Wood, TN)

MAURITANIA—Radio Mauritanie, 4845 in AA at 0050. (DeGennaro, NY)

MEXICO—Radio Educacion, 6185 in SS at 0231. (DeGennaro, NY) 0415 with U.S. 60s songs. (Maxant, WV)

MOROCCO—RTV Marocaine, 5980 at 0016, 7135 at 2347, 15335 at 1220 and 15345 at 1814. (DeGennaro, NY) 15335 at 1347. (Brossell, WI) 1907. (Charlton, ON) 2030. (Clapshaw, WA) (*all in Arabic—gld*)

VOA Relay, 7115 in AA at 0559. Off at 0600. (MacKenzie, CA) 15240 in EE heard at 1835. (Jeffery, NY) 1933. (Charlton, ON)

NEW ZEALAND—Radio New Zealand, 6095 at 1259 with bird IS, ID "This is Radio New Zealand News. Good morning." (Brossell, WI) 9885 at 1005 carrying BBC. Also 17675 at 2315 relaying the national network. (Maxant, WV) 9885 at 1036 with a


QSL
Certificado de Sintonía

Emisora Radio República

Para Richard A. D'Angelo

Muchas gracias por su informe de recepción. Tenemos el gusto de confirmar su control de nuestra emisión en 6.010 kHz. de fecha 1 January 2006 a las 0000 - 0034 horas de UTC con vatios de potencia.

Directorio Democrático Cubano

firma

sello oficial

The new Cuban opposition station Radio Republica, operated by the Cuban Democratic Directorate, quickly replied to Rich D'Angelo using the prepared card he supplied.

Sammy Davis number. (DeGennaro, NY) 15720 at 2043 with interview. (Burrow, WA)

NETHERLANDS—Radio Nederland, 5955 monitored in DD to Europe at 0842, 9795 via Singapore in Indonesian at 1204, 9895 via Madagascar in SS at 0113, 9940 via Madagascar in Indonesian at 2309, 1655 via Madagascar at 1957 and 11900 via Ascension in SS at 0058. (DeGennaro, NY) 9940 via Russia in an Asian language at 1348 and 12065 via Uzbekistan in an Asian language at 1348. (Brossell, WI) 11655 with news features at 0545. (Moser, IL) 11710 at 0545. (Maxant, WV)

NETHERLANDS ANTILLES—Radio Nederland Relay, Bonaire, 6165 at 0134 and 15525 at 1905. (Charlton, ON) 11655 at 1930 and 15525 at 1920. (Maxant, WV)

NIGERIA—Radio Nigeria, 4770-Kaduna, at 0432 with EE service just before transmission break, which lasted until 0455. Drums from 0459, ID and news by man. (D'Angelo, PA) 0445 with EE music and local weather. (Maxant, WV) 7275-Abuja, 0630 with talk, ID, Afropops. Covered by Tunisia prior to 0630. (Alexander, PA)

Voice of Nigeria, 7255 at 0605 about civil unrest. Also 15120 at 1901 with ID and into news. (Maxant, WV) 7255 in Hausa at 2217 and 15120 in EE at 1947. (DeGennaro, NY) 1629 sign on with opening theme, into AA. EE at 1700. (Alexander, PA)

NORTH KOREA—KDNP, 4450 in Korean at 1305. (Brossell, WI)

Voice of Korea, 9335 in EE at 1553 and 9730 in EE at 0320. (Burrow, WA) 9975 in EE at 1920. (Maxant, WV)

NORTHERN MARIANAS—FEBC-Saipan, 11650 in RR with religious program at 1319. (DeGennaro, NY)

OMAN—Radio Sultanate of Oman, 9760 in AA at 0114 and 15140 in AA to Europe at 1557. (DeGennaro, NY) 15140 at 1400 with EE news and IDs, variety of music. Back into AA heard at 1500. (Alexander, PA)

OPPOSITION—Voice of the Tigray Revolution, 5500, open carrier to 0350 when IS, echo anmt at 0400, flute music, another man with ID and opening anmts in Tigrinya, then news. (D'Angelo, PA)

Radio Republica, 7110 in SS at 0200 sign on with "Alternativa" pgm. Cuban bubble jammer underneath. Also 7160 via Nauen, Germany, in SS at 0206 and 7205 in SS at 0135 to 0200 close. Cuban jamming. (Taylor, WI) 7160 in SS to Cuba at 0017. (DeGennaro, NY)

Voice of Mesopotamia, 11530 via Moldova in Kurdish at 1046. (DeGennaro, NY)

Sudan Radio Service, 7120 via UK at 0410 with vernacular talk, ID, local music. This is Monday–Friday only. Also 11705 via UK at 1700 sign on. Also M–F only. And 15575 at 1500 sign on to 1659 close with sked, ID, phone numbers, station promos. EE news at 1505. (Alexander, PA)

Radio Free Asia, 7550 via Kuwait in CC at 2350. Jamming from China, //7540-Tadzhik. (MacKenzie, CA) 9905 via Palau in unid language at 2343. (Clapshaw, WA) 12105 via Sri Lanka at 1330 in Asian language. (Brossell, WI)

Voice of the Diaspora, 9405 via Germany at 2000 sign on with local music and EE sign on. Talks about the Gambia election. Off at 2030. This is Saturdays only. (Alexander, PA)

Radio Farda, 9335 via Sri Lanka at 2055 with Farsi anmts over pop songs and suffering splash from an over-modulated WBCQ-9330. (Strawman, IA) 11500 in Farsi at 1843. (Brossell, WI) 15410 at 1320. (Northrup, MO)

Radio Nile, 12060 via Madagascar at 0359 sign on with local music, EE IDs and sked, then EE news items alternating with music segments. Religious program at 0410. Off at 0455

Radio Solh, 15265 via England in listed Pashto/Dari at 1345. (Brossell, WI)

Voice of Biafra, 7380 via Meyerton at 2101 with tribal vocals, man with EE ID. (D'Angelo, PA)

Salama Radio, 11885 via UK in unid language monitored at 1955. (Charlton, ON)

Radio Voice of the People, 11705 via Madagascar at 1700 sign on with soft instl music, ID "This is Radio Voice of the People, broadcasting from Zimbabwe every day from 1900 to 2000 hours Zimbabwe time," then local vocals with the ID repeated after each song. (D'Angelo, PA) 1705 to 1756 close with EE talk, IDs, frequency, and address. Many IDs. (Alexander, PA)

PERU—(*all in SS—gld*) Radio Madre de Dios, Puerto Maldonado, 4950 at 1032 with ID, TC, music. (DeGennaro NY)

Radio Tarma, Tarma, 4775 at 1010 with female vocal, raucous male anncr, ID. (DeGennaro, NY)

Radio Maranon, Jaen, 4835.8 heard at 1045 with comml anmts, music. (DeGennaro, NY)

Radio Huanta 2000, Huanta, 4746 with music and anmts at 1020. (DeGennaro, NY)

Radio Union, Lima, 6115 at 0840 with OA music, IDs, anmts. (Alexander, PA)

Radio Huancabamba, Huancabamba, 6536 at 0200 with continuous talk to 0220 close. (Alexander, PA)

Radio Cultural Amuata, Huanta, 4955 with talk at 1047. (DeGennaro, NY)

Radio Luz y Sonido, Huamuco, 3224.8 with music and man talking at 1012. (DeGennaro, NY)

Radio Imperio, Chiclayo, 4385.7 with live church broadcast at 1014. (D'Angelo, PA)

Radio Frecuencia, San Ignacio, 5699.8 at 0138 with OA vocals, man host. Off at 0148 with orchestral NA. (D'Angelo, PA) 0138 running to 0155 close. (Alexander, PA)

Radio San Andres, 5544.6 with continuous OA vocals, occasional anmts and ID with sign off heard at 0300. Carrier ran until 0312. (D'Angelo, PA)

PHILIPPINES—FEBC, 9405 in CC to Asia at 1137 and 9430 in CC to Asia at 1139. (DeGennaro, NY) 9430 in CC heard at 1336. (D'Angelo, PA)

Radio Veritas Asia, 15530 in Tagalog at 0130. (Clapshaw, WA)

PIRATES—Mystery Radio (Euro) 6220 at 0215 with techno-pop and canned ID at 0219. (Alexander, PA)

WAR, 6948.9 at 2040. Tentative ID. Oldies reflecting top 40 stations from the '60s. U.S. National Anthem at 2100 close. (Hassig, IL)

KIPM, 6925u at 2110 with a show titled "Question." Elkhorn address announced. Also at 2307 with program called "The Hollow Earth." (Zeller, OH) 2126 about all the women he has met and who desired him and "Bolero" playing in the background. Another date heard at 2320 with "Hollow Earth" program. (Hassig, IL)

Mouth of Mohammed (*Golly! Hope including this one doesn't bring on any riots!—gld*), 6925u at 2140. No address announced. Also at 2213 with pop vocals, ID and off in mid-song. Again, no address. (Zeller, OH) At 2200 about the controversial cartoons. (Hassig, IL)

