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# POPULAR COMMUNICATIONS

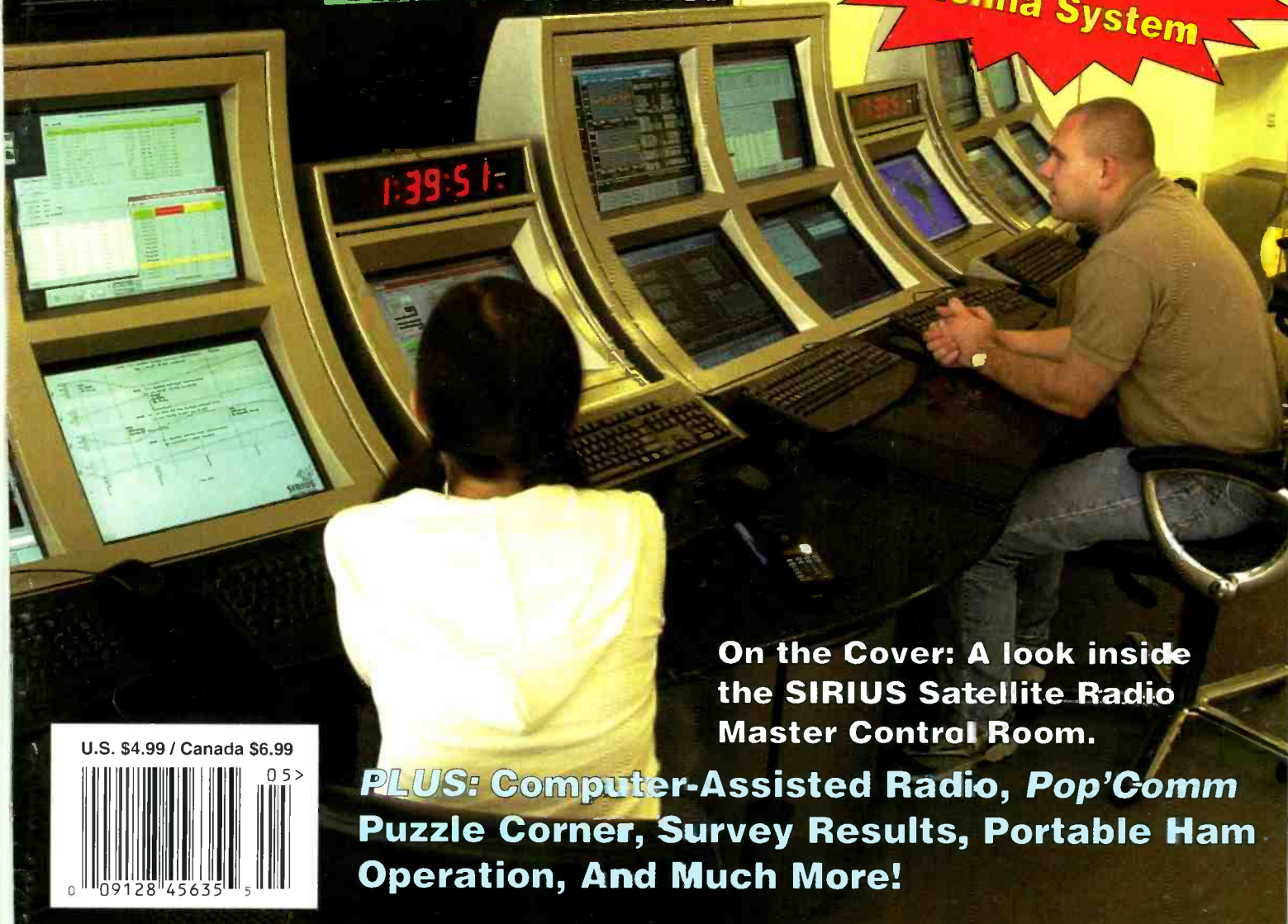
MAY 2003

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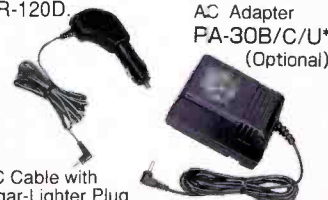


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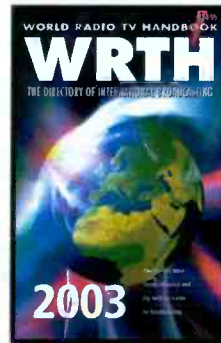
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## RADIO BOOKS

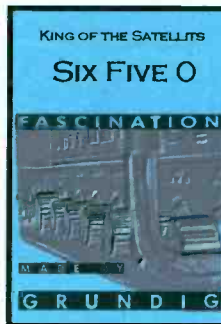
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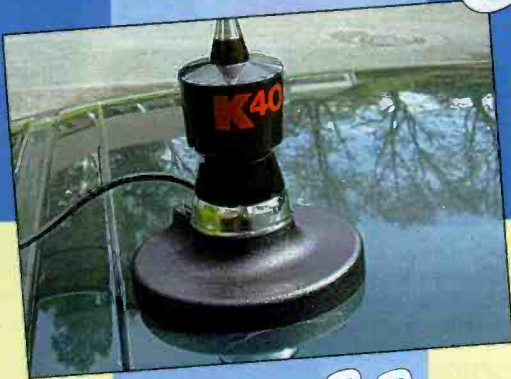
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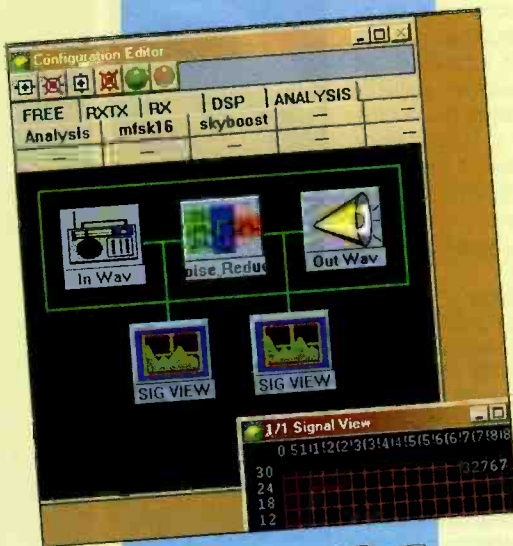
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### On The Cover

Engineers Colleen Dunne and Jeffrey Ross at SIRIUS's Satellite Control Room. Will SIRIUS and XM weather the start-up storm? Get the inside story on satellite radio in this month's Radio Resources column beginning on page 14. (Photo by Larry Mulvehill.)

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# tuning in

by Harold Ort, N2RLL, SSB-596

an editorial

## Looking—And Listening—Beyond 2003

A CNN report within weeks of the Shuttle *Columbia* tragedy discussed the way we should be exploring space, whether with manned or unmanned missions. In speaking of unmanned missions CNN said, "Although less glamorous, such missions pose no risks to humans."

Certainly it's a point worth discussion, but not until we've solved the problems that caused the *Columbia* tragedy. That's the trouble with critics' hindsight after a tragedy of this magnitude; they shrink to a level of human depth and understanding that makes me wonder how we've evolved this far without dumping the whole program. After all, unmanned exploration would be a heck of a lot easier and a whole lot cheaper. We could just as easily leave space exploration to commercial endeavors, or perhaps the Europeans or Chinese. (Have you heard,

by the way, that the Chinese are looking seriously at putting a man on Mars in the coming years?)

While CNN is absolutely correct that unmanned missions pose no risks to humans, the obvious practically smacks you in the face: Opting not to send people into space is the easy way out. We're living during a time where sending a quarter-million troops away from home every few years is considered okay and perfectly acceptable because they've signed on to do the politician's dirty work. Risks? Tell me about risks, please. Been there, done that, as they say. You don't need to tell the families and friends of those lost on *Columbia* about risks. They faced it head on every minute of every day.

Have you heard "the risks" on your radio? The chase aircraft on UHF, Cape Radio on HF and the multitude of sup-

*(Continued on page 68)*



The crew of STS-107 is shown here in front of the SPACEHAB Double Module in pre-flight training.

## POPULAR COMMUNICATIONS

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- Beeper and vibrator alert
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- Beeper and vibrator alert
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# our readers

## speak out *letters to the editor*

Each month, we select representative reader letters for our "Our Readers Speak Out" column. We reserve the right to condense lengthy letters for space reasons and to edit to conform to style. All letters submitted must be signed and show a return mailing address or valid e-mail address. Upon request, we will withhold a sender's name if the letter is used in "Our Readers Speak Out." Address letters to: Harold Ort, N2RLL, SSB-596, Editor, Popular Communications, 25 Newbridge Road, Hicksville, NY 11801-2909, or send e-mail via the Internet to <pop-ularcom@aol.com>.

### Hansen's Key Pad

Dear Editor:

Just a note to thank you for the inclusion of the "John Hansen Key Pad" in Gordon West's column in the February issue of *Pop'Comm*. Every once in a while a new product comes along that significantly improves our ability to use our equipment. John Hansen's ICOM/Yaesu Key Pad is just one of those devices.

The day I read Gordo's column and read about the John Hansen Key Pad, I punched in the URL and ordered a key pad for my Yaesu FT-817 plus an extra key pad cable for ICOM radios. Ordering was a simple and fast Pay Pal deal and in three days I had my key pad (I chose not to buy the kit).

In a matter of a few minutes for hook up I had a whole new and very easy tuning session with my once hard-to-find-the-frequency Yaesu FT-817. Having tuned the FT-817 I made a quick cable change and was soon speeding my way through frequencies on my ICOM IC-706 MKII.

The key pad works like a charm and does a lot more than just allow fast tapping in frequencies. For any other big stub-fingered hobbyists who own one of the new and fun small rigs I highly recommend they take a look at John's website at <www.john.hansen.net/key.pad.htm>. All you have to lose is time and finger nails! Dang good product!

John T. Wagner  
Ohio

### R&R—Rehabilitation And Reinvigoration

Dear Editor:

I thoroughly enjoyed your editorial about Citizen's Band Radio in the March 2003 issue. Your description of problems fitting communications gear into modern vehicle interiors certainly hit home. The specifications you describe for a 21st Century mobile transceiver are perfect. But has any CB manufacturer shown any interest in producing such a device? The good folks at Midland radio still seem interested in Citizen's Band (in all its forms). Perhaps they could be convinced such a project would be worthwhile.

And speaking of our friends at Midland, kudos to them for their "Midland 1 Listens" program. But one thought comes to mind: Midland proposes to adopt Channel 1 on CB, FRS, and GMRS radios for contact, travel assistance, and emergency use. Sounds good and easy to remember. Meanwhile, Rich Arland, in his "Homeland Security" column in the same issue, mentions

that the FCC has designated 462.675 MHz as the emergency calling and traveler's information channel for GMRS. Pardon my ignorance here, but is that frequency Channel 1? Perhaps it is, but I ask the question anyway because, in order for the program to work, everyone has to be on the same page—from the radio operator all the way up to the FCC.

But "Midland 1 Listens" sounds like a great way to begin a rehabilitation and reinvigoration of Citizen's Band radio while cross-pollinating with the rapidly growing FRS and GMRS services as well. If RadioShack, Uniden, and a few other manufacturers got on board, we might really have something. Now, if we could only do something about some of the Neanderthals populating 11 meters.

Steve Biro  
Freehold, NJ

### Thanks To Shannon!

Dear Editor:

Thanks for the memories—"Shannon's Broadcast Classics" in March 2003. Her article on broadcast van toys reminded me of my Renwal TV remote truck. I was given this finely detailed toy truck in the early 1950s. It was modeled after the truck that RCA offered TV stations through their broadcast equipment catalog. It included a nicely detailed and scaled to the truck RCA TK-10 TV camera on a tripod. There's also a microphone on a stand and a light—all molded in plastic. This toy really thrilled me as a seven-year-old who was fascinated with television and wound up spending a career in television production.

Steve Dichter  
Los Angeles, CA

### Jason's Two Cents

Dear Editor:

I highly respect Midland's enthusiasm and will to push forward their Channel 1 plan. It's good to see that corporations are still willing to participate in society, especially in this day and age. However, I think that they should put this plan into action on the already FCC-established emergency channel, Channel 9. Having multiple channels set aside for assistance (Channels 9, 19, and soon 1) can be quite confusing and could cause the already-low monitoring rate to become spread even thinner.

I can understand the choice of Channel 1, keeping the help channel number the same, but most travelers have it embedded in their head that Channel 9 or 19 is the choice for aid on the CB. In fact, most CB radios now come with instant Channel 9/19 buttons for easy/quick access to the emergency channels. If Channel 9—the designated emergency channel—is going to waste, why will Channel 1 be any different?

In short, I think that we, citizens and corporations alike, should MAKE USE of the already-established emergency channel(s) instead of adding more channels to the list of choices, only to cause confusion that is unwelcome during emergency situations. Well that was my two cents.

Jason, KG4SBQ



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The Bearcat 895XLT is superb for intercepting trunked analog communications transmissions with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include Auto Store - Automatically stores all active frequencies within the specified bank(s). Auto Recording - Lets you record channel activity from the scanner onto a tape recorder. CTCSS Tone Band (Continuous Tone Control Squelch System) allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning pleasure, order the following optional accessories: PS001 Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; PS002 DC power cord - enables permanent operation from your vehicle fuse box \$14.95; MB001 Mobile mounting bracket \$14.95; EX711 External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. CAT895 Computer serial cable \$29.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS or LTR systems.



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**Mfg. suggested list price \$429.95/CEI price \$189.95**

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**Trunk Lockout • Trunk Delay • Cloning Capability**  
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# DXing Those "Secret" Subcarrier Signals On FM

## How To Tune A Radio Band Your Neighbors Don't Know Exists!

By Bruce F. Elving, Ph.D.

**A**s a boy in Duluth, Minnesota, I tuned the standard 88- to 108-MHz FM band and experimented with FM DX back in 1948. The receiver was a table model Zenith AM/FM radio—all tubes, of course! Later I added an outdoor, turnstile FM antenna that increased the DX I could hear. A couple of years after that, a Yagi antenna was installed, one of the first FM-only Yagis available—a JFD brand.

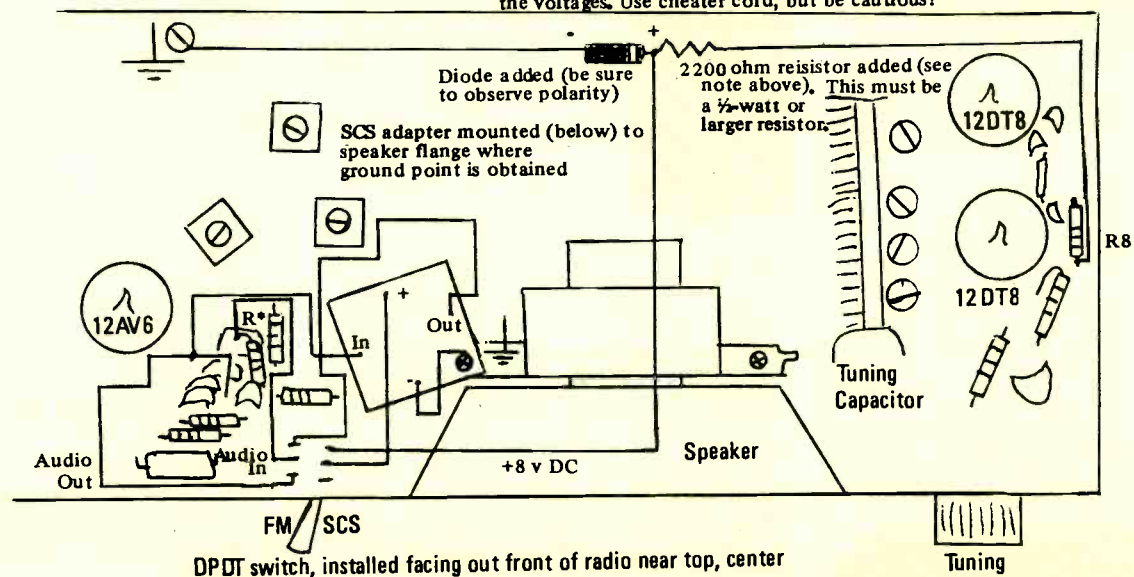
During this pioneering time when there was no FM car radio, the FCC authorized FM subcarrier broadcasting. It was also a period when regular FM stations were hurting financially. Many, like WWDC-FM 101.1 in Washington, DC, and WFME 100.3 in Chicago, found that selling background music to stores was a way to stay financially afloat. I recall that WFME, which

could be DXed from Duluth, had a low-frequency tone to increase the volume of commercials or to mute certain radios, under a system called "simplex" operation. Thus, receivers in certain stores would play commercials louder than the surrounding music, while in other stores the announcements were blanked out.

Eventually the FCC declared "simplex" operation not to be broadcasting, as defined by the Communications Act of 1934. The new technology, known as multiplexing had, by 1954, won approval from the Commission. Stations could "multiplex" the background music to the stores, while the public heard an entirely different program. Shortly thereafter, the FCC ordered all FM stations to stop simplex transmissions and relegate the in-

Admiral Y3621N, Y3627N (Chassis 8X2N), Tube Table Model  
FM-AM Radio, FM/SCS Installation. Caution: one side of the AC line is connected to the chassis. Schematic is in Sams Photofact set 719, Folder 6, of 10-64.

Diode and resistor added to drop the voltage found at R8 from about 60 v DC to about 10v DC. The exact value of the added resistor may vary according to the power requirements of the SCS adapter used. Clip adapter's + and - sides into the circuit, and change the value(s) of the resistor accordingly as you measure the voltages. Use cheater cord, but be cautious!



\*R is the 100 k-ohm R22. It stands vertically, and its lead is severed for SCS detection point and radio audio in-out.

*A look at how the author modified a tube-type radio for subcarrier reception.*



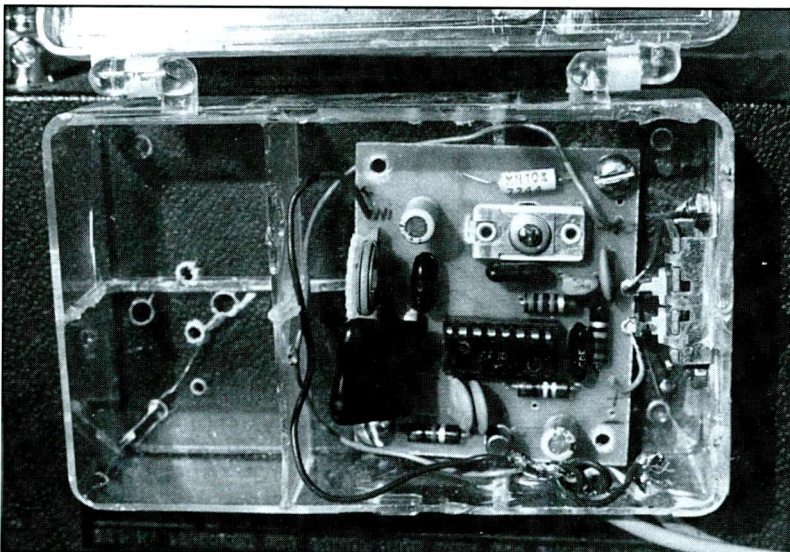
Front view of a vintage Wards Airline radio showing SCS "in" and "out" plugs using the radio's "MPX" out jack (a jack not found on modern radios) and its audio-in jack.

store music and announcements to subcarriers. (FM's inventor, Edwin H. Armstrong, had demonstrated how one station could send out two separate programs by multiplexing, which opened the way for FM stereo to be authorized in 1960. Armstrong's demonstration of multiplexing occurred only a few months before he died in the spring of 1954).

There was considerable broadcaster resistance to the FCC's multiplexing edict because each station offering background music would have to invest in a subcarrier generator, priced at about \$5,000, with special receivers costing about \$100 each (that's 1950s' dollars). Instead, the FCC wanted the public to receive programs more of a "broadcast" nature, as opposed to point-to-point, like the in-store music and commercials.

## You Can Hear It Today!

You can relive the 1950s and again tune in pleasant background music (or detestable Muzak, depending on how you look at it!). This is music that has been denied you by an FCC edict



Inside the Wards Airline radio showing the attached SCS module (67-kHz unit). Six-volt DC power was derived from inside the radio.

of so long ago. All you need is an FM radio modified to get FM/SCS, or subcarriers, or an adapter device that can be installed in one or more of your radios. Since the '50s, many other stations and services have come on, so even if you're not an avid fan of schmaltz, there might be something exciting to tune in, depending on where you live and the creativity of your local broadcasters.

I find, in fact that some people like to have the FM subcarrier feature available, even if they don't plan to listen much. It's like owning a gun. You don't plan to make daily use of the instrument, but there might be times when you relish the thought that, with radio, you have access to a circuit that gets a radio band that 99 percent of your neighbors can't tune in. And it's instructive to know what ingredients are in the radio signals which cross your property! Today, in fact, there is less use of SCS for music than long ago; many of the stores have installed direct satellite reception dishes to get the music. There is no background music, for example, in Des Moines, Iowa, or Springfield, Missouri—markets that did have it for several years. But other uses of the subcarrier medium are thriving.

Interestingly, the October 2001 issue of *PopComm* had a response to a Canadian listener who was hearing foreign-language broadcasts on what they call "SCMO" (Subsidiary Communications Multiplex Operation). In the U.S. it's called SCS, but the "authorization" part of the moniker disappeared with radio deregulation. No longer does an FM station have to get advanced "authorization" before starting a program service of music, speech, or data on their subcarrier or subcarriers.

Tuning in by the general public to SCMO is not frowned upon by the government in Canada, while in the U.S. it is considered a point-to-point private service, not to be tuned in by the general public. I have disputed this interpretation, pointing out that more than 250,000 "illegal" FM/SCS radios are in the public's hands, making it fairly generally available.

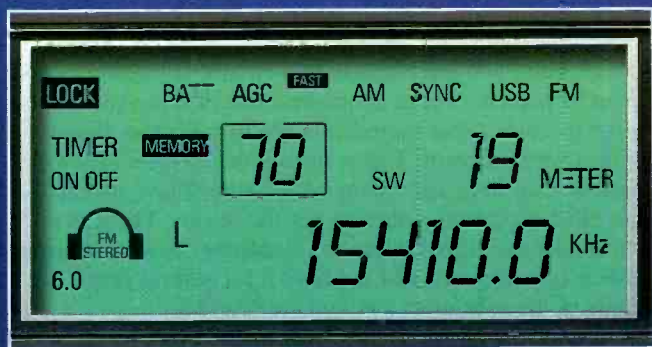
Another point is that federal legislation makes it illegal to market radios expressly designed for FM subcarrier reception (unless you happen to be an "authorized" user). But, apparently, a radio that has a subcarrier added to it is in compliance with the law, so long as the mod is only incidental to the main purpose of the radio. Besides, I know of no "radio police" who will invade your home looking for subcarrier radios. Those who are concerned about the legality are best advised to approach a friendly, local broadcaster and ask them to sign a statement for you, worded something like: "Station W--- has no objection to John Q. Listener tuning in to our subcarrier signals for his noncommercial hobby purposes."

The idea of "authorized user" hearkens to the days of Communist Albania where the authorities determined what the populace could listen to. It is little different in the U.S. where, for example, blind people interested in tuning in radio reading services of newspapers, magazines, and the latest books have to prove that they are "eligible" (by means of a doctor's certificate) to receive and listen to a single-frequency radio they are "assigned" to tune in. Some of the radio reading services for the blind send out

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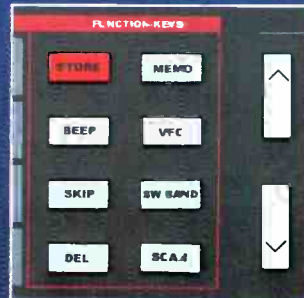
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audio pornography, with the belief that blind citizens should have access to all of the printed word that sighted people have.

(I feel the main reason the blind services are so paranoid about the general public tuning in those emissions is because it would lead to negative publicity; after all, they sometimes send out language that would make even Howard Stern blush. And, on some stations, such broadcasts are not on late at night only, but have been creeping into their late afternoon schedules).

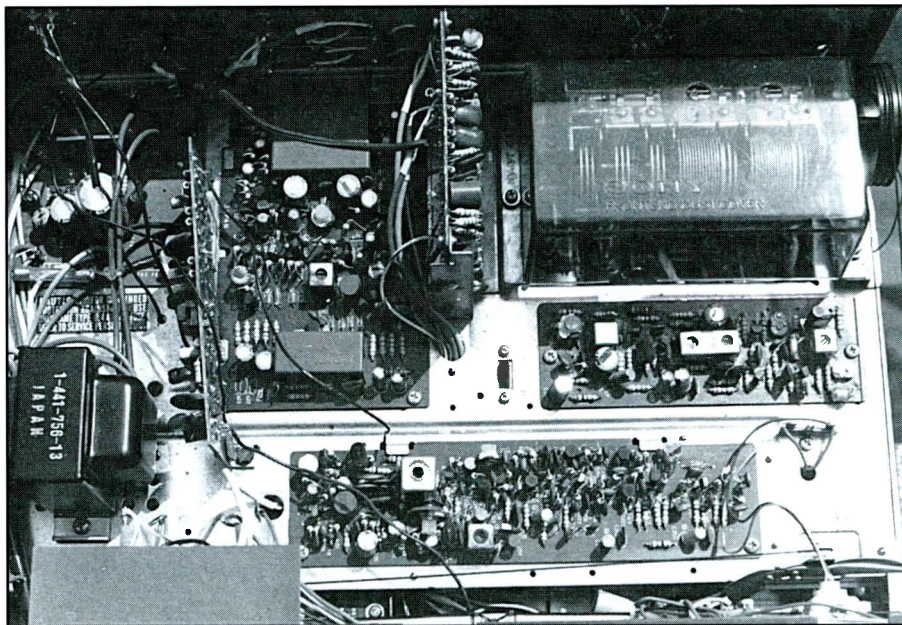
## What Can Be Heard On Subcarriers?

Besides background music and talking books for the blind, there is ethnic and foreign-language programming, mostly in larger markets, where you may hear Farsi, Chinese, Spanish, Korean, Haitian French, and Russian. There is also programming on religion, with the main service being *His Kids Radio*, which originates in Grand Rapids, Michigan. You'll also hear relaying of various program services, including FM/SCS AM stations in areas having poor nighttime AM coverage, campus carrier current stations, NOAA weather radio, and pure network programs, such as the various ABC radio networks. These relays can be utilized to reach nearby affiliates who can put up a simple FM Yagi antenna and use an SCS receiver instead of installing a more costly satellite system.

Other uses of FM/SCS include telemetry for the audio listener, who will hear pleasant chirping sounds and other interesting noises from other forms of data and alphanumeric paging. Hearing data isn't interesting in itself, but it can signal the existence of a certain main carrier station when you are tuning rapidly across the band in FM/SCS mode.

I contend that if the shackles were taken off FM/SCS, more uses of the medium would be found by the nation's broadcasters. If large numbers of people had the radios, I can envision a public radio station sending out stereo music on its main carrier, while on a subcarrier it offered specialized talk programs.

The New York State Assembly, for example, used a subcarrier of WAMC 90.3 in Albany to offer live deliberations to citizens having the special radios and who lived within range of the WAMC signal. Similarly, in small towns across the country, play-by-play sports, town council meetings, and other events could be



*Inside a Sony ST-5130 FM tuner showing large FM/SCS adapter mounted vertically just to the right of the power transformer.*

sent out to folks who have an interest in hearing such fare, although it might not be of sufficient listener interest to involve the main station (FM or AM) facilities. At other times, the main station, the station's network, or a nearby co-owned station's programming could fill the SCS airwaves to assure constancy of signal for either the SCS radio-owning public or for the amusement of the station's engineer or manager.

Right now, only about one-quarter of the nation's FM stations make use of an SCS. I am sure that percentage would rise dramatically if broadcasters were aware of all the ways they could, even today with comparatively few radios in the hands of the public, provide a profit-making or public-service type program on their subcarriers.

## Radio Data Systems

One aspect of subcarriers is RDS (Radio Data Systems), which allows for the transmission of call letters or station slogan on an LCD display to certain car and home radios and also gives an indication of the song being played. Its carriers on the 57-kHz subcarrier signal have been in use in Europe and developed more intensively there than here. Normally, however, the 67-kHz frequency (from the center of the 200-kHz-wide FM station channel) or the newer 92-kHz frequency is used for talk and music. Certain modified radios are able to lock in on either

the 67- or 92-kHz frequency. A tunable adapter allows for hearing all the FM subcarrier baseband, having a control knob (or potentiometer) to enable tuning from 57 through 92 kHz.

A similar service to FM subcarriers is TV-SAP (Secondary Audio Program). By using the SAP feature on your VCR, or tuning in using a modified TV set or modified TV audio radio, you might hear Spanish translations of the news (say, in Los Angeles or Miami), DVS (descriptive video services) for the blind, such as *Nature*, *Nova*, or *Masterpiece Theatre*, sent out by certain PBS affiliates, or a radio reading service, such as sent out by KTVU, Channel 2 in Oakland, California. That service is at 78.67 kHz and tunable on an adapter board having the potentiometer or control and knob system.

TV's "Pro Channel" is a Never-Never Land type service that you, the general public, are not to tune in on. It is at 102.271 kHz on certain TV stations that wish to broadcast to remote crews or to send promotions to nearby radio stations of news stories to be covered. I won't reveal if the tunable subcarrier adapters will tune out to the Pro Channel band!

## Work It

Once you're equipped for subcarrier listening, it's natural to try to DX that band. Realize that FM/SCS signals only have about one-tenth the power and coverage of main channel FM. However, if



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you are receiving a station with full stereo and there is no multipath-type interference, FM subcarrier reception of the same station should be good. Using an antenna such as I described in a previous *Pop Comm* article ("Hook Your Stereo To An Antenna And Try FM DXing," September 1997) or as pictured on the "FM DX Page" on my main Web page (<<http://members.aol.com/fmatlas/home.html>>), you will be in an enviable position to listen to special subcarrier programs by means of skip or tropospheric enhancement. Such reception might be from a neighboring broadcast market, the state next to yours, or from half a continent away!

Accompanying this article is a pictorial showing how I modified a tube-type FM radio from the era when I first started DXing. I try to make the modification as unobtrusive as possible, adding only a small switch and/or control near the edge of the radio or in the back. Often I use authentic cloth-covered wire in making the modifications to harmonize as much as possible with the original construction.

So there you have it. Armed with an FM/SCS radio or adapter you can enjoy a wide variety of special programs Big

Brother and Big Business would rather you not even know about. You can take an SCS radio with you as you travel or modify a car radio for this unusual band. Or you can have SCS playing through your component hi-fi system at home, as well as any number of other smaller radios or scanners that tune in the 88- to 108-MHz FM band. (The easiest radios to modify are larger, hollower models such as the Sangean/C.Crane radio or the

GE SuperRadio. It takes considerable electronics expertise, however, to go into a radio and perform the modification; it's like installing a pacemaker in a human being! Those who lack the experience to do their own radio modifications should consider buying a radio that is already modified. Not only is FM/SCS DX possible, at its best, reception will be as clear, reliable and static-free as your local FM stations.

*Editor's Note: Bruce F. Elving has a Ph.D. in communications from Syracuse University. He was the FM/DX editor of the former Newark News Radio Club in the 1950s, wrote an FM column for DXing Horizons magazine in the 1960s, and was FCC-FM editor of the Worldwide TV-FM DX Association in the '70s and '80s. His FM QSL collection numbers almost 1,700 verifications, with many of the stations writing to say his report of reception is the most distant they have heard from any listener. His latest FM Atlas is the 18th edition, which sells for \$19.99 plus \$2 shipping. It lists main channel FM stations, including their music formats and stereo information, and shows which stations have an FM/SCS subcarrier and what, specifically, each station is using the subcarrier(s) for.*

*Dr. Elving's home page includes more information about subcarriers and available modified radios. He invites readers to visit it at <<http://members.aol.com/fmatlas/home.html>>, or you can write for a printed catalog to P.O. Box 336, Esko, MN 55733-0336. Later, he hopes to do a cassette catalog for the blind.*

### Satellite Radio Looking For A Niche

If you had a scanner that could tune 100 MHz above and below the popular 2400-MHz band, signals would be coming in everywhere from land and sky. Most incoming signals would be digital; there's plenty of spread spectrum, and lots of activity from cordless telephones plus the new 802.11g wireless home networking devices.

But with the right decoder, you might be tuning into stereo music from the SIRIUS satellite channel at 2320 MHz to 2332 MHz, or from XM Satellite Radio at 2332 MHz to 2344 MHz. These two space microwave channel allocations hold up to 100 digital channels each for each satellite radio broadcaster to deliver coast-to-coast music and entertainment to their subscribers with the right equipment, for around \$10 to 13 a month.