WBNY, 6854.1 at 1505 relayed by The Crystal Ship. Goofy, random talk by two guys, several IDs. Gave a street address on Wyandette Avenue in Lakewood, Ohio, less then two miles from me. (Zeller, OH) 6925 fm? at 0020. Horrible reception. Also at 0110 with '70s album rock (Hassig, IL)

Undercover Radio, 3365 at 0244 with Dr. Benway and replay of New Year's pgm. Disappeared suddenly at 0258. (D'Angelo, PA) 6924.9 at 1724 sign on with repeat of the program aired at 1505 earlier that day. (Zeller, OH)

The Crystal Ship, 6854.1 immediately followed the 1505 broadcast of WBNY. Various rock things and some TV audio. Several IDs by "The Poet," who anncd the Belfast address. (Zeller, OH)

The Border Radio, 6925u at 2142 with rock/pop, IDs and address as theborderradio@yahoo.com. (Zeller, OH)

Radio Free Whatever, 6925u at 2350 "From the Right Coast," heavy metal and "fight for the right to party." (Hassig, IL)

PORTUGAL—RDP Int. 9715 at 0046, 9815 at 1159, 11980 at 0033, 15540 at 2007 and 21655 at 1157. (DeGennaro, NY) 15440 with soccer game at 1920. (Charlton, ON) 21655 at 1336. (Brossell, WI) (*all bcsts in PP—gld*)

ROMANIA—Radio Romania Int., 5960 in SS at 0000, 6080 in Romanian at 2209, 6150 in EE at 0123, 9525 in SS at 0008, 9610 in EE at 2351 and 9640 in EE at 2355. (DeGennaro, NY) 9755 in EE at 2140. (Maxant, WV)

RUSSIA—Voice of Russia, 5900-Moscow in SS at 0112, 6175-Julich, Germany in AA at 2356, 6195-St. Petersburg in SS at 0115, 7125 via Moldova in RR at 0044, 7150-Armavir in RR at 0232, 7180 via Moldova in EE at 0236, 7240 via Ukraine in RR at 0254, 7250 via Armenia in EE at 0258, 7330-Moscow in EE at 2134, 7390-Moscow in EE at 2118, 7445-Kaliningrad in RR at 2109 and 9800-Armaviar in Urdu at 1236. (DeGennaro, NY) 7150 in EE at 0515 and 7390-Samara in PP at 0020. (MacKenzie, CA) 7180 via Moldova in SS at 0126. (Charlton, ON) 7240 via Ukraine in RR at 0350. (Brossell, WI)

Kamchatka Radio-Petropavlovask, 6075 with radio drama in RR at 0815. (Clapshaw, WA) 1357 relaying Radio Rossii to 1359 close. (Brossell, WI)

Radio Rossii, 7310-Moscow in RR at 1710. (DeGennaro, NY)

RWANDA—Radio Rwanda, 6055 at 2034 with mainly long FF talks. ID 2059 and off at 2101. (D'Angelo, PA) 2045 with local highlife music, FF talk, time pips at 2101 and off. (Alexander, PA)

Deutsche Welle Relay, 11690 in EE to West Africa at 2155. (DeGennaro, NY) 15205 in AA monitored at 1830. (Jeffery, NY) 1917. (Charlton, ON)

SAO TOME—VOA Relay, 4960 at 0413. (Brossell, WI) 6080 heard at 0625 on African soccer championships. (Wood, TN)

SAUDI ARABIA—BSKSA, 9555 at 2150, 9870 at 2131, 11820 at 1845, 11935 at 1102 and 17560 at 1624. (DeGennaro, NY) 15205 at 1632. (Charlton, ON) (*all in AA—gld*)

SINGAPORE—Radio Singapore Int., 6119-Kranji in Malay at 0940. (DeGennaro, NY)

Mediacorp Radio, 6150 with personal advice program at 1550. (Burrow, WA)

BBC Relay, 9540 in an unid Asian language at 1251. (Brossell, WI)

SLOVAKIA—Radio Slovakia Int., 7210 in SS at 0245, 7230 in EE at 0123 and 7345 in Slovak at 2020. (DeGennaro, NY) 7230 with "Slovakia Today" at 0102. (Charlton, ON)

SOUTH AFRICA—Channel Africa, 3345 with domestic service at 0319. (DeGennaro, NY) 0321 with interview on economic future there. (Burrow, WA) 0332 with "Inner Voice" program. (D'Angelo, PA) 0330, //7390. (Brossell, WI) 7390 at 0325 with news items and short music segments. (Taylor, WI) 11825 in EE and others at 1010. (Maxant, WV) 15285 at 1719 with a reporter on-scene in Liberia. (Charlton, ON)

Radio Sondergrense, 3320 heard at 0303 with rock and MOR music in Afrikaans and EE. (Taylor, WI) 0323. (DeGennaro, NY)

Trans World Radio via Meyerton, 7215 at 0347 in African dialect, EE ID at 0355. (Brossell, WI) 11640 at 0605. (Maxant, WV)

Adventist World Radio, 11885 at 1930 with multilingual ID. (Brossell, WI)

SOUTH KOREA—KBS World Radio, 5975 at 1618 with report on a sports defector from the North. (Burrow, WA) 9650 via Canada with listener mail at 1230. (DeGennaro, NY) 11810 in JJ at 0030. (Clapshaw, WA)

SPAIN—Radio Exterior de Espana, 6055 with EE/SS lessons at 0048 and 17850 Costa Rica Relay in SS at 1840. (Charlton, ON) 6055 in EE at 0026, 7270 in SS at 2045, 7275 in SS at 2041, 9630 in SS at 2240, 11625 in SS at 2208, 12035 in AA at 1905, 13720 in SS at 1117, 15585 in SS at 1203 and 17595 in SS at 1145. (DeGennaro, NY) 6055 in SS at 0540, //9675. (MacKenzie, CA) 6055 in SS at 0545 and 9630 at 1910. (Maxant, WV) 9595//9680 in SS at 2037. (Burrow, WA) 9675 in SS at 0330. (Barton, AZ) 11910 via China in SS at 1342. (Brossell, WI) 15125 in SS at 1825. (Jeffery, NY) 17595 in SS heard at 1325. (Northrup, MO)

SWAZILAND—Trans World Radio, 3200 at 0258 in local language, IS with EE ID at 0300 and African music. Also 3240 in Ndau language, TWR IS and off at 0345. (Taylor, WI) 3240 in African language at 0327. (Brossell, WI) 0324 in listed Shona, multiple IDs, IS and opening in listed Ndau. Also 4775 at 0339-0355 and back on again at 0400 with IS, ID and into listed Lomwe language service heard at 1910.

SWEDEN—Radio Sweden, 6065 in Swedish at 0849, 9490 via Canada in Swedish at 0015. (DeGennaro, NY) 15240 in EE at 1340. (Brossell, WI)

IBRA Radio, 7340 via Julich in AA at 2023. (DeGennaro, NY)

SYRIA—Radio Damascus, 9330 in AA at 2340. (DeGennaro, NY)

TAIWAN—Radio Taiwan Int., 7130, ending EE at 1255. (Barton, AZ) 5950 via Florida in EE at 0359, into CC at 0400, 11715 in CC to Australasia at 1052, 15440 via Florida at 2003. (DeGennaro, NY) 9330 at 2245. (Maxant, WV) 11665 in GG at 2121. (Moser, IL) 11665 in GG at 2125 and 17760 in CC at 1937. (Charlton, ON)

TANZANIA (Zanzibar)—Radio Tanzania-Zanzibar, 6015 in Washable with call to prayer at 0305. (Paszkiewicz, WI) 0411. (DeGennaro, NY) 11735 at 1826 with prayers in Swahili and English. (Brossell, WI) 2100 close. (Moser, IL)

THAILAND—Radio Thailand, 5890 via Delano giving domestic weather and web site URL at 2354. (Charlton, ON) 5890 via Greenville in TT at 0109, 7285 in Thai at 1042, 9810 in EE to SEA at 1231 and 11805 in Indonesian at 1215. (DeGennaro, NY) 9535 at 2030 with pgm preview, domestic news. (Burrow, WA)

VOA relay, 5985 in Asian language at 1358 and off at 1359. (Brossell, WI)

TUNISIA—RT Tunisienne, 7190 in AA at 2250. (Brossell, WI) 7190 in AA at 2104, 7225 in AA at 2056 and 12005 in AA at 1901. (DeGennaro, NY)

TURKEY—Voice of Turkey, 5960 in EE at 2315, also 5970 in EE at 2315. (Maxant, WV) 5960 in EE at 2303 and 7300 in TT at 0130. (Charlton, ON) 5960 in EE at 1848. (Branco, NY) 6020 in EE at 0416, 7300 in TT at 0035, 11735 in EE at 1327 and 11955 in TT at 1356. (DeGennaro, NY) 11735 in EE at 1339. (Brossell, WI)

UGANDA—Radio Uganda, (p) 4976 at 0409 with news in EE. Seemed to change programming heard at 0421 and apparent language change around 0430. No ID noted. (D'Angelo, PA)

UKRAINE—Radio Ukraine Int., 5840 in EE at 2234 and 5910 in EE at 0114. (DeGennaro, NY)

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 popular-com@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 **Mark Taylor** of Madison, Wisconsin, who receives a copy of the 2006 edition of the *World Radio TV Handbook*, courtesy of Watson-Guptil Publications. The 2006 edition of this gotta-have, information-packed reference is available from most shortwave equipment suppliers, as well as larger book dealers.