XM Satellite Radio (<[www.xmradio.com](http://www.xmradio.com)>) was first on the air with two satellites in geostationary orbits beaming signals back to North America. XM broadcasts to an audience of about 360,000 subscribers, hoping for 1.2 million subscribers by the end of this year.

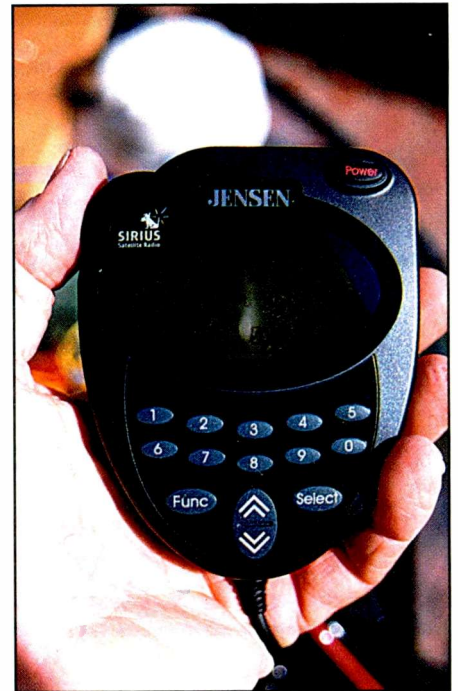
SIRIUS satellite radio ([www.siriusradio.com](http://www.siriusradio.com)) has three satellites in an elliptical orbit above North America, beaming down coast-to-coast signals to just over 20,000 subscribers. XM Satellite Radio charges \$9.99 a month for 100 digital channels (36 commercial-free) and SIRIUS charges \$12.95 a month for 60 music channels with zero commercials, along with 40 world-class channels for sports, news, and entertainment.

#### Weathering The Start-Up Storm

Both XM and SIRIUS have launched multiple national campaigns to attract new subscribers. Industry experts show break-even points at a staggering 3,000,000 subscribers, with both companies posting substantial losses and each company looking for financing plans to keep them firmly in space. Most recently the Federal Communications Commission indicated that "the proposed



*The backlit LCD controller at night. It has four levels of dimming.*



*The Jensen hand controller in the bright hot sun.*

restructuring of SIRIUS' application relating to recapitalization will benefit the public interest," allowing SIRIUS to access the financial resources necessary to maintain and expand its service to the public. Industry experts seem optimistic about both XM and SIRIUS weathering the "start-up storm" with both companies looking to the very bright future of the massive coast-to-coast satellite market, which includes:

- 400 million boats over 22 feet long
- 3 million RVs on the road
- 200 million cars and trucks on the road daily
- 60 million new vehicles introduced every year in the OEM market
- 3 million heavy trucks
- Business office "piped in" music
- Home installations
- Streaming up-to-the minute financial reports

The clarity of XM and SIRIUS radio broadcasts must be heard on a quality audio system to be appreciated. You will be tuning in CD-quality audio, total stereo left and right channels, with absolutely no static. SIRIUS calls it "statistical multiplexing" streaming data, which is just as digitally pure as it was when digitally uploaded to the satellites from their huge studio in New York City in the McGraw-Hill Building.

I toured their facility last January and watched their recording artists, each in their own micro studio, loading up their continuous programming of everything from pop, rock, and country to a brand new menu of rock channel, hip-hop DJs showing off their cutting and scratching skills, rave, folk music, and a new E-Z listening channel for mood music. And for SIRIUS satellite listeners wanting a little spice in their streaming audio, the SIRIUS left channel offers uncompro-





*The Shakespeare antenna gives two inputs—terrestrial for tuners, and satellite direct.*

mised dialogue about political and social issues, and the SIRIUS right channel offers conservative middle-of-the-road talk shows. And if you can't get enough of court television, Court TV will also appear on one of your SIRIUS channels. In all, it maneuvers 60 music streams and 40 talk channels to better represent what listeners might want.

SIRIUS also conducted a first-ever live broadcast of video on their network at the recent Las Vegas Consumer Electronics Convention. "This video technology lets us dynamically allocate bandwidth to where the music needs it, but also gives us the flexibility to use those bits to transmit other data, which could include video, stock quotes, news clips, kid's shows, sporting events, movies, along with many other types of content and applications," commented Joe Clayton, President and CEO of SIRIUS.

XM satellite receivers may total more than 400,000 in just new General Motors cars this year. Industry experts calculate a 70-percent activation rate by those new car dealers who discover a satellite radio receiver onboard. XM is also hoping their new transportable car-to-home portable system, called Delphi SkyFi, selling for under \$200 will help add subscribers.

SIRIUS Satellite Radio is also "in the dash" with Daimler-Chrysler, Ford, and BMW. SIRIUS is also coming onboard new Monaco Coach and Dynamax recreational vehicles, along with big truck manufacturers like Freightliner, Kenilworth, Peterbilt, Mack, and Volvo.

During my visit to the New York SIRIUS studios, Jeff Smith, National Sales

Manager of marine, air, and specialized land vehicles indicated that they are seeking FAA certification. Presently, it is widely available in the marine market.

Both satellite radio providers were quick to form alliances with popular mobile audio system manufacturers, and the SIRIUS list of satellite radio products includes the following receiver audio manufacturers and distributors: Kenwood, Panasonic, Clarion, Audiovox, Jensen, JVC, Eclipse, Sanyo, Circuit City, Best Buy, Sears, Good Guys, Tweeter, Ultimate Electronics, and Crutchfield.

### Lots of Features

Both SIRIUS- and XM-authorized receivers do a lot more than indicate what channel you have dialed in. Absolutely cool-looking displays will show artist name, song title, channel name, and category. They might also show animation, freeze-frame video, stock reports moving from right to left, and anything else that the receiver is capable of displaying and either satellite group may be transmitting within the datastream.

Both companies declined to elaborate on exactly what transmitting format was getting beamed down to the proprietary receivers offered by leading manufacturers. We were told that the 2.4-GHz datastream is circularly polarized from satellite to earth, and the repeater stations that would fill in tunnels and other major underground thoroughfares would be "an alternate polarization" that the receiver would detect for a seamless transfer. When I asked exactly how many tunnels

were filled with repeated 2.4-GHz satellite signals, mum was the word!

I wanted to do some "SIRIUS" testing of their system in my very noisy dune buggy, so I took advantage of an ongoing special of an almost free SIRIUS receiver if I signed up for a year of service. I selected the Jensen SSR2000 receiver because it was a black box that would mount under the dune buggy seat for protection, and a microphone-looking handset would allow me to change channels and see what I was tuned into. The output of the SIRIUS receiver would feed an already-installed stereo unit in the buggy, also hidden out of the way to keep out dust.

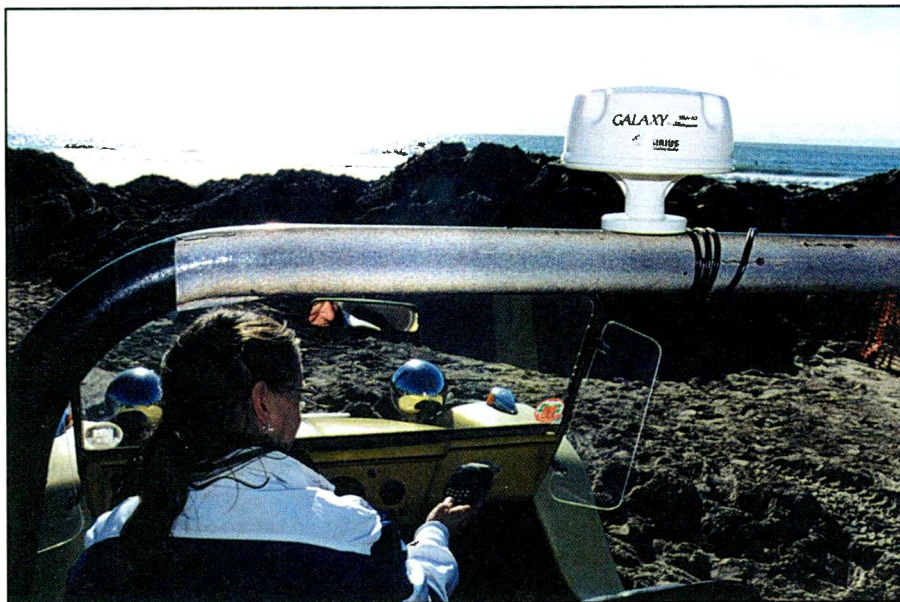
My existing stereo did not have an auxiliary input capability, so I brought in the Jensen KVFM1 FM modulator and plugged it in between my existing stereo and the SIRIUS receiver output. The output was converted to a low-level stereo signal that plugged directly into my existing audio unit in the dune buggy. Seven dip-switch selectable frequencies were available, so I chose 87.9 MHz which was "clear channel" for me. The audio was absolutely outstanding! However, if I had a stereo unit already installed in the vehicle with an auxiliary input capability, I would have the ultimate in reception because I'm not converting data over to radio waves, but rather data to a shielded analog direct cable for left side and right side inputs.

When you register for service, you will need to know your proprietary receiver electronic serial number (ESN). You can often find this on the outside of the box, and always on the inside within the instruction manual. It's also stamped somewhere on the receiver itself and may even scroll across the face of the screen if you do the correct button-pushing.

### Unit-Specific Subscription, And A Couple Of Surprises

Much like satellite broadcasting, your monthly subscription is for a specific unit. However, the specific unit does not necessarily need to be fixed to the vehicle. I could easily pull mine out dune buggy, move it into the house, and then hook it up to my big home audio system, continuing to receive CD-quality radio.

The 2.4-GHz antenna is usually an extra cost item beyond the purchase price of the SIRIUS or XM receiver/decoder. The antenna for a vehicle normally runs

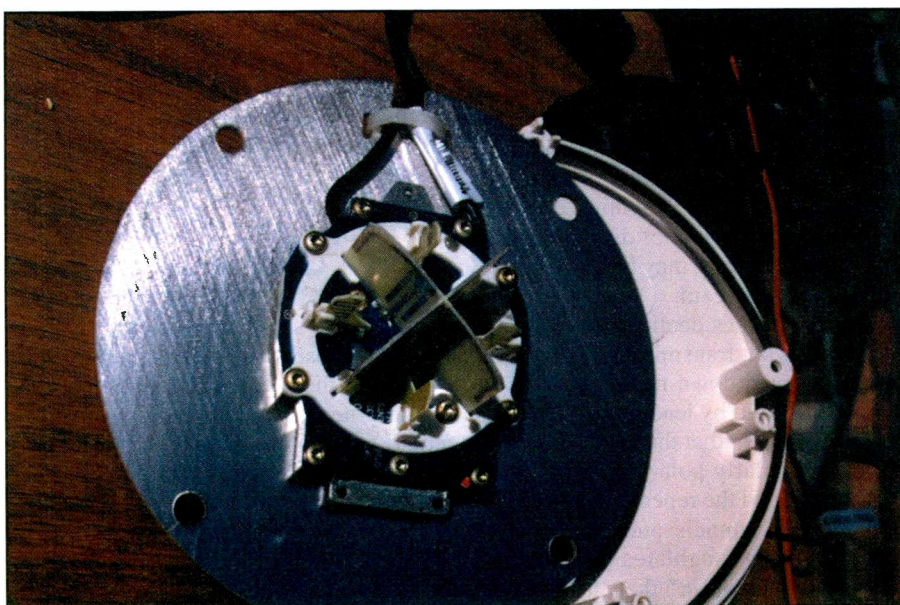


*The 2.4 GHz high gain satellite antenna mounted on the dune buggy roll bar.*

around \$50, but I needed something that would work on the fiberglass shell of the dune buggy, so spent a little more on the Shakespeare Electronics marine and RV SRA-10 SIRIUS Galaxy satellite radio antenna. This antenna is about the size of a grapefruit half, but is quite lightweight at under one pound. It has a small phased-array set of elements on the inside, with an uplook of 20 degrees to 90 degrees.

The built-in pre-amp gets its voltage from the coax cable from the satellite decode box. The connectors are a little strange, but our industry standard direct

connection goes to the twin input ports on each brand of decoder black box. The decoder box from each manufacturer outputs about 400 mV RMS at 10 k ohms audio. Common RCA output left and right channel cables plug into your existing automobile, aircraft, or marine stereo system amplifier. We are beginning to see complete satellite radio systems for new installations in a vehicle without a stereo system onboard. This means you get everything in one box without needing to make the decoder connection to the existing stereo.



*The marine/RV 2.4 GHz from Shakespeare Electronics with cover removed for a close-up view.*

I took the dune buggy on its test drive down at the beach, up in the mountains, and out on the desert. I could not find a spot where I lost satellite reception until I spent a few minutes parked under a bridge, then reception quit until I came back out. But my little receiver is pretty smart and any short interruption of incoming data is magically buffered so signals won't necessarily pop in and out if you pass under an overpass. Another trade secret, I am told.

One thing I was not absolutely clear on at first was how long the wait time was for the satellite receiver to capture and memorize what channels were where at initial turn-on of the system. The book didn't mention the approximately 15 minutes needed for settle-in of the display, so I was beginning to think my receiver had some sort of problem and I called the SIRIUS help line for assistance. I was prepared for the endless routine one expects when calling a help line, but to my surprise a very friendly voice came on the line immediately, asked for my unit's serial number, and then explained exactly what was happening. As a follow up, I was even contacted by e-mail to make sure that the problem was resolved. Excellent SIRIUS help! And I have also heard of equally supportive phone personnel taking care of XM radio customers, too.

The only other surprise was that both companies want you to sign up for at least a year's worth of service. And in reading the fine print, you may need to call them after a year is up and tell them to keep it going or shut it down—but don't shut down too early or you may get hit with an early cancellation policy. Not much different from cell phone service, but it's something you should think about when signing up for however many dollars a month and they want you to go for the entire year.

## Out Of This World

So how do I like it? It's terrific. I encourage all of you to log onto both websites and see which satellite radio system is right for you. Be sure to check out the menu of all the channels offered. And, if you currently have an in-dash stereo unit that sounds outrageous, and especially if it has an auxiliary input set of cables, you'll be all set to take advantage of the many almost-free radio offers to get you signed up for either XM or SIRIUS satellite radio. Wait until you hear the audio! ■

# the Pop'Comm

by Eric Force <eric@dobe.com>

## puzzle corner test your radio knowledge

(RevSp = Reverse Spelling – e.g. "SPELLING" = "GNILLEPS" in puzzle)

### DEDICATED TO OUR FALLEN HEROES and HEROINES OF THE SPACE SHUTTLE COLUMBIA



RICK D. HUSBAND  
Commander



WILLIAM C. MCCOOL  
Pilot



MICHAEL P. ANDERSON  
Payload Commander



DAVID M. BROWN  
Mission Specialist



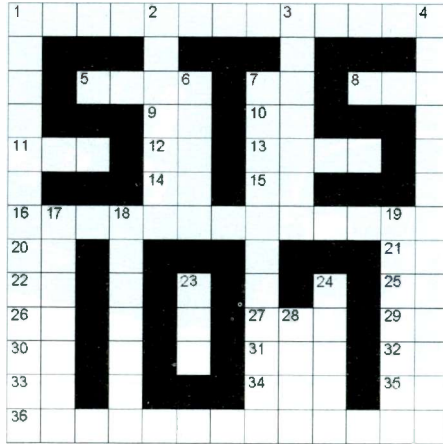
KALPANA CHAWLA  
Mission Specialist



LAUREL CLARK  
Mission Specialist



LAN RAMON  
Mission Specialist



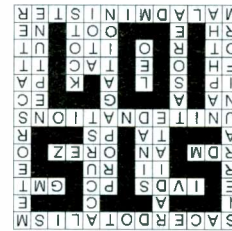
#### ACROSS

- 1 Methods of the priesthood
- 5 Hand-held device system, abvr.
- 7 Military center of operations, abvr. (RevSp)
- 8 Time at Greenwich, England
- 9 CW abvr., I Repeat
- 10 CW abvr., Your; You're (RevSp)
- 11 Research Double Module, abvr.
- 12 Sodium symbol (RevSp)
- 13 Naught (RevSp)
- 14 CW abvr. for @ sign (RevSp)
- 15 Postscript
- 16 Beacon entity
- 4U1UN (2 wds)

- 20 One billionth of an ampere, abvr.
- 21 236 as Hexidecimal
- 22 3.1417 ... (RevSp)
- 25 News agency abvr. (RevSp)
- 26 Frequency range 3 to 30 MHz, abvr. (RevSp)
- 27 Tic Toe's middle name
- 29 CW abvr., That dah-dah-dah, dah
- 31 Airport ID, Hilo, HI
- 32 CW abbr, Thank you (RevSp)
- 33 Time abvr, 60 minutes (RevSp)
- 34 Phonetic "2", NATO/Int'l (RevSp)
- 35 Aprox. 035-056 Degrees, abvr.
- 36 Manage badly
- 4 Ionized trails of meteors (2 wds)
- 6 Signal to noise and distortion ratio, abvr.
- 7 Improves with lower A-Index values
- 17 Volatile petroleum distillate
- 18 Inflight live TV programing company (RevSp)
- 19 Eighth planet from the sun
- 23 Constellation : The lion
- 24 Rifle's shoulder rest (RevSp)
- 28 Convert String to an Integer (prog. function)

#### DOWN

- 1 Callsign, Aeroflot, 2 wds
- 2 To transmit RF energy
- 3 Ill-fated



*".. The crew of the shuttle Columbia did not return safely to Earth; yet we can pray that all are safely home ..."*

President George W. Bush – February 1, 2003



Crew Photos and Patch Image courtesy NASA

#### THIS MONTH IN RADIO HISTORY CYPHER

(Hint: Think "ASCII")

On May 14, 1996 ...

54 48 45 20 56 4F 49 43 45 20 4F 46 20 41 4D 45 52  
 49 43 41 20 50 4F 57 45 52 45 44 20 55 50 20 49 54  
 53 20 4E 45 57 45 53 54 20 52 41 44 49 4F 20 54 52  
 41 4E 53 4D 49 54 54 45 52 20 49 4E 20 4B 55 57 41  
 49 54 20 44 49 52 45 43 54 45 44 20 54 4F 57 41 52  
 44 53 20 49 52 41 4E 20 41 4E 44 20 49 52 41 51 2E

Solution: THE VOICE OF AMERICA POWERED UP ITS NEWEST RADIO TRANSMITTER IN KUWAIT DIRECTED TOWARDS IRAN AND IRAQ.

#### Pop'Comm Trivia...

I am known as the "definitive source for Shuttle mission information". As such, I detail virtually every aspect of Columbia's 16-day mission in space including biographies and photographs of Columbia's heroic crew. What am I?

Ans: The STS-107 Shuttle Press Kit  
 More info at: <http://www.shuttlepresskit.com/STS-107/>

Got a good Trivia question? Send it in and win a FREE Pop'Comm subscription if we publish it. E-mail your trivia question (and answer) to: [trivia@dobe.com](mailto:trivia@dobe.com)

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## What "Midland 1 Listens!" Means To You, And Doing A Mobile Installation The Right Way!

The April column had already been put to bed when I received a very interesting bit of information from the folks at Midland. For many years, Midland has been one of the frontrunners in the manufacture and sale of CB and personal communications radio equipment. Rather than paraphrase the communiqué from Midland, let me quote directly from the text of the message:

"Midland 1 Listens!" Connects CB,  
Two-Way Radio Consumers Across the USA

Everyday CB and two-way radio users throughout the country in cars, SUVs, pick-up trucks, RV vehicles, and even those enjoying the "great outdoors" will be able to reach out and contact someone for help or conversation as the result of a new initiative just announced by Midland Radio Corp., one of the nation's leading marketers of personal communications products.

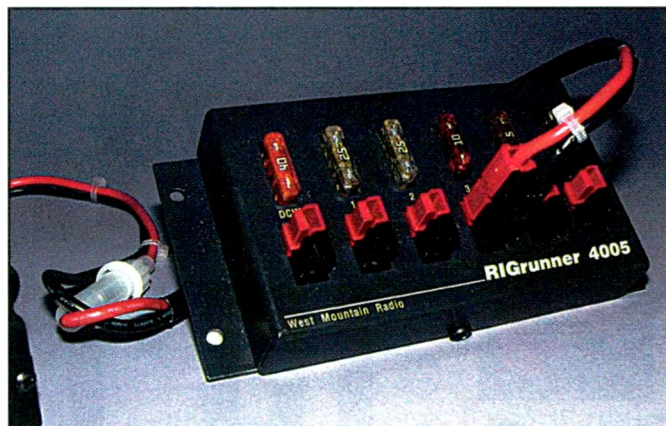
"Midland 1 Listens!" will voluntarily adopt CB Radio Channel 1 as well as Channel 1 on all FRS (Family Radio Service) and GMRS (General Mobile Radio Service) Two-Way Radios effective immediately for all types of "meet 'n' greet" contacts and travel assistance as well as emergency use.

Information will be added to Midland advertising, product packages, in-store dealer displays, and promotional material to inform purchasers about "Midland 1 Listens!" Program details also will be placed on the company's website at <<http://www.midlandradio.com/>>.

Midland Dealers, Others Will Listen

Midland dealers will be enlisted to monitor Channel 1 on CB and Two-Way Radios to assist users and travelers in their local area. The company also will notify law enforcement agencies, travelers' aid organizations, and radio user groups across the country.

A substantial public information campaign will be initiated, and news media will be invited to support the concept. Enthusiast publi-



Here is a close up of the West Mountain Radio RIGrunner model 4005. Note the Anderson PowerPole connectors which are extremely rugged and virtually impossible to reverse polarize once installed correctly. This unit will accommodate up to five pieces of gear.

cations *Popular Communications* and *Monitoring Times* have already informed Midland they will back the effort in upcoming issues of their monthly magazines.

Enhanced Communications Is The Primary Goal

Midland's primary goal is enhanced communications by establishing a centralized channel for consumers who purchase and use these products, according to Tony Lane, Midland's senior vice president.

"This is simply the right thing to do to elevate the usefulness of these very popular consumer communications technologies," Lane stated. "Whether you're looking for a good pancake restaurant while traveling or you're lost or you're lonely on the road, now there will be a new place to tune with 'Midland 1 Listens!'"

"We expect that very quickly our 'Midland 1' effort will become to the four-wheel/two-legged community what the very busy CB Channel 19 is to the long-haul truckers," Lane added. "Obviously you won't need a Midland radio to enjoy using all that Channel 1 will have to offer, and that's just fine with us. Spread the word! Of course, we'll always welcome you as our customer."

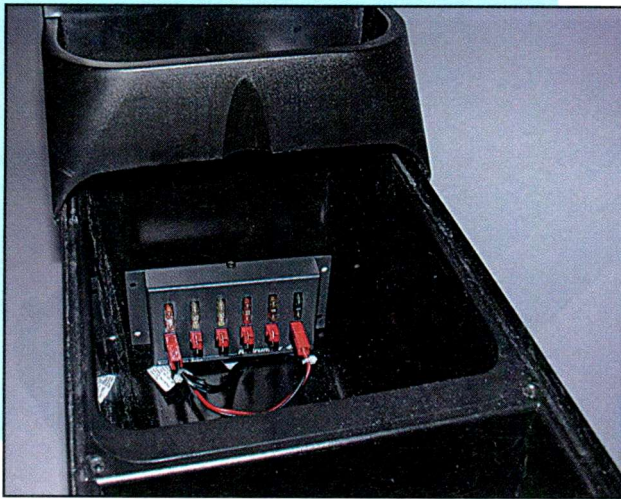
### Hello? Is Anyone Out There?

Okay, so what does all this mean? In a nutshell, someone has finally taken the bull by the horns and decided to publicly identify a specific group of frequencies for us "ordinary folks" to use in order to get information, roadside assistance, report trouble, and make new friends via CB, FRS, and GMRS. This is a step in the right direction. After monitoring Channel 19 for extended periods it would be refreshing to have a frequency to hang out on that was specifically intended for use by non-truckers. Additionally, I also feel that Channel 1 on MURS should be included in the "Midland 1 Listens!" program.

The only non-commercial radio service not directly addressed by Midland's plan is amateur radio. While it can be debated that hams can raise assistance via local repeaters, espe-



This is a shot of the rear end of my portable/mobile HF SSB/CW/DATA station, a Yaesu FT-817/LDG Z-11 autotuner. Both are DC powered and have permanently attached power cords that are terminated in Anderson PowerPoles for attachment to a West Mountain RIGrunner.



*Here is a close up of the West Mountain RIGrunner mounted in the second compartment of the van console. The unit is attached to the back of the compartment with double-sided foam tape. Holes were bored through the plastic bottom using a 3/4 inch wood drill bit. Wiring is passed through these holes to keep the installation looking neat.*

cially ones featuring autopatch capability, this is not always the case. (Autopatch is the ability to interface a telephone line directly to the ham repeater, thereby allowing mobile and portable operators to access the commercial phone system using DTMF tones, just like touch-tone phones.) However, there are areas around the country where autopatch repeater coverage is nonexistent.

Therefore, I would encourage Midland to include not only Channel 1 of MURS but also 146.520 MHz (simplex) in their listing of "Midland 1 Listens!" frequencies. "Five-Two Simplex" has been set aside for years as a calling channel for the 2-meter ham band. When I'm on the road I often have the 2-meter gear sitting on "Five-Two" and hear nothing! I'll announce my callsign and even call "CQ" and no one comes back. "Hello? Is anybody out there?"

If "Five-Two Simplex" is the national calling frequency, how come nobody is calling on it? This frequency is useful only if hams utilize it—otherwise it's just another 2-meter channel. I propose that we hams who are "Road Warriors" start monitoring and using 146.520 MHz on a nation-wide basis in conjunction with "Midland 1 Listens!" This would add another dimension to using the radio hobby to promote safety, security, and provide information to the public.

### **Interoperability— The Name Of The Game**

Interoperability seems to be one of the key buzzwords in today's emergency communications lexicon. As I indicated in the January "Homeland Security" column, after the terrorist's attacks of 9/11/01, it was found that the trunked radio systems used by the fire/police/EMS personnel were inadequate to insure the safety of the emergency responders. In fact, in-depth research using material available from the Association of Public-Safety Communications Officials (APCO) sources ([www.apco911.org/frequency/project\\_39/history.html](http://www.apco911.org/frequency/project_39/history.html)) concludes that interference from cellular telephone systems has been an ongoing problem with 800-MHz trunked public

safety radio systems for several years, and it is now reaching epic proportions.

APCO Project 39 is a must-read for anyone involved in emergency communications. There seems to be an ongoing hot debate between emergency service communications agencies and the cellular industry regarding interference problems caused by the cellular sites to the fire/police/EMS trunked radio systems. Essentially, the emergency services folks want the offending cellular equipment frequencies to be moved far enough away to stop causing the interference. The cellular industry claims that they have billions invested in cellular infrastructure and the public safety folks should move *their* frequencies to accommodate the cell phone industry!

Let me just offer this as an observation: If the cellular industry succeeds in getting the FCC to reallocate the emergency communications trunked radio frequencies, and subsequently requires the public safety trunked radio systems to move to different frequencies, it would make communications history! Not since David Sarnoff ("The General" at RCA) successfully pressured the FCC to move the commercial FM broadcast band allocation from 46 MHz up to its present location in the 88- to 108-MHz portion of the VHF spectrum after the end of WWII has anyone had that much pull with the FCC.

This test of wills between the cell industry and public safety communicators will be interesting to watch. Don't think it can't happen. The cellular industry has several key members of Congress in its pocket. Remembering back to the Electronic Communications Privacy Act of 1986, the cellular folks pulled the wool over everyone's eyes and managed, through very effective high-pressure lobbying, to get Congress to pass a Draconian piece of anti-scanner legislation that forever altered the way private citizens use their radio equipment. Unfortunately, if the cell dudes get their way, a lot of small municipalities and mid-size cities will be left with useless multi-million dollar trunked radio systems and virtually no communications!

While it will cost a huge chunk of change to move either of these services to another part of the spectrum, the cellular industry certainly has the bigger checkbook and can more easily absorb the costs of moving their equipment to different frequencies. With the events of 9-11-01 still fresh in our minds, it should be obvious that we need to put turf guarding and capitalism aside in favor of insuring that our emergency services personnel can do their jobs without hindrance or communications interference of from other non-critical services or having to declare bankruptcy!

For additional information on APCO check out their main webpage at [www.apcointl.org/](http://www.apcointl.org/). I think you'll find the trip very worthwhile.

### **A Quest For The "Ultimate" Mobile Installation**

Looking back over the last several years, there has been a tremendous upsurge in radio hobbyists and scanner enthusiasts taking their hobby (and equipment) on the road. Today mobile radio systems are very much in the forefront of the radio hobby. Whether you are contemplating a simple installation, like a 2-meter FM, CB set, scanner, or GMRS transceiver, or you're planning to hit the highway with a "DC-to-Daylight" shack crammed into your vehicle, you need some basic information regarding how to plan and implement your mobile installation. For the remainder of this column, and continuing over the next several

installments, we'll take a detailed look at what goes into assembling a top-notch mobile radio system.

## This Is NOT Your Father's Oldsmobile

The simple fact is that today's vehicles have an entirely different embedded electronics technology than vehicles of the past. With the average vehicle currently having between 15 and 30 computers and electronic (computer-controlled) modules, the days of the "shade tree mechanic" are over. So are the days of the mobile radio operator who, armed with a handful of resistor spark plugs, capacitors, and shielded plug wires, plans on ridding his vehicle of offending Electro Magnetic and Radio Frequency I interference (EMI/RFI). In researching this column, I uncovered a wealth of vital information regarding vehicular EMI/RFI.

My research led me to my long-time friend, fellow QRPer, electronics technician extraordinaire, and all-around good dude, Ed Hare, W1RFI (dig the callsign!). Ed is the "Head Lab Rat" at the ARRL Lab and he is an outstanding source of information regarding EMI/RFI. At his insistence, I logged onto the ARRL website ([www.arrl.org/tis](http://www.arrl.org/tis)) and looked over the RFI information on the Technical Services portion of the site. If you are serious about doing a *quality* mobile radio installation, I strongly suggest you do the same. I would also recommend that you obtain the ARRL publication *The ARRL RFI Book* (product #6834, \$20 plus s/h from the ARRL Bookstore at [www.arrl.org/shop](http://www.arrl.org/shop)). Both are outstanding sources of practical information about EMI/RFI suppression.

## Finding "Clean" Power

Before you start assembling the radio equipment, before you mount any antennas, before you start routing coaxial cable, you *must* acquire power for your mobile gear. *Clean* DC power for the mobile radio equipment can be hard to find.

The SUV craze of the last 10 years has spawned several automotive innovations that have carried over into mini-vans, pickup trucks, and passenger cars. I'm referring primarily to the abundance of 12-VDC "power ports" that are sprinkled around inside these newer vehicles. Basically these are nothing more than a cigarette lighter socket (or two, or three, or more) wired into the main 12-volt power buss of the vehicle. While, on the surface, this seems like a wonderfully innovative way to provide access to DC power, in reality it is the worst possible scenario for radio equipment.

Here's why. Vehicles over the last 20 years have become more and more dependent upon computers and electronic modules to handle the on-board electrical systems. There are computers and modules that run the electronic ignition and the fuel injection system, as well as handle the air/fuel mixture and the timing of the engine. Computers tell the automatic transmission when to shift up and down, and they control everything from the windshield wipers and anti-lock braking systems to the GPS/OnStar locator/communications systems.

What may sound like ignition noise to the untrained ear is more likely fuel injection noise, which varies in intensity as the throttle is depressed. Many newer vehicles no longer use high-voltage wiring to the spark plugs. Instead they use low-voltage wiring that terminates in a special module on the end of each spark plug. These modules develop the necessary high voltage to fire the plugs. In reality, you cannot get away from these com-



*This photo shows a very nice addition to my Pontiac Montana van. The console was procured at Wal-Mart for about \$20. It is just the right size to fit between the two front seats in the van. Currently it holds a Radio Shack CB set with speaker (forefront) and a West Mountain Radio model 4005 RIGrunner. Plans call for the addition of a mobile scanner in one of the compartments and a Yaesu FT-817 HF SSB/CW/DATA radio in the other compartment. The RIGrunner will power all three pieces of gear and more.*

puters/modules and the noise, hash, and trash they generate.

Along comes Mr. Radio Operator with a transceiver that is sooooo sensitive that it can hear grass grow three states away, and he wants to put this rig into a vehicle with an abnormally high noise floor. Talk about a challenge! Can it be done successfully? Sure, but there will be some tradeoffs in the process.

## 12-VDC Noise

DC wiring inside a vehicle is bundled together and routed to the various areas of the automobile right along with signaling lines, motor controls, sensors, etc. This bundle of wires is commonly called the *wiring harness*. With all these wires in very close proximity, any noise generated by on-board computer systems, wiper/electric window/power door lock motors and solenoids, gas gauge, fuel pump, fuel injectors, ignition control circuitry, and engine sensors can easily be coupled to other sections of the wiring harness by the phenomenon known as *mutual inductance*. It can be a nightmare!