UNITED STATES—WMLK, Bethel, PA, 9265.1 heard at 1600 sign on and into usual talks about Yahweh. Monday to Friday only. (Alexander, PA)

AFN/AFRTS, Key West, FL, 5446.5u heard at 0908 and 12133.5u at 2128. (DeGennaro, NY)

VATICAN STATE—7250 in EE at 2051, 7305 in PP at 0031, 7335 in Hindi/Tamil at 0108, 7370 in RR at 2123, 9865 in Hindi/Tamil at 0104 and 11625 in PP at 1948. (DeGennaro, NY) 7335 with IS and ID at 2359 and 11625 in FF at 1726. (Charlton, ON) 7305 at 0250. (Maxant, WV) 12055 via Russia in an unid Asian language heard at 1345. (Brossell, WI)

VENEZUELA—Radio Nacional, 11760 via Cuba in SS at 2319. (Charlton, ON) 13680 via Cuba in SS at 2043. (Moser, IL)

VIETNAM—Voice of Vietnam, 5925-Xuan Mai with H'mong domestic service monitored at 1045. (D'Angelo, PA) 6175 via Canada in EE at 0235. (DeGennaro, NY) 0106. (Charlton, ON)

YEMEN—Republic of Yemen Radio, 9779.5 (t) at 1708 in AA and mentions of Yemen. (Burrow, WA) 2024 with AA vocals. (Strawman, IA) 2149 in AA. (DeGennaro, NY)

ZAMBIA—ZNBC/Radio Zambia, 4910 in unid language with drums, talk, guitars at 0315. (Paszkiewicz, WI) 0331 with domestic service at 0331. (DeGennaro, NY) 5915 (p) at 0440 with phone calls in vernacular. (Strawman, IA) 6165 heard at 0242 sign on with fish eagle IS. Under Radio Nederland. (Alexander, PA)

The Voice-Africa, 4965 at 0058 with EE ad ID at 0059. Also 9885 with religious message at 1345. (DeGennaro, NY) 4965 at 2117. (Yohnicki, ON)

ZIMBABWE—Radio Zimbabwe, 6612 (2 x 3306) at 0314 with vocals, man talking listener calls. Choral anthem at 0358 and ID then news in local language. (D'Angelo, PA)

And once again, order is restored! Light the ceremonial fires in tribute to the following who shared their efforts this time: Charles Maxant, Barbourville, WV; Joe Wood, Greenback, TN; Michael Yohnicki, London, ON; Arnold Zeck, Bayberry, NY; Howard Moser, Lincolnshire, IL; Rich D'Angelo, Wyomissing, PA; Stewart MacKenzie, Huntington Beach, CA; Rick Barton; Phoenix, AZ; Bob Brossell, Pewaukee, WI; Bruce Burrow, Snoqualmie, WA; Jerry Strawman, Des Moines, IA; George Zeller, Cleveland, OH; William Hassig, Mt. Pleasant, IL; Brian Alexander, Mechanicsburg, IL; Mark Northrup, Gladstone, IL; Ciro DeGennaro, Feura Bush, NY; Sheryl Paszkiewicz, Manitowoc, WI; Mark Taylor, Madison, WI; Robert Charlton, Windsor, ON; Dave Jeffery, Niagara Falls, NY; Michael Clapshaw, Port Angeles, WA; and Mike Branco, Islip, MI.

Thanks to each one of you. And, until next month—good listening! ■

by Peter J. Bertini, radioconnection@juno.com

Our Majestic 90 Restoration—Some Unexpected Problems!

It's been a long and challenging project, but the end is in sight! This month's column will cover the final steps needed to bring the radio back to life. For our new readers, our subject is a large vintage 1929 Majestic model 92 lowboy console (**Photo A**). The set used a model 90 chassis (just to make things confusing) and was one of the earliest radios for battery-free AC line-powered operation when it was introduced in 1929.

So far we've covered the routine recapping and rewiring, the tedious expected tasks, now it's time for a few unexpected challenges!

Pot Metal

Every new set brings new challenges and hopefully a learning process to make us better prepared for future projects. I had been forewarned to expect some "pot metal" problems in the Majestic before I started working on it. Boy, was that on the mark!

Photo A. This is the restored Majestic model 92 radio that's been our subject for the past few columns.

What the heck is pot metal? Well, pot metal means different things depending on what it was used for, and when. For example, pot metal used for cooking utensils used a much different formula (iron-based) from one used for automotive or radio parts (zinc-based.) For our purposes, pot metal is a castable zinc-based metal alloy with a low melting point. Differences in the alloy mixture gave the metal different properties, determined by the characteristics needed for the metal, such as machinability and durability.

Unfortunately, vintage parts cast from pot metal generally fare poorly over time. The metal distorts and, in the worst cases, it develops deep fissures and can completely crumble! The cause is corrosion at the grain boundaries in the metal. As the corrosion forms internally, forces are developed that cause the metal to expand and become misshapen. Acid (even brief exposure to tomato juice, for example) will greatly accelerate the problem. I suspect moisture and contaminates in the air work are major contributors to these problems as well.

Pot Metal Tuning Capacitors

Pot metal was used for pulleys in many early battery sets, such as the three-ganged tuning capacitors in the Atwater Kent model AK-33. It was also used in the manufacture of the large five-section tuning capacitor used in the Majestic 90 TRF chassis. For **Photo B**, I removed the cover from the Majestic 90 chassis to show the tuning capacitor. (The later model 90B sets did not have these problems, by the way.)

The rotor and stator plate assemblies are mounted in cast pot metals. Alas, almost every existing model 90 is unusable because of this! You'll likely to find the tuning capacitor bound up tightly because of the rotor and stator plates being in firm, tight contact with each other. The capacitor sections were shorted.

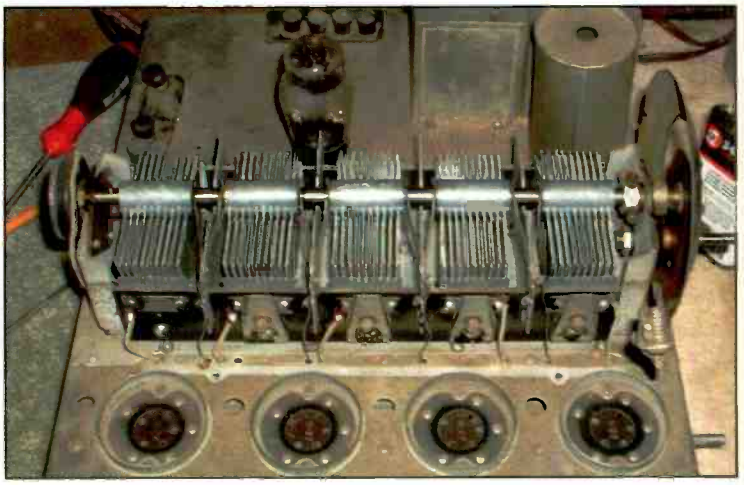


Photo B. The Majestic 90 tuning capacitor is normally fitted with a protective metal dust cover and shield. It was removed for this photo. Unfortunately, it often prevents a new owner from noticing the hidden pot metal problems until restoration is started!

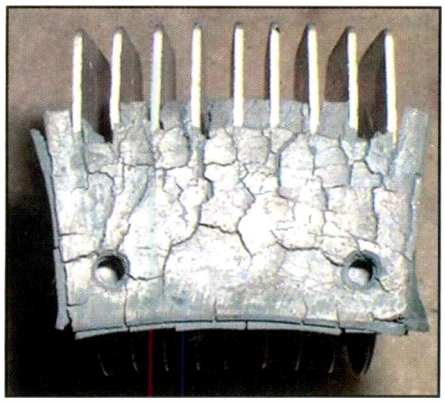


Photo C. This shows an end view of one of the worst stator plate block assemblies. The aluminum plates were cast in pot metal. Notice how the metal has fissured and distorted!

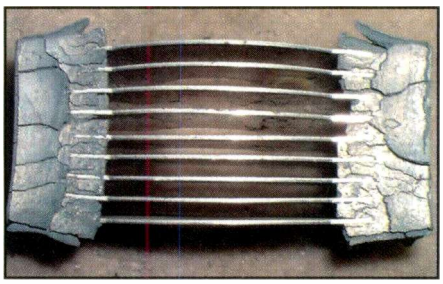


Photo D. Here's the bottom view of the same stator block shown in Photo C. Notice how the stator plates have been bowed outward on both sides by the distorted pot metal casting.

A few good pictures are better than a lot of words, so here are some good examples of what I'm taking about. The stator plate assemblies shown in **Photos C** and **D** are about as bad as you'd ever want to see! Note how the metal has fissured and how the plates are keystoned and no longer parallel to each other. Bowing can be noticed in the examples shown in **Photo E**.

I'm saving the best for last. Compare the two stator plate assemblies laid side by side as shown in **Photo F**! Dimensional creep on the example at left has caused the casting to expand; notice how much further apart the plates are than in the example on the right. Since the rotor plates have the same spacing, there's no way the plates will mesh without touching and shorting. In fact, it might even be physically impossible to mesh the plates without destroying parts in the attempt. The center stator plates were properly spaced, but the outside plates would be touching on opposing sides as the amount of error accumulates toward the ends of the blocks! You have to see it to believe it.

Allow me to make one point here that is very important: The plates of the rotor and stator assemblies must be spaced equidistant; that is, they should remain equally spaced and perfectly parallel to each other throughout the rotor rotation. Any distortions that allow deviation from this requirement can make a set impossible to align. I'll explain this in greater detail when we get to the alignment procedures for the radio.

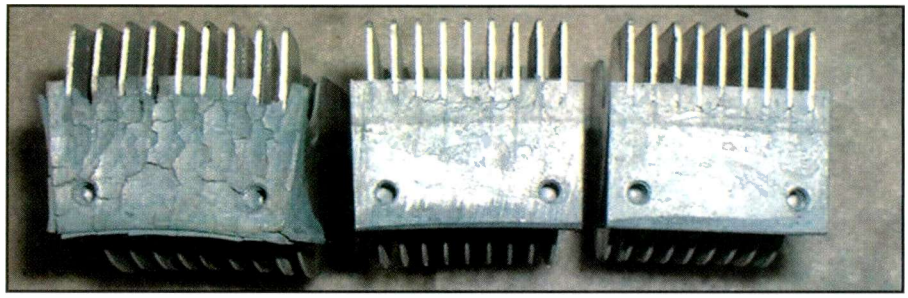


Photo E. Again, notice how the plates are keystoned; they have developed a wider spacing at the top due to the distorted metal casting.

Solutions?

Unless you're fortunate—and we'll discuss your options for "luck" in that department—the remaining option is to locate a donor chassis. All these caps have some degree of damage. Some are salvageable, while others are garbage. If you can't salvage or repair the capacitor, the radio restoration may not be possible until one is available.

Some inquiries netted two donor capacitors (**Photo G**) that were supplied by two generous fellow restorers. Alas, they were in worse shape than the original. I was running out of options at this point! I suspected it might be possible to build a jig to hold the plates in alignment and then fabricate a clay mold to permit recasting the pot metal, which has a low melting point. Another possibility would be removing the plates and using long screws with washer spacers to rebuild the stator assemblies. Neither option was particularly practical or desirable from my vantage point!

The rotor plate hubs that mount the rotor plates to the shaft are also cast pot metal. Fortunately, these seem to have fared the ravages of time without developing major problems. Any small problems encountered were correctable by applying some gentle bending and probing as needed on those plates.

The capacitors are held together with machine screws, so they're easily disassembled for repair. Start by unsoldering the numerous leads going to the capacitor; removing it from the chassis makes the work much easier. Next, remove the black Bakelite side insulators that support the stator assemblies, permitting the stator assemblies to slide out from the capacitor frame.

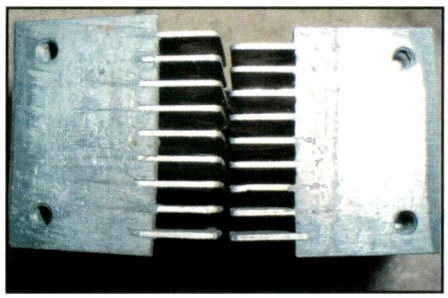


Photo F. Still not convinced? Here's a good side-by-side comparison of what was once two identical stator block assemblies. Note how the unit at the left has spread—there's no way it could ever mesh properly without binding or shorting.

Fortunately, I was able to garner some sage advice on the subject on the Antique Radio Forum (www.antiqueradios.com). It seems antique car buffs had good luck with submersing vintage pot metal automotive parts in boiling water, which apparently made the metal malleable enough to permit some straightening and corrective forming without fracturing or shattering the material. It's possible that the water is able to permeate the metal pores and soften the corrosion. If any reader can shed more information on this subject, I'd be pleased to share it in a future column.

A Boiling Cauldron!

With nothing to lose, I filled a small aluminum cake pan with water and set it to boiling on the family gas grill (**Photo H**). Not being sure how long the metal should be heated, I allowed the pot metal assemblies to sit in the boiling water for 30 minutes. The metal must be hot, and not allowed to cool when removed from the water, for the corrective force to be applied. You want to get the pot metal used

Photo G. Thanks to the kind efforts of two other fellow restorers, these two tuning capacitors were donated for needed parts.

Photo I. Once the pot metal is heated and softened, work must progress quickly before it cools. The machinists vice was an ideal means to compress the metal. The jaws of the vice assured that pressure was applied equally, and in parallel, to the sides of the blocks. Be sure to use gloves when handling the hot metal parts.

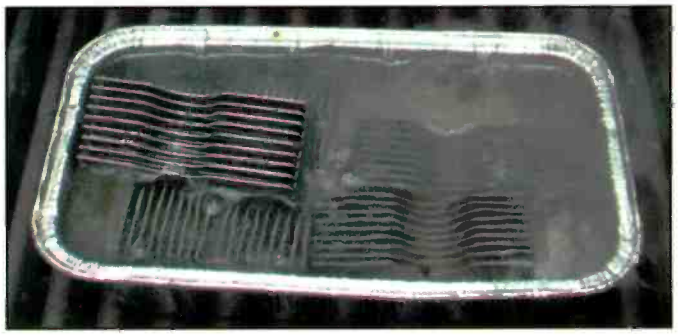


Photo H. I boiled the stator blocks in water for 30 minutes in an attempt to soften the metal to make it malleable enough for straightening.

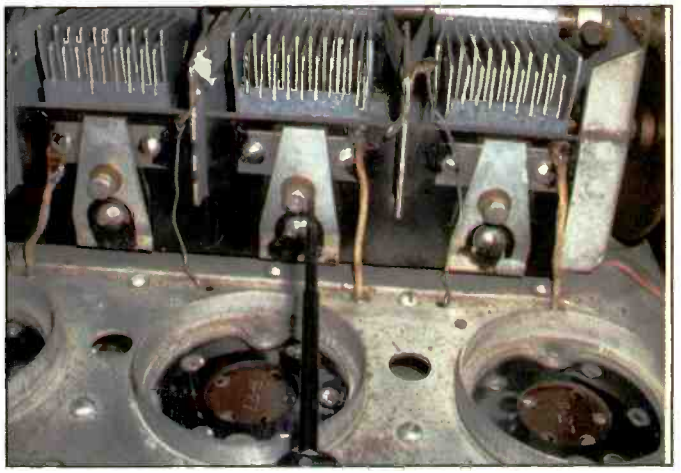


Photo J. This photo was taken to illustrate an alignment point for the next column, but it also shows to what degree we were able to achieve getting the plate spacing between the rotor and sections as close to equidistant and parallel as possible. It's not perfect, but the radio was salvaged.

to mount the stator plates to a point where the stator plates are perfectly parallel to each other. An ideal means to do this is a machinist's vise, as shown in **Photo I**. As the vise compressed and stressed the heated pot metal, I could hear the metal groaning! I selected the best surviving examples from the numerous stator assemblies removed from the three tuning capacitors to undergo this treatment.

Reassembly

If the rotor plates are in good condition, the alignment can be checked before reassembly by simply meshing each of the stator assemblies against a rotor to ensure that the plates are truly parallel to each other. Allow the stator plates to press against the rotor plates on one side or the other. The adjacent plates should fully touch across their entire surfaces, without gaps.

Once reassembled, the air-gap spacing between the opposing plates will be fairly tight and any error will be easy to spot! If my past experiences are any indication, you won't achieve perfection, however. The desired goal is to have no shorting as the rotor plates are rotated through the full 180-degree tuning range with the stators. Carefully bend the aluminum rotor or stator plates as needed to keep them from rubbing and shorting. Use an ohmmeter as a final check to make sure there are no shorts on each section for the full tuning range.

The stator block mounting screws can be loosened to permit adjusting each stator block for best positioning. Do the best you can; the closer to parallel and equidistant the plates are kept, the easier the final alignment will be. The better the spacing, the longer the capacitor will continue to work if the pot metal should become unstable again.

I'm including a photo (**Photo J**) that will be used in the alignment procedures to show what was accomplished. As you can see, the repairs weren't perfect, but the capacitor was salvaged and is useable for the purpose intended. Whether the pot metal will continue to deteriorate and cause problems in the coming decades remains to be seen. I suspect it will be a future restorer's concern, and maybe he'll even stumble over my humble missives as a reference for those repairs!