How do you get away from this noisy garbage? The short answer is, "You don't." But that's not what you want to hear. By locating your 12-VDC power buss coupling points directly on the battery's positive and negative terminals and routing the main DC power wiring for your gear away from ignition and fuel injection wiring, you can make great strides in cleaning up the DC power to the radio equipment. Adding a heavy duty in-line hash filter (check with your local RadioShack store) in the positive 12-volt line will further minimize noise pickup from the engine compartment. There are also clip-on EMI/RFI suppressors (ferrite cores) that function as RF chokes, which can be added to power leads, speaker wiring, and control cables to help reduce and/or eliminate the interference and noise.

It should be noted here that some automobile manufacturers have an installation procedure that must be followed so as not to void the vehicle warranty. While the universally accepted method

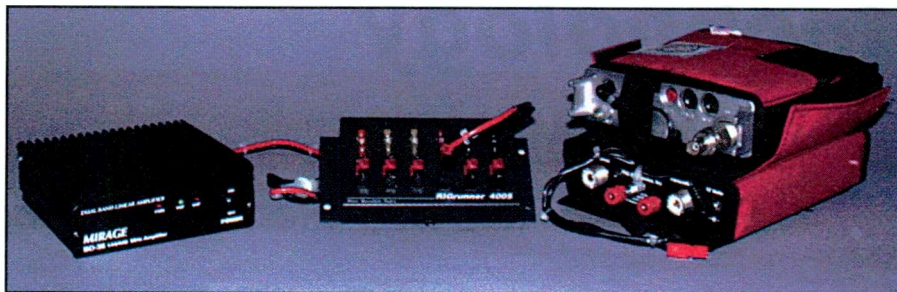
of hooking up the DC power cabling for the radio equipment is to hook the wiring directly to its respective leads on the vehicle battery (with a fuse in each lead), sometimes the manufacturer does not want you to do that. *In all cases, PLEASE check with your vehicle's dealership and/or manufacturer to find out if there are any caveats or special installation instructions regarding the radio installation and running the DC power cabling. Neither myself or CQ Communications, Inc. will be held responsible or liable for improper installation of radio equipment in your vehicle.*

## How Do We Get There From Here?

About 99 percent of the time the battery is located in the engine compartment and your radio gear is located inside the driving compartment (cab) of the vehicle. How do you get from point A to point B with the DC wiring? Simple: All along the firewall that separates the engine compartment from the cab there are rubber or plastic grommets used to plug holes that wiring and hoses pass through. Locate one of these grommets (preferably one that does not have anything passing through it) and pass your DC power wire through the grommet by *carefully* making a small slit with a hobby or utility knife in the rubber/plastic that covers the firewall hole. Add some silicone sealant to the slit area to insure that the newly made access hole is sealed against the elements. Sometimes you will not have a vacant (spare) grommet, so you will have to run the DC power wiring adjacent to the wiring bundle that is passing through the grommet. Be careful not to cut or slice into this bundle should you be required to enlarge or make a separate entry hole. Take your time and do it right.

Speaking of DC buss wiring, be sure to select large diameter stranded copper wire to reduce the DC voltage drop between the battery and the power distribution panel. Many wire/coaxial cable suppliers offer red/black "zip cord" in a variety of wire gauges. A normal 100-watt HF SSB/CW transceiver installation will require a *minimum* of #12 AWG wire; however, #10 AWG would be better.

Both the positive and negative DC power buss leads that connect to the battery need to have in-line fuses of the proper rating installed. This provides the maximum protection for the radio equipment and the vehicle, should either lead become abraded and ground out against



*Shown here is part of my emergency communications "jump kit". The RIGrunner power distribution panel is in the center. On the left is the Mirage BD-35 V/UHF amplifier. On the right is the Yaesu FT-817 HF rig. These pieces of gear, along with a lot more stuff, goes into a soft-sided cooler for easy transport.*

the vehicle frame or other sub-assemblies inside the engine compartment. If your HF rig will draw 20 amps on full power with the key down, then a 25-amp fast blow fuse in each power lead would be adequate. Don't forget to figure in any additional power requirements needed for other radio gear like the VHF/UHF transceiver, GPS unit, scanner, etc.

Okay, so now we have the #10 or #12 AWG, red/black zip-cord (with both leads fused) installed at the battery (*or alternatively using an approved method furnished by your vehicle's manufacturer*), and the wire has been run into the cab of the vehicle via a handy grommet in the firewall. Now what? Well, in order to use this power you're going to have to provide some way to distribute the voltage to the variety of gear you are installing.

By far the easiest, safest, and most esthetically pleasing method of power distribution is through the use of West Mountain Radio's RIGrunners DC power distribution panels. They offer individually fused voltage output ports with LED open fuse indicators for five, eight, or up to 12 pieces of gear. The 4012 and 4008 models also feature under/over voltage alerting (both visual via LEDs and audibly). There are no messy binding posts, wire nuts, frayed wires, or icky black electrical taped connections to worry about.

In both of my mobile installations I use the 4005 (five-port) RIGrunner. Each of the output ports can be fused with whatever amperage fuse you desire to accommodate your gear. The DC buss wiring from the battery to the input of the RIGrunner is also fused at 40 amps. The RIGrunners are well designed and very robust. By mounting the RIGrunner at a central location inside the cab, the power cord from each piece of comm gear can be routed to the RIGrunner and connected via Anderson PowerPole connectors.

The Amateur Radio Emergency Service (ARES) and the Radio Amateur

Civil Emergency Service (RACES) programs along with many EMS/EMA/SAR units across the country have standardized on the Anderson PowerPole connectors for DC power distribution. Using these polarized power connectors, when they are properly installed on the power cord, it is impossible to reverse polarize a piece of gear. Visit <www.westmountainradio.com> and check out the RIGrunners for yourself.

That is a wrap for this month. Next month we'll continue our quest for clean DC power for our mobile equipment and then discuss of where to mount the radio gear. Until next time, train hard and remember: preparedness is *not* an option.

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### K40 Electronics K40 CB Antenna And Magnamount Assembly

**W**e've been reading a lot lately about how CB—despite its inherent flaws (many not the fault of the *service* itself, but rather the cross-section of society using the microphone)—has seen decades of use for mere hobby chat and emergency use. Fact is CB comes through loud and clear. And, for many Americans, the fact that it's an unlicensed, uncomplicated radio service makes it ideal. I know it is for me.

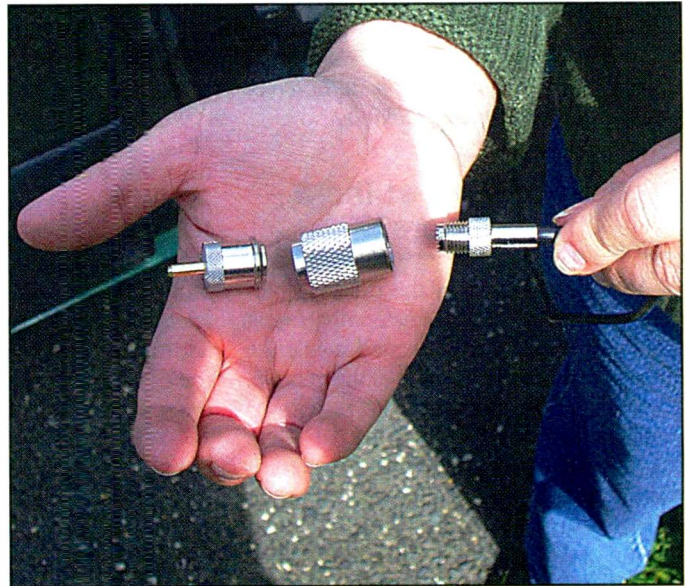
But for you to be heard by the other operator a good antenna is a must! And if you're serious about your mobile CB operation, K40's extensive variety of antennas deserves consideration. I had a chance to try out the K40 Electronics K40 Antenna and their M40 Magnamount over a three-month period on various vehicles and under extreme road conditions. The K40 is the one that started it all many years ago, making it *the* standard of comparison, if you will. It comes complete with a stainless steel whip and can be mounted to your vehicle in a variety of ways: trunk-lip, through-the-roof, or (with the optional M40 Magnamount) virtually anywhere on your vehicle.

#### Quality Throughout

K40 has provided long service to the radio community from their headquarters in Elgin, Illinois, providing quality American-made products for 26 years. According to K40, in many radio installations, the antenna is, "...the most overlooked and misunderstood piece to the performance puzzle," and they tell folks they "...need not look any further than K40..." Judging by the signal reports, ease of assembly and tuning of the K40 antenna I've been using, this just might be true.

The K40 comes packaged on standard cardboard with plenty of crystal-clear instructions. You also get a small allen wrench to tune the antenna for a near-perfect match. I say "near-perfect" because you'll never get a *perfect* match on all 40 CB channels. It's going to be a little higher at band extremes, but most operators will tune the antenna to operate at mid-band. For example, accepting a *reasonable* SWR (standing wave ratio) on Channel 19, say, and a less-than-perfect SWR on Channel 1 or 40 is the way the world works. The beauty of the K40 is that it drops a full couple of inches into the mount. You then pull it up about 1/4 inch and you're set for CB operation! Operation on all 40 CB channels and on the 10-meter amateur band is possible with minor adjustments of the whip! I've

*Use the supplied large allen wrench to tighten the K40 to the Magnamount. If you change vehicles, you can always disassemble this part and use the provided small allen wrench to mount the K40 to your trunk.*



*The K40's quality coax connector requires no soldering, just a simple 1-2-3 screw assembly and you're on the road.*

used other whip/mag-mount assemblies that require separate whips or lots of cutting for each band. No so with the K40. This fact alone gives the K40 an A+ in my book!

The K40 comes complete with 17 feet of quality coax, terminated with a PL-259 connector (not some *wimpy* PL-259, but a good, beefy connector!), and takes about five minutes to assemble. Figure another couple of minutes to slide the coil unit into the Magnamount, adjust the angle of the antenna to fit your vehicle's needs, and you're in business. I'd recommend installing the antenna in the center of the roof, first cleaning and







Here's the K40 ready to be connected to the Magnamount. The entire simple process took about five minutes.



The completed K40 and Magnamount ready to hit the road. I like to call this a K40 antenna "system" because it's so versatile: mag-mount, trunk-lip mount, or if you're brave, drill-a-hole-through-the-roof mount!

completely drying the vehicle's surface for best performance.

I use a Cobra 148 and Ranger 2970 for CB and 10 meters, respectively, with an SWR on Channel 19 of 1.5:1. When it's time to use 10 meters, you simply adjust the stainless steel whip for the best SWR; no fooling around with cutting the whip only to discover you've cut too much off the end! My SWR on 28.500 MHz? The needle barely moved! Of course moving some distance up or down the band will change your SWR, but you can always re-tune the antenna in the same manner.

I've found that by using CB on the road you've got an edge over the folks who don't. You're informed about accidents, weather, radar traps, and even good places to eat. Sometimes listening is better than talking, but when you want to talk, the

K40 shines. I have no problem being heard up and down the interstates with the K40 attached to the Magnamount.

After a few hundred miles (you'll get best results not using a mag-mount antenna as a permanent mobile installation) at New Jersey, Pennsylvania, and Ohio highway speeds (enough said!), through all kinds of weather and temperature extremes, the K40 performed flawlessly. I just can't say that about other antennas I've used. On some antennas water sometimes gets into the coil assembly, seri-

ously degrading performance. The resultant loss is very insidious; one day you're talking around the world, the next week you can't talk around town! After a particularly rainy trip I removed the antenna and disassembled the mag-mount assembly. It was dry and clean.

The company also makes a tunable Power Whip and K40 Trucker center-loaded antennas. The K40 Trucker has a solid, 8-gauge, 100-percent silver-plated coil with a large surface area for lower resistance and less RF signal loss. It features 1.6 MHz bandwidth and weather band reception. All K40 antenna products carry a five-year materials and workmanship warranty. Suggested retail price for the whips run from \$21.95 to \$30.00; the K40 Trucker's suggested retail price is \$69.95.

With the K40 antenna (suggested retail \$64.95) and the M40 Magnamount (suggested retail \$31.95) your search for a quality mobile CB antenna is now officially over. Quick, easy assembly and tuning makes it a pleasure to use. For more information contact K40 Electronics at 800-323-6768 or visit them on the Web at <www.k40.com>. Be sure to tell them you read about the K40 and Magnamount in *Popular Communications*. ■

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# discoveries connecting as a radio amateur

## Portable Operation

Although I can't exactly tell that summer is around the corner as I write this month's column during a Minnesota snow shower, I know from the cover date on this issue that summer is already here for you! And, if you don't live in a part of the world that experiences winter—and I'm not talking about a little rain or "chilly" 60-degree temperatures—you probably don't know what it's like to experience the coming of spring. In the more northerly latitudes, anyway, spring means getting outside to do your thing. In our case, that thing is ham radio!

Spring and summer aside, next month means Field Day—thousands of ops working an emergency preparedness contest from a variety of locations away from home. Field Day doesn't have to be an outdoor activity, but for most ops it is. For a look at this year's Field Day rules, point your browser to <[www.arrl.org/contests/announcements/fd/](http://www.arrl.org/contests/announcements/fd/)>, and if you're thinking about participating, keep the weekend of June 28–29 set aside for some radio fun.

Whether you're working Field Day or just having fun, thanks to today's ever-shrinking radios, you can take your ham

radio hobby just about anywhere. Picnics, camping trips, road trips, a weekend at grandma's, a weekend in the Caribbean, whatever—ham radio can go anywhere. And don't forget boat rides, hiking excursions, and that summer you've always wanted to spend at the lake cabin. Here are a few steps to take in the direction of summer fun.

### First Things First

Choosing a place to operate depends on where you are and what you're doing. Try to remember that the basics of amateur radio still apply here. The thing that's different is your location. Instead of being in your home shack you're out in the boonies somewhere.

Hilltops are pretty good for just about any radio activity, especially VHF/UHF. HF operators will want at least a few tall trees for stringing antennas, while VHF/UHF ops may have better luck if there are only a few trees (or even none) to absorb precious higher-frequency signals.

Remember to show the proper respect for the land (and the landowners) when you set up a portable station or campsite on property that's not your own. Don't break branches when stringing antennas, take down any antennas you put up, and don't leave *any* garbage or debris behind when you leave. Try to get permission ahead of time, if possible.

### Honey, I Shrunk the Radio!

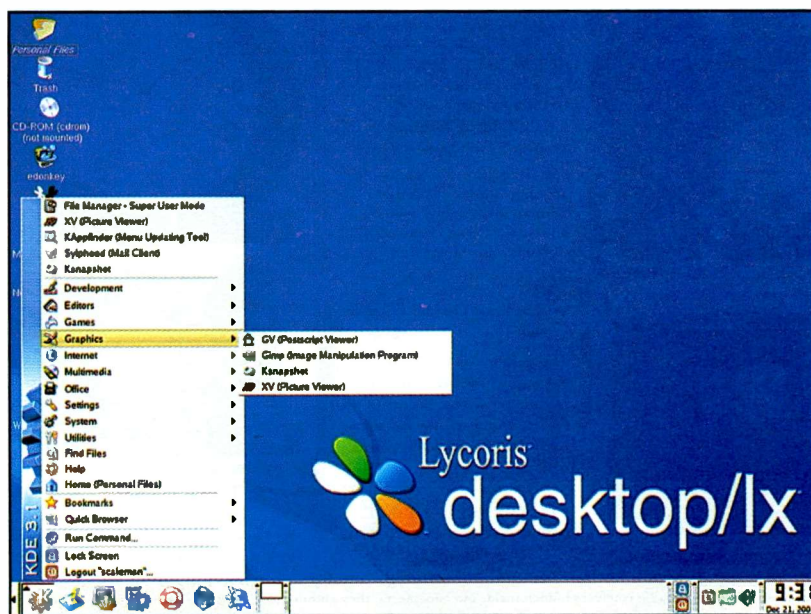
Just about any rig will work from the field as long as you can supply the required power, but most hams operating portable do so with compact commercial mobile rigs, commercial or kit QRP transceivers, or QRP gear they've built themselves. Because most portable operation is done without access to the AC power mains, most ops choose gear that runs on 12 VDC. Unless you're hiking or biking, you probably have a source of 12-VDC power nearby (car alternators, automotive or marine batteries, and so on).

When relying on battery power, transceiver characteristics that can be ignored at home can be quite important in the

### Linux For Microsoft Windows Refugees

Hams have lots of stuff in their shacks, and among the radios and antenna tuners are plenty of PCs. Now, most PCs run some form of Microsoft Windows, and that's why I'm so excited to report on a Linux distribution that's aimed squarely at Windows users (and former Windows users). If you're tired of playing the Windows licensing game with Bill Gates and his minions, consider that there is now a super-friendly version of Linux—Lycoris Desktop LX—that looks and feels like Windows, but ISN'T Windows!

I'm not a Linux Geek, but I've been testing various Linux distributions, and Lycoris wins hands down when it comes to ease of installation and ease of use. I put Desktop LX on my kids' PC and they hardly noticed! Plus, thanks to WINE (a Windows "emulator" for Linux), many Windows software packages, including those written for ham radio, run in Linux without modification. We're almost ready for Linux on the ham radio desktop! Get your next FREE operating system at <[www.lycoris.org](http://www.lycoris.org)>.



field. One of the most important is power consumption. If you're operating from a battery that can't be recharged until you get home (common), your rig's power draw will determine your operating time. Reducing your transmitter power can make a big difference when you're *transmitting*, but will do nothing to save power while you're receiving, which accounts for the bulk of your operating time.

To address this situation, some manufacturers have produced rigs designed for minimal current consumption while receiving. For example, most Wilderness Radio portable QRP rigs consume very little power in receive mode, and Yaesu's FT-81—a low-power multimode, multiband HF/VHF/UHF transceiver designed from the ground up for field operations—offers true DC-to-daylight coverage. When it comes to the ultimate in HF performance in a field-friendly package, however, Elecraft's K2 kit transceiver takes on all comers. Check out these tiny wonder radios at <[www.yaesu.com/amateur/ft817.html](http://www.yaesu.com/amateur/ft817.html)> and <[www.elecraft.com](http://www.elecraft.com)>.

## Skywires

Antennas for field use should be lightweight and unobtrusive. You don't want to mar your (or anyone else's) scenic vistas with a rat's nest of wires, feed lines, or aluminum tubing. I've used two types of portable antennas over the years. One is a 40-meter dipole fed with 300-ohm TV twinlead. The elements are made from 20-gauge magnet wire, the center and end insulators are made from small, thin Plexiglas scraps, and the center and ends are held up with 30-pound-test monofilament fishing line. With a small tuner (with a built-in balun and an SWR meter) I can work all the bands from 40 meters and up.

My second portable antenna is even easier to set up and use. I simply toss a 66-foot wire into (or over) a tree and connect the near side right to the business end of my antenna tuner. I then roll out one or two 66-foot counterpoise wires and connect it (them) to my tuner's grounding post. This lazy vertical or inverted-L (depending on tree height, placement, and density) *starts at the tuner*, which eliminates any loss from feed line runs, etc. I can tune this antenna on all bands from 80 meters and up using a conventional tuner.

While using the vertical wire I haven't had any problems with "RF in the shack" at QRP levels, but it's occasionally troublesome at 50 W or so (not to mention potential RF exposure issues at power levels above 50 W). To make this antenna even easier to use, I place an SGC autocoil at the base of the wire vertical and run a short coaxial feed line to my operating position. This is especially handy while operating from a mini camper.

Feel free to make a "portable" version of your favorite antenna. Remember to keep things simple, compact, and lightweight. Portable antennas don't have to last forever, and they don't have to survive hurricanes and winter storms, so don't be afraid to sacrifice ultimate survivability to achieve something that doesn't hog all the space in your backpack!

## Feed Lines

TV twinlead has always been a favorite for portable use. It has very low SWR losses, is lightweight, can be rolled into a small, flat package, and doesn't require special connectors. You'll need to use it with a tuner/balun, but you'll probably have that on hand anyway for multiband operation.

If you have the room and can stand the weight, conventional

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coax works as well in the field as it does at home. If you're thinking of using a mini coax, such as the teeny RG-174, confine your efforts to 80 and 40 meters and keep the coax run as short as possible. Mini cables are just too lossy at higher frequencies or with long cable runs.

### Portable Safety

Before you put up any antenna—especially in unfamiliar areas—always double-check for hidden power lines, telephone lines, or other dangerous situations. If you see an overhead wire, always assume that it's hot. And be sure to follow the other common sense rules when setting up in the field. Don't place antennas where other people can come into contact with them. Route power cables and antenna leads so people can't trip over them. And keep your gear and any cables out of the water or away from wet areas.

### Handy Stuff

The best possible preparation for a portable operation is to assemble the exact station you'll be using and put it on the air in your backyard before you leave

town. Use the same antenna, the same battery, the same tuner, etc. That way you'll know if you have everything you need when it's time to leave. When the station setup seems perfect, carefully make a checklist of your station's components and look it over while you pack items prior to departure.

A few additions to your barebones equipment list will accommodate an emergency or an unforeseen situation. As space and weight allow, consider bringing along a miniature logbook or notebook, a tiny digital multimeter, a pocketknife or multifunction Leatherman-style tool, electrical tape, extra wire, clipleads, a compact set of screwdrivers, a small wire cutter/stripper, a pair of Walkman-style headphones with an appropriate adapter—whatever you might need.

### Portable Power

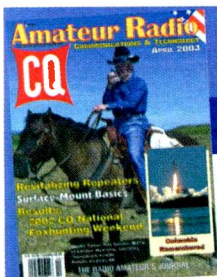
Providing power to portable stations is the bane of many radio adventurers. As we mentioned, if you're traveling by car or boat, you probably have a handy source of 12-VDC power along for the ride. But if you're hiking, biking, or canoeing, for example, you'll have to carry batteries, a small generator, or a bulky solar panel—none of which are appealing. When it comes to providing power there are no free lunches.

Basically, you have to scale your power requirements to match your available energy. For backpackers, hikers, and those "traveling light," a mini QRP rig designed for minimal (or micro) power consumption is a practical upper limit. Go beyond that and you'll exhaust your flashlight-size batteries in a jiffy. If you can manage to carry a larger NiCd pack or a gel cell, a less exotic low-power rig will work just fine. And if you can handle a medium- to full-size deep cycle marine battery (recharged by a vehicle alternator, a compact gasoline-powered generator, or a solar panel) the sky's the limit. That is, you can easily power your regular 100-W base station rig in the field.

### Enjoy!

See you next month, and see you at Field Day 2003. I'm trying to use the outing as an excuse to plan a fishing/camping/radio fun trip. Send your QSL cards, questions, and letters to "Ham Discoveries," 25 Newbridge Road., Hicksville, NY 11801. ■

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## Space Aliens On Your Radio?

**P**irates, pirates, pirates! There's another healthy crop of reports this time, so let's get it on!

**Undercover Radio, 6950** at 0002 and 0120 with music, ID, and a program with L. Anderson. (Lee Silvi, OH) 2330 with ID and QSL address for electronic reports (<undercoverradio@mail.com>) and Billy Idol song. (Richard D'Angelo, PA) **6950.1** at 2345 with Indian-like music and reading by William S. Burroughs. (William T. Hassig, IL) 6950 at 2218. (Finn, PA) 0010 with mainly instrumentals, most of it in new age style, anncr. William S. Burroughs with periodic IDs and e-mail address for reports. I got a reply the next day from a Dr. Bernway saying a QSL would be forthcoming. (George Zeller, OH)

**Reflections Europe, 6295** at 2310 with "The Calvary Hour" running to ID and close at 2335. (Angelo, PA)

**Mystery Science Radio, 6950** at 0008 with broadcasts from Yellow Submarine and Elkhorn, Nebraska, address for reports. (D'Angelo, PA)

**Voice of the Abnormal, 6950** at 0018 sign on, after Mystery Radio went off. Also using the Elkhorn, Nebraska, address. Also at 0032 with "Free Mexican Air Force is flying tonight" and others from program host Guy Paganie. (D'Angelo, PA) **6925 USB** at 0625 with a song called "Beer Is Good for You" and other songs about beer or other alcohol. Possible relay by KIPM? (Hassig, IL)

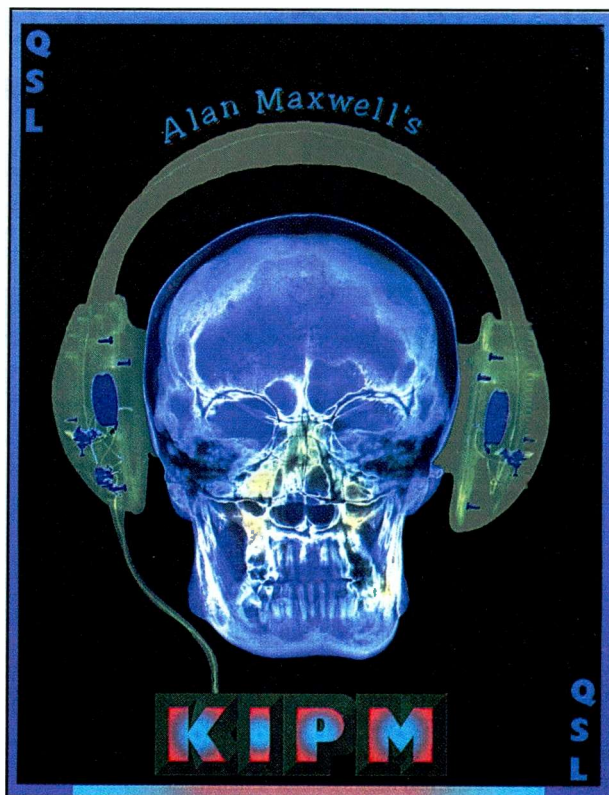
**KIPM, 6950** at 0120 sign on with *Outer Limits* theme and closed at 0156 with Alan Maxwell giving ID and Elkhorn address. Another program followed at 0158. (D'Angelo, PA) Many logs on **6925** and 6950 during the 0000, 0100, 0200, 90400, 0600, and 0700 time periods with such shows as "Twin Poles of Reality," "Space Aliens," and "He Who Shrank." During the last monitored broadcast Alan Maxwell said it was the last show due to a lack of response. (Hassig, IL) (*That's too bad...his shows were very creative and very well done.—Teach*) **6950** at 0120. (Finn, PA) 0204 with another complex psychological drama about the "Illuminati" entitled "The Trinity" and talk about the nice QSLs they offer for reports. (Zeller, OH)

**WMPR, 6955** heard at 2310 and 0438 with techno-pop and dance stuff. (Hassig, IL) Heard at 1915, 2110 2357. (Finn, PA) 2350 and later "Micropower Radio" IDs. No address, as usual. (Zeller, OH)

**WFMQ, 6925** heard at 0027 with pops, quick fade at 0045. (Hassig, IL)

**Captain Morgan, tentative, on 6950** at 2320 with Southern rock. Also at 0230 with "All You Need Is Love." (Hassig, IL) 0132 with rock/pop vocals, much of it by Paul Simon. No address heard. (Zeller, OH) 0224 with some Hendrix music, *Twilight Zone* theme and *Saturday Night Live* skit. (Finn, PA)

**WHYP, 6952.6** at 0319 with Nirvana song and various obscure rock tunes. Audio was distorted. Again on **6925** with pop music, commercials for free trips, and Mr. Rogers with "Won't You Be My Neighbor." (Hassig, IL) Various days at 0005, 1810, 2355. (Finn, PA)



**WAIR (All Inside Radio), 6950 USB** heard at 0645 with host Robert J. Yardbrown. Another possible KIPM relay. (Hassig, IL)

**Radio Time Machine or Radio Atlantis, 6950 USB** at 0726 also possible relay by KIPM. (Hassig, IL)

**Ragnor Radio, 6925** at 0104 with country/western music, gun commercials. Tinny audio as though fed through a phone line. (Hassig, IL)

**Radio Azteca, 6952.6** at 0225 with host Bram Stoker and 10th anniversary program featuring new wave music. Belfast, New York, address. (Hassig, IL)

**Radio Free Speech, 6950.6** at 01051. Program ending with D.J.'s Bill of Rights. (Hassig, IL) 6950 at 1500, 2240, 0120. (Finn, PA)

**Radio Bingo, 6952.6** heard at 0230 with a song about a train wreck, country/western music, promo for a Lions Club picnic, Mr. Rogers, song, "Smoke, Smoke, Smoke that Cigarette." (Hassig, IL)

**The Crooked Man, 6950** at 2206 with ID "The Crooked Man Is Calling." Then a Beatles number. (Finn, PA)

**Wild Imagination Radio, 6950** at 1846 with talk of a \$40-record player down the toilet. (Finn, PA)

**Radio BorderHunder (Europe) 21880** at 1550 with hellos to specific listeners. (Finn, PA)

**Indira Calling, 6925** monitored at 0127. (Finn, PA)

Now that's what I call a heck of a great set of loggings! Question is, can you keep it going? I guess we'll see next time! ■

# computer-assisted radio monitoring

by Joe Cooper <joe@provcomm.net>

## Using Virtual Components To Enhance Your Monitoring—Part 1



Over the past year I've been showing you the basic background information you need to successfully set up and operate a computer-assisted radio monitoring station. Hopefully you've come to understand that if you approach the required tasks one at a time, you'll see that the operation of such stations is relatively easy.

Over the next two columns I want to show you how to take your radio monitoring to a whole new level through the use of a new generation of software that will allow you to "build" custom components based on your particular monitoring needs. This new approach lets you forgo the "outboard" components that would normally come in a metal or plastic cabinet that you attach to your radio. Now all you need to do is plug your radio's audio output into a computer sound card and build what you need to process the sound or decode a signal right in the computer.

I should also mention before getting too far into the column that I am still looking forward to hearing from people who want to share their computer-assisted experiences with everyone. I am particularly interested in how people hooked up their systems, rather than just receiving lists of equipment or software. Why did you take a particular approach and how hard or easy was it?

Over the coming year, I am also going to be taking a closer look at computer net-

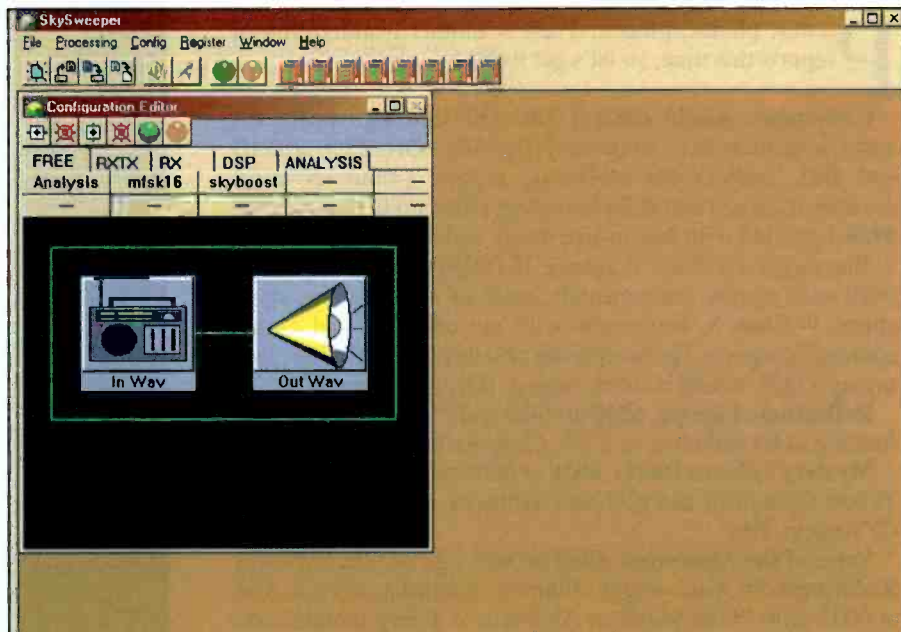


Photo 1. The SkySweep software user interface, showing the most basic configuration that can be set up.

working with the aim of showing you how to remotely operate and listen to a compatible monitoring radio between computers and over the Internet. It might sound like a big deal but it actually isn't,

thanks to new software and easily configured computer operating systems. Really, you don't have to be a computer geek or system engineer to do this sort of stuff anymore.