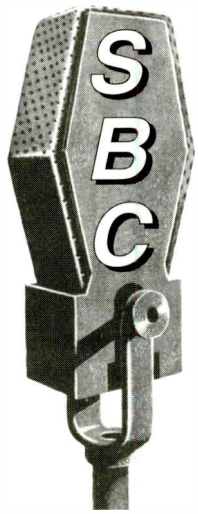
Until Next Month!

Next month I'll show you how to align the Majestic 90. It's a fairly involved task that I think you'll find interesting. I'll also try to cover some interesting facts on tuning capacitors in general, if space permits.

Until next time, keep those soldering irons warm and old tubes glowing! ■

by Shannon Huniwell, melodyfm@dreamscape.com

Radio Medford Via "Cheetah Bottom"



To most people radio is little more than a light switch. They click it on when they want music, a bit of news or weather, but never consider how the broadcast comes their way. For this vast public, all radio and related radio terminology is alike. There are no nuances. A megahertz might as well be a kilowatt.

Maybe that's why, despite my protests for more accuracy, I got tagged with the nickname "Short Wave." Of course, the fact that I've never been much taller than five feet might have added to the appropriateness of the identifier. Even so, as I pointed out to the freshman classmate who christened me with the S-W nickname, it's long been local AM and FM, not international transmission, that is my cup of tea.

She got her comeuppance, though, soon after branding me. A group of catty older girls in our Phys Ed class saw to that after their ringleader spotted her in some jungle print attire she'd inadvertently worn, not remembering it was a gym day. "Cheetah Bottom!" they bullied. That moniker stuck fast and unmercifully followed the poor kid all the way into those little captions under her senior yearbook picture. We've stayed in touch through the years, and it's she who (though still happily professing to know nothing much about radio) often forwards me interesting tidbits suitable for turning into a *Pop'Comm* column.

"Found This For 50-cents At A Yard Sale—Your Friend, Cheetah Bottom"

So read a pink Post-It note adorning the colorful cover of a Winter '61–'62 (No. 582) *Radio-TV Experimenter* edition, carefully padded in a fresh U.S. Postal Service envelope. A little arrow from my friend's notation extended to the cover's circular inset picture of a young woman with strawberry blonde hair. The model was shown seated in front of an all-band communications receiver, the cherry red nail polish on her fingers contrasting with some silver toggle switch the photographer undoubtedly instructed her to touch. "Hey Short Wave, looks kind of like you!" my old classmate had scribbled.

True to form, there was no notation about the vintage magazine's most interesting broadcast features: an "expanded *Whites Radio Log* with 500 new, up-to-date" AM/FM/TV listings, and a cockeyed black and white snapshot wedged, bookmark-style, against the page where Medford, Oregon's KMED 1440 had been clumsily underlined.

While the original source of the photo will probably remain a mild mystery, it's possible that he—or maybe she—visited the small/medium market station sometime during the early 1960s and captured a quick candid on the Kodak. Serendipitously parked in front of the KMED building was the station's new Chevy van, emblazoned with the numbers "10" and "1440," references to KMED's VHF-television and AM dial positions.

Here's that snapshot found wedged in the old Radio-TV Experimenter magazine. Notable are the "T-V" and "RADIO" signage on either side of the KMED lettering, and the hefty pole-mounted transformers that were probably added when the television studio was built adjacent (not visible from front) to the original radio facility, and the Chevrolet Corvair news wagon. KMED-TV employed such "news cruisers" to showcase its news gathering penchant over many miles of southern Oregon and northern California roadways. By the 1970s, a fleet of Ford Mustangs had replaced the humble Chevy van.

"Guess What? We've Got Three Neat KMED Pix In The Pro-File Collection!"

That's a close paraphrase of what Jan Lowry exclaimed when I mentioned my "rare" KMED picture. With four such photos having surfaced, showing various incarnations of one seemingly standard-issue western broadcast facility, I couldn't resist ordering (from *Broadcast Pro-File*, 28243 Royal Road, Castaic, CA 91384-3028) Jan's picturesque trio, as well as his company's informative KMED history.

It appears that KMED sprang from the metaphorical ashes of a short-lived Ashford, Oregon amateur station activated in 1921 for fun by a bunch of radio buffs who held their broadcasting club sessions in a garage. Greeting local crystal set owners over the air and spinning Victrola records for southeast Oregon's cadre of "radioists," or listeners, served as the garage station gang's typical agenda. When this novelty faded and the fledgling operation started seeming like work, William J. Virgin, the most enthusiastic member of the group went solo.

Virgin had been bitten by the radio bug while in the Navy. He packed away a few electronic components from the garage set-up, and then asked the government for an official broadcast license. On September 23, 1922, KFAY of Medford resulted. Some credit this as Oregon's first commercial station. Its 5 watts initially hit the air on 833 kHz before moving to 1060 on the dial in early 1924. Even then, Medford was southern Oregon's largest city and a decent place to run a station. (Present popu-

McPherson, Kans.	KNEX	1540	
McRae, Ga.	WDAX	1410	
Meadville, Pa.	WMGW	1490	
Medford, Mass.	WHIL	1430	
Medford, Oreg.	KMED	1440	A
	KDOV	1300	
	KBOY	730	
	KYJC	1230	A-C
Medford, Wis.	WIGM	1490	M
Medicine Hat, Alta.	CHAT	1270	
Melbourne, Fla.	WMMB	1240	M
Memphis, Tenn.	WHBQ	560	M
	WHER	1430	
	WMC	790	N
	WDIA	1070	
	WMPS	680	
	WHHM	1340	A
	WLOK	1480	
	WREC	600	C
	KWAM	990	
Mena, Ark.	KENA	1450	
Menominee, Mich.	WAGN	1340	A
Menomonie, Wis.	WMNE	1360	
Merced, Calif.	KYOS	1480	M
	KWIP	1580	
Meriden, Conn.	WMMW	1470	
Meridian, Miss.	WCOC	910	C
	WDAL	1330	
	WMOX	1010	
	WOKK	1450	A
	WQIC	1390	
Merrill, Wis.	WXMT	730	
Mesa, Ariz.	KBUZ	1310	
Metropolis, Ill.	WMOK	920	
Mexia, Tex.	KBUS	1590	
Mexico, Mo.	KXEO	1340	M
Mexico, Pa.	WJUN	1220	
Miami, Ariz.	KIKO	1340	
Miami, Fla.	WQBS	710	C
	WCKR	610	N
	WFAB	990	
	WMBM	1220	
	WAME	1260	A
	WMIE	1140	
	WQAM	560	
	WSKP	1450	
	WINZ	940	
Miami, Okla.	KGLC	910	
Miami Beach, Fla.	WMET	1490	
	WKAT	1360	M-A-C
	WFUN	790	
Michigan City, Ind.	WIMS	1420	

A clipping from the 1961/62 White's Radio Log showing KMED Medford, Oregon, singled out by some long-ago radio enthusiast. The "A" after KMED's 1440 dial spot indicates an ABC Radio Network affiliation. During the early 1960s, the station had three main local competitors, plus an 800-watt FM which simulcast daytimer KBOY.

lation is about 70,000, with additional population centers in nearby communities like Ashland.)

Though Virgin took KFAY dark a year or so later, he must have continued mulling over Medford's spot advertising business potential and was sufficiently infected by "radioitis" in 1926 to petition the Radio Division of the Bureau of Navigation, U.S. Department of Commerce, for a construction permit to build a new Medford station. This request was answered with a Christmas Eve 1926 present in the form of authorization to fire up a 50-watt broadcast facility on 1120 kHz.

Some sources say that Virgin accepted $1,500 for a half interest in the station. More than this modest fiscal backing, it was the new partner's newspaper connection Virgin probably figured would come in handy. Legend has it that *The Medford Mail-Tribune* publisher, Robert Ruhl, had convinced his associate to have ditched KFAY and start from scratch with a completely different facility christened KMED (for Medford). Virgin did recycle some gear from the defunct KFAY. New, though, was a small 50-watt Western Electric transmitter with which Virgin began KMED test transmissions on the day after Christmas. This fledgling AM's signal sprang from a wire antenna strung 82 feet between a pair of 85-foot wooden towers on top of a Western Auto hardware store housed in the Sparta Building. These "sticks" were originally designed for service as farm windmills, re-configured *sans* blades.

Officially, KMED programming debuted on December 28. It didn't take long for die-hard newspaperman Ruhl to judge broadcasting a fad with no real future. So disenchanted in the aural medium was Ruhl that he simply gave Virgin the other 50 percent of KMED control. Interestingly, there's no government record of Ruhl having a stake in the station, but his name surfaces in several KMED sagas. It might have been, too, that the paper's relationship was primarily a way for the local print outlet to receive on-air plugs and wider distribution of its news—info easily upstaged by KMED's live entertainment programming.

Incidentally, whatever the reason for leaving radio in the late 1920s, *The Medford Mail-Tribune* got back into the broadcast game in 1947 after building 250-watt KYJC 1230 kHz (licensed to Medford), though letting expire a concurrently granted permit to construct a KYJC-FM.