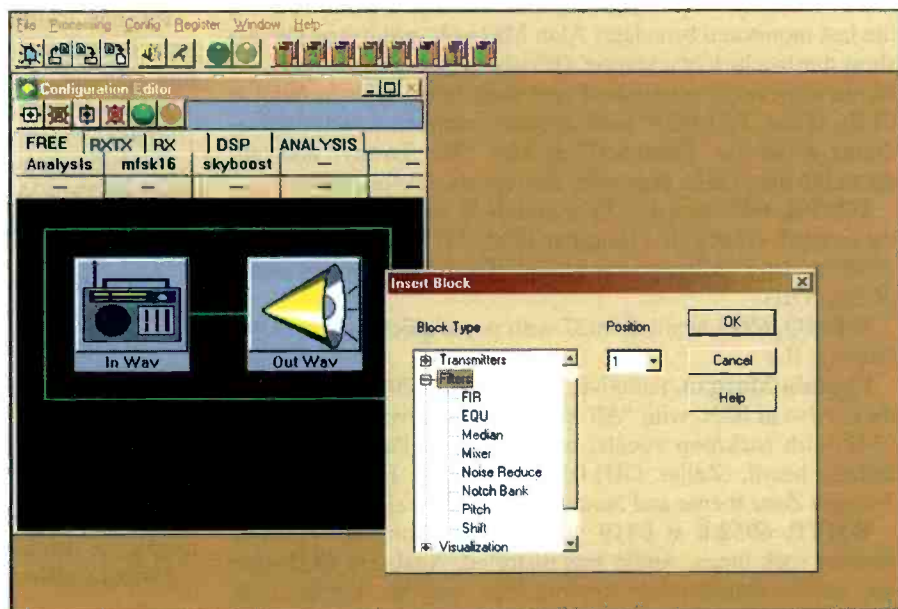


Photo 2. Selecting a filter to be inserted into the basic configuration.

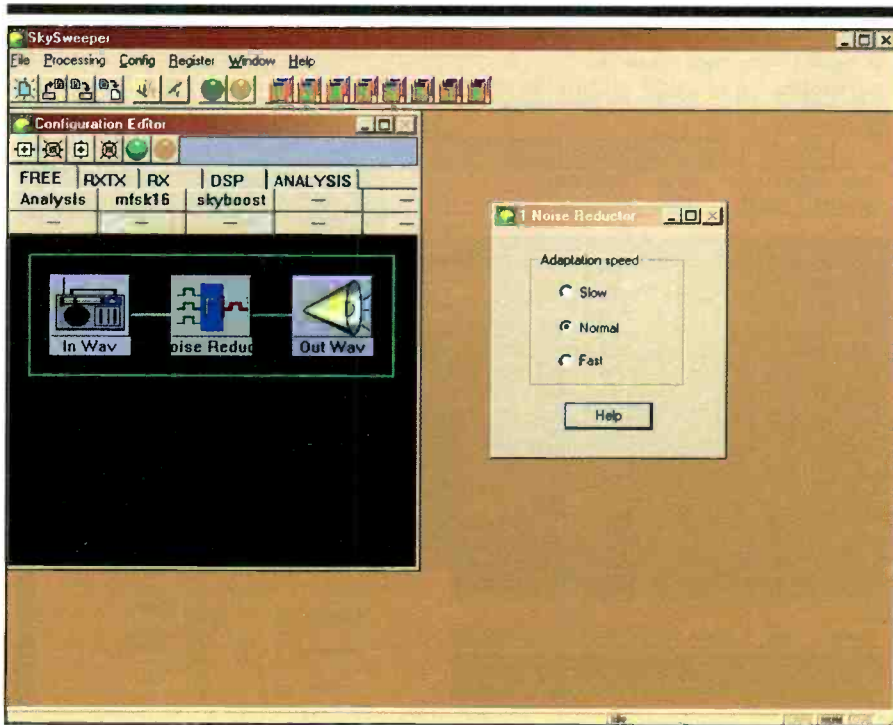


Photo 3. A noise reduction filter has been inserted which you can control using the radio buttons shown in a separate window.

So on to this month's topic—the use of virtual components.

## Introduction To Skysweep

When putting together this column, I started looking at different ways to illustrate the concept of virtual radio components. I've actually shown you a few over the past few months, particularly when looking at DSP (Digital Signal Processing) software.

The problem with many of those pieces of software has been that, while they may be able to perform multiple functions, you are limited to one application at a time.

Let's suppose you wanted to decode a radio teletype (RTTY) signal and also want to apply some DSP to your radio's audio to overcome some interference. The fact is that you could not do that with two separate applications. One or the other software program would take control of the sound card to the exclusion of the other, making it impossible to decode and process at the same time.

Like everything nowadays with computers, it seems as soon as you run into a problem like the one I described, you find a solution appearing on the market. For this particular case, there is a software program called SkySweep. It was created in Finland by SkySweep Technologies (www.skysweep.com) and is marketed in

the United States by Computer Aided Technologies (www.seancat.com). SkySweep is a Microsoft Windows-based program that provides a unique integrated software environment, allowing you to "build" a virtual device through the use of multiple components. What is ex-

tremely interesting is that you can do this "on the fly" by connection graphic symbols of the different components together in diagram form.

Take a look at **Photo 1**. Here you have the most basic configuration you can start with. The audio output of the radio plugged into the sound card, which then records the sound of the stations monitored into a computer file. Now let's say you want to do more than that. You are monitoring a station that has a great deal of static or noise in the signal. So, what you can do is insert a virtual filter into the virtual circuit. If you take a look at **Photo 2**, you'll see there are several different types of filters to choose from. In this case, I've chosen a noise reducer; you can see the icon and the controls in **Photo 3**.

The next point is how do you know that the filter is working, other than hearing the results? The answer is that you can also add visual analysis onto your virtual device. In **Photo 4** you can see that I've now included two oscilloscope-type devices to show me how the signal looks before and after it passes through the filter.

SkySweep provides you with eight filters and five visualizations that you can mix and match according to your specific monitoring needs. Likewise, you have four input and output modes to choose from, one of which is a network/Internet mode that allows you to listen to and even *control* a radio from a remote location (if

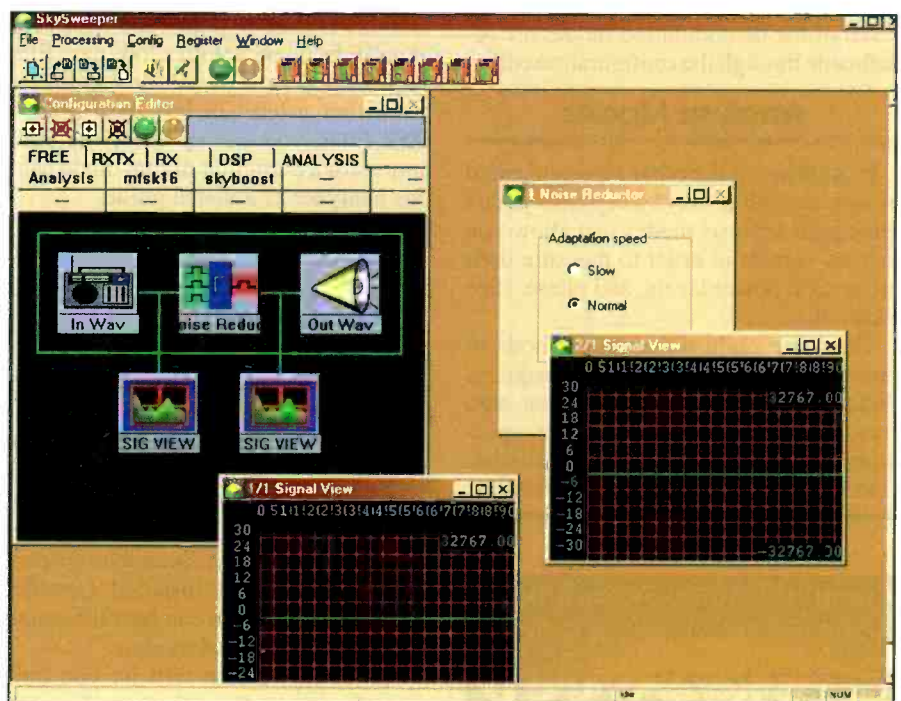


Photo 4. Two visualization devices have been added before and after the filter in order to view the changes made to the signal when different settings are used.

you have a network connection, Internet access, and a compatible radio).

## Demodulation Of Digital Modes

In addition to providing filters and visualizations, the SkySweep software also demodulates a wide range of digital signals. This ranges from basic Morse code (CW) and RTTY through to commercial modes such as ACARS, HFDDL, HF-FAX, Mil-ALE, SITOR, SELCAL, SSTV, and WE-FAX.

The software also has transmission capability for non-commercial digital modes used by amateur radio operators. The modes supported are CW, Hellscriber, MFSK16, PSK, RTTY, and SSTV. I'll talk more about this capability in the next column.

One thing that makes this software feature interesting is that most of the modes come pre-configured. There is a tab in the upper left hand corner of the software that contains various options. These can be used to either create new virtual configurations or select from a group of pre-configured modes.

You can view a virtual device in the upper left hand corner, a tuning screen for locking onto the digital signal in the upper right, a visualization screen to help you identify the signal on the lower left, and a print-out of the demodulated text on the lower right.

All of the demodulation modes are re-definable through the configuration editor.

## Analysis Modes

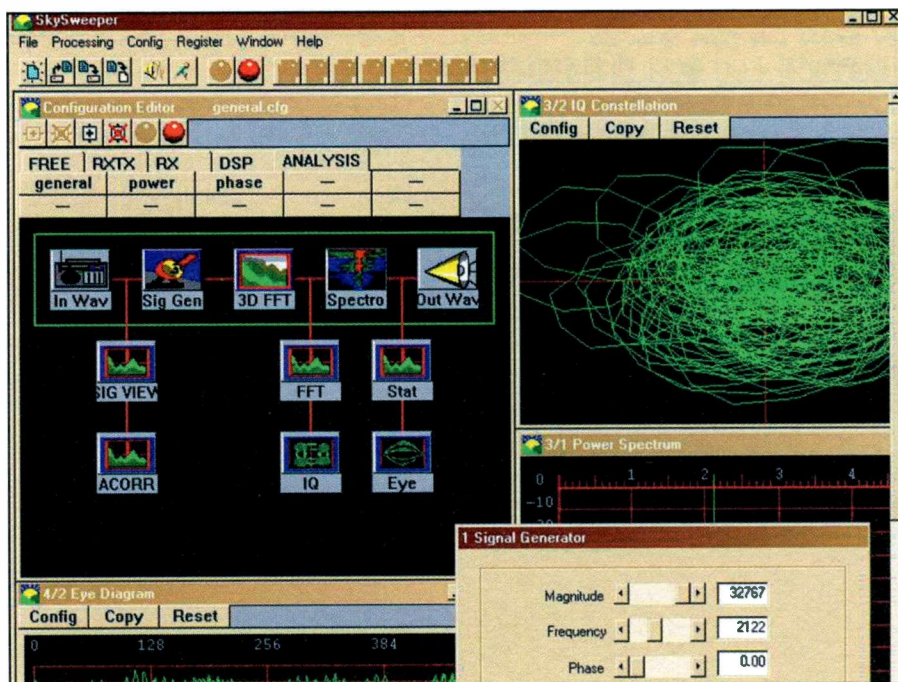
In addition to the other pre-configured modes available, SkySweep also offers three pure analysis modes that allow you to view signals in order to measure their properties, power levels, and phase. (See **Photo 6**.)

There are eight different methods of visualization analysis: Spectrogram/Waterfall, 3D-FFT, IQ constellation, auto correlation, eye diagram, power spectrum, signal view, and signal statistics. Don't worry if these terms are unfamiliar.

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*Photo 6. This is a partial screen shot showing some of the visual analysis screens available. In this case, the software's built-in audio signal generator is being used to activate the analysis screens.*

The software comes with a 149-page manual (in software form that you must print out) which explains exactly what they are and how they are used.

For example, there is a visualization called the "IQ Constellation Analyzer"—an impressive name, but it doesn't give a clear idea of what it does. By checking the manual, though, we learn that this is used to adjust the bandwidth of an IF frequency with a low-pass filter. So if you have a monitoring radio that has either a built-in low-pass filter or DSP filter, you can optimize the audio output for a particular digital mode using this analyzer as a visual guide.

## Now What?

I would suggest you go over to Computer Aided Technologies' website at [www.scancat.com](http://www.scancat.com) and download the demo version. You don't have to have a monitoring radio hooked up to your computer to run the demo. However, you will need to have a Pentium-based computer, running one of Microsoft Windows' operating systems, and a Soundblaster-compatible sound card installed (speakers would be nice so you can hear the sounds of the different digital modes).

The demo version will let you build some basic configurations and see the software in action through the various modes. It will also give you some real

hands-on experience working in its virtual environment.

## More Monitoring Ahead

Next month we'll look at each of the monitoring modes in more detail and hopefully have some reports on actual hands-on operation by users of the software. I'm going to try to have as many different types of monitoring experiences represented here as I can.

Keep in mind that I'm also looking for reports on how you set up your computer-assisted monitoring station. Your report doesn't have to be on the SkySweep software; send in anything you feel is relevant to the topic at hand.

Please e-mail or write to me with ideas, comments, and suggestions. My e-mail address is [joe@provcomm.net](mailto:joe@provcomm.net) and my mailing address is "Computer-Assisted Radio Monitoring," C/O Joe Cooper, PMB 121, 1623 Military Rd. Niagara Falls, NY 14304-1745.

Don't forget that I can't answer general questions about computers, software, or operating systems, but I will do my best to address any questions about the content of the columns or computer-assisted radio in general.

Thanks again and I hope the information provided here will help you get more out of your computer and radio monitoring than you ever thought possible. ■



# Survey Results

## What You're Telling Us About Your Magazine And Hobby

By Harold Ort, N2RLL, Editor

**R**ecordkeeping and archiving . . . It's one of the things we hobbyists do as a matter of course, whether we're scanner enthusiasts at the extreme level, or shortwave monitors. So a while ago we asked about your recordkeeping activities. Fully 75 percent of you told us that you don't record your monitoring sessions, while about 20 percent of you said that you do sometimes. A scant 2 percent of you reported that you record your shortwave/DX sessions. A small percentage—about 3 percent—said you used to record sessions, but it's a hassle storing the tapes. One reader said he uses a VCR and gets several hours of good audio recording time on a tape!

Logging is another matter altogether as 45 percent of you said you keep a log of your shortwave/DX activities in a spiral-bound booklet, while about the same number of you said you don't keep a log. Interestingly, and I'll also admit to doing this sometimes, about 20 percent of respondents indicated they keep notes on plain paper, but usually lose the notes! While the computer continues to gain popularity in our monitoring activities, your responses indicate it isn't in the logging of DX activities, as only about 5 percent of readers said they use a computer for that purpose.

How about a *Pop'Comm* logbook? Sixty percent of respondents said they'd consider buying a *Pop'Comm* logbook; 25 percent said they would not; and another 15 percent said they were undecided.

When it comes to archiving *Pop'Comm* for future reference, what's the best way to do it? Boxes? Binders? Some publications have put back issues on CD, so we asked the question, "If back issues of *Popular Communications* were available on CD, would you buy a set?" and found that about 65 percent of you would, while another 35 percent said no, and the remainder of respondents were undecided. Time will tell on this one, folks; perhaps more feedback is in order. Send us a letter or e-mail with your thoughts, please.

### The New And The Old

With the drive toward satellite radio at home and on the road, we asked you if you'd buy a new satellite receiver and pay a monthly fee to listen to noise-free, fade-free satellite radio. Fully 70 percent of you said no; 19 percent of you said you would; and another 5 percent said you might, depending on the price. Another 4 percent of you said, "Definitely not, because it's only one more monthly bill I'd have to pay."

Remember those old radios—the cathedral radios, large consoles, and "newer" transistor radios we see at garage sales today? Well, about 45 percent of you said you don't own old radio equipment (older than 10 years), especially tube-type radios. Another 21 percent of you reported having tube-type

communications receivers, while about 3 percent said you have mostly antique wooden radios over 50 years old. Thirty percent of you said you have several old radios that are relegated to the basement or attic. Time to get out those antiques, dust 'em off, and write to our Wireless Connection columnist, Peter Bertini!

### Inside The Shack

A few months ago we asked you about your radio equipment. Thirty-five percent of you said your gear is two to four years old, while 30 percent of you reported having equipment more than four years old, but less than 10; and 25 percent of you said your radios were more than 10 years old. Just about 2 percent of you said the radios you own were new within the past year. About three percent of you said your radios were one to two years old.

In addition to your base communications receiver, 60 percent of you said you own a portable shortwave for traveling or emergencies; another 20 percent of you reported having an AM/FM portable for the same purpose.

Imagine all that coax! Fully 55 percent of you said your coax comes from the store down the street or at the mall, while 15 percent of you reported buying coax from a specialty cable manufacturer; another 12 percent of you buy it from an amateur radio dealer; and 10 percent of you purchase it at hamfest flea markets.

CBers responding to the survey said they also hook that coax to a vertical antenna from RadioShack—about 55 percent of you—while about the same percentage indicated having a vertical antenna from another manufacturer. Another 35 percent reported hooking it to a homebrew longwire/dipole cut for 11 meters. Only about 5 percent of responding CBers reported having a commercial beam, and two percent of you—at the other end of the spectrum—are using a back-of-radio antenna.

Let's see . . . How is that lighting in the shack? I'm a real nut about good, quality lighting (I suppose that happens once you're, as Mom would say, "past 39."). It can make a real difference in not just what you see, of course, but your mood as well and your success at the monitoring game! So we asked you about lighting in your shack and it's split right down the middle, three ways, 33 percent of you each reporting using an incandescent table-top or fluorescent lamp or simply using an overhead ceiling light.

This month we reported on two months' worth of surveys, so our two winners of a one-year gift subscription to *Pop'Comm* are Edward Doorn of Cicero, Illinois and Bill Johnson of Rockview, West Virginia. Congratulations! Don't forget to keep those survey results coming. They're one of the most important tools we have in shaping the future of *your* magazine! ■

# Popular Communications May 2003 Survey Questions

A very small number of readers contribute photos, loggings and short articles to the magazine. Please indicate the last time you sent in any of these items to our columnists:

- Within the past month.....1
- A couple of months ago.....2
- Six months to a year ago.....3
- More than a year ago.....4
- One to two years ago.....5
- I don't remember, but it was a long time ago.....6
- I've never contributed any material to the magazine.....7

The reason I don't send in items to the columnists is:

- The columns are already full of information and contributions.....8
- I only have a little bit to contribute - perhaps a handful of loggings.....9
- I don't think my shack is loaded with radios and it's not very neat.....10

- I sent an article in it would need to be rewritten, therefore it's not worth the effort.....11
- There's no "form" on the Pop'Comm website for that purpose.....12
- They wouldn't use it anyway because I believe my loggings/information is very ordinary.....13
- In the "Utility Radio Review" column I'd prefer to see the loggings done differently. Here's what I suggest (mark all that are appropriate):
  - Make each logging very brief and use much less jargon...14
  - Organize them by service; example: Aircraft items first, followed by Military, etc. so they're easier to find....15
  - Greatly reduce the number of loggings and have more information in the actual column.....16
  - Eliminate the loggings completely, putting them on the Pop'Comm website because they're very timely.....17
  - Do nothing, the loggings are fine right now.....18

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**Getting Started in Ham Radio** – How to select equipment, antennas, bands, use repeater stations, grounding, basic soldering.

**Getting Started in VHF** – Intro to VHF. Repeater usage, packet, satellites and more exotic VHF op modes.

**Getting Started in DXing** – Top DXers share experiences with equipment, antennas, op skills and QSLing.

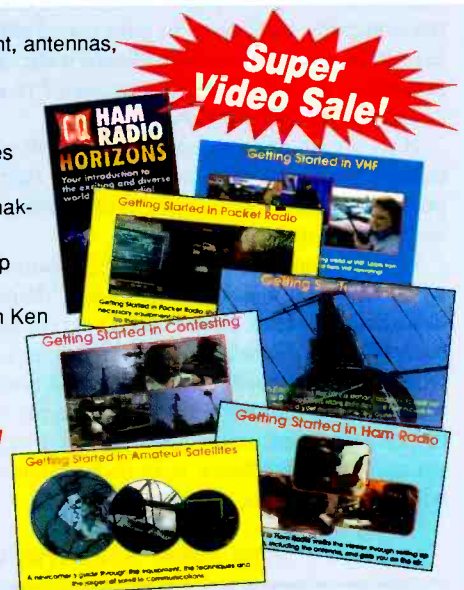
**Getting Started in Packet** – De-mystify packet. Info on making contacts, bulletin boards, networks, satellites.

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## The Heard All States DX Challenge!

The ultimate challenge for AM broadcast DXers is to log all 50 U.S. states. While considerably more difficult than it was before the breakup of the clear channel frequencies began some 30 years ago, it doesn't stop dedicated DXers from trying.

Much of your success will depend upon equipment, antennas, solar conditions, persistence, and determination, but, most importantly, location, location, location. Perhaps the best locations for receiving all 50 are from western upstate New York and along the Appalachians into Virginia and North Carolina, just far enough west for access to the Pacific coast while still within range of the small states in the northeast. DXers located along the eastern seaboard and west of the Rockies stand little chance of hearing all 50, but it's still fun to try to log as many states as possible.

Because the future of long-distance reception with IBOC (In Band On-Channel) and DRM (Digital Radio Mondiale) digital broadcasting is unknown, now's the time to give it a shot before it may be too late. Here are some potential targets for you to check out.

### Alabama

1550 WLOR Huntsville has always been a top DX target. It puts out 50 kW during the day and you can try to catch it during critical hours at sunset before power-down or at sunrise when it's first back to full power. For a while 1620 WPHG Atmore was being received worldwide, but has since gone silent, with future plans to return to the airwaves from across the border in the Florida panhandle. The 1700 WEUV Huntsville relay of 1600 WEUP with gospel music keeps hope alive for most DXers.

### Alaska

It's probably the most difficult of all the states to receive because of its northern latitude. Unless you live on the Pacific coast, your best chance of receiving anything from Alaska is during a solar minimum. Try for some of the low-band clear channel stations, such as Newsradio 650 KENI Anchorage with coast-to-coast AM, Outlaw 700 KBYR Anchorage with hot country music, or news station 750 KFQD Anchorage-Eagle River.

### Arizona

News/Talk 660 KTNN Window Rock is an easy target for at least half the nation. While this state has a number of other stations assigned to clear channels, most entered the scene late in the game and thus protect co-channel signals with low power and limited directional signals.

### Arkansas

The Gospel Voice of the South 1090 KAAY Little Rock has long been the best chance for logging this state. Now you can depend on 1650 KWHN Fort Smith relaying 1320 KYHN with coast-to-coast AM overnight.

### California

Station 640 KFI Los Angeles was once the hottest target from this state, but not anymore with so many co-channel radio stations east of the Mississippi on the air 24 hours a day. KFI still represents a good DX target across two-thirds of the nation, though. For the rest of us, the expanded band is California gold, with a station on every frequency except 1700. Station 1070 KNX Los Angeles as well as San Francisco's 680 KNBR and 740 KCBS are also worth trying.

### Colorado

Station 850 KOA Denver still promotes nighttime listenership in 38 states, Canada, and Mexico. Indeed it can be received even in the shadow of co-channel 50 kW WEEI Boston. The move of CKVL Verdun, Quebec, to FM made reception easier for DXers in the northeast. However co-channel interference from WYLF Penn Yan, New York, and WKNR Cleveland, Ohio, among others still makes it a challenge. In that case, Radio Disney 1690 KDDZ Arvada is a good option. The music format is easy to identify under interference, and it's the only Disney station on the frequency.

### Connecticut

Station 1080 WTIC Hartford is the only 50-kW clear channel from the Nutmeg State. In the past, engineers have coordinated downtime for transmitter maintenance with co-channel KRLD Dallas, Texas, making WTIC an easier target. Absent



such a special event, try sunrise or sunset skip DXing on the high-end clear channels. You just might catch 1500 WFIF Milford or 1530 WDJZ Bridgeport during critical hours at sign-on or sign-off.

### **Delaware**

Listen for annual DX tests from Newsradio 1450 WILM Wilmington. Despite being on a graveyard frequency, this station really gets out, especially when a Morse code test is underway. Still it's going to be the toughest little state to receive away from the east coast. Station 1150 WDEL Wilmington is another favorite DX target.

### **Florida**

Mystic 1580 WSRF Fort Lauderdale with its distinctive Caribbean reggae music format is a good target during auroral conditions. The Sunshine State has a couple of unique expanded band stations as well. Check out 1680 WTIR Winter Garden with 24-hour tourist information, and 1700 WJCC Miami Springs with the Voz Cristiana network in Spanish. For more standard fare, "South Florida's only Newsradio" 610 WIOD Miami is heard all the way up the eastern seaboard coast-to-coast AM.

### **Georgia**

"The first radio station in the South," 750 WSB Atlanta is the clear choice here. If reception isn't so peachy for you, then try for the 1630 WTEL Augusta relay of News/Talk/Sports 1480 WRDW, or the 1670 WRNC Warner Robins relay of The Light 1280 WLCG and 102.5 FM. La Que Buena 1550 WAZX Smyrna is another option when it's operating with 50 kW during critical hours and with its unmistakable Mexican music format.

### **Hawaii**

Station 900 KNUI Kahului represents an interesting target with distinctive traditional Hawaiian music, a real treat if you can get it. Otherwise the islands are erupting with 10-kW signals for transpacific DXers.

### **Idaho**

Depend on News/Talk 670 KBOI Boise for the Midnight Cowboy Trucking Network overnight and on 1140 KGEM for Original Hits. Listen to Mexican music from 1620 KBLI Blackfoot, the state's only expanded band allotment.

### **Illinois**

Four signals from the Windy City should easily blow through any interference. The Score 670 WSCR, News and Talk 720 WGN, Newsradio 780 WBBM, and News/Talk 890 WLS are all widely heard omnidirectional 50-kW Chicago clears covering most of the nation. ESPN Radio 1000 WMVP is another potential 50-kW target, limited only by a nighttime directional antenna pattern to protect co-channel KOMO Seattle, Washington.

### **Indiana**

CBS radio pioneer 1190 WOWO Fort Wayne has been a more difficult target since adjusting nighttime coverage to make way for fulltime operation of co-channel WLIB New York. WOWO, running 50 kW, is still your best bet for the Hoosier State. Station 1070 WIBC Indianapolis might get the checkered flag during critical hours, otherwise race to the expanded band to catch 1620 WDND South Bend.

### **Iowa**

Listen for The Truckin' Bozo overnight on Newsradio 1040 WHO Des Moines. Iowa got its fair share of expanded band assignments. One of the most widely heard is 1630 KCJJ Iowa City-Coralville-Cedar Rapids with News First and pop music.

Continue up the right side of the dial for 1650 KDNZ Cedar Falls and 1700 KBBG Des Moines.

### **Kansas**

Station 860 KKOW Pittsburg, "It's all you need to know," can be logged in the east despite a super signal from co-channel CJBC Toronto, Ontario. Listen for Kansas City Royals baseball, agriculture reports, and coast-to-coast AM with George Noory. For something completely different, keep an ear open for classical music from 1660 KXTR Kansas City.

### **Kentucky**

Station 840 WHAS Louisville, "Depend on it!" That's the moniker of this leading full service station and DX target. KXNT North Las Vegas, Nevada, and Dobleve, Cuba, are the only major co-channel contenders.

### **Louisiana**

Station 870 WWL New Orleans is an easy nationwide DX target with few exceptions. A null in the nighttime directional antenna pattern wastes little signal over the Gulf of Mexico, distributing more power to the north, east, and west. Fox Sports 1130 KWKH Shreveport is another good target although tough to separate from fellow co-channel sports talker ESPN Radio WDFN Detroit, Michigan.

### **Maine**

Logging the Pine Tree State is indeed a challenge. Station 780 WTME Rumford, relaying 1240 WCNM Lewiston, is an interesting possibility when at 10 kW during critical hours. Otherwise go for the coastal stations from Portland, such as Newsradio 560 WGAN and Hot Talk 970 WZAN.

### **Maryland**

"Maryland's most powerful broadcast voice," 1090 WBAL Baltimore, has long been the standard DX target, despite beaming much of its nighttime signal over the Atlantic Ocean to protect co-channel KAAY Little Rock, Arkansas. Listen for rebroadcast of Rush Limbaugh during the early morning hours. Heaven 1580 WPGC Morningside is a worthy sunrise/sunset skip target. Check the expanded band for 1690 WPTX Lexington Park.

### **Massachusetts**

Newsradio 1030 WBZ Boston still recognizes its listenership in "38 states and the best provinces of Canada." WBZ is one of only a few east coast 50-kW radio stations beaming its signal west to increase its coverage area while wasting little signal over the open ocean. All the other Boston 50-kW stations beam east across the Atlantic to protect inland co-channel broadcasts. The Zone 1510 WWZN Boston sports talk can be received better in South Africa than in most of the U.S.!

### **Michigan**

The Voice of the Great Lakes will always be 760 WJR Detroit. Co-channel interference sources are few and far, mostly from KFMB San Diego, California, or in Spanish from Radio Reloj, Cuba, and RCN Colombia. Steer toward the Grand Rapids urban contemporary rapper 1680 WJNZ Ada for a more challenging target.

### **Minnesota**

"The station that serves the nation" 830 WCCO Minneapolis still covers most of the U.S., and only a few low-power signals at the extremes of the WCCO coverage area will make it a challenge to receive. Cross town rival talker, 1500 KSTP St. Paul, transmits a huge signal to the west, protecting co-channel WTOP Washington, DC.

## Mississippi

This just might be the toughest of the southern states to log. Try for 1180 WJNT Pearl when it runs 50 kW omnidirectional during critical hours. It drops output power to 500 watts at night. The question is how did this state miss out on the expanded band assignments?

## Missouri

Show me 1120 KMOX The Voice of St. Louis, and I'll show you a 50-kW omnidirectional signal "heard in 44 states, Canada, and Mexico." Unless you live on the west coast where co-channel KPNW Eugene, Oregon, can make reception difficult, or in the shadow of one of a handful of low-power stations operating 24 hours on 1120, well outside the KMOX coverage area, KMOX is the gateway to Missouri.

## Montana

This is definitely the toughest of the Rocky Mountain States to DX. Station 790 KGHL and 970 KBUL Billings, along with 1180 KOFI Kalispell, provide good signals for western DXers, big sky dreams for the rest.

## Nebraska

Rural Radio 880 KRVN Lexington still serves Midwest farmers. The signal is only limited to the east to protect co-channel WCBS New York. Station 1110 KFAB Omaha is another powerful western signal protecting co-channel WBT Charlotte, North Carolina. Check the expanded band for The Zone 1620 KOZN Bellevue with ESPN Radio.

## Nevada

"The most powerful AM radio station in southern Nevada," Talk Radio 720 KDWN Las Vegas is your best bet. Listen overnight for coast-to-coast AM.

## New Hampshire

New England's only expanded band assignment, 1700 WAYU Rochester, won't be built. So your best hope for logging the Granite State might be when 720 WQTH finally signs on the air, eventually to become the new full-time dial position for daytime only 1020 WNTK Newport. Until then, the local Newsradio network flagship 610 WGIR and nostalgic 1370 WFEA Manchester are DXer favorites. Station 900 WOTW Nashua might be worth a shot, too; it's low power but omnidirectional and now on the air 24 hours.

## New Jersey

The opening of the AM expanded band placed this state in the log for many DXers when Radio Ahs 1660 WJDM Elizabeth City was the first on the air. Now it's been replaced by Radio Unica in Spanish on 1660 WWRU Jersey City and the unique Korean language 1680 WTTM Princeton, both giving the Garden State a chance of being heard.

## New Mexico

Despite its powerful signal, 770 KKOBB Albuquerque is boosted by a low-power synchronous transmitter in Santa Fe as the 50-kW main signal is beamed west to protect co-channel WABC New York. Station 1020 KINF Roswell has the largest coverage area on the frequency outside of co-channel KDKA Pittsburgh. Another possibility is the Western Indian Ministries station 880 KHAC Tse Bonito, logged in the east with Moody network Christian music overnight, while co-channel WCBS New York was down for maintenance.