Frequency Changes And A Feminine First

During mid May 1927, KMED got shifted to 1200 kilocycles and was assigned to share airtime with KFJI in Astoria, Oregon. Another switch, this time to 1110, took KMED off timeshare status in early 1928, and to 1310 by the end of the year.

Understandably, these changing dial positions were not a top priority in the Virgin household. Bright's Disease with which 41-year old Bill Virgin had been lately suffering, claimed him around the time KMED went to 1310. His widow, Blanche, was granted assignment of the station's Federal Radio Commission (FRC) license shortly thereafter. This authorization instantly turned her into the world's first woman to own and manage a commercial broadcast property. In this regard, Blanche Virgin is truly an unsung radio hero. It's odd that broadcast history has not given her any "hall-of-fame" status for blazing a trail since followed by other women, from WNEW New York's Bernice Judis to Katherine Graham of the Washington Post Stations.

After dealing with her grief, Mrs. Virgin made KMED a priority. Acquiring more transmitter power was put on the front burner as, in 1930, she sought and received FRC permission to bump KMED to 100 watts and got an FCC nod to jump to 250 watts day (100 watts night) four years later.

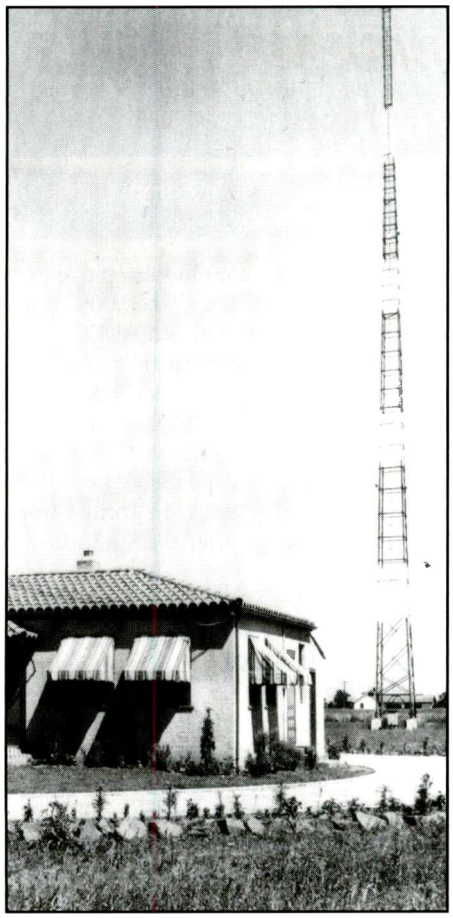
A New Site, Stick, And Stylish Shack

Rooftop wire antenna arrays were becoming old hat by the mid-1930s. So, when KMED increased day power to 250 watts, a two-step transmission modernization plan was begun. First, by January 1935, a one story tile-roofed cement building was erected to house KMED's transmitter and other technical equipment just off of Ross Lane, sometimes referred to as Rossanley Drive, two miles northwest of Medford.

It's likely that some kind of long wire there served as a temporary aerial until a state-of-the-art Blaw-Knox self-supporting vertical radiator could be installed not far from the new "shack." This improvement coincided with an upgrade to 250 watts of night power just shy of Halloween 1936. Yet another frequency change, this time to 1410, went into effect the following summer, in time for KMED's debut as an NBC network affiliate.

Moving To The Transmitter Site And Then Moving On

Since its first words, KMED programming emanated from the downtown Sparta Building. Possibly rising rent, or the desire for more convenient parking, plus the opportunity for an all-in-one operation, prompted Mrs. Virgin to okay



Three of the four concrete tower bases are clearly evident in this 1936 portrait of KMED's then-new Blaw-Knox tower and stylish transmitter "shack." Nice landscaping, too! Note the two small "marker lights" (as opposed to a single "beacon") atop the 179-foot, quad-legged stick.

the construction of "a new modern Broadcast Center" enveloping the little transmitter house on Ross Lane. The grand opening took place in early 1939, as did a daytime output increase to 1 kW.

Around the time of this ribbon cutting, in Mrs. Virgin's office was a copy of an FCC application seeking an FM construction permit, but other priorities and a subsequent World War II-era freeze on new stations kept this proposed "low-band" frequency modulation outlet from becoming reality. AM band gerrymandering, due to the complex 1941 frequency reallocations, caused Medford-area listeners to note 1440 as KMED's new and ultimately best known dial position.

Through the war years, little FCC intervention occurred at the station, and things at KMED remained rather routine until a construction permit for 5,000 watts daytime came through in 1948. For decades, the fulltime-licensed facility's broadcast schedule was modest 7 a.m. to 10 p.m. Once KMED was operating with maximum AM Regional Channel daylight power (5 kW), there was little else one could do to improve the property's market value. Mrs. Virgin decided she'd gotten KMED into top shape, and so sold the business on July 1, 1950. Commission documents show that a group of local businessmen, headed by Vernon Robinson, paid her $290,000 for the AM outlet.

A Savvy Chief Engineer Eyes Video Opportunities

At the time of Radio Medford's sale, Ray Johnson wore the station's chief engineer hat. His technical acumen was to be rewarded by Vern Robinson in an atypical way.

While most broadcast "C-Es" remained segregated in the equipment maintenance area, Ray Johnson branched out from being KMED's head tech to assuming the executive vice president and general manager posts in a regular series of promotions. By 1957, Johnson had acquired 20 percent of the station and began the planning that led to KMED's 1959 application for a vacant VHF-TV Channel 10 spot allocated to Medford. Aimed at northern California and southern Oregon, the resulting television outlet signed on as KMED-TV from studios located next to the KMED radio building.

Blackwell Hill, near the town of Gold Hill, served as KMED-TV's original transmitter site. This 149-kW visual/79.5-kW aural installation's VHF "Batwing" antenna was just shy of 300 feet off the ground and 700 feet above the average terrain. It saw service from October 3, 1961, through September 1966, when, as noted in the present Medford Channel 10's webpage,

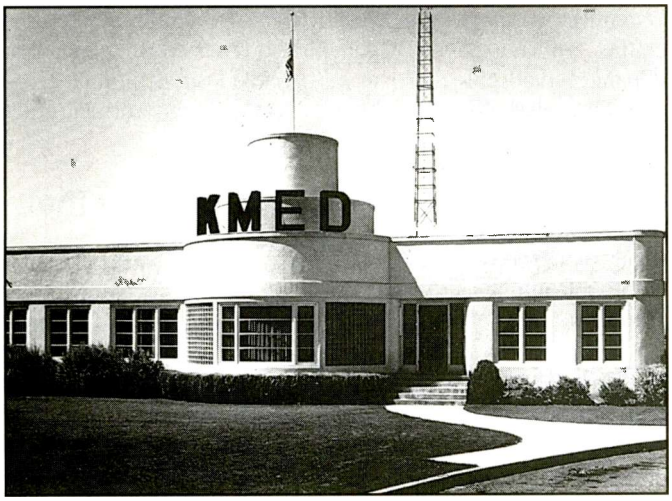
> ...the development of the Mount Ashland Ski Resort gave the station an opportunity to tremendously expand its viewing coverage area. KMED-TV began telecasting from the summit of Mount Ashland; 7,600 feet above sea level, it is the highest TV transmitting antenna in the Pacific Northwest, with a primary signal covering Klamath, Josephine, and Jackson Counties Oregon, and Siskiyou County in California—plus parts of Modoc, Lake Douglas, and Curry Counties.

FCC figures show the antenna on a modest tower of about 160 feet, but a dizzying 3,310 feet above the average terrain as measured by random points within a 10-mile radius of the stick. Until a third television station was authorized for Medford, KMED-TV featured NBC and ABC network shows, as well as local fare such as news and editorials often offered by general manager and former chief engineer, Ray Johnson.

Meanwhile Back At The Radio Station...

No doubt the TV side, in all its video glory, garnered much of Johnson's affection. A mid-1960s look at KMED radio shows it to be a rather generic AM running innocuous "middle-of-the-road" music augmented by local and network news. It should be noted, however, that Johnson's group was thinking in radio terms enough to acquire KQMS (1400 kHz) in Redding, California, during 1967.

The company's super TV transmitter site must have prompted Johnson to consider establishing a frequency modulation sister for his Medford AM. KMED-FM resulted on October 15, 1970. The 18.5-kW signal from an antenna height of 3,260 feet above average terrain really filled its 93.7-MHz dial position. The stereo outlet earned an identity all its own by 1972 when the call letters were changed to KTMT-FM.



That patriotic flag atop KMED's art deco-style studio/transmitter building indicates calm winds at the moment this early 1939 publicity photo was taken. The locale was dubbed "Broadcast Center," and it used the same tower installed three years earlier.

Additional modifications came down the pike in the summer of 1977. Then, Johnson's group decided to leave the AM radio business to concentrate on its television property and FM. KMED went to Northstar Broadcasting, Inc., for $476,000. The sale specified that the radio properties vacate 1440 Rossanley Drive, or "Broadcast Center," which the AM/FM had shared with the TV.