## New York

New York City is home to an abundance of 50-kW clear channel signals. Station 660 WFAN sports talk, IBOC digital test

## PENDING

New Call	Location	Freq.	Old Call
KDKL	Fountain Hills, AZ	89.1	KBIE
KVLB	Bend, OR	90.5	KYBN

## CHANGES

New Call	Location	Freq.	Old Call
WVIV	Chicago, IL	1200	WLXX
KOWZ	Waseca, MN	1170	KOWO
KRDM	Redmond, OR	1240	New
KJLP	Palmer, AK	88.9	New
KRCY-FM	Lake Havasu City, AZ	96.7	KBBC-FM
KSSE	Arcadia, CA	107.1	KLYY
KPSL-FM	Bakersfield, CA	92.1	KIWI
KSSD	Fallbrook, CA	107.1	KSYU
KIWI	McFarland, CA	102.9	KPSL-FM
KLFH	Ojai, CA	89.5	New
KLYY	Riverside, CA	97.5	KSSE
KXJS	Sutter, CA	88.7	New
KSSC	Ventura, CA	107.1	KVYY
KLZV	Sterling, CO	91.3	New
WZZR	Riviera Beach, FL	94.3	WWLV
WRXQ	Coal City, IL	100.7	WBVS
WVIV-FM	Highland Park, IL	103.1	WXXY-FM
WYPY	Baton Rouge, LA	100.7	WTGE
KQLK	De Ridder, LA	97.9	KAOK-FM
WQUS	Lapeer, MI	103.1	WRXF
KOWZ-FM	Blooming Prairie, MN	100.9	KOWZ
WQVI	Forest, MS	90.5	New
WSQH	Forest, MS	91.7	New
WKNE	Keene, NH	103.7	WKNE-FM
WXBE	Beaufort, NC	88.5	New
WJZY-FM	Carolina Beach, NC	106.7	WLGX
WYTT	Gaston, NC	97.9	WLGQ
WBNE	Wrightsville Beach, NC	93.7	WFZX
WCLV	Lorain, OH	104.9	WCLV-FM
KOBK	Baker City, OR	91.5	New
KIAN	Byrne, TX	88.5	New
WLGQ	Emporia, VA	99.5	WYTT
KSVR	Mount Vernon, WA	91.7	KMWS

outlet 710 WOR, America's number one talk station 770 WABC, the new home of Yankees' baseball Newsradio 880 WCBS, and Radio Disney 1560 WQEW are the most widely heard. For something out of the ordinary, try for the Brooklyn Chabad-Lubavitch station broadcasting in English and Hebrew all alone on 1710. Outside the Big Apple, tune in upstate stations 1180 WHAM Rochester, where the Truckin' Bozo has returned to the air after overwhelming listener response, and 1520 WWKB Buffalo with its retro music format.

## North Carolina

The directional antenna pattern of powerhouse 1110 WBT Charlotte has "a north-south nighttime signal which reaches from Canada to Key West." A more challenging target is DXer-friendly AM Stereo 560 WGAI Elizabeth City. La Favorita 1070 WNCT Greenville will make an appearance in Spanish during auroral conditions.

## North Dakota

This was probably the toughest of the Midwestern states to catch until Star 1660 KQWB West Fargo moved from 1550 to

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its new expanded band frequency. "The Red River Valley's Information Radio" 1080 KNDK Langdon is a potential target during critical hours.

### Ohio

The Big One 700 WLW Cincinnati and Newsradio 1100 WTAM Cleveland are two excellent targets. Both are 50-kW omnidirectional on still relatively clear frequencies. Listen overnight to WLW for The Truckin' Bozo and WTAM for coast-to-coast AM. Station 1530 WSAI Cincinnati is another good choice, also on a clear channel but beaming east at night to protect KFBK Sacramento, California.

### Oklahoma

Station 740 KRMG Tulsa, 1170 KFAQ Tulsa, and 1520 KOMA Oklahoma City are the signals most likely to be lassoed here. Interestingly, KOMA just recently dropped its popular oldies music format for news/talk at the same time co-channel WWKB Buffalo, New York, changed from business talk to oldies. At least KOMA oldies remain on 92.5 FM for everyone to enjoy.

### Oregon

Like their counterparts on the east coast, 750 KXL and 1190 KEX Portland dump most their signal strength over the ocean at night to protect inland co-channel stations. Station 1640 KPBC Lake Oswego is one of the newest additions to the Radio Disney family and thus an easily identifiable target for DXers.

### Pennsylvania

Pioneer 1020 KDKA Pittsburgh, all news 1060 KYW Philadelphia, and talker 1210 WPHT Philadelphia are your powerful friends in the Keystone State. I wonder if WPHT feels left out because it wasn't assigned a rare eastern K callsign?

### Rhode Island

If you've got a salt-water path, then you should have no problem catching a wave from the Ocean State—unfortunately that precludes most of us. Station 630 WPRO Providence is a favorite target. Nonetheless, the Radio Ranch 1180 WJFJ Hope Valley has the potential for sunset skip and 1590 WARV Warwick is often logged in Europe.

### South Carolina

With no fulltime high-power stations, DXers depend on sunrise/sunset skip conditions to produce 730 WSCC Charleston, 1550 WBSC Bennettsville, and 1580 WDAB Travelers Rest. Station 730 often identifies itself with a three-letter WSC callsign.

### South Dakota

Station 570 WNAX Yankton is a favorite target, known to reach surprisingly long distances when conditions are right and featuring farm news and coast-to-coast AM. Lacking an expanded band station, I would consider this the most challenging of the Midwestern States.

### Tennessee

The Grand Ole Opry and great classic country music can still be heard across much of the nation from 650 WSM Nashville, thanks to preservationists who fought to save the Music City icon from a change to a sports talk format. Newsradio 1510 WLAC is another strong Nashville signal with coast-to-coast AM overnight, not to be confused with co-channel talker KGA Spokane, Washington. Station 1580 WLJF Shelbyville is a good sunrise skip target and a good verifier as well, with a down-home mix of bluegrass and country music.

### Texas

Station 1200 WOAI San Antonio used to be the only one on that frequency at night. Now, however, 1200 is overcrowded, and with WKOX Framingham, Massachusetts, given the go-ahead for 50 kW at night, WOAI will be an even more difficult target for some. Station 820 WBAP Fort Worth is another former cross-country clear channel signal that's lost nighttime coverage to co-channel interference. Thankfully The Lone Star State was a big winner in expanded band assignments. Try for News/Talk 1620 WTAW College Station, Spanish 1630 KNAX Fort Worth, and The Ticket 1700 KTBK Sherman.

### Utah

Newsradio 1160 KSL Salt Lake City covers the west, while the frequency is inundated by low-power signals in the east. Central Utah's full-service country station 650 KMTI Manti with coast-to-coast AM overnight is another good western target. Fortunately there are two possible targets in the expanded band: 1640 KBJA Sandy and 1660 KXOL Brigham City.

### Virginia

"Serving Virginia and the nation since 1925," 1140 WRVA Richmond is the state's only full-time 50-kW broadcast voice. Radio Disney 1650 WHKT Portsmouth is a good target as well thanks to the easily identified Disney pop music format.

### Vermont

The Green Mountain State leaves many green with envy that anyone else has it in their logbook. It can be tough even for DXers in neighboring states. Station 620 WVMT and 1390 WKDR Burlington, and 1380 WSYB Rutland are about as good as it gets.

### Washington

Just like their counterparts in the east, the Pacific coast 50-kW stations dump a lot of power over the open ocean to protect inland co-channel signals. News/Talk 1510 KGA Spokane has a wider coverage area than most and is often received in the east. Listen for America Live with Ernie Brown weeknights and the Midnight Trucking Network overnight weekends. Station 1000 KOMO Seattle has good north/south coverage as well.

### West Virginia

From the home of the world famous Jamboree USA, 1170 WWVA Wheeling dominates in the east as this state's only 50-kW clear channel signal. Station 1550 WMRE Charles Town has always been a favorite sunset skip target.

### Wisconsin

Stations 620 WTMJ and 1130 WISN Milwaukee were prime targets. Now 1640 WKSH Sussex and 1670 WTDY Madison are the big cheeses.

### Wyoming

Station 1030 KTWO Casper is a preferred target, but the powerful signal is beamed west at night to protect co-channel WBZ Boston, Massachusetts. Instead try to catch The Spirit of Wyoming 1630 KKWY Fox Farm-Cheyenne classic country, heard nationwide. Best reception is often pre-sunrise.

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## Send In Your Suggestions

Now, as they say, results may vary. Have any additional favorites? I'm sure I missed a few. Send them along in the form of broadcast loggings. Your QSL Information and broadcast loggings will be back next month. Until then, 73 and good DX!

# Tap into secret Shortwave Signals

Turn mysterious signals into exciting text messages with the MFJ MultiReader™!

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

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

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

## Eavesdrop on the World

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

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

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

Monitor Morse code from hams, military, commercial, aeronautical, diplomatic, maritime

## Super Active Antenna

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

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

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

Switch two receivers and auxiliary or active antenna. MFJ-1024 139<sup>95</sup> 6x3x5 inches. Remote has 54 inch whip, 50 feet coax. 3x2x4 inches. 12 VDC or 110 VAC with MFJ-1312, \$14.95.

## Indoor Active Antenna

Rival outside long wires with this tuned indoor active antenna.

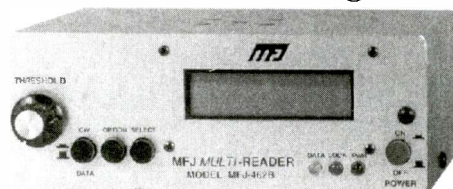
"World Radio TV Handbook" says MFJ-1020B is a "fine value... fair price... best offering to date... performs very well indeed."

Tuned circuitry minimizes intermod, improves selectivity, reduces noise outside tuned band. Use as a preselector with external antenna. Covers 0.3-30 MHz. Tune, Band, Gain, On/Off/Bypass Controls. Detachable telescoping whip. 5x2x6 in. Use 9 volt battery, 9-18 VDC or 110 VAC with MFJ-1312, \$14.95.

## Compact Active Antenna

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

Detachable 20 inch telescoping antenna. 9 volt battery or 110 VAC MFJ-1312B, \$14.95. 3 1/8x1 1/4x4 in.



-- all over the world -- Australia, Russia, Japan, etc. MFJ-462B \$179<sup>95</sup>

## Printer Monitors 24 Hours a Day

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

## MFJ MessageSaver™

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

## High Performance Modem

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

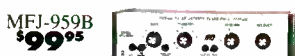
## Eliminate power line noise!



MFJ-1026 \$179<sup>95</sup>

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

## MFJ Antenna Matcher



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

Preamp with gain control boosts weak stations 10 times. 20 dB attenuator prevents overload. Select 2 antennas and 2 receivers. 1.6-30 MHz. 9x2x6 in. Use 9-18 VDC or 110 VAC with MFJ-1312, \$14.95.

## Dual Tunable Audio Filter



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

## High-Gain Preselector



High-gain, high-Q receiver pre-selector covers 1.8-54 MHz. Boost weak signals 10 times with low noise dual gate MOSFET. Reject out-of-band signals and images with high-Q tuned circuits. Push buttons let you select 2 antennas and 2 receivers. Dual coax and phono connectors. Use 9-18 VDC or 110 VAC with MFJ-1312, \$14.95.

## CW, RTTY, ASCII Interface



MFJ-1214PC \$149<sup>95</sup>

Use your computer and radio to receive and display brilliant full color FAX news photos and incredible WeFAX weather maps. Also RTTY, ASCII and Morse code. Frequency manager lists over 900 FAX stations. Auto picture saver.

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

## High-Q Passive Preselector

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

## Super Passive Preselector



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

## Easy-Up Antennas

How to build and put up inexpensive, fully tested wire antennas using readily available parts that'll bring signals in like you've never heard before. Antennas from 100 KHz to 1000 MHz.

greatly improves copy on CW and other modes.

## Easy to use, tune and read

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

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

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

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

Use 12 VDC or use 110 VAC with MFJ-1312B AC adapter, \$14.95. 5 1/4x2 1/4x5 1/4 inches.

## No Matter What™ One Year Warranty

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

## Try it for 30 Days

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

## MFJ Antenna Switches



MFJ-1704 heavy duty antenna switch lets you select 4 antennas or ground them for static and lightning protection. Unused antennas automatically grounded. Replaceable lightning surge protection. Good to 500 MHz. 60 dB isolation at 30 MHz. MFJ-1702C for 2 antennas.

## World Band Radio Kit

Build this regenerative shortwave receiver kit and listen to signals from all over the world with just a 10 foot wire antenna. Has RF stage, vernier reduction drive, smooth regeneration, five bands.

## 21 Band World Receiver

MFJ's MFJ-8121 new 21 Band World Receiver lets you travel the world from your armchair! Listen to BBC news from London, live music from Paris, soccer matches from Germany and more! Covers 21 bands including FM, Medium Wave, Long Wave and Shortwave. Sony® integrated circuit from Japan, multicolored tuning dial, built-in telescopic antenna, permanent silkscreened world time zone, frequency charts on back panel. Carrying handle. Operates on four "AA"s. Super compact size!

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# world band

## tuning tips *your monthly international radio map*

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

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

UTC	Freq.	Station/Country	Notes	UTC	Freq.	Station/Country	Notes
0000	6055	Radio Exterior de Espana, Spain	SS	0300	15120	Radio Pilipinas, Philippines	
0000	13605	All India Radio		0300	9885	VOA relay, Botswana	
0000	17510	KWHR, Hawaii		0300	7210	Radio Minsk, Belarus	RR
0000	13770	RDP Int'l, Portugal	PP	0300	6139	Radio UNAMSIL, Sierra Leone	EE, others
0000	17615	BBC relay, Thailand		0330	9495	Radio Sweden	
0000	17835	Radio Imperial, El Salvador	SS	0330	13765	UAE Radio, Dubai	
0000	9925	Voice of Croatia, via Germany		0330	3255	BBC relay, South Africa	
0000	5010	Radio Pueblo, Dominican Republic	SS	0330	4800	Radio Lesotho	
0000	9400	Radio Bulgaria		0330	9835	Radio Budapest, Hungary	
0000	4985	Radio Brazil Central, Brazil	PP	0330	7160	Radio Tirana, Albania	
0030	13695	Radio Thailand		0345	7285	Voice of Croatia, via Germany	
0030	17675	Radio New Zealand Int'l		0400	9810	Radio Ukraine Int'l	
0030	5770	Radio Miskut, Nicaragua	SS	0400	15400	BBC Relay, South Africa	unid
0030	11915	China National Radio	CC	0400	7190	RTV Tunisienne, Tunisia	AA
0030	3310	Radio Mosoj Chaski, Bolivia		0400	11985	Radio Vlaanderen Int'l, Belgium, via Bonaire	
0100	7115	Radio Yugoslavia		0400	7125	Voice of Russia, via Moldova	
0100	17835	Radio Japan/NHK		0400	6940	Radio Fana, Ethiopia	local
0100	9737	Radio Nacional, Paraguay	SS	0400	4960	Radio Cima Cien, Dominican Republic	SS
0100	11780	Radio Nacional, Brazil	PP	0400	9730	China Radio Int'l, via French Guiana	
0100	20276	Argentine domestic stations relay		0400	7255	Radio Botswana	
0130	5930	Radio Slovakia Int'l, Slovak Republic		0400	6175	Voice of Vietnam, via Canada	VV
0130	6155	RTE, Ireland, via England		0500	11710	Channel Africa, South Africa	
0130	3250	Radio Luz y Vida, Honduras	SS	0500	6900	Turkish Meteorological Station	TT
0130	6090	Caribbean Beacon, Anguilla (University Network)		0500	6120	Deutsche Welle, Germany, via Portugal	
0200	9560	Radio Korea Int'l, via Canada		0500	6165	Radio Netherlands, via Bonaire	
0200	9765	Voice of Russia		0500	6185	Radio Educacion, Mexico	SS
0200	6973	Galei Zahal, Israel	HH	0500	4915	Ghana Broadcasting Corp.	
0200	6110	RAI Int'l, Italy, via Ascension Is.	II	0500	7255	Voice of Nigeria	
0200	4885	Radio Clube do Para, Brazil	PP	0500	11970	Adventist World Radio via South Africa	
0200	7325	Radio Austria Int'l	GG	0500	5030	Radio Burkina, Burkina Faso	FF
0200	11710	RAE, Argentina		0500	4950	Radio Nacional, Angola	PP
0200	4845	Radio K'ekchi, Guatemala	SS	0600	7275	RTV Tunisienne, Tunisia	AA
0200	6120	Voice of Islamic Republic of Iran		0600	4845	Radio Mauritania, Mauritania	AA
0230	4919	Radio Quito, Ecuador	SS	0600	11710	Radio France Int'l., via Gabon	FF
0230	7270	Radio Tirana, Albania		0600	9725	University Network, Costa Rica	
0230	9890	Radio Sedaye Kashmir (clandestine)	Hindi	0600	9820	Radio Havana Cuba	
0300	6265	Zambia National Broadcasting Corp.	EE, other	0630	11805	Georgian Radio, Georgia Rep.	unid
0300	4830	Radio Tachira, Venezuela	SS	0700	7200	Radio Rossii, Russia	RR
0300	9945	Norwegian Radio	NN	0700	4784	RTV Malienne, Mali	FF
0300	5010	RTV Malagasy, Madagascar		0700	6055	Radio Tampa, Japan	JJ
0300	6005	Deutschlandradio, Germany	GG	0700	6145	Radio Japan/NHK	RR
0300	10320	AFRTS, Hawaii		0700	6160	CKZU, relay CBC - Canada	



UTC	Freq.	Station/Country	Notes	UTC	Freq.	Station/Country	Notes
0730	5470	Radio Veritas, Liberia		1430	9535	Radio Thailand	
0730	6100	Radio Liberia		1500	11705	Radio Japan/NHK, via Canada	
0800	5994	Radio Melodia, Peru	SS	1500	9515	Radio Canada Int'l	
0800	3290	Radio Centro, Ecuador	SS	1530	13620	Radio Kuwait	AA
0830	6115	Radio Union, Peru	SS	1600	13605	UAE Radio, Dubai	Ee/AA
0830	6045	Radio Sawa, USA, via Morocco	AA	1600	9525	Channel Africa, South Africa	
0830	7245	Radio Mauritaine, Mauritania	AA	1600	19010	VOA relay, Sri Lanka	unid
0830	6010	La Voz de Tu Conciencia, Colombia	SS	1600	11690	Radio Jordan	
0900	11820	Voice of Russia		1600	15605	Radio France Int'l	
0930	3375	Radio Nacional Sao Gabriel, Brazil	PP	1600	11570	Radio Pakistan	
1000	9740	BBC relay, Singapore		1630	11550	Radio Taipei Int'l, Taiwan	
1000	6458.5	AFRTS, Puerto Rico		1630	21660	BBC relay, Cyprus	
1000	9970	RTBF Int'l, Belgium	FF	1645	11640	Far East Broadcasting Assn., Seychelles	unid
1030	4775	Radio Tarma, Peru	SS	1700	15435	Radio Jamahiriya/V of Africa, Libya	AA/EE
1030	4996	Radio Andina, Peru	SS	1730	21610	Radio Exterior de Espana, Spain	AA/SS
1030	9520	Radio Veritas Asia, Philippines		1730	15520	Adventist World Radio via UAE	unid
1030	4781	Radio Oriental, Ecuador	SS	1730	13695	Radio Free Asia, No. Marianas Is.	CC
1030	4960	Radio Federacion, Ecuador	SS	1730	15475	Africa Number One, Gabon	FF
1030	4815	Radio Buen Pastor, Ecuador	SS	1730	17675	Egyptian Radio	AA
1045	5010	Radio Misiones Int'l, Honduras	SS	1730	21745	Radio Prague, Czech Republic	
1100	5020	Solomon Is. Broadcasting Corp	BBC	1800	9779	Republic of Yemen Radio	
1100	9600	Radio Singapore		1830	15220	Swiss Radio International, via Germany	FF
1100	4955	Radio Cultural Amuata, Peru	SS	1900	11990	Radio Kuwait	
1100	9335	Voice of Korea, North Korea		1900	11730	Radio Pilipinas, Philippines	Tagalog
1100	17630	Africa Number One, Gabon	FF	1900	15120	Voice of Nigeria	
1100	4832	Radio Litoral, Honduras	SS	1930	17605	Radio Netherlands	
1100	5054	Faro del Caribe, Costa Rica	SS	1930	17845	VOA relay, Morocco	
1100	7335	CHU time station, Canada		2000	11605	Kol Israel	
1100	2310	ABC N. Territories Service, Australia		2000	11785	Voice of Indonesia	
1130	5910	Deutsche Welle, Germany, via Russia	GG	2000	9960	Voice of Armenia	
1130	9600	Radio Rebelde, Cuba	SS	2030	11734	Radio Tanzania-Zanzibar	Swahili
1130	11935	Voz Cristiana, Chile	SS	2100	9585	Vatican Radio	RR
1130	15700	Radio Bulgaria	GG	2100	9460	Voice of Turkey	TT
1200	7130	Radio Taipei International, Taiwan		2100	17765	Deutsche Welle, Germany, via Rwanda	
1200	21705	Broadcasting Svc. of the Kingdom of Saudi Arabia	AA	2100	11775	VOA relay, Sao Tome	FF
1200	21675	Radio Jamahiriya, Libya, via France	AA	2100	11620	All India Radio	Hindi
1200	15300	Radio France Int'l	FF	2100	9425	Voice of Greece	Greek
1200	4890	NBC, Papua New Guinea		2100	17705	Voice of Greece, via USA	Greek
1200	12055	HCJB, Ecuador		2100	11655	Radio Netherlands relay, Madagascar	DD
1200	9580	Radio Australia		2100	13610	Radio Damascus, Syria	
1230	18960	Radio Sweden		2105	11965	China Radio Int'l	AA
1230	15690	Radio Free Afghanistan, via Sri Lanka	unid	2130	11820	Broadcasting Svc of Kingdom of Saudi Arabia	AA
1230	7185	Bangladesh Betar		2130	9660	Adventist World Radio, via Australia	
1300	11645	Central Broadcasting System, Taiwan	CC	2200	9990	Egyptian Radio	
1300	21760	Channel Africa, South Africa		2200	15120	Radio Havana Cuba	SS
1300	7295	Radio Malaysia/Radio 4		2230	12000	Deutsche Welle, Germany, via Portugal	GG
1300	17660	YLE/Radio Finland Int'l	FF	2230	11800	RAI Int'l, Italy	II
1300	6020	Radio Australia		2230	5920	Radio Studio, Russia	
1330	17815	Voice of Turkey		2230	7345	Radio Prague, Czech Republic	
1330	12070	Radio Netherlands via Uzbekistan	unid	2300	9510	Radio Romania Int'l	
1330	17600	Radio Rossii, Russia	RR	2300	7135	RTV Marocaine, Morocco	AA
1330	17720	Radio Romania Int'l	PP	2300	9875	Radio Vilnius, Lithuania	
1330	11950	Voice of Islamic Republic of Iran	Persian	2300	17680	Voz Cristiana, Chile	SS
1330	17535	Kol Israel	HH	2300	6715	Full Gospel Church, Canary Islands	KK, USB (not daily)
1330	15540	RDP Int'l, Portugal	PP				
1400	17790	Radio Romania Int'l		2330	9885	Swiss Radio International	
1400	9625	CBC Northern Service, Canada		2330	11760	VOA relay, Philippines	
1430	13765	Vatican Radio	AA	2330	11785	Radio Guaiaba, Brazil	PP

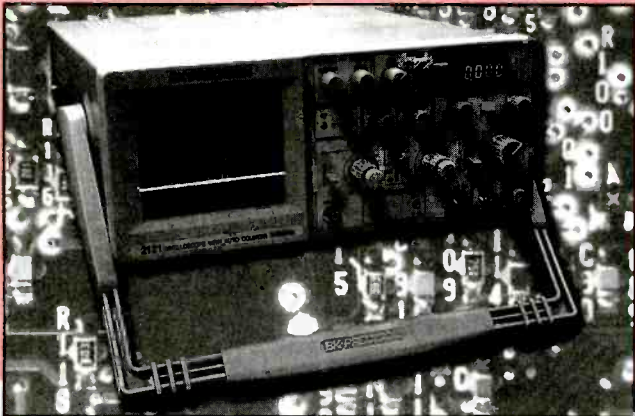
## radios & high-tech gear

review of new, interesting and useful products

### B+K Precision Introduces 30 MHz Dual-Channel Analog Oscilloscope With Frequency Counter

B+K Precision Corporation's new Model 2121 oscilloscope is a compact, versatile easy-to-use benchtop scope that incorporates a built-in frequency counter. It includes a number of features including dual or single trace operation (5 mV/div sensitivity), AUTO/NORM triggered sweep operation, and calibrated 23 step time base with a x10 magnifier.

The addition of the frequency counter allows for quicker, and in some cases more accurate signal analysis. Since the input of the counter is coupled with either input channel of the oscilloscope, the counter uses the same trigger level setting as the oscilloscope, allowing the counter to be used with more complex waveforms than allowed by many standalone frequency counters.



The B&K Precision oscilloscope with frequency counter.

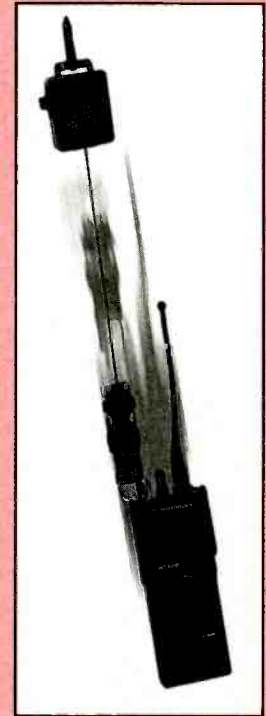
The Model 2121 measures a compact 14.5 inches high, 7 inches wide and 17 1/4 inches deep. It's covered by B+K's two-year warranty and comes complete with operating manual, PR-33A x 1/x10 type probes, AC power cord and spare fuse. It's priced at \$599. For more information or the name and location of an authorized distributor near you, contact B+K Precision Corporation, 22820 Savi Ranch Parkway, Yorba Linda, CA 92887 or phone 714-921-9095. They're also on the Web at [www.bkprecision.com](http://www.bkprecision.com).

### Gear Keeper® Tethers And Retractors

Hammerhead Industries, Inc.'s Gear Keeper® line of tethers and retractors for outdoor, marine, fire/rescue and law enforcement are perfect for scanner enthusiasts, hams, CBers and other radio users interested in keeping their gear safe. The heart of the devices is a gently spring-loaded, 28-inch nylon-coated steel cable which retracts into an attractive housing. A stainless steel spring-clip (or pin on a different model) allows the housing to attach to virtually any pants, belt, or purse; the



The Retractable CB Mic Keeper by Gear Keeper® is a great alternative to standard mobile mic mounts, especially for truckers.



The Two-Way Radio Security Tether is specially made for heavier radios.

retracting cable attaches to the radio or microphone with a special lanyard and quick-connect system for easy removal.

The Gear Keeper® Retractable Mic Tether, for example mounts and suspends your mic; grab your mic, use it and let it go - it retracts back every time so it's not dangling and you're not fumbling for your mic or trying to clip it back on your pocket or belt.

Truckers can now securely attach their CB mic to the headliner (hardware included) using the Retractable CB Mic Keeper. It works with most CB mics, keeping them safely and securely up and away until you need to use it!

The company even makes a Retractable FRS Radio Tether in three models; snap-clip mount, pin mount or belt clip mount. They keep your FRS radio handy, allowing you to clip it in any position on a jacket or harness, pull it toward you and use it, then let it gently snap back into place. You can also easily disconnect the radio from the Gear Keeper®

Another Gear Keeper® model, the Two-Way Radio Security Tether secures heavier radios with 80 pounds of breaking strength, locking your radio in any position. It's constructed of the same heavy-duty plastic and stainless steel as the other Gear Keeper® tethers. You can also buy an optional Slide Release System that allows you to quickly disconnect the radio from the tether.

For more information about the Gear Keeper® tethers and retractors, contact Hammerhead Industries, Inc. at 1501 Goodyear Avenue, Ventura, CA 93003, phone 805-658-9922 or visit them on the Web at [www.gearkeeper.com](http://www.gearkeeper.com). Be sure to tell them you read about their products in *Popular Communications*.

## Klingenfuss News

Klingenfuss has published a new edition of their famous Radio Data Code Manual. The handbook has more than 600 pages with 265 fascinating new screenshots and details on state-of-the-art digital data transmission systems such as: ACARS ALE, ALF-RDS, ALIS, ALIS-2, ARQ-E, ARQ-E3, ARQ-M, ASCII, BULG-ASCII, Chirp Sounders, CIS-36, MFSK, Clover Clover-2, Clover-2000, CODAN, Coquelet, DGPS, DSC, DUP-ARQ; Military modem standards, teleprinter alphabets, Unicode tables, the latest versions of major meteorological codes, thousands of new WMO index numbers of observing stations, thousands of new ICAO location indicators, solar and geophysical data, dozens of new Internet addresses, hundreds of new screenshots from our continuous radio monitoring; cryptology, and intelligence.

The new 17th edition is priced at 45 EUR including worldwide surface mail postage. If you would like to be among the first readers of the new book, you can place an advance order right now.

A new edition of the Encyclopedia Of Intelligence And Secret Services has been published by Klingenfuss. It has been considerably enlarged to 770 pages (!) and is, again, the most up-to-date international handbook on the current methods,

techniques, and organization of secret services all over the world. On page 44 it even notes the new Kommando Strategische Aufklaerung created on 17 JAN 2002! The author is a noted expert from the Swiss military.

This unique book is now available from us for 50 EUR including worldwide surface mail postage. Attention: this handbook is in French - there is NO English edition. The new edition can be ordered right now for immediate delivery.

You can save with Klingenfuss' new package price of 90 EUR for the Radio Data Code Manual and Encyclopedia Of Intelligence And Secret Services including worldwide surface mail postage!

Klingenfuss told us that "Due to excessive new so-called 'service charges' and really absurd new authorization procedures, we can't accept Visa card payments any longer. The whole story behind that - and convenient alternatives for Visa card holders - can be found at <http://www.klingenfuss.org/visa.htm>."

Please note their new e-mail address is [info@klingenfuss.org](mailto:info@klingenfuss.org). They also tell us, "Recently communication via e-mail has become more and more unreliable, and in the case of cyber attacks will crash completely. If you send us an e-mail message and don't get a reply within one or two days, we did not receive your message and you should contact us by other means. (But please note we're closed for a few weeks between April and September each year.) Good old telefax is still the safest and fastest way of communication, particularly for orders with payment by credit card. Forget that so-called SSL et al - its latest versions have been perfectly hacked!"

For more information contact Klingenfuss directly by phone at ++49 7071 62830 or FAX ++49 7071 600849 or visit them on the Web at [www.klingenfuss.org](http://www.klingenfuss.org). Tell them *Pop'Comm* sent you!

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### FCC To Study Increasing Access For Unlicensed Devices, And More

The Federal Communications Commission is asking for comments on whether unlicensed operations should be permitted in additional frequency bands, such as those used by TV broadcasters, during times when the spectrum is not being used (Notice of Inquiry, FCC 02-328). Many devices such as cordless phones, home security systems, electronic toys, inventory control systems, and wireless local area networks (LANs) use unlicensed spectrum on a low-power, non-interference basis. "The success of those rules," according to an FCC statement, "shows that there could be significant benefits to the economy, businesses and consumers in making additional spectrum available for unlicensed transmitters."

Although the FCC is specifically looking at use of the TV broadcast band, it is also seeking comment on the feasibility of permitting unlicensed devices to operate in other bands, such as the 3650- to 3700-MHz band, at power levels higher than other unlicensed transmitters and with only the minimal technical requirements necessary to prevent interference to licensed services. The FCC statement continues,

There have been significant advances in technology that may make it feasible to design new types of unlicensed devices that are able to share spectrum in the TV bands without causing interference to licensed services operating in those bands.

Advances in computer technology make it possible to design equipment that could monitor the spectrum to detect frequencies already in use and ensure that transmissions only occur on open frequencies. The low cost of GPS equipment could allow a device to determine its location and use information from a database to determine whether there are any licensed operations in its vicinity. Equipment can be designed that is frequency agile, with the capability of changing frequency as needed to avoid interference to licensed users.

#### Defense Department Seeks Wireless Access Limit

It sounds as if the Defense Department is getting a little worried. All of this talk about snatching spectrum for wireless devices has the brass concerned about interference with military radar systems. DoD is finally speaking up, seeking limits on frequency spectrum-sharing technologies. Of course, the wireless industry is clutching its collective chest in horror. Limitations could negatively affect the growth of popular wireless Internet access technologies. Though DoD reports no interference problems between wireless Net use and military radar yet, they believe that spectrum-sharing technology is unproven and could ultimately cause interference problems. Just to prove that it's serious about all this nail biting, they have taken their concerns to the World Administrative Radio Conference (WARC), which oversees radio frequency allocations and standards. Stay tuned.

#### Nextel Snags GSA Contract

Nextel Communications has announced the acquisition of a General Services Administration (GSA) contract to provide nationwide Enhanced Special-ized Mobile Radio (ESMR) services to all federal agencies, as well as state and local agencies with federal funding. Nextel will also offer interoperability for emergency preparedness and response. The two-year base contract with three one-year option periods is estimated to ring up at \$200 million per year. The contract is said to offer access to wireless phones and accessories, Nextel's Java-technology-enabled wireless phones, wireless packet data tools, Nextel Direct Connect, digital, long-range two-way feature, messaging services, Custom Network Solutions, and the Emergency Response rental program.

#### Paying For Bandwidth

Somebody's getting a little desperate. Nextel Communications, Inc., has offered a wireless spectrum swap. In exchange for bandwidth, the company says it will pay \$850 million to upgrade public safety communications (up from its original offer of \$500 million). Nextel said it would raise backing to retune the equipment of public safety agencies and others on the 800-MHz band so they could communicate without interference. Of course, this sly plan has its critics, who say it's an unfair move for the rest of the wireless community. You can read the CTIA's comments at <<http://www.wow-com.com/industry/policy/legal/>>.

#### Treasury Gets P25 Radios

EF Johnson, Inc. has announced a \$970,000 order from the Department of the Treasury for SMARTNET, SmartZone, and Project 25 digital portable and mobile radios. The 5100-series and 5300-series software programmable radios will be used at the Federal Law Enforcement Training Center (FLETC) in Glynco, Georgia.

#### Mitnick Gets His Ticket Back

The FCC has renewed convicted computer hacker Kevin Mitnick's amateur radio license. The license came up for renewal in 1999, but Mitnick was a little busy serving a five-year prison term for computer fraud, theft, and various other crimes. The Commission delayed a decision until recently, when it decided the ex-con was "sufficiently rehabilitated to show that he now possesses the requisite character for the renewal of his licenses in the amateur radio service."

Mitnick says that ham radio has been his hobby since he was 13 years old and that it led him to his interest in computer hacking. "It's how I first became intoxicated with technology, with figuring out how things worked. Ham radio was all about communication but also about building radios. I loved taking things apart and then putting them together." The fight to get his ticket back has cost the former felon \$16,000 in legal costs, money that he is attempting to defray by auctioning items (such as a signed galley of the book he co-wrote with William Simon, *The Art of Deception: Controlling the Human Element of Security*) on eBay. Mitnick says getting his renewal has been expensive, but worth it.

### California Speedway Nailed For Unlicensed Operation

The FCC has issued a monetary forfeiture to California Speedway for using an unlicensed radio transmitter. The Fontana, California, business was docked \$8,000 after an investigation by the Los Angeles FCC Office revealed a radio transmitter operating on 104.7-MHz FM in apparent violation of Section 301 of the Communications Act of 1934, as amended. The Director of Operations for the business told an agent of the FCC that California Speedway operates a 1-watt transmitter on 104.7 MHz only during events. Though they hold a license to operate on several frequencies in the 461- to 466-MHz band under callsign WPJX911, they have no license for an FM broadcast frequency.

The Commission sent a Notice of Unlicensed Radio Operation to California Speedway warning them of the violation, but received no response. After another phone call to warn the business to cease operation of the transmitter or face a penalty, agents used a Mobile Digital Direction Finding vehicle and direction finding techniques at the Speedway and detected radio transmissions on frequency 104.7 MHz from a location in the middle of the grounds of California Speedway. Field strength measurements revealed that the radio emissions exceeded the levels allowed for non-licensed operation. Though the business argued against the forfeiture, stating that they were never told they were prohibited from using the equipment, the FCC disagreed. ■

# v.i.p.

## spotlight *how you got started in radio*

### Congratulations To Jim Gurley Of Paducah, Kentucky!

**P**opular 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 (no Polaroids, please) should be included.

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

The person whose entry is selected will receive a one-year gift subscription (or one-year subscription extension) to *Popular Communications*. 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>, letting us know if you're sending photos. Please print your return address on the envelope if using the postal mail system. Not doing so will delay your submission being

processed. If you're e-mailing photos, please send them in a separate e-mail with your name in the "subject" line.

### Our March Winner: Jim Gurley, KG4HSF

*Pop'Comm* reader Jim Gurley of Kentucky says,

My interest in radio goes back to when I was a teenager and bought my first portable radio at a local Western Auto store. When I got home my father made me return it because it was battery operated. He said it wouldn't last because it wasn't electric, so I did return it. But that was the beginning of my interest in radio, and since then I have always had some kind of radio by my side. The 1940s' Zenith to the left in the photo still brings in those SW signals really well.

My other equipment includes an ICOM W32A, AOR 8000, AOR 8200, Yaesu VX5R, ICOM R10, and a CCRadio Plus, which does great on AM distant stations. I got my ham license in 2000, and I often wonder if my Dad had not made me return my first radio if I would have the interest I do in all radio communications. I have a 10-year-old grandson who is studying for his ham license. We both enjoy *Popular Communications* very much. ■



Jim Gurley's neat monitoring post in Paducah, Kentucky.

### What Is The Ionosphere?

I've had a few letters and e-mails asking for more details about the ionosphere and how radio waves propagate in this region of our atmosphere. What happens exactly as an atom becomes ionized? What is believed to happen at this level when a radiowave encounters ionized gases? What causes reflection or refraction? What physically accounts for the fact that some frequencies do not reflect off of these gases while some do?

Earth's atmosphere is a mixture of gases held to the surface of the earth by gravity. These gases vary in density and composition as the altitude increases above the surface. As the atmosphere extends outward from earth, it becomes thinner and blends with particles of interplanetary space.

The first 60 miles of earth's atmosphere consists of a homogeneous mixture of various gases. This region is called the homosphere. Above the homosphere lies the heterosphere where the gases are no longer uniformly mixed. Relatively more of the heavy gas molecules, such as  $N_2$  and  $O_2$ , are found near the bottom of this region, and relatively more of the lighter gases, such as hydrogen and helium, are found near the top.

The atmosphere is also divided into four regions according to temperature trends: the troposphere, the stratosphere, the mesosphere, and the thermosphere.

The troposphere is the lowest region and extends from the earth's surface up to about six miles. The gases in this region are heavier than those in higher altitudes and include the molecular oxygen ( $O_2$ ) and molecular nitrogen ( $N_2$ ). Earth's highest mountains reach to within the troposphere, and it is also where the high-altitude jet stream is found. Weather is confined to this lower region, and it contains 90 percent of the Earth's atmosphere and 99% of the water vapor.

The atmosphere above the troposphere is called the stratosphere, and it starts about six miles out. Gas composition changes slightly as the altitude increases and the air thins. In this layer, incoming solar radiation at wavelengths below 240 nanometers creates ozone, a molecule of

oxygen consisting of three oxygen atoms ( $O_3$ ). This gas reaches a peak density of a few parts per million at an altitude of about 16 miles.

#### Where The Ionosphere Begins

At an altitude above 50 miles, the gas is so thin that free electrons can exist for short periods before they are captured by a nearby positive ion. The existence of charged particles at this altitude and above marks the beginning of the ionosphere, a region having the properties of a gas and plasma.

Above the ionosphere exists a vast region of charged particles formed by the interaction between the solar wind and earth's magnetic field. It is called the magnetosphere and begins at about 600 miles above the earth's surface. It extends to a distance of about 40,000 miles on the side facing the sun and even to greater distances on the side of the earth that is turned away from the sun.

#### How Is The Ionosphere Formed?

Much of the energy from the sun that reaches our atmosphere is absorbed. All of the hazardous ionizing radiation, gamma rays and x-rays are blocked before they reach the surface. Much of the ultraviolet radiation from the sun is also absorbed. The deepest penetrating of these waves is in the ultraviolet range. Atmospheric ozone in the ozone layer is the greatest absorber of ultraviolet radiation, protecting virtually all life forms on earth. Solar radiation at ultraviolet and shorter wavelengths is considered "ionizing" since photons of energy at these frequencies are capable of dislodging an electron from a neutral gas atom or molecule during a collision.

Atoms in the ionosphere absorb the incoming solar radiation, causing them to become highly excited. When an atom becomes energized, an electron may break away from its orbit, and free electrons and positively charged ions are produced. At

the highest levels of the earth's outer atmosphere, solar radiation is very strong but there are few atoms to interact with, so little ionization occurs. As the altitude decreases, more gas atoms are present so the ionization process increases.

At the same time, however, an opposing process, called recombination, begins to take place. In recombination, a free electron is "captured" by a positive ion if it moves close enough to it. As the gas density increases at lower altitudes, the process accelerates since the gas molecules and ions are closer together.

Because the composition of the atmosphere changes with height, the ion production rate also changes, and this leads to the formation of several distinct ionization regions, known as the *D*, *E*, *F*<sub>1</sub>, and *F*<sub>2</sub> layers. The breakdown between layers is based on what wavelength of solar radiation is most frequently absorbed in that region.

The *D* region is the lowest in altitude, though it absorbs the most energetic radiation, known as hard x-rays. The *D* region doesn't have a definite starting and stopping point, but includes the ionization that occurs below about 56 miles. This region absorbs high frequency (HF) waves between 3 and 30 MHz or wavelengths between 100 meters and 10 meters. It refracts frequencies in the range of 3 to 30 kHz very low frequencies (VLF). This region is a **daytime layer** due to the density of the gases. Absorption of ultra-violet and visible light radiation creates more negative ions than electrons during the day. At night these ions quickly recombine with other ionic particles.

The *E* region of the ionosphere extends from about 56 miles up to about 65 miles. The air here is considerably thinner than in the layers below it so there are fewer collisions of ions and electrons, resulting in a population of molecular ions. The *E* region absorbs soft x-rays. This layer is **highly variable from day to night**.

The *F* region is the largest part of the ionosphere, as well as the highest. It extends from about 65 miles up through the end of our atmosphere. Since particle densities decrease as you travel away from earth, it is difficult to say exactly

where our atmosphere ends. Since it is such a large region, the *F* layer is divided into two sections, the **daytime layer,  $F_1$ , and the denser  $F_2$  region** which exists both during the day and night.

In the upper reaches of the ionosphere gravity has a lessening effect on particles. As a result, particles create different layers, depending on their mass. The heavier particles sink to the bottom of the *F* region and the lighter ones rise to the top. This explains why electron density increases with altitude.

Along the day/night meridian, electron numbers rise and fall. At sunset electrons decrease, resulting in recombination of these particles with ions in the  $F_1$  layer during the night. On the sunrise meridian, electron numbers increase as neutral molecules and atoms absorb solar radiation, mostly ultra-violet.

## Radiowaves In The Ionosphere

As an electromagnetic wave enters the ionosphere at the *D* layer, the energy sets electrons in motion. Because this layer is so dense, there is a high probability that the energy will be absorbed in a collision

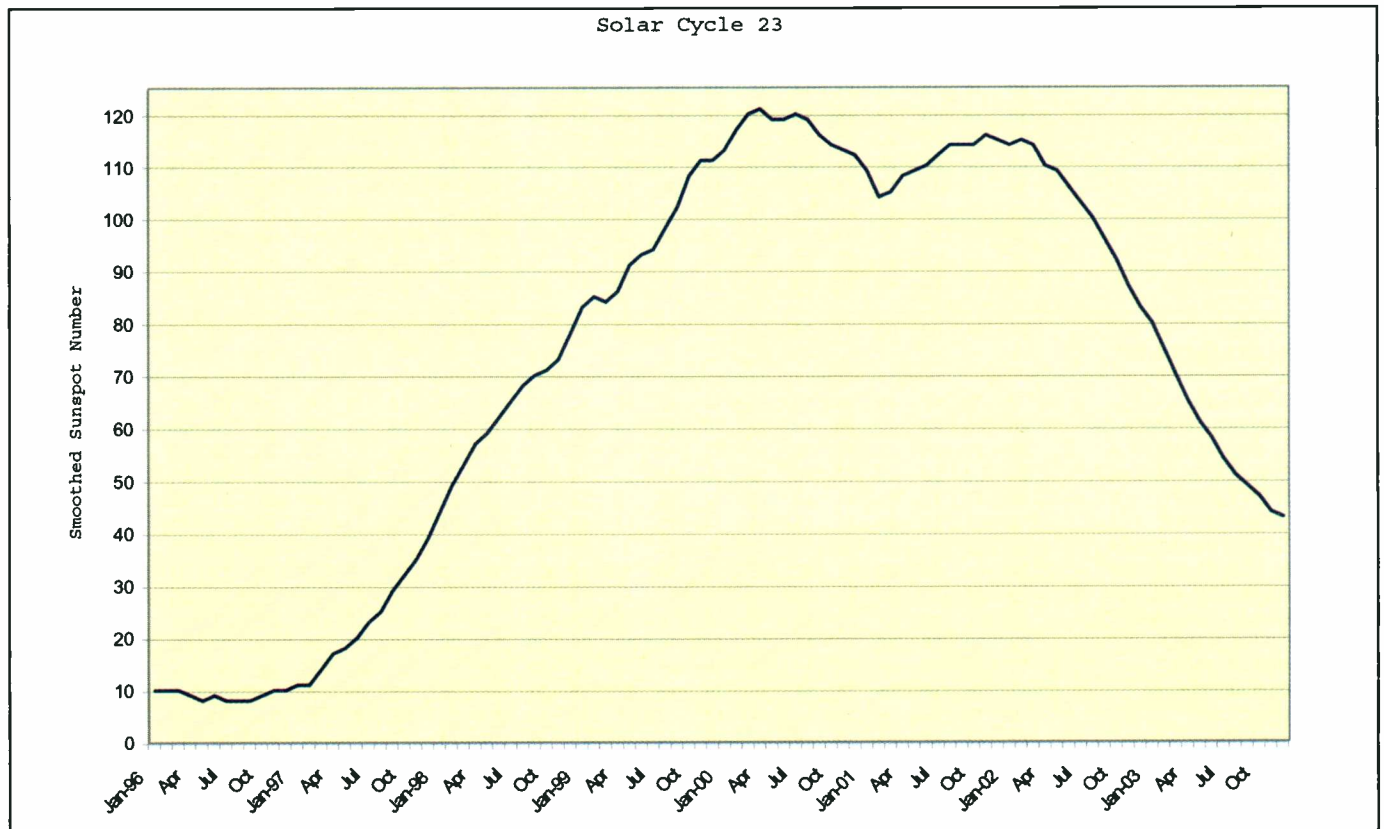
with nearby molecules. The electromagnetic energy is turned into kinetic energy (heat) and, as far as radio propagation is concerned, lost. The higher the frequency and the shorter the wavelength, the higher the energy, but also the fewer collisions between free electrons and gas molecules than at lower frequencies. As a result, lower frequency signals are attenuated far more than those at higher frequencies. It is possible that the lowest frequencies are completely absorbed, while higher frequencies will make it through to the *E* layer.

Since the *E* layer is less dense than the *D* layer, electrons are not so quickly recombined with neighboring atoms, so losses are lower. Because these electrons are not as quickly bound with other atoms, they lose energy and the electromagnetic wave is re-radiated. Because the signal is traveling in an area where electron density is increasing it will go further. At the same time, the wave is bent away from the denser, and higher, area of electrons. The amount of bending, or refraction, depends on the frequency of the wave: the higher the frequency, the more energy that wave has and the more likely it is to pass through the layer to reach the next higher region.

When an electromagnetic wave enters the *F* layer, the same phenomenon takes place. The radio signal rides the free electrons of this layer, and, if the frequency of the signal is high enough, it will pass through the layer out into space. Otherwise, it will gradually bend back away from the higher and denser layers of electrons to be sent back toward earth.

Those frequencies that are refracted back to earth have to pass through the lower ionospheric layers again. *D* layer absorption will attenuate the signal some more. If there is enough energy in the signal, the wave may bounce between the ionosphere and earth multiple times, greatly extending the distance it can travel. Under some conditions, it might be so absorbed that no communications are possible. Under other conditions, a radiowave will enter the Ionosphere, bounce off the *F* layer, but then refract back up away from the *E* layer, making multiple "hops" until it can punch back through the *E* layer and back to earth.

All this depends on how ionized the gases become in these various layers, and how dense each layer is, as well as the strength, angle of incidence, and frequency of the radio signal. Ionization depends on the direct energy from solar



Current Solar Cycle 23, smoothed sunspot numbers. August 2002 through December 2003 smoothed sunspots are forecast.





radiation. Would all of the layers of the ionosphere perform identically if they each received the same amount of solar energy? No, because of the different gases found in each layer and the density of those layers.

## Current Solar Cycle 23 Progress

Solar activity continues to show a decline in the current cycle. The Royal Observatory of Belgium reports a monthly mean sunspot number of 80 for January 2003, down 2 points from December 2002. The low for the month was 27 on January 2, and the high was 117 on January 10 and again on the 11th. This results in a smoothed sunspot number of 103 centered on July 2002, down from June. A smoothed sunspot level of 65 is expected for April 2003, plus or minus 12 points.

Canada's Dominion Radio Astrophysical Observatory at Penticton, British Columbia, reports a 10.7-cm observed monthly mean solar flux of 144 for January, down from December. The 12-month smoothed 10.7-cm flux centered on July 2002 is 176, down from June's 1883. A smoothed 10.7-cm solar flux of about 122 is predicted for April 2003, plus or minus about 17 points.

The observed monthly mean planetary A Index (Ap) for January 2003 is 13, the same as for December. The 12-month smoothed Ap index centered on June 2002 is 13.9.

## HF Propagation

On the higher HF frequencies (16 through 11 meters), fairly good daytime openings should be possible on north/south paths, but in shorter windows. As we move closer to summer, daytime DX signals on 16 through 11 meters will become weaker and openings sparser than during the fall and winter.

As the days grow longer in the Northern Hemisphere, the sun heats and thins the ionosphere. With less ionization, the maximum frequency refracted is lower than during colder months. By June, this thinning causes a real reduction in the maximum usable frequency. Sixteen meters will be the best bet out of the higher bands, not only because of propagation, but also because more international broadcasters will still use this band around the clock.

Most DX signals, and the strongest signals, will be found on lower bands. When the 10.7-cm flux is high, especially above 120, conditions on 19 (and sometimes on 16) meters are great. Look for peaks in signals around in the hours near sunrise, and again just before sunset and into late evening. Daytime paths are best when they terminate in areas where it is night;

this enhances propagation to remote parts of the world and lengthens the DX window. Twenty-five and 22 meters will have more stable signals than 19 meters will, especially on north/south paths, again around the hours of sunrise and sunset. Thirty-one meters again becomes one of the strongest and most reliable bands, though you will find it congested. Look

## 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) means 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>>.

for Europe and Africa early in the morning through late morning, then north/south openings during the day if the solar activity is low (otherwise the *D* layer absorption will wipe out the band). As sunset approaches, look for South Pacific, then Asia as the sun sets.

At night, 41 through 60 meters should provide good openings from Europe, Africa, and the east. Some DX should be possible on 75 through 120 meters, but signals are expected to be mainly weak and covered by seasonal noise. Static levels also increase noticeably during May, and signals may sound weaker on DX openings during the daylight hours.

## VHF Conditions

Possible transequatorial propagation, occasional *F* layer propagation, and moderate auroral activity will keep the VHF enthusiast happy. Solar activity will continue to be high enough so that an *F* layer DX opening might be possible on low VHF. Such openings will not last long, however. Look for them when the 10.7-cm flux approaches the 125 level, perhaps for a couple of days. The best time to look for these openings is during the afternoon hours on those days with high flux readings.

Sporadic-*E* ionization is expected to

increase considerably during May, and fairly frequent VHF meteor-scatter short-skip openings should be possible. These are likely to occur over distances of approximately 1,000 to 1,400 miles. Although sporadic-*E* openings can take place at just about any time, the best time to check is between 10 a.m. and 2 p.m. and again between 6 and 10 p.m. local daylight time.

A seasonal decline in transequatorial (TE) propagation is expected during May. An occasional opening may still be possible on VHF. The best time to check for VHF 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.

Auroral activity is generally lower than in March and April due to the change in the orientation and position of the earth and magnetosphere in relation to the solar wind. Watch for Keplarian (*Kp*) values above 6, which occur on days of disturbed HF conditions.

One major meteor shower, the **Eta Aquarids**, will occur in May. The Eta Aquarids peak in the morning of **May 6**, but start around April 24, 2003. This shower has a peak rate of up to 60 per hour. Most meteor showers are at their best after midnight. At that hour, you're on the leading edge of the earth and meeting the meteors head-on; before midnight, you're on the trailing edge of the earth and the meteors have to catch up to you. That's why not only are more meteors seen in the pre-dawn hours, but their impact speeds as they encounter the earth's atmosphere are much higher and the meteors generally faster and brighter. This also causes greater ionization, which is what you use to refract a radio signal. Look for TV and FM broadcasts during these events. If you are an amateur radio operator, look for 6- and 2-meter openings off of the ionized meteor trails.

## Keep Sending Your E-mails And Letters

If there's something you would like me to cover in an up-coming issue, please send me an e-mail to <pc-prop-man@hfradio.org> or a letter to *Popular Communications*, "Propagation Corner," 25 Newbridge Road, Hicksville, NY 11801. Is the information I'm presenting here helpful? I look forward to hearing from you.

Happy hunting those signals! Until next month, 73!

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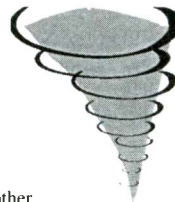
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# the wireless connection

a look behind the dials

by Peter J. Bertini <radioconnection@juno.com>

## The Largest Cathedral Radio Ever Made!

Admit it; I'm a bottom feeder. In the world of vintage radios, I'm the fellow who buys the clunkers—the guy looking under the radio show tables for sets with major cabinet damage or a rusted chassis. It's a matter of necessity. I can't justify laying out the hefty prices that the larger tombstone radios I prefer to collect would command if in good condition.

Now, not all of the sets I acquire need major restoration, and part of this art is recognizing how much "restoration" needs to be—or should be—done to bring a radio into presentable condition. It's fine to bring a "basket case" into as-new factory condition, but to restore a set showing the wear appropriate for its age to showroom condition might be a travesty in the opinion of some collectors!

There are means to bring back old finishes exhibiting minor crazing or scratches to very presentable condition. Sometimes the old finish can be lightly sanded or lightly rubbed with 0000 furniture-grade steel wool and brought back to as-new with a fresh finish coat of lacquer. That seems to work 40 percent of time, but when it fails it's time to strip to the bare wood and start fresh. I'll discuss some of the products and how to apply them in future columns.

For now, here's a tale of two vintage Philco radios that needed heroic measures to bring them back after years of neglect.

### The Mighty Philco 16B

Photo A shows the as-found condition of two of the larger Philco wood table radios in my collection. Both date to Philco's 1934 model year. Believe it or not, except for the speaker size, both sets use the identical chassis! Both are Philco 16B models; the art-deco tombstone shown in Photo B is the earliest version, the later tombstone was less deco in styling and featured shouldered sides.

The earlier 16B tombstone is a very popular and sought-after set. The 16B cathedral was certainly Philco's biggest ever, and it was also probably the largest cathedral radio manufactured by anyone, at least that I'm aware of. These sets use a large 11-tube chassis, and the early models covered five bands: 550 to 1500 kc, 1.5 to 4.1 mc, 4.1 to 10 mc, and 9.8 to 22 mc. They featured Philco's QAVC (quiet automatic volume control) system. When the QAVC was activated by the side-mounted toggle switch, a pot on the rear chassis apron determined the threshold signal level needed for a station to be heard—simply, it was an early squelch circuit. The 16B, which was also offered in a floor console model, featured the Philco shadow meter tuning system, which was offered in floor console cabinets as well. Before long, Philco changed the 16B design by adding an RF stage, dropping the QVAC feature, and going to four bands instead of the original five-band coverage.

Some feel the 16B is one of the finest shortwave receivers ever made. I suppose this could be argued, but they are fun band cruisers and nice eye candy! The audio is produced by a 42 audio power tube driving a pair of 42 tubes in push-pull Class A. Wow!



Photo A. The author's Philco 16B radios, the early art deco tombstone and the cathedral. Both radios were in very poor condition, but the cathedral was a basket case.



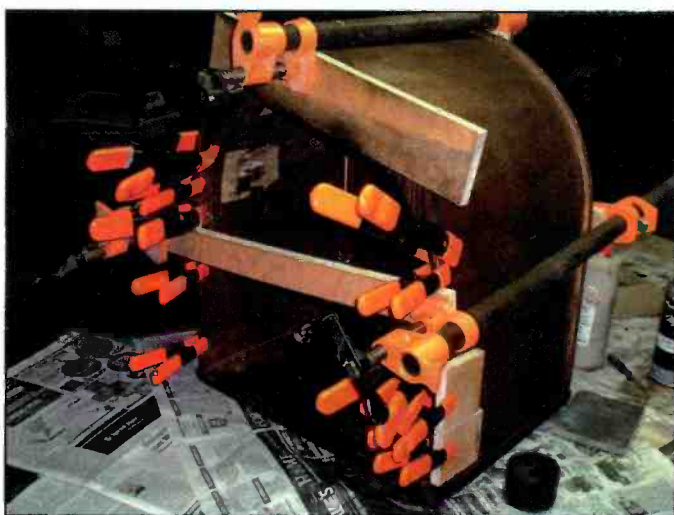
Photo B. The 16B early deco tombstone is the most sought after model.

The audio was high-fidelity by 1934 standards, and they still sound sweet today!

## The 16B Cathedral

Of the two, my 16B cathedral was the bigger basket case. The 16B deco tombstone needed a refinishing, a new grille cloth, and minor woodworking. Nothing major there. The cathedral was another story. I had acquired the chassis several years before I was fortunate enough to obtain a restorable cathedral cabinet from my late friend, Frank Maggiore.

The price was right, but the cabinet had several major problems. The finish was gone. The outer cabinet had areas with missing veneer. The speaker fretwork was broken, and the damaged pieces were missing. Although the damage was beyond my expertise at the time, I displayed the radios in as-found condition. Eventually encouraged by advice and guidance offered by friends on the Rec.Antique.Radios&Phono Internet newsgroup, I decided to tackle both of 16B cabinets, with extra attention to the needs of the cathedral's restoration.



*Photo C. You can never have enough hands—or wood clamps—when it's time to glue up an old cabinet. Here, the 16B cathedral is undergoing cabinet restoration.*



*Photo D. Three areas missing veneer are patched using roughly cut in and glued veneer patches. Gaps were later filled with wood filler and then sanded after the filler dried.*



*Photo E. Another missing area is patched on the opposite side of the cathedral shell.*

The cabinet needed to be reglued because the sides were separating from the front panel and base. Also, there was delaminating of the veneer layers at the rear edge of the cabinet housing. **Photo C** shows the first steps I went through to save this radio.

First, I thoroughly removed what little was left of the old lacquer with a Citristrip, a finishing stripper that was strongly endorsed on the antique radio newsgroup. Citristrip works great, but you'll find the old lacquer and spent Citristrip flows off as a gooey mess! This is easily cleaned up, though, using sawdust or wood-chip based hamster/rabbit bedding (from a pet store) to absorb the waste. Wear eye protection and follow the manufacturer's directions! While Citristrip has a seemingly harmless citrus aroma, it is a caustic chemical. I then gave the cabinet a final wipe down with clean rags dampened with Naptha.

After regluing the joints, I used wood-working pipe clamps to hold the major sections together while the glue set overnight. I had to work freshly applied carpenter's glue into the delaminated areas of the rear edge of the cabinet, and used spring clamps to hold the laminations together until the glue set.

**Photos D** and **E** show how I patched in new veneer on the



*Photo F. It looks bad, but it is really worse than it looks. What remains is the center core of the fretwork, the outer layers are missing on both sides. A lot of work is needed.*

cabinet shell. I cut replacement veneer patches from scrap pieces of veneer laying about the shop. It pays to remove and save all veneer from scrapped radio cabinets! Don't throw anything away—you need to match wood type, thickness, and grain pattern to do the job like a pro. My efforts were a little less than stellar, but I got by using some wood filler where the edges didn't match up perfectly and left some small gaps! (I'll confess to a little light sanding to make things level, but please don't tell anyone.)

But you can do even better than I did! One trick for a perfect patch is to use a square to make the cuts. First, cut and trim the damaged areas on the cabinet to leave a perfect 45-degree triangular area of missing veneer. Then cut a replacement patch also on a 45-degree corner, glue and slide into place to make a perfectly tight butt seam against the original veneer. If you make a good match of the veneer type and grain pattern, the patch will be nearly invisible. Once the glue has dried, you can trim the excess veneer flush with the cabinet edge and stain it to match the rest of the cabinet if needed.

## Fixing The Speaker Fretwork

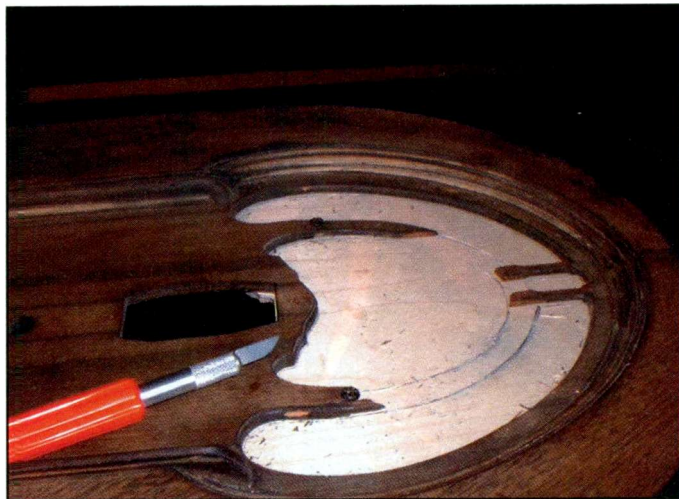
**Photo F** gives a good idea of the damage done to this area of the cabinet. The remaining laminations making up the fretwork showed signs of separation. The wood was very brittle and lacked strength due to the failing glue. Remember, the strength is enhanced by the cross-grained layering of the wood substrates! These areas had to be glued and clamped before any new work could be started.

Since most of the damaged pieces were long gone, I needed a template of the original grille to follow when replicating the damaged areas. I could either use a French curve and some free-hand artistry based on what was left, or trace the speaker opening from a good 16B cabinet. I was lucky enough to find someone willing to make the tracing for me.

I added a sheet of micro-plywood, sized to fit the full speaker opening, behind the front panel. The fretwork tracing was copied to the plywood and, once carefully aligned with the remaining material, glued in place. This reinforced what was left of the original fretwork and provided a foundation and guide to build up the new layers of wood. I used sheets of 1/16- and 1/32-inch-thick birch plywood for this project. Birch micro-plywood is surprisingly strong stuff and is carried by larger hobby shops, but it isn't cheap!

**Photo G** shows the new plywood sheet glued behind the cabinet. The next step was to cut the excess away using an X-Acto hobby knife and a supply of sharp blades! The results are shown in **Photo H**. Next, the remaining layers of missing wood had to be built up, missing layer upon missing layer, trimmed and sanded to match the birch plywood template as each new layer was applied. Again, it helps to have a scrap bin of reclaimed old veneers and cabinet woods—matching the wood thickness of the missing layers is critical!

I should also note two other things here. First, I trimmed the remaining fretwork layers to produce “steps,” with the innermost layer protruding out (exposed) the furthest. This permitted an overlapping of the new layers over the old, producing a much stronger “sandwich” joint than if a single butt-joint were attempted! I also trimmed back all remaining areas that would have ended at speaker mounting holes—the speaker needs to mount to the strongest possible structure, and allowing splices at the screw holes invites future problems. Second, it's very



*Photo G. The micro-plywood sheet, with the grille tracing, is glued in position. The fretwork will be trimmed out using an X-Acto knife with fresh blades.*

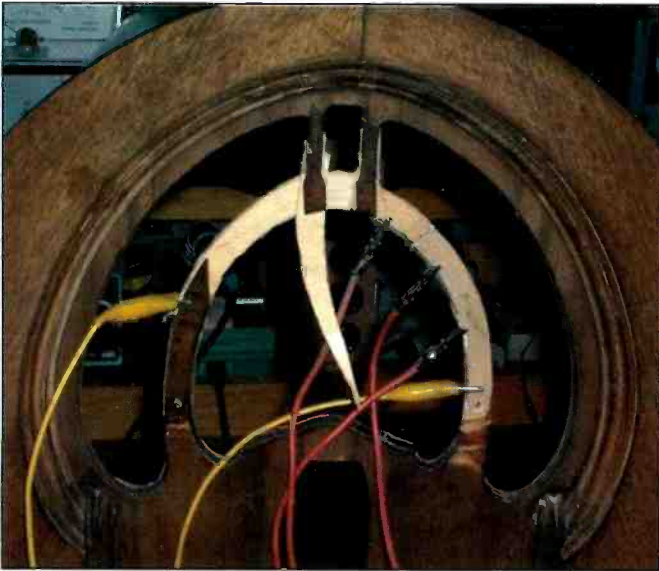


*Photo H. The micro-plywood is carefully cut, following the tracing outline. Fine tuning will be done using sandpaper.*

important to drill any new speaker hardware holes from the front using a brad-point drill bit. Drilling from the back will splinter out the veneer, resulting in a real mess if you have already done the hand-rubbed lacquer refinishing. Don't ask.

**Photos I and J** show how the layers progress. In all, I added five layers, including the added piece of micro-plywood used as the foundation and template. As each layer was added and once the glue dried, I trimmed the newest layer to match the bottom section of micro-plywood, which served as a template and guide as the work progressed. Some sanding was needed to “even” out the surface final layer.