KMED-TV became KTVL-TV so that the vintage calls could be retained by the AM. Radio studios were rigged up at Suite 202 of 820 Crater Lake Avenue in Medford. By 1981, KMED's neat old, four-legged Blaw-Knox tower was decommissioned and taken down, though serious radio buffs might still notice the former radiator's four concrete bases out back of the Rossanley Drive venue. An FCC go-ahead to build a new transmitting system near North Phoenix Road at Coal Mine Road in Medford made the decommissioning possible. Johnson's group sold off the TV/FM properties in 1981.

Help! K-MEDIC!

Early 1982 saw one of several sales of KMED in that decade. The price appears to have dropped with each transaction. Even so, one in a series of buyers defaulted, tossing the formerly preeminent Medford station into receivership. A check of period *Broadcasting Yearbook* issues indicates that KMED's rate card had fallen, too, in comparison to the 60-second commercial charge commanded by most of the station's cross-town rivals. Also fickle was the KMED format of the early- to mid-1980s, ranging from adult contemporary music to news/talk, and oldies & currents, back to middle-of-the-road programming.

Network affiliation fluctuated as well. Studios moved 86 Fourth Street in Gold Hill, Oregon, so as to be co-located with

KRNQ-FM, which was owned by the couple who picked up KMED in 1985 for just $20,000 down and a $160,000 mortgage. These folks improved the pioneer Medford AM's standing to the point that an outfit, which was subsequently absorbed by radio giant Clear Channel Communications, purchased KMED. Shortly before this 1998 transaction, KMED had been returned to a Medford venue at 3624 Avon Drive.

Today, KMED listeners know it as a dependable news/talk operation. Clear Channel saw fit to flip the AM's format from music to talk and information just days after the 9/11 attacks back east.

Getting Back To Cheetah Bottom, With A Note Of Thanks

When I sent a "thank you" to my friend for her thoughtfulness in digging up the KMED picture that spawned this article, though she admitted to not even knowing that the snapshot had been wedged inside the old *Radio-TV Experimenter*. "Hey Short Wave," she laughed in a catch-up phone call about a week later, "to be perfectly honest, I hadn't even opened that old magazine before sending it your way. All radio publications look the same to me."

"Ah hem...," came my exaggerated throat clearing response to that generalization. "Sorry," she giggled. "What I meant to say was...all radio magazines look the same *except* for the one you write for!"

And so ends another day of broadcast history. ■

Signs on downtown Medford's Sparta Building hawked everything from Western Auto wares to "eats, pool, beauty shop" and "drinks." Nowhere in this circa-1929 scene, however, were the call letters KMED, but those towers on the structure's roof shout "radio!" The towers were supposed to hold windmills to help pump water on a couple of Oregon farms, but were bought from the local Grange before they could get enlisted for such bucolic endeavors. Strung with copper wires, they instead served to wing KMED's 50-watt signal to Medford area listeners.

Our June Winner: James Wood Of Arcola, Illinois!

James Wood at his shack in Arcola, Illinois.

Pop'Comm reader James Wood tells us:

My radio experiences span many memories of both events and equipment. I remember Arthur Godfrey and his ukulele, Art Linkletter, and the Don McNeal "Breakfast Club" which was on WLS [890 AM Chicago] earlier in the day than the popular hit music of the '60s. I attempted an early stereo reception was accomplished by tuning an AM radio and an FM radio to the same local station where they transmitted; each channel of the broadcast was on the different transmitters.

Being able to transmit came about when my older brother assembled a Heathkit CB transceiver. It allowed us to communicate with our cousins without driving three miles. They lived one-third mile off of the oiled road, and the telephone company at the time would not string wires to their house without a large payment. It also allowed us to talk "skip" to characters in faraway states.

Our callsign was KHC5195. We purchased QSL cards and traded them with other CBers. We moved up to a five-channel Utica with a variable tuning receiver and an external plug-in transmit crystal socket. We also bought a 30- to 50-MHz public service receiver that had to be tuned using a variable capacitor. Try to catch action on that radio!

Next investment was a shortwave receiver. I wanted something newer than our wood cabinet AM/shortwave receiver. After many hours of fieldwork, I purchased a Hallicrafters SX-130. Listening to hams on 80 and 40 meters fueled my desire for an amateur ticket, but I was so busy raising money for and attending college that I put licensing on the back burner. After a few years of teaching I acquired my license with the callsign WN9URK, now WB9URK.

Gone are the wood cabinet radio, scanners that had to be tuned, and the Heathkit. Today's station consists of a RadioShack PRO-2005, a scanning FRS, an Azden PCS-7500H, a RadioShack TRC-495 CB, and ICOMs 725, R75, 208H, 28H, and 38A.

Popular Communications invites you to submit, in about 300 words, how you got started in the communications hobby. Entries should be typewritten, or otherwise easily readable. If possible, your photo should be included.

Address all entries to: "V.I.P. Spotlight," *Popular Communications*, 25 Newbridge Road, Hicksville, NY 11801 or e-mail your entry to popularcom@aol.com.

thing about other types of receivers, or for that matter CBers inherent right to carry a weapon, crowbar, or two-foot long metal flashlight in their vehicles because they were *licensed* CBers.

There *is*, however, PR Docket 91-36, released on September 3, 1993, that addresses the issue of "Federal Preemption of State and Local Laws Concerning Amateur Operator Use of Transceivers Capable of Reception Beyond Amateur Service Frequency Allocations." Thirteen years ago the Commission received a total of 115 comments and reply comments on the issue, mostly from amateurs who support the preemption. Interestingly, as reported in the Commission's official docket, the Michigan Department of State Police (MSP) stated that, "...although it cooperates with the amateur service during emergencies, it is concerned about isolated incidents of apparently unlawful actions taken by amateur licensees upon receipt of public safety communications outside of the amateur radio band." The MSP concluded, "there can be no beneficial need for amateur radio equipment to tune in public safety channels."

Interestingly, the Commission only addressed "scanner laws" that prohibit amateur *transceivers* because they also receive out-of-band signals; 91-36 says nothing about scanning receivers possessed by amateur operators, either mobile or otherwise. The Commission's concerns are spelled out quite succinctly in 91-36, where it's stated,

> We find it necessary to preempt state and local laws that effectively preclude the possession in vehicles or elsewhere of amateur service transceivers by amateur operators merely on the basis that the transceivers are capable of reception on public safety, special emergency or other radio service frequencies, the reception of which is not prohibited by federal law.

There, my friends, is the key to unraveling states' anti-scanner arguments: the "reception of which is not prohibited by federal law." Period.

But as they say on TV, "wait, there's more!" The Commission also said 13 years ago in this ruling that "This decision does not pertain to scanner laws narrowly tailored to the use of such radios, for example, for *criminal* [italics mine] ends such as to assist flight from law enforcement personnel."

That, of course *should* be the end of the story, but it's not. Even back in 1993 the Commission stated that a "permit scheme" "will not save from preemption an otherwise objectionable law." And they also hit the bull's-eye when they state what *Pop'Comm* has said since 1982: if law enforcement or the Feds want to keep their comms private, they should scramble or encrypt such communications.

Then there's the Buckeye State's City of Jackson with about 6,500 residents (and in influx of another 30,000 or so because of thriving local industry!) that gets the Scanner Friendly Award Of The Decade. On their website (www.jacksonohio.us/policedeptDispatch.htm) they state, "While some police agencies discourage monitoring official police communications, the Jackson Police Department encourages it. Monitoring allows the community to understand what the police department does and how it works." Monitoring them is no problem, obviously, and they even list their frequencies.

So a reasonably intelligent person would ask what *Michigan* was originally thinking with its goofy law and permit system. Remember, as law-abiding, traveling Americans we have nothing to fear except misdirected, archaic legislation—and uninformed state police—not just in Michigan, but in other states like Minnesota, New York, Indiana, Kentucky, South Dakota, and Florida where it's a good idea to keep the volume down on that mobile scanner—or perhaps get an amateur license, permit, or a good lawyer. Or you could move to Jackson, Ohio! ■

INFOCENTRAL *(from page 5)*

new partnership allowing listeners in cities such as Bangalore, Chennai, Delhi, Hyderabad, and Mumbai to subscribe to WorldSpace's basic package to hear BBC news and BBC World Service programs in four languages: English, Hindi, Urdu, and Bengali. They can also hear BBC programs on WorldSpace's newly launched all-sports radio channel, Play. Subscribers to an enhanced gold package will, in addition, receive the BBC Global News channel, which has up-to-the-minute news and in-depth analysis from the BBC.

VOR Will Start DRM Soon

The Voice of Russia state Radio Broadcasting Corporation will broadcast its programs to Europe in a digital format from a new radio transmitter. The first digital radio transmitter built in Russia according to the DRM standards was commissioned at the Taldom radio broadcasting center north of Moscow in early March. The new radio transmitter was built to meet the standards of a modernized broadcasting system developed by the Voice of Russia and the Russian Teleradio Broadcasting Systems. The Voice of Russia Radio was founded in 1929 broadcasts to more than 160 countries. The Voice of Russia's audience numbers more than 100 million people, speaking 32 languages.