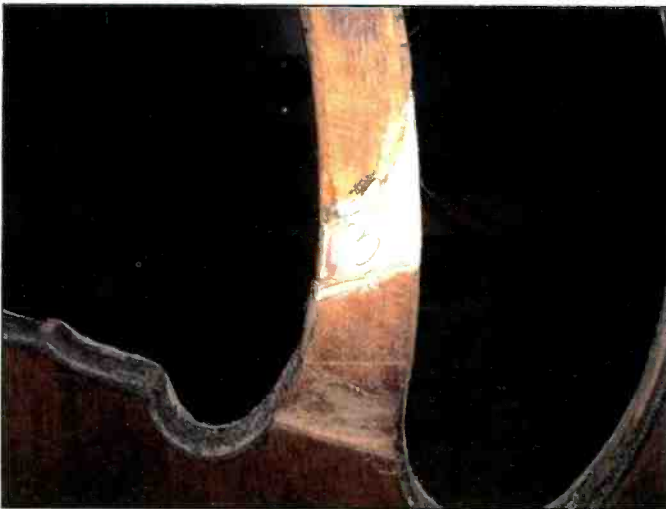
My attempts at matching weren't perfect, but I was able to fudge things so the transition between old and new was smooth and level. **Photo K** shows the speaker fretwork with the final finish layer of walnut veneer added and stained to match the original walnut cabinet veneer. I used a furniture touch-up pen to match the new to the old veneers. **Photo L** shows the cabinet after it was finished using Perfect Brown toner, followed by several coats of hand-rubbed Parks gloss lacquer. The overall



*Photo I. New layers are added and held in place as the glue dries.*



*Photo K. Here's the finish layer of veneer in place and stained to match. It's starting to look as good as new at this point, thanks to some final sanding and trimming.*



*Photo J. Tiny pieces are fitted where gaps remain between salvaged original pieces. Here, the patch lies over one of the speaker mounting holes.*

finish is a tad darker than I had wanted, but I did have some veneer matching issues to hide on the side edges, and the walnut grain of the front panel veneer shows through much better than the photos indicate.

Also, the original fretwork had an ogee edging. Since I lacked a small enough router and bit to replicate the original, I simply hand-sanded a curved edge on the outsides of the inner fretwork to approximate the look of the original ogee. Router bits are made for Dremel tools that might be the best approach if a true ogee edge is desired. It is good enough to fool anyone who isn't an astute Philco collector!

I worked on the project over several sittings on a long weekend. Waiting for the glue to dry as each new layer was added consumed most of the time, followed by the trimming and sanding. Yet, I was amazed at how well the cabinet repairs came out—much better than I had hoped! If there's a lesson here, it's to have faith in your abilities and try to do what you think you can't! What is there to lose?



*Photo L. The cabinet has been finished with Perfect Brown toner followed by several coats of hand-rubbed gloss lacquer. I went a few shades too dark with the toner, but the set looks gorgeous! I'm going to leave it alone for now.*



Photo M. It took several years to get around to these radios, but the wait was well worth it!

Photo N. Ed demonstrates how he uses a small counter to align a receiver.



Photo M tells it all. The 16B cathedral sports new replica knobs, and that's the original grille cloth after a gentle hand cleaning! The deco 16B tombstone cabinet has been reglued and refinished, and it sports a new replica grille cloth and dial escutcheon. Both sets are fully electrically restored and play as good as they look.

Was it all worth it? The cathedral isn't especially valuable, maybe \$200 to \$400, depending upon the market. Philco made a lot of cathedrals based on Clyde Shuler's cabinet design, so the 16B, except for size, looks much like a Philco 19B, 43, 44, 52B, 60B, 71B, 91B, 89B, or even the diminutive four-tube 80 Jr. No matter. Bringing this giant back was a labor of love for me; besides I tend to favor sets I've invested some sweat equity in. I've seen sellers asking over \$1,000 for restored deco 16B tombstones, however. These were the top-of-line offerings during the height of the great Depression. I suspect most working-class families considered themselves lucky if they could afford the modest Philco 80-Jr., or maybe an 89B, during those times.

### More On Receiver Alignment

Ed Engelken comments on our November column:

Just got around to reading your November column on signal generators and frequency counters. Well done! I have a suggestion.

How about using a handheld frequency counter to directly measure the frequency of the LO [local oscillator] of a receiver to do the alignment?

Here is how I do it: To align the IF, simply tune in a local BC [broadcast] station and

adjust the LO to the BC station frequency plus the IF frequency. This produces an exact IF frequency at the output of the first mixer (converter). Peak the IF cans and you have it!

To align the LO on the BC and other bands, set the dial at the proper signal frequency, cal-

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culate the IF plus signal frequency and set the LO to that value. The signal-frequency circuits can be peaked up on BC and shortwave stations at known frequencies (or use your signal generator). This procedure has the advantage of getting the LO on the proper side (usually the high side) of the signal frequency.

Some sets, like the Hallicrafters S-40, put the LO on the low side of the signal on Band 4. It only takes about a half-turn of the trimmer to move the LO from the high to the low side of the signal at 35 MHz. The counter makes the adjustment easy. Trying to do the alignment with a signal generator will result in getting the LO on the wrong side of the signal about half the time!

I suspect many of the problems folks have aligning multiband sets result from getting the LO on the wrong side of the signal on the high-frequency band. Most people don't know how to turn the LO trimmer all the way down then bring it up in capacity and look for the second peak to get the LO on the high side. The counter eliminates all the confusion. It's a lot quicker, too, as you know exactly where the LO is and which way and how far to move it.

The counter is great for spot-checking the alignment of a set without the hassle of setting a signal generator. It also provides a

quick indication that the LO is working and that it is on the proper frequency. That is a big help when installing those "universal" oscillator coils or trimming a hand-wound oscillator coil.

I've included a photo of my counter in action. The radio is a National NC-125 and it is tuned to WOAI located in San Antonio, Texas, broadcasting on 1200 kHz. The counter "antenna" is a piece of hookup wire attached to a BNC-to-Binding Post adapter. In **Photo N**, the antenna is being held about one inch above the LO section of the tuning capacitor. The reading of 1655 kHz corresponds to the received frequency (1200 kHz) plus the IF frequency (455 kHz). I put the BFO on and could tell little difference in the beat note when sniffing the LO—perhaps 100 Hz at most. Of course, you should use as loose a coupling as you can and still get stable readings.

The counter used is a RadioShack device, catalog number 22-306, but the older #22-305 works as well. Unfortunately, they are no longer sold but they do regularly show up on eBay. There is an outfit that advertises in *Popular Communications* from time to time that has a similar unit for \$99. [*Elenco Model F-2800, available from C&S Sales, <www.cs-sales.com>.*—Peter]

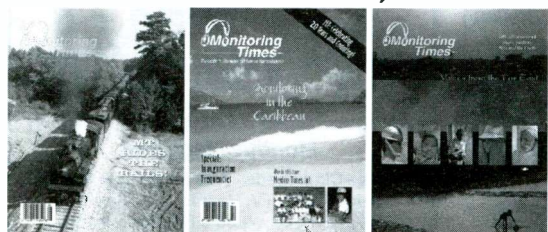
While I haven't used the Elenco, the specs sound much like the RS counter. According to the published info on my counter, the RF dynamic range is from 10 mV to 1 V RMS. These counters work from 1 MHz to 1.3 GHz, so they cover everything from the BC band through FM, and even TV frequencies. My counter is sensitive enough to pick up the LO signal from solid-state sets running on 9-V batteries. Tube-type radios have a much larger LO voltage and the LO can be "sniffed" with a short insulated wire antenna on the counter from a distance of an inch or more. The LO can be sniffed at the oscillator coil or the oscillator section of the tuning capacitor.

I still use my signal generator, but since I have been using the counter in the manner I described, I find myself using it much less often. Try this technique with your handheld counter and see if it works for you. Once you get the hang of using the counter, you will never go back to the traditional method of alignment.

Ed. Canyon Lake, TX

See you next month with more restorations and projects. Until then, don't forget to send me photos and articles about your restoration projects! ■

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## Scanner Features: Our Continuing In-Depth Look At What's Important And What's Not

A lot of the questions I receive regard specific functions of a scanner. There's a wide range of equipment out there, and the selection can be confusing, especially for the beginner. It can certainly be mind-boggling trying to sort through all the catalogs and literature, particularly when different manufacturers have different names for similar functions.

If you're trying to upgrade your scanner, you might be wondering if you need a particular feature or not. With that in mind, let's take a look at some of the more common scanner doo-dads and what they mean to you. Then you can decide if they're worth paying for or not.

### First, The Basics

Volume and squelch are pretty much standard equipment so there's not much to discuss there. Just in case Harold's reading, though, we'd better take a second to explain their functions. Volume controls how much you annoy other members of the household, and squelch controls how much the radio annoys you. Set them both at a comfortable level, but not too high, and have fun.

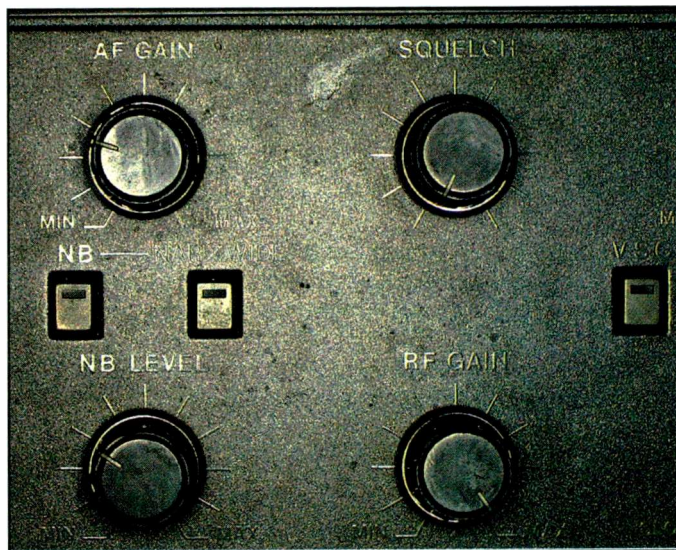
### Classes Of Scanners

It's useful to divide scanners into classes so you can be sure you're making fair comparisons. At a minimum, I'd lump things into three groups: 1) portables (that is radios with their own power source like batteries); 2) base/mobile (these used to be separate); and 3) communications receivers (whose primary function isn't scanning, but receiving the best signal they can).

At one time, there were some pretty clear dividing lines for what was what. Even base and mobile scanners were easy to tell apart as the mobile ones had mounting brackets and a way to plug them into 12 VDC versus a base scanner that required AC power. These days, even the communications receivers can operate off of 12 volts. I'm not sure where you'd put an ICOM R-9000 in your car, but it can be done! Some portables like the AR-8200 fall more into the category of communications receiver than portable, but they are portable. While there's no hard and fast rule, it is useful to keep these categories in mind as you look at the various models and prices available.

Actually, an argument can be made that price is the real dividing criterion. You would expect a \$500 scanner to perform better than a \$100 scanner and, for the most part, you'd be right. But even here, there are some nasty surprises.

As an example, the ICOM-PCR-1000 computer-controlled receiver has 1,000 channels that can be loaded all at once from the computer software. The software, however, can only scan one bank of 50 channels at a time. Third party software fixes this limitation, but it's kind of a "gotcha" if you weren't planning on the additional expense. If this were a more traditional radio, this would be a major drawback.



When is a volume control not a volume control? On many communications receivers it's labeled AF Gain. Note the RF gain in the lower right corner; it allows control of the receiver's front-end amplifiers to provide more control and reduce interference. This receiver also offers the shortwave and longwave bands where the RF gain control is more useful.

So, while the price point probably indicates about how many features and general level of quality you might expect, you might in fact find you'd be happier with the \$100 scanner in our example above—as a scanner, that is. That's not to say that the communications receiver won't perform better as a receiver, but the \$100 radio is probably built with more "scanning" functions in mind. Many enthusiasts have both for this reason.

The reason we look at this group of receivers is to get the performance specifications that only they are capable of. They're not really designed to be scanners, but rather dedicated receivers for, in some cases, commercial applications. Way back in June of 1998 (when the column was still called "ScanTech"), we ran an article on high-end receivers and how they operate. If you don't have the back issue, check with *Pop'Comm* HQ at 516-681-2922 and see about getting one if you're interested in these receivers. Or you can send your questions in and we'll try to deal with them in future articles.

### Channels And Banks

Most scanners you can buy today are programmable. That means you don't have to buy a \$6 crystal every time you want to listen to a new channel. Hmmm...imagine a 1,000-channel scanner at \$6 a channel. Now there's evidence of progress! Anyway, the feature of interest is how many channels the radio has. Probably more important than the number of channels is



*This base/mobile unit from RadioShack is very versatile, except for the part about fitting in your pocket.*

the number of banks that can be switched on and off as desired so you can group services or geographical areas together as you'd like. A 1,000-channel scanner with only one bank would be nearly useless.

Also important is the number of banks that can be scanned at once. As you go further into the communications receiver class (the more expensive scanners that we want for better performance), you're more likely to encounter some strange things related to banks.

That's probably the basic stuff. We might want to add trunking to that list since it's becoming a major factor in scanner purchase decisions. We'll do a more complete definition of trunking when we get there alphabetically, but be aware that it's something you should consider before you buy any new radio.

## The List

So that leads us to a discussion of additional features you might find listed on a scanner you're considering or that want to make sure it has. I've chosen to run the list alphabetically rather than setting some arbitrary order of importance. We'll continue our examination for a couple of months, so you might want to hold off on any purchase decisions until you have the whole list.

### Attenuator

Many scanners are used in areas where there are a lot of strong signals. If that describes your location, you might want to consider a device called an attenuator. The idea is to reduce the incoming signal strength to a level the radio can process more efficiently. Of course, if you're out in the sticks where all signals are weak, this is the last thing you'd want. But these days radio signals are everywhere and "out in the sticks," from an RF point of view, is getting harder and harder to find.

The most important thing to remember about attenuators is that "off" is desirable, if possible, but at the very least, less attenuation is better for overall performance and sensitivity. Off, or sometimes marked 0 dB, means that all of the signal coming from your antenna is passed through to the radio for processing. The "on" position is also indicated as minus dB, frequently -6 or -10 dB. That minus number means that we are reducing the signal strength fed to the receiver. A setting of -6 means that about 1/4 of the original signal is passed, -10 means that only 1/10 (if it really is -10) is passed to the receiver. In many cases,

that's still plenty to hear a good signal without overloading your receiver.

Attenuators come in three varieties, but they all do the same thing. The first type is external and plugs in between the antenna and the radio. Some are even switchable, on and off, or sometimes you can select the amount of attenuation you'd like applied. Of course, most of the time you'll want the minimum that will eliminate the problem signals so that you're not reducing your radio's overall sensitivity.

The second kind is a bit more desirable. It's built into the receiver and actuated with some sort of switch. These are more convenient and generally are found only on better scanners and some communications receivers. With it built in, it's there when you need it.

The disadvantage of these first two types of attenuators is that they apply to every signal that arrives at the antenna. Your radio's performance is impacted across its entire range, even though you may only have problems on one or two channels.

That's where the third and most desirable attenuator type comes in. These are not only built into the radio, but built into the operation of the radio so that you can turn attenuation on or off on a per-channel basis. Very few receivers have this capability, but it is becoming a bit more commonplace on some of the higher-end units. The Uniden BC-780/785 and the AOR-5000 come to mind as radios with this option, although there are a few others.

### Autostore

Autostore is a function that you'll either use a lot or hate—there doesn't seem to be much middle ground. When you're searching for new frequencies, using the scanner's search function, autostore will put anything it finds into memories for you. On some radios you can designate which banks are used, while on others a predetermined bank or banks are used. Generally, once the scanner banks fill up with the findings, the search operation is stopped.

Some radios are intelligent enough to figure out that they've already stored a frequency and won't store it again if subsequent activity is found on the same channel. Others, however, don't do this, and it doesn't take very many passes through an interference area or the paging channels to fill up lots of memories. If you travel a lot to different cities you might find this a handy feature. If you pretty much stick close to home for scanning you can probably let this one pass.

### Band Plan

In order to find correct frequencies and be in the correct mode, all scanners have a plan built in for how the frequency spectrum is allocated. For instance, if the receiver covers the air band, the scanner has to know that the AM mode is used from 108 to 137 MHz. That plan is pretty much cast in stone for most receivers. Some receivers will allow you to override the mode, so you can listen to AM traffic in the 400-MHz range for instance, but many do not.

The radio also has to know what the valid frequencies are or must provide for constant tuning. For instance, 154.8495 is not a valid channel but 154.845 is, and most scanners will also allow you to program in 154.850 even though the next actual channel that could be allocated currently is 154.8525. All of this information makes up the radio's Band Plan.

Most of the time, the manufacturer's plan is perfectly adequate for the frequencies we listen to, providing the radio was built for the band plan of the country we happen to be using it in. They do change as you go around the world, and sometimes the change is drastic. As a good example, in Europe the AM broadcast stations are spaced 9 kHz apart, rather than the 10 kHz used here in North America. So starting at 530 kHz, the next channel in Europe is 539, but 540 in North America. By the time you work your way to the top of the broadcast band, it can be a huge difference. I realize most of our scanners don't cover this range, but strange things happen in some ranges of the public safety band.

If you have an older scanner, the AM mode probably stops at 136 MHz, the upper limit of the aircraft band up until a couple of years ago. The FCC authorized an additional 1 MHz of frequency space for aviation services. If your radio can override the default mode, you're still in luck, but if not, you can't receive that upper 1MHz in the correct mode, meaning you probably won't hear anything there. On high-end receivers, the band plan itself is programmable. That means that if you take that receiver to another country, or if the allocations change, you can modify the default. In all cases, those radios that have programmable band plans also have the ability to override what's programmed in there anyway, so you might not have to reprogram the plan.

This can be worthwhile when things change or if you travel a lot, but for most of us, it's a minor feature, particularly if the radio supports override. It is a consideration, however, if you're thinking about bringing a radio back from a trip abroad; you'll want to reprogram the band plan to make it compatible with frequencies at home. Generally, only the high-end units offer this, but it's not something I'd worry about unless you fall into one of the previous categories.

### Band Scope

Several recent handhelds have featured a device called a band scope. Essentially, this offers a visual representation of activity on either side of the currently tuned frequency. The radio sweeps constantly from some lower frequency to some higher frequency and makes a graph of any signal strength that it might find along the way.

The problem is that most of the radios that feature a band scope lately are handhelds, and the display isn't big enough to really do this process justice. Other lim-

itations are that they don't cover enough distance from the low to high range to be truly useful, or they take so long to do it that, by the time you've seen the display and tuned to that frequency, the signal is long gone. I suppose if you were tuning around a busy area, or if you were using the radio to look for interference, this sort of mini-spectrum analyzer might be of some assistance, but for day-to-day monitoring, I have found that I simply don't bother with it.

I know others out there will disagree with me and say that they find it terribly useful. Great! If you think this might be an important feature for you, my advice is to get your hands on a radio that has it and see how it works before you spend any money. You'll probably be glad you did. And if you happen to decide on a radio that has one, have fun with it—hopefully you decided on that radio for other reasons, or you're a person who really likes the band scope.

### Battery Saver

Battery saver functions apply more to ham radios than to scanners, but we're starting to see a few scanners with the function built in, so it's included here. Essentially, a battery saver attempts to shut off circuitry that isn't being used so that the batteries will last longer. On a radio that's monitoring a single frequency, that's fairly easy to do. Turn the receiver on and check for activity. If you find some, then leave the receiver on, but if you don't turn it back off for a brief second. If you repeat this often enough, and for a long enough time in the rest mode, you can, in fact, extend the battery life for quite some time.

On scanners it's a bit more difficult. For one thing, we tend to listen to channels that are busy more often so the radio doesn't get as much resting time, even if you're only on one channel, like the ham transceiver. However, if you're scanning, turning the receiver off is contrary to finding the next bit of activity as fast as you can, so you wind up missing more or not saving the battery much. This is another feature that won't have much of an impact on your buying decision, unless you often use the radio to monitor a single channel.

### Channel Count

If you've been scanning for any length of time, you've probably noticed that some frequencies don't get a lot of activity, while others are busy all the time. Or if you're into searching and come across a bunch of channels you want to investi-



*Handheld scanners aren't just scanners anymore, either. This versatile unit has a TV receiver on board. The display is also used for presenting a bandscope and other information while scanning, or it can be turned off and the smaller LCD display used to save batteries when scanning. Having a TV along and being able to do some casual scanning is a great combination, and this makes an excellent second receiver. For really serious scanning, you might do better with a more focused receiver.*

gate, being able to track activity can be a handy thing. Channel count does what it sounds like: it counts the activity on each channel. You can let it run while you're not around and see which channels are active without hearing anything. That can be a big timesaver all by itself. But you can also go through and check the count of activity on your normal scanning channels and identify those that aren't seeing much traffic. Maybe they can be replaced with something a bit more interesting.

Having said all that, if you're really interested in this feature, you should look seriously at a radio that can be computer controlled. The computer-controlled systems can do all this and more, including record the audio and log the signal strength, time of the activity, etc. It really makes for a much more complete "unattended" scanning environment. Of course, if you just want channel count to track activity on your normal channels, it's great, too.

### Conversion: The Truth

Double conversion, triple conversion—what's the difference? Well that's

probably worthy of an entire column by itself someday, but for now let's look at the basics. All modern receivers convert the received or desired frequency to something else before processing the audio. It can be done in one step, which would mean a single conversion receiver. However, single-conversion receivers would be quite prone to interference for a variety of reasons. By adding a second stage (intermediate frequency stage, or IF for short), we can eliminate much of the interference. If you want to go further, you can add still another IF stage and have a triple-conversion receiver. There's even one receiver I'm aware of (and probably more at the high end of the government/industrial market) that is quadruple conversion—four IFs!

So, all of this conversion business really comes down to interference rejection. You can have a triple-conversion receiver that gets interference, make no mistake about that. But it is much less likely to occur than on a double conversion receiver if all other factors are equal. There are also some things that double conversion receiver designers can do to their systems to make them less interference prone, so don't think that one is bad and the other is not—they're just different. You can expect to pay a bit more for a triple-conversion receiver, and you should be able to expect better performance from it overall. Overall is the key word.

### CTCSS

CTCSS (Continuous Tone Coded Squelch System) is also known by its Motorola trade name of PL, for Private Line. Tone squelch has been the subject of columns before, and probably will be again as I get asked questions about it on a regular basis. Here's just a brief look at it for now.

CTCSS is a tone that is transmitted right along with the audio, but at a lower level and frequency so that it can be filtered out of the receiver. The idea is that the receiver won't open its squelch unless that tone is present. It works kind of like a password to get into the receiver. Without that password, the receiver will ignore the signal, even though it may be very strong.

This system really isn't in place for us as scanner listeners, but was designed for users of the two-way system to reduce interference from nearby transmitters, or to allow two or more users to share a frequency without having to listen to each other's traffic.

Normally, as scanner listeners, we want to hear all the traffic on a particular fre-



*This receiver from Uniden features a separate set of 10 keys for convenience. Some Uniden receivers have used these extra keys to get a total of 20 banks, which is very convenient for splitting up your channels and grouping them into logical blocks.*

quency. However, it could be that a frequency you listen to is shared by many users. By having CTCSS in your scanner, you can take advantage of this system if the transmitter is sending the tone. You can also use CTCSS in your scanner to reduce interference. It's a very effective tool for this purpose.

### DCS

DCS stands for Digital Coded Squelch and it is used exactly the same way as CTCSS. This is a newer version that offers more codes than CTCSS, so more users can share frequencies or adjoining channels. It's not uncommon to find some users on a frequency with a CTCSS tone and others with a DCS code.

If you're interested in DCS, read the feature list carefully. Many scanners that include tone squelch just receive CTCSS, not DCS. If DCS is in use in your area, you'll need to make sure the receiver you're interested in can decode these signals, too, if you're interested in this capability. Remember that DCS is just a form of tone squelch; you can listen to the sig-

nals without the feature, you'll just hear everything that's being transmitted on that channel.

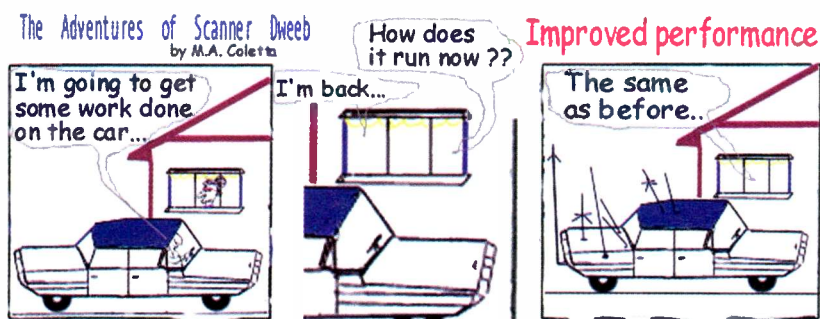
## Frequency Of The Month

Our frequency this month will be **155.640**. Have a listen and let me know what you hear! We'll enter your name in the drawing for a one-year subscription to *Popular Communications*! E-mail or snail mail is fine, just be sure you put the frequency in the subject or on the envelope so it gets routed to the right place!

## Your Input Needed!

Next month, we'll be continuing with this "dictionary of features." In the meantime, if you've still got questions or other scanner-related things on your mind, don't hesitate to write. You can reach me via e-mail at <radioken@earthlink.net>, or via the regular mail at Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126.

Until next month, Good listening! ■



### A Reader's Response: Popular Communications or Popular Psychology

This month's contribution, "Popular Communications or Popular Psychology?" comes from Bob Combs of New Mexico. Bob read Craig Rose's "More Than Just Voices," which was recently published in this column, and disagrees with some of the ideas he found there. Bob's background is in Air Force and interestingly, he saw service in the United Kingdom. Here he shares his observations on the ethics of monitoring Utility radio traffic. Bob has many good points to make, as you'll see. He is quite correct about taking pictures of railways and airports. All of the rail carriers in the United States have given their employees notice that any unusual trackside activity must be reported immediately and many are interpreting that to include rail fans. No need to say anything about airports or other sensitive places.

Craig Rose, by the way, has read Bob's piece and will be providing a response to the points raised here in an upcoming column. Watch for it.

How about you? Do you have a story or two to tell about your experiences, past or present, working in the field of utility radio? How about photos?

Now, on to our readers' logs.

#### Readers' Logs

The numbers of logs is down a bit this month as people have been busy with post-holiday projects. Still, there are some good catches here. Mark Cleary (MC), for instance, has a number of good Coast Guard logs that include some rescues and one medical emergency.

I've been getting some feedback that the numbers of the technical abbreviations are getting too dense and making the interpretation of what you're reading difficult. Likewise some people would like to see the logs split into modes and services, rather than listing them out by frequency as has been the practice.

What would you like to see? Send me your (constructive) feedback please.

Remember that all frequencies are in kiloHertz and times are Universal (Z).

**0000:** STATION, Anytown, USA, summary of traffic heard in MODE at 0000 Z (Z), personal comments here. (JC)

**2187.5:** UNID, GMDSS ALERT CHANNEL DSC//100/E/170 Safety/Test exchange btwn ship *Tor Gothia/LAOZ5* and Lyngby Radio/OXZ MM 2020. (DW)

**2381.6:** PBC DN GOEREE ISLAND RTTY//75/N/850 CARB "02a 04b 06a 08a 12b 17g 22x PBC." Weak, unlisted. Spur of 2474? MI 2047. (DW)

**2463:** IDR IN ROME RTTY//75/N/850 CARB "IGJ41 /IGJ4 /IGJ43 /IDR2 /IDR3 /IDR8" MI 2053. (DW)

**2531:** OWI DAF AALBORG MIL.STD 188-141A ALE on USB. Clog OWP/unid MI 2048. (DW)

**2608.4:** FUO FN TOULON RTTY//75/N/850 Marker "oo FAAA de FUO znr uuuu zui testing RYs SGs" MI 2058. (DW)

**2618.5:** GYA RN NORTHWOOD FAX//120/576/N/800 1800Z sfc. Fuzzy due m/path MF 2102. (DW)

**2643:** A9M BAHRAIN RADIO CW chan free marker "de A9M TLX" MM 2121. (DW)

**2789:** FUE FN BREST RTTY//75/N/850 marker "FAAA de FUE RYs SGs figs int zbz kkkk" MI 2126. (DW)

**2813.3:** MTI RN PLYMOUTH VFT// 2 chan VFT on USB. Chan 2 idle on permanent mark. MI 2134. (DW)

**2813.9:** MTI RN PLYMOUTH RTTY//75/R/200 chan 2 in VFT. CARB "02 02a MTI" MI 2136. (DW)

**2829.5:** SPB28 SZCZECIN RADIO CW chan free marker "SPB." QRM. 2155-2244 tfc list, stn info. Poor copy due QRM at first. Blind tfc/Px in PP. MM 2139. (DW)

**2845:** PBB DN DEN HELDER RTTY//75/N/850 CARB "02b 04a 06y 08y PBB" MI 2142. (DW)

**3413:** Shannon: 0331Z USB w/volmet. (RP3)

**3413:** Shannon: 0551Z USB w/volmet. (RP3)

**3416:** O/M (IT): 0424Z USB w/O/M (IT). (RP3)

**3485:** Gander Radio heard at 0329Z USB in w/volmet. (RP3)

**3490:** O/M (RR): 0333Z USB w/unheard station. (RP3)

**3494:** ARINC New York: 0327Z USB w/North American flight (identifier missed) w/depart message. (RP3)

**3497:** Enciphered speech heard at 0325Z in USB. 24/01. (RP3)

**4214:** IDR2 IN ROME RTTY//75/N/850 CARB. Chans IGJ41, IGK42 and IGJ43 busy. IGJ41 "QSL 1386 k" MI 1711. (DW)

**4216:** TAH ISTANBUL RADIO CW channel free marker MM 1718. (DW)

**4216.5:** IAR ROME RADIO CW channel free marker MM 1720Z. (DW)

**4372:** D5T, D7I, X1T and GIANTKILLER (FACSFAC VACAPES) in Link 11 Coord net at 0233Z. (MC)

**4426:** CAMSLANT Chesapeake with Perfect Paul High Seas WX Forecast at 0352Z. (MC)

**4455:** O/M (IT): 0425Z USB w/O/M (IT). (RP3)

**4570:** HZN46 JEDDAH MET RTTY//100/R/460 Met tfc MR 1858Z. (DW)

**4583:** DDK2 HAMBURG MET RTTY//50/N/450 Met tfc AAXX (SYNOP) MR 1914Z. (DW)

**4610:** GYA RN NORTHWOOD FAX//120/576/N/800 blank chart overprinted with "due to communications problems data is currently unavailable." s/b 850hPa 24hr Prog. MF 1925Z. (DW)

**4615.9:** BMF TAIPEI MET FAX// 120/576/N/800 Sat pix showing S China Sea. MF 1936Z. (DW)

**4625:** ALGERIAN MIL/MOI? MIL.STD 188-141A ALE on USB. Clog QF11N@. QRM. Also at 2009 NG 1955Z. (DW)

**4625:** qf11n@ ALGERIAN MIL/MOI? MIL.STD 188-141A ALE on USB. QF14N responds NG 2011Z. (DW)

**4625:** UNID, ALGERIAN MIL/MOI? MIL.STD 188-141A ALE on USB. Cld/clng under QRM -AL11N AL12N EJ11N IQ11N NX11N 1F15N QF16N RV11N RV16N SB11N YA1\_N NG 2057Z. (DW)

**5442.2:** HEC BERN RADIO SITOR/B//100/E/170 Series of "HEC" then "Bern Radio." DTS svc tfc list (=QRU) CO 1800Z. (DW)

**5517:** Tripoli (MWARA AFI-3): 0039Z USB w/flight 653 at end of position report. (RP3)

**5547:** San Francisco (MWARA CEP-2): 1127 w/aircraft in position report. Sets new freq as 5628Z. (RP3)

**5565:** Atlantico Radio (MWARA SAT-2): 0421Z USB w/Lufthansa 502 in pos rept & SELCAL check (AC-GS). (RP3)

**5696:** CG Rescue 1708 rptng time and position of DMB drop to CAMSLANT 1708 involved with SAR near 19N-81W. (DS2)

**5696:** Clearwater AIR w/ CG Rescue 1708 rqstng to know how much time 1708 can remain on scene before being on deck. (DS2)

**5696:** 33C calling PANTHER but no joy so rqstng CAMSLANT to take their guard and notify PANTHER of such. (DS2)

**5696:** CG Rescue 1718 declaring IFE to CAMSPAC. Was going to try to make McClellan but decided to divert to Arcada.

Later rptd to CAMSPAC that they landed safely. (DS2)