Sirius Reports Record Subscriber Growth In 2005

Sirius Satellite Radio has announced record fourth-quarter and full-year 2005 financial and operating results, driven by better-than-expected subscriber growth across its distribution channels. Sirius ended 2005 with 3,316,560 subscribers, reflecting a 190-percent increase in total subscribers for the year and record net subscriber additions of 2,173,302. For the fourth quarter, the company added 1,142,640 net subscribers, making Sirius the market share leader in terms of net satellite radio subscriber additions for the quarter.

During 2005, Sirius added 1,554,108 net subscribers from its retail channel, a 123-percent increase from the 696,028 net retail subscriber additions in 2004. The company also added 620,224 net subscribers from its automotive OEM channel, and more than 241 percent above net automotive OEM subscriber additions of 181,646 in 2004. For the fourth quarter, Sirius added 900,645 net subscribers from its retail channel and 241,705 net subscribers from its automotive OEM channel.

XM Added Over 2.7 Million Net Subscribers In 2005

XM Satellite Radio reported sharply higher 2005 revenue, and the company said it expected to report positive cash flow from operations in the fourth quarter of 2006. XM ended 2005 with 5,932,957 subscribers, an increase of 84 percent over 2004. Despite an intensely competitive marketplace in the fourth quarter, XM achieved net subscriber additions of 898,315. Later than expect-

ed activations from strong holiday sales brought the total to more than six million during the first week of January.

WDR Plans To Start DRM Tests On 1593 kHz This Summer

German public broadcaster WDR plans to start DRM tests on 1593 kHz in the summer. They will be run with 20 kW and are scheduled for a period of 18 months. The objective is to gather experience with the system in order to find out if it has a future. DRM receivers are expected to be available this summer. Two new Transradio (ex Telefunken) mediumwave transmitters of 100 kW each are to be installed at WDR's Langenberg station, where 1593 can be used once again after IBB's Holzkirchen transmitter went to Kuwait.

In the 1990s WDR let the IBB (International Broadcasting Bureau) have 1593 after shutting down the two 600-kW transmitters at Langenberg in 1993 due to PCB and asbestos contamination. In exchange it got fulltime authorization for the ex-Holzkirchen Channel 720 (previously available at Langenberg during daytime only).

Sri Lanka To Change Clock Back After 10-Year Experiment

Sri Lanka will put the clock back by a half-hour and revert to its original time after a 10-year experiment that largely failed to save energy, according to state radio. The Sri Lankan President Mahinda Rajapakse ordered that Sri Lanka revert to its original standard time, five and a half hours ahead of UTC, which the country maintained till May 1996.

Faced with an electricity crisis in May 1996, the government advanced the clock by an hour to extend daylight hours. In October of that year it brought it back by half an hour to put Sri Lanka six hours ahead of UTC. The island will now return to five and a half hours ahead of UTC and be on the same time zone as its giant neighbor, India. Even though the government in 1996 advanced the clock, the Tamil Tiger rebels who control large parts of the island's northeast did not follow it, leading to two de facto time zones within the country. ■

ADVERTISERS' INDEX

readers' market

Advertising Rates for Readers' Mart: Non-commercial ads are 30 cents per word, including abbreviations and addresses; minimum charge $6.00 per issue. Ads from firms offering commercial products or services are $1.00 per word; minimum charge $20.00 per issue. Boldface words are $1.20 each (specify which words). Leading key words set in all caps at no additional charge. All ads *must be prepaid in full* at time of insertion; a 5% discount is offered for prepaid 6 time insertions. All ads must be typewritten double spaced.

Approval: All ad copy is subject to Publisher's approval and may be modified to eliminate references to equipment and practices which are either illegal or otherwise not within the spirit or coverage scope of the magazine.

Closing Date: The 10th day in the third month preceding date of publication. Because the advertisers and equipment contained in Readers' Market have not been investigated, the Publisher of *Popular Communications* cannot vouch for the merchandise listed therein. Direct all correspondence and ad copy to: Attention: Classified Dept., PC Readers' Market, 25 Newbridge Rd., Hicksville, NY 11801.

by Bill Price, N3AVY

Just What Norm Needs...

I know that I will surely rot in heck for telling secrets about Norm, but Norm is, shall we say, *frugal*. No, on second thought, we shall not say frugal. Norm is so cheap that George Washington squints when Norm opens his wallet. Norm also loves surplus goodies, and I have found just the thing for him.

"Actually, I hate telephones, cell phones, and microphones, even though Norm has given me a rig with a nice microphone..."

Now remember, this is the Norm who wants me to get on the air (which I have promised to do) so we can talk off line, even though the Internet gives us unlimited e-mail and, if we really wanted to, we could use Voice over Internet and talk. Actually, I hate telephones, cell phones, and microphones, even though Norm has given me a nice rig with a nice microphone, and in fact, he even gave me a huge tangled-up ball of wire that is to become my antenna once the weather becomes nicer.

Anyway, there I was in my favorite gun shop, which also sells some U.S. and foreign military surplus, and what to my wondering eyes should appear but a set (several sets, actually) of Scandinavian (Swedish, I think) field phones. I knew right away they were field phones because they had little cranks on one end. The interesting part, even though their Bakelite construction belied their age, is that they carried an Ericsson logo! I'm sure it's the same company that made the successful jump to cell phones and similar electronics goodies.

"So, while I was pondering getting a pair of these for old Norm...I noticed an unusual phonetic alphabet on a little brass plate atop one of the phones—and it didn't begin with Abel, or Alfa, or even Aye..."

So, while I was pondering getting a pair of these for old Norm (and knowing full well that he'd never actually connect them and use them), I noticed an unusual phonetic alphabet on a little brass plate atop one of the phones—and it didn't begin with Abel, or Alfa, or even Aye (one of my favorite phonetic words for the letter A).

As I pondered this lovely pair of FEINDEN ESSNARS, I saw that there were *30* characters instead of the usual 26! This, I found out, is because there is an A with a little circle above it (that gets called "Ake" with the little circle above the A), then there's another A with a straight line above it, sort of a long dash (that one is called "Arlig" with the dash above the A), then there's an O with an umlaut (bet you didn't know I knew what an umlaut was, did you?) over it (that's two dots, for the umlaut-impaired), and for that you say "Osten" (and don't forget the umlaut!). Finally, there is a U with an umlaut. To convey that to the person on the other end, you must say "Ubel."

On top of the strange names and words (okay, so they're not so strange to people who use this language every day) there were numbers, the digits 1 through 9 and 0 (zero) and little words next to them in case you never went to school and learned to pronounce your digits. As you might suspect, they were not uno, dos, tres... No, they were eif, fvaa (but the first "a" has a little circle over it), trea (makes sense to me), fyra, femma, sexa (leave it alone, Harold), sjua, otla, and nia. For zero, I believe it was "nolla," but on all the phones, the writing was worn in that area so I'm guessing.

Our charming editor, Harold "blue-pencil" Ort, will be pleased to know that his name (Harold, not "blue-pencil") has been entered into Svenske posterity as the phonetic equivalent for the letter H. (Bill was not used anywhere—I checked). Those of you who are aware of guitar legends will appreciate "Yngvie," but I suspect "Xerxes" for the letter X could be confusing. I also think we'd have a problem hearing "Filip" for the letter F, because half of us would write down the letter P when we heard it.

So instead of giving in to my whims and buying that Webley-Vickers (which could be the very one carried by Walter Mitty), I'm seriously considering buying a pair of these, a few thousand feet (oops, I mean meters) of wire, and springing for the shipping charges (these puppies are *heavy*!) and surprising Norm at his new home, which is (as yet) probably not cluttered with tubes, wires, and military surplus gadgets.

I looked on the map, and Norm and I are still over a thousand miles apart, I guess. That pretty much precludes my running wire from here to there and *really* surprising him. Guess I'll have to revert to plan A: stringing a nice G5RV antenna among the trees, hoping that something else attracts the mid-Atlantic lightning, and using the waiting SSB transceiver he brought me on his last trip through the nation's capital.

I know he'll be coming back through here as the weather warms up, and I think I'll try to plan a side trip to my local gun shop and surplus store. The problem I see is that Norm knows more about surplus guns than I do, but also usually can identify almost any U.S. military surplus equipment from an M1 rifle to an M1 tank (I don't think any of those have been sent to the surplus market just yet). And with him never wanting to pass up a bargain, somehow I just *know* that I'll end up storing a dozen or so of these field-phones (and who knows what else) at my place until he comes back through with either a rental truck, or...the BUS!

Yes, Norm still has a bus. Not the one I worked on with him, but another, nicer (kinder, gentler) bus. Maybe he can use a pair of phones to talk from the front of the bus to the back. I promise to tell more about the bus next month. Meanwhile, can you say "Scenicruiser"? ■

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