**5696:** CAMSLANT wkg CG 6041 on a SAR at 0227Z. CG 6041 is overhead a 35-foot vessel with 3 POB in the Bahamas. SHARK 11 is en route with an ETA of 4 hours. (MC)

**5717:** Halifax Military: 0043 USB w/Tusker 18 (CC-130H, CANFORCE 14TH WING CFB GREENWOOD) reporting off scene & asking Halifax to relay to the RCC. They switch to 6694 kHz. (RP3)

**5732:** Service Center: 0050Z USB w/Omaha 63L (not heard) passing target at 3054N/1927W as one truck. (RP3)

**5786:** Sophode R+S NET MIL.STD 188-141A ALE on USB. CIng Nomade8 CO 1746Z. (DW)

**5786:** Nomade8 R+S NET MIL.STD 188-141A ALE on USB. Responds to Sophocleb, then short burst mode (conventional?) R+S data system after [UUF] 124 0 7 trigger, thru 1756. CO 1747Z. (DW)

**5851.2:** WPC SEAWAVE MIDDLETOWN CW chan free marker. CW ID "WPC" every 3 mins. MM 2054Z. (DW)

**5887.5:** IMB3 ROME MET RTTY// 50/R/850 Met tfc but hvy QRM and little copy MR 2014Z. (DW)

**6316:** NMN, USCG PORTSMOUTH CW chan free marker "NMN" MM 0903Z. (DW)

**6317:** WLO, MOBILE RADIO CW chan free marker "WLO" MM 0904Z. (DW)

**6319.4:** O/M (CC) heard at 0603Z in USB w/O/M (CC) (RP3)

**6319.5:** UCE ARKHANGELSK RADIO SITOR/A//100/E/170 QSL to ship csgn UFHZ. 3sc. Then revert to chan free marker MM 0906Z. (DW)

**6524:** O/M (EE): 0614Z USB w/O/M (EE). Both speaker w/New England accents. Discussing prices and markets for various fish. Probably fishermen on the Grand Banks. (RP3)

**6535:** Dakar (MWARA AFI-1/SAT-1) heard at 0420Z USB w/Lufthansa 456 in position report. Sets 8855 or 10096 as secondary freqs. (RP3)

**6640:** ARINC New York: 2327Z USB w/AA 926 in SELCALcheck. (RP3)

**6694:** Halifax Military: 0045Z USB w/Tusker 18. They QSY to 8992. (RP3)

**6783:** MGJ RN FASLANE RTTY// 75/N/340 CARB. Channels 02p 04q 06p busy MI 2005Z. (DW)

**6840:** UNID YL/EE with letters, no apparent grouping USB at 2207Z 9. (CG)

**6959:** "Lincolnshire Poacher" numbers station: YL/EE with British accent with "27148" many times alternated with music. Then into 5-figure groups, each given twice. USB at 2104Z. (CG)

**7598:** UNID, CARABINIERI ROME /LSB RTTY on 2210 Hz offset 50bd/170 Hz with bit inversion and char substitution, or Radio Technology in Italian (@1400Z) MI 1353. (DW)

**8031:** UNID, FF NAQOURA ? ARQ/ E// 184.5/I/400 RC8 betas. Variable sync. No app tfc thru 2000Z MI 1918Z. (DW)

**8040:** GYA, RN NORTHWOOD FAX// 120/576/N/800 sfc prognosis. Hvy m/path MF 2007Z. (DW)

**8103:** 4XZ IN HAIFA CW Tfc in offline encrypt, or marker "VVV de 4XZ==" MI 2035Z. (DW)

**8272:** O/M (Tagalog): 0241Z USB w/O/M (Tagalog). 24/01. (RP3)

**8272:** Baldon 3 (O/M SS): 0102Z USB w/Whiskey Alpha 3 (O/M SS). Chat contains out of context refs to Portugal--possibly a cover term. Data signal also noted on this freq. Not sure if related to the voice. RP3

**8294:** O/M (EE): 0111Z USB w/O/M (EE). Both speakers heavy U.S. southern accents. Possible Gulf of Mexico fishermen. (RP3)

**8334:** 2222 MOROCCAN OIL ?LOC MIL.STD 188-141A ALE on USB. Sounding CO 2208. (DW)

**8370:** O/M (Greek): 0243 USB w/O/M (Greek). (RP3)

**8385.5:** 3FZL7 M/V Ketaling 1140 ARQ w/QQVM SELCAL& tfc to PKR6 PERTAMINASHIP Cilacap, this freq also used by CHN vsls wkg Shanghai. (ML)

**8395:** UFAS STR Volgoradskii Kosmolets 1155Z ARQ w/QSPV seq SELCAL & crew msgs to UEA Preobrazheniye, this freq also used by CHN vsls wkg Guangzhou. (ML)

**8413:** UBNJ TH Volga-4011 1133Z ARQ msg to Khabarovsk. (ML)

**8417:** LSD836 BUENOS AIRES RADIO CW channel free marker "LDS836" MM 2353Z. (DW)

**8418:** IAR ROME RADIO CW chan free marker "IAR" MM 0913Z. (DW)

**8419.5:** PPR RIO DE JANEIRO RADIO CW channel free marker "PPR" MM 2356Z. (DW)

**8420.5:** HEC BERN RADIO CW chan free marker "HEC." Briefly into ARQ with "QBF ga+?" then return to marker. MM 0915Z. (DW)

**8420.5:** HEC BERN RADIO SITOR/A//100/E/170 lists commands then long period to 1308Z idling before reverting to marker. MM 1302Z. (DW)

**8420.5:** CBV VALPARAISO RADIO CW channel free marker "CBV" MM at 2358Z. (DW)

**8421.5:** LZV VARNA RADIO CW channel free marker MM 1732Z. (DW)

**8422:** OSY SAILMAIL BRUGGE PACTOR-II/100/-/200 Wkng WCZ6989. "No tfc." Hdr indicates OSY is beaming SE. MM 0924Z. (DW)

**8422:** ESA TALLINN RADIO CW Chan free marker "de ESA" MM 0927Z. (DW)

**8425.5:** PKR6 PERTAMINASHIP Cilacap INS 1148 ARQ QSL to 3FZL7 M/V Ketaling. (ML)

**8585:** O/M (JJ) heard at 0244Z in USB w/O/M (JJ). (RP3)

**8710:** O/M (SS): 2255Z USB w/O/M (SS). One of the speakers is addressed as Captain (Capitan). Placename Cartegna mention in chat. (RP3)

**8713:** O/M (SS): 0245Z USB w/unheard station—probably working duplex. (RP3)

**8722:** Iberia Radio heard at 0534Z in USB w/Toro. Has trouble hearing him so switches them to chnl 1203 (13083). Didn't find them there. (RP3)

**8734:** Iberia Radio: 0533Z USB w/vessel Toro telling them to switch to chnl 802 (8722). (RP3)

**8764:** CAMSLANT wkg A2J (unid CG cutter) about SITOR broadcast messages at 2353Z. (MC)

**8779:** O/M (SS): 0237Z USB w/O/M (SS) passing four-figure groups. Each string of groups preceded by term Fuera. (RP3)

**8806:** O/M (SS) heard at 0246Z in USB w/O/M (SS). (RP3)

**8807.5:** 3AC MONACO RADIO PACTOR-II/100/-/200 Tfc list. MM 1033Z. (DW)

**8832:** O/M (SS/EE) heard at 2248Z in USB w/O/M (SS/EE). Mixed with Caribbean accented EE. (RP3)

**8833:** O/M (SS) heard at 2337Z in USB w/O/M (SS). (RP3)

**8855:** Piarco Radio (MWARA SAM-2): 0320Z USB w/Continental 30 in position report and SELCAL check (BL-GR). (RP3)

**8867:** San Francisco (MWARA SP): 1126Z w/unidentified aircraft in SELCAL check. (RP3)

**8870.6:** O/M (SS) heard at 2243Z in USB w/O/M (SS). (RP3)

**8912:** O/M (Vietnamese): 2336Z USB w/O/M (Vietnamese). (RP3)

**8912:** O/M (South Korean): 2154Z USB w/O/M (South Korean). (RP3)

**8915:** O/M (Caribbean accented EE): 2331Z USB w/O/M (Caribbean accented EE). (RP3)

**8945.5:** Bandinario (O/M (SS): 2325Z USB w/O/M (SS). (RP3)

**8970:** O/M (SS) heard at 0112Z in USB O/M (SS). (RP3)

**8971:** SOUTHERN FRIED and TRIDENT 802 (P-3C, VP-26) hailing each other with No Joy at 0210Z. (MC)

**8971:** WESTERN SKY (TSC North Island) wkg several a/c at 0152Z. (MC)

**8971:** FIDDLE (TSC Jacksonville) wkg CARDFILE 711 (P-3C) on submarine tracking exercise at 2203Z. CARDFILE 712 has been delayed. 711 will drop remaining two "pointers" and try to maintain contact. Has fuel for more 45 minutes. (MC)

**8971:** Short TADIL A Link 11 data transmission followed by GOLDEN HAWK (TSC Brunswick) hailing WAFER 21 (P-3C) at 2207Z. (MC)

**8971:** Western Sky (TSCC, NAS NORTH ISLAND CA): 0105 w/Dragon Claw 37 (P-3C VP-40 MARLINSNAS WHIDBEY ISLAND) in clear & ANDVT ex on email address for CWO at TSCC. (RP3)

**8983:** CAMSLANT wkg CG 2121 and CG 6598 responding to a heart attack victim on a vessel in the Gulf of Mexico at 2217Z. (MC)

**8983:** CG 01 (Commandant's aircraft) in radio checks with CAMSLANT heard in USB at 2152Z. (MC)

**8983:** CAMSPAC Point Reyes, CA. wkg CG 1700 and CG 1708 on two SAR cases in the Pacific at 0038Z. (MC)

**8985:** O/M (EE): 0124 USB w/O/M (EE) in chat about exchanging food supplies the next morning. Both speakers w/heavy US southern accents. (RP3)

**8989:** O/M (SS): 2302Z USB w/unheard sta-

tion. Operator was passing text message--repeated each word/phrase twice for confirmation. Mention of Costa Rica and Punta Arenas & names Hermano, Lulu & Gloria repeated several times in chat. (RP3)

**8992:** REACH Z1 p/p via Andrews HF-GCS to HILDA EAST at 0330Z. They are given a choice of several airfields and finally arrange to go to Moron AB. (MC)

**8992:** REACH 43Y p/p via Puerto Rico HF-GCS to HILDA Meteo for 0500Z WX at Frankfurt. (MC)

**8992:** Halifax Military: 0046Z USB calling Tusker 18. GCS station w/EAM blocking Halifax Military. (RP3)

**8994:** O/M (SS): 2304Z USB w/O/M (SS). (RP3)

**9020:** O/M (Arabic): 2149Z USB w/unheard station. (RP3)

**9041:** 5YE NAIROBI MET RTTY//100/N/850 Met tfc. ID string "CQ de 5YE RY's" then revert to met MR 1733Z. (DW)

**9085:** 2805 (?) GUARDI DI FINANZA (?) LOC MIL.STD 188-141A ALE on USB. 2805 or 2005?. ClnG 2004 NG 1018Z. (DW)

**9085:** 2005 GUARDI DI FINANZA ?LOC MIL.STD 188-141A ALE on USB. ClnG 2005 NG 1018Z. (DW)

**9110:** NMF USCG BOSTON FAX// 120/576/N/800 Wave prog MF 2020Z. (DW)

**9128:** O/M (SS): 0310Z USB w/O/M (SS). (RP3)

**9130:** Y/L (EE) heard at 0311Z in USB w/five-letter groups. (RP3)

**9135:** O/M (SS) heard 2316Z in LSB w/O/M (SS). (RP3)

**9145:** O/M (SS) heard at 0527Z in USB w/O/M (SS). (RP3)

**9184:** O/M (SS) heard at 2318Z in USB w/O/M (SS). (RP3)

**9240:** O/M (IT) heard at 0312Z in USB w/O/M (IT). (RP3)

**9259:** NX14J ALGERIAN MOI ? MIL.STD 188-141A ALE on USB. ClnG NX11J NG 1341Z. (DW)

**9328.7:** UNID, EGYPTIAN DIPLO? SITOR/A//100/E/170 tfc in AA (ATU80) DP 2053Z. (DW)

**10033:** Aircraft (O/M SS)-flight 4885: 0257Z USB w/O/M (SS)-probable dispatch w/aircraft departure message. Possible Aero Mexico LDOC. 24/01. (RP3)

**10033:** Miami Radio: 0259Z USB w/DAE 001. Tries departure message in EE then they both switch to SS. (RP3)

**10033:** LV 150: 2202 USB w/Miami Radio reporting departure from KSMI (unlocated) at 2123Z and ETA Miami of 0030Z. (RP3)

**10040:** O/M (SS) heard at 2325 in LSB w/O/M (SS). (RP3)

**10075:** O/M (Portuguese): 2118Z USB w/O/M (Portuguese). (RP3)

**10077:** O/M (CC): 2211Z USB w/unheard station. (RP3)

**10096:** Ascot 3200 (RAF Tristar-weekly shuttle run to Falklands): 2235Z USB w/Recife (MWARA SAT-1) in position report. (RP3)

**10096:** Atlantico: 2343Z USB w/Iberia 6840 in position report. (RP3)

**10225:** O/M (SS) heard at 0303 in USB w/O/M (SS). (RP3)

**10248:** 8by FRENCH INTEL PARIS CW marker "vvv 8BY 354/505/218/155/ 933". NG 1240Z. (DW)

**10260:** O/M (CC) heard at 2119 in USB w/O/M (CC). (RP3)

**10404.6:** HEC96 BERN RADIO CW chan free marker (acf=250). CW ID "HEC95" every 3 mins. D TS svc? CO 1541Z. (DW)

**10482.3:** UNID, FF PARIS ? ARQ/E3//100/E/400 8rc. Betas. No app tfc thru 1705 MI 1614Z. (DW)

**10520:** O/M (SS): 2127 USB w/unheard station. (RP3)

**11039:** DDH9 HAMBURG MET RTTY//50/N/450 Met tfc in German MR 1at 644Z. (DW)

**11175:** C3P calling Andrews with no joy USB at 0022Z. (CG)

**11175:** RETRO 47 p/p via Puerto Rico HF-GCS to a base in the Middle East at 0441Z. (MC)

**11175:** REACH 6341 (KC-135) p/p via Puerto Rico for WX at several airfields in the Middle East. (MC)

**11175:** SNOOP 55 (RC-135) p/p via Puerto Rico HF-GCS to a base in Saudi Arabia at 2129Z. (MC)

**11175:** AIRCRAFT 008 in radio checks with Thule HF-GCS in USB at 0153Z. (MC)

**11175:** KING 22 (HC-130) p/p via Keflavik HF-GCS to MINUTEMAN OPS at Andrews AFB at 2111Z to report arrival at Patrick AFB. (MC)

**11232:** RAZOR 66 (E-8 J-STARS) (gives posit as over South Carolina) p/p via TRENTON MILITARY to RAYMOND 19 (Robins AFB) with coded ops report at 0207Z. (MC)

**11232:** RAZOR 41 p/p via TRENTON MILITARY to RAYMOND 19 at 2130Z with ops report. (MC)

**11232:** Trenton Military: 2128Z USB w/Canforce 2944 in pp w/Trenton Wing Ops w/arrival information. (RP3)

**11232:** Trenton Military: 2139Z USB w/Bandsaw Lima (E-3B AWACS, Tinker AFB) in pp w/Best Deal (unidentified) w/formatted operations report. Then in pp w/Hip Bone (unidentified) at DSN 939-1XXX (Strategic Command Post). (RP3)

**11265:** O/M (SS): 2341 USB w/O/M (SS). (RP3)

**11299:** O/M (JJ): 2126 USB w/O/M (JJ). (RP3)

**11330:** New York (MWARA CAR-B): 2053Z USB w/World 100 & Europe 2966 in position reports & SELCAL check (EM-LR for Europe 2966). (RP3)

**11396:** New York (MWARA CAR-A): 2112Z USB w/Continental 1967 in position report. Also w/AA 899 in pp test w/AA Dispatch, Desk 14. (RP3)

**11410:** O/M (SS): 2339 USB w/unheard station. (RP3)

**11410:** O/M (Arabic): 2120 USB w/O/M (Arabic). (RP3)

**11416:** --- UNID CW tfc in offline encrypt (5 fig grps) [15wpm] with each grp sent twice MS 1537Z. (DW)

**11475:** tns ALGERIAN EMB TUNIS MIL.STD 188-141A ALE on USB. ClnG MAE/Algiers [UUF] 124 67 65 DP 1015Z. (DW)

**11475:** mae MFA ALGIERS MIL.STD 188-141A ALE on USB. ClnG TRP/Tripoli. 1016 responds to TNS/Tunis DP1014. (DW)

**11484:** UNID, UNID CW "vvvvvvv" then "nwnw" rptd, then offair MS 1530Z. (DW)

**11490:** O/M (Arabic): 1306 USB w/ unheard station. (RP3)

**11556.7:** UNID, EGYPTIAN EMB ROME SITOR/A//100/E/170 in irs then tfc in AA(ATU80). Revert irs and off air 1607Z DP 1557Z. (DW)

**12161.7:** UNID, ALGERIAN CUSTOMS ALGIERS PACT//200/-/200. (DW)

**12489:** UHVB TH Plastun 0914 ARQ msg to Vladivostok. (ML)

**12581.5:** LSD836 BUENOS AIRES RADIO CW channel free marker "LSD836" MM 0008Z. (DW)

**12581.5:** XSV TIANJIN RADIO CW chan free marker "XSV" MM 0932Z. (DW)

**12582:** VIP PERTH RADIO CW barely audible. Chan free marker "VIP." Wkng ship in Globedata. MM 0934Z. (DW)

**12584:** VIP PERTH RADIO CW chan free marker "VIP." Wkng ship in Globedata. MM 0953 (DW)

**12584.5:** WLO MOBILE RADIO CW chan free marker "WLO" MM 1315Z. (DW)

**12585:** NRV USCG GUAM CW chan free marker "NRV" MM 1318Z. (DW)

**12585.5:** VRX HONG KONG RADIO CW chan free marker "VRX" MM 0956Z. (DW)

**12586:** UDK2 MURMANSK RADIO CW chan free marker "de UDK2" MM 1323Z. (DW)

**12587:** LZV VARNA RADIO SITOR/B//100/E/170 bulletin in Bulgarian. Reverting to chan free marker "de LZV LZV" MM 1000Z. (DW)

**12916.5:** HLF Seoul R 0800 CW msg of 2/3/4LGs then to CQ DE HLF QSX 12MHZ K mkr. (ML)

**13011:** IAR ROME RADIO CW end of tfc list MM 1208Z. (DW)

**13265:** O/M (EE): 2138Z USB w/unheard station. (RP3)

**13330:** Houston Radio: 2212Z USB w/aircraft (identifier missed) in SELCALcheck (?M-JL). (RP3)

**13330:** Houston Radio: 2227Z USB w/Omni 111 reporting ETA at Biggs AAF, Ft Bliss TX of 0543Z. (RP3)

**13342:** Stockholm Radio: 1315 USB w/Lufthansa 719 (GE/EE) in pp w/Dispatch (GE/EE) w/departure message & position report. (RP3)

**19131:** Atlas (DEA flight following facility): 1349 USB w/Flint 454 (not heard-DEA pilot) establishing radio guard. (RP3)

**13348:** ARINC-San Francisco: 2145 USB w/unidentified aircraft w/departure message. (RP3)

**13927:** HAVOC 54 (gives position as over Montgomery, AL) wkg USAF MARS for several morale patches to Texas at 2116Z. (MC)

**13927:** REACH 181 (self-id as C-17, 62 AW) p/p via USAF MARS to HILDA EAST and Meteo at 0245Z for WX at Bangor. (MC)

**13927:** KING 74 (HC-130) p/p via USAF MARS to Gabreski ANGB Base Ops. Report ETA to Key West and request info on the helos at 2320Z. (MC)

**14396.5:** MARS net with AFA4BR as NCS. MARS was on a "level 2 alert" at this time USB at 2309Z. (CG)

**14448.5:** FUG FN LA REGINE RTTY// 150/N/850 Marker "Testing FAA de FUG figs rys sgs." Poor sig. spurs? MM 1446Z. (DW)

**14550:** OLC ALGERIAN MIL/MOI? MIL.STD 188-141A ALE on USB. Cng Q5C MI 1925Z. (DW)

**14580:** ASI UK MIL/DIPLO ASCENSION MIL.STD 188-141A ALE on USB. Sounding, also 2009 MI 1834Z. (DW)

**14580:** hsp UK MIL/DIPLO HANSLOPE-PARK MIL.STD 188-141A ALE on USB. Sounding. Also 2009Z MI1814. (DW)

**14670:** CHU TS OTTAWA USB Time signals, and weak voice announcements, data bursts. MS1506Z. (DW)

**14812:** BRA MFA BRATISLAVA MIL.STD 188-141A ALE on USB. Sounding DP at 1803Z. (DW)

**14996:** RWM TS MOSCOW CW Time signals MS 1525Z (DW)

**15025:** Smasher (USOUTHAF Flight Monitoring.Facility, NAS Key West): 1319Z USB w/Reach 210 (id as C-17#0054). Caught end of transmission. (RP3)

**16056.7:** Egyptian Emb Pyongyang (JG YSLGQ SKGQ) 1025 ARQ 5LG msg to Cairo. (ML)

**16100:** BRAMFA BRATISLAVA MIL.STD 188-141A ALE on USB. DP 1051Z. (DW)

**16121.7:** UNID, MFA CAIRO ? SITOR/A//100/E/170 SELCALs KKVO/ Ndjamen—no QSO DP1440. (DW)

**16241.7:** UNID, MFA CAIRO ? SITOR/A//100/E/170 SELCALs QQTX/ Prague—no QSO DP1505. (DW)

**16267:** OLZ88 MFA PRAGUE MIL.STD 188-141A ALE on USB. Cng OLZ55. [AMD]FAXDATA then tfc by Clover2000 modem. DP1140. (DW)

**16270:** OLZ88 MFA PRAGUE MIL.STD 188-141A ALE on USB. Sounding. DP1521. (DW)

**16278.8:** UNID, MFA ALGIERS COQ/8// 26.7// tfc in offline encypt, FF and AA(ATU80) thru 1340Z. Appears relay/broadcast DP1315. (DW)

**16280.2:** UNID, FF PARIS ? ARQ/342// 200/E/400 4rc. 2 chan tdm. Poo/little sync MI1151. (DW)

**16318.7:** UNID, EGYPTIAN DIPLO ?LOC SITOR/A//100/E/170 IRS mode then brief opchat in AA(ATU80) and s/off. DP 1524Z. (DW)

**16324.7:** UNID, FF LIBREVILLE? ARQ/E3//192/E/400 8rc. Virtually no sync. MI 1410. (DW)

**16400:** 3 O/Ms (Arabic): 2058Z USB w/unheard station. Use first names as identifiers. Chat is personal/business related. (RP3)

**16417:** O/M (JJ): 2105 USB w/unheard station. (RP3)

**16432:** OM (EE) heard at 2352 in USB w/O/M (EE). (RP3)

**16471:** Plantina (O/M RR): 1801Z USB calling Kaliningrad w/no response. Another O/M (RR) in background passing series of groups to Kaliningrad. Both using push-to-talk transmitters. Groups passed appear to be tracking of some sort w/current UTC time, i.e. 13803 1800Z (repeated twice) followed by phrase "all is normal" (BCE normal'no). Uses military-type radio procedures. (RP3)

**16477:** P3NN3 (Nikos N- Cypriot cargo vessel): 2107 USB calling Olympia Radio w/no response. (RP3)

**17441.6:** 5YE, NAIROBI MET RTTY// 100/N/850 METARs. Moderate copy MR 1236Z. (DW)

**17550.9:** RFTJ, FF DAKAR ARQ/E3// 192/E/400 8rc. Betas. 1257Z cct [AFL] Controle de V svc RFTJ de RFTJ MI at 1246Z. (DW)

**18003:** HAW, USAF ASCENSION MIL.STD 188-141A ALE on USB. Sounding MI 0938Z. (DW)

**18003:** ICZ, USAF SIGONELLA MIL.STD 188-141A ALE on USB. Sounding MI at 0928Z. (DW)

**18220:** JMH5. TOKYO MET FAX// 120/ 576/N/800 Sfc analysis, grainy MF 0843Z. (DW)

**18238:** ZSJ, SAN CAPETOWN FAX// 120/ 576/N/800 Sfc analysis. Started 1605 - 35 mins behind schedule. Grainy, fading in/out noise MF 1530Z. (DW)

**18269:** UNID, MFA BERN? SITOR/A//100/E/170 tfc in offline encrypt. No ID on signoff 1504Z DP1500Z. (DW)

**18320:** BRA, MFA BRATISLAVA MIL.STD 188-141A ALE on USB. Sounding, also on 1249 1301 1347 1401 1407 1431 1437 1439 kHz DP1241Z. (DW)

**18320.8:** RFTJ, FF DAKAR ARQ/E3// 192/E/400 crc8. Betas. 1605Z cct [TJD] C de v svc RFTJ de RFTJ. No further tfc thru 1655Z MI 1510Z. (DW)

**18400:** UNID, CZECH DIPLO? MIL.STD 188-110A Data bursts on USB. 1200bps shrt intlv, then weak opr chat in Radio Technology thru 0958Z DP 0953Z. (DW)

**18476.7:** UNID, MFA CAIRO SITOR/A//100/E/170 SELCALs KKXE (Luanda or Lusaka?) then qso, op sigs in AA(ATU80). Revert to SELCALs then off air 1506Z DP 1500. (DW)

**18480:** OLZ69, CZECH EMB CAIRO? MIL.STD 188-141A ALE on USB. Cng Prague/OLZ88. Agn 1013 [AMD]FAXDATA followed by Clover2000 modem DP1008Z. (DW)

**18667.7:** UNID, EGYPTIAN EMB ABIDJAN SITOR/A//100/E/170 In irs then tfc in AA(ATU80) and offline encrypt. Poor copy thru 1746Z when lost under noise DP1722Z. (DW)

**18709.1:** O/M (Caribbean accented EE): 2045Z USB w/O/M (Caribbean accented EE) discussing local travel plans. Mention of having to go to Santo Domingo and also Miami. Chat interspersed with Spanish terms. Probably Dominican Republic net. (RP3)

**18770:** O/M (RR): 1617Z USB w/unheard station. Push-to-talk transmitter. Probably working duplex. Uses military-type radio procedures. (RP3)

**18828:** O/M (RR): 1637Z USB w/O/M (RR). Push-to-talk transmitter. (RP3)

**18848.5:** 6 Charlie Alpha (O/M accented EE) at 1652 USB calling 7 Charlie w/no response. (RP3)

**19146.7:** Egyptian Emb Islamabad (JG KPD-KJKYKM) heard at 1020Z ARQ 5LG msg to Cairo. (ML)

**19216.7:** RFLI, FF FT DE FRANCE ARQ/E3//96/E/400 8rc. Betas. Weak sync 1615 cct [LIH] C de v svc Antilles de Antilles. Slow transfer - 18 minutes! MI 1612Z. (DW)

**19309:** 055, UNID MIL.STD 188-141A ALE on USB. Sounding CM 1145Z. (DW)

**19320:** BRA, MFA BRATISLAVA MIL.STD 188-141A ALE on USB. Sounding. Also at 1147Z DP1126Z. (DW)

**19320:** OLZ88, MFA PRAGUE MIL.STD 188-141A ALE on USB. Cng OLZ78/unid. [AMD]FAX triggering Clover2000 datamodem DP 1135Z. (DW)

**19340:** BMLV1 AUSTRIAN MOD VIENNA MIL.STD 188-141A ALE on USB. Cng 1111 MI1144. (DW)

**19463:** UNID, SUNA KHARTOUM RTTY// 50/N/140 Marker "zczc...(x4) zczc, RY's". Freq stab poor. 0924 marker closes, idle mark. 1000 Press in EE thru 1025, poor copy shift varies. 1509 Px in FF pr ccopy thru 1526. 1605-09 marker, 1610-18 px in EE PR at 0900Z. (DW)

**19541.7:** MFA Cairo 1020 ARQ w/KKVZ SELCAL, op chat & s/off to Kampala. (ML)

**19699:** UFN, NOVOROSSIYSK RADIO CW chan free marker "de UFN" MM 1017Z. (DW)

**19724.5:** UIW, KALININGRAD RADIO 3SC//50/R/170 blind trfc in 3sc. MM at 1502Z. (DW)

**19910:** O/M (IT): 1727 LSB w/O/M (IT). Chat refs locations 31 North & 36 North & Morocco. Possible maritime link. (RP3)

**19945:** NKT ALGERIAN EMB NOUAKCHOTT MIL.STD 188-141A ALE on USB. Cng MAE/Algiers. [UUF] 124 67 65 J then 124 67 65 HJ then 124 67 65 8 and triggers Skyfax datamodem DP 1518. (DW)

**19977:** CYP UK MIL/DIPLO CYPRUS MIL.STD 188-141A ALE on USB. Sounding MI 1351. (DW)

**19977:** CYP UK MIL/DIPLO EPISKOPI MIL.STD 188-141A ALE on USB. Sounding. MI 1351. (DW)

**20221.7:** --- EGYPTIAN EMB AMMAN SITOR/A//100/E/170 tfc in AA(ATU80). mn abwj (fm Amman?) thru 1600Z DP 1543Z. (DW)

**20617:** BRA, MFA BRATISLAVA MIL.STD 188-141A ALE on USB. Sounding 1042Z. (DW)

**20631:** MPA USAF MNT PLEASANCE ? MIL.STD 188-141A ALE on USB. Sounding MI 1111. (DW)

**20890:** CS9 US CUSTOMS ?LOC MIL.STD 188-141A ALE on USB. Sounding. NG 1510Z. (DW)



**20981.7:** MFA Islamabad 0856 ARQ svc msg to Pyongyang. (ML)  
**20981.7:** Pakistani Emb Dhaka 0643 ARQ svc msg & op chat to Islamabad. (ML)  
**21810:** BRAMFA BRATISLAVA MIL.STD 188-141A ALE on USB. Sounding, also at 1118, 1134 DP 1057Z. (DW)  
**21866:** AF5 UNID MIL.STD 188-141A ALE on USB. CM 1307Z. (DW)  
**21867:** KUW UK MIL/DIPLO KUWAIT

MIL.STD 188-141A ALE on USB. Sounding, also at 1258Z. (DW)  
**21964:** AA 814: 2018Z USB w/Miami Radio w/departure message. (RP3)  
**22380.5:** CBV VALPARAISO RADIO CW Barely audible. Chan free marker "CBV" MM 1021Z. (DW)  
**22382:** NRV USCG GUAM CW chan free marker "NRV" MM 1024Z. (DW)  
**22383.5:** WLO MOBILE RADIO CW chan

free marker "WLO" MM 1329Z. (DW)  
**23210:** Stockholm Radio heard at 1311 in USB w/Reach 116 (not heard) in pp w/unidentified metro. (RP3)  
**23210:** O/M (SS): 2015 USB w/unheard station. (RP3)  
**23337:** HAW USAF ASCENSION MIL.STD 188-141A ALE on USB. Sounding MI. (DW)  
**23337:** IKF USAF KEFLAVICK MIL.STD 188-141A ALE on USB. Sounding MI. (DW)  
**23471:** 369 UNID MIL.STD 188-141A ALE on USB. Sounding CM. (DW)  
**23822:** CYP UK MIL/DIPLO EPISKOPI MIL.STD 188-141A ALE on USB. Sounding MI 1200Z. (DW)  
**24100:** OLZ88 MFA PRAGUE MIL.STD 188-141A ALE on USB. Cng OLZ67/unid. DP 1256Z. (DW)  
**24268:** CYP UK MIL/DIPLO EPISKOPI MIL.STD 188-141A ALE on USB. Sounding MI 1205Z. (DW)  
**24268:** KUW UK MIL/DIPLO KUWAIT MIL.STD 188-141A ALE on USB. Sounding. MI 1324Z. (DW)  
**25186:** KUW UK MIL/DIPLO KUWAIT MIL.STD 188-141A ALE on USB. Sounding MI 0955Z. (DW)  
**25350:** PRI U.S. CUSTOMS ?LOC MIL.STD 188-141A ALE on USB. Sounding NG 1454Z. (DW)

## Popular Communications Or Popular Psychology?

*A response to Craig Rose's "More Than Just Voices" (February 2003)*

*By Bob Combs*

I am from the old school that was taught whatever goes on the air and is NOT encrypted is free game. Many years ago, I was an Air Force Technical Controller for a large communications base in the UK. Our basic training was that if you don't want anyone to hear what you're saying, don't talk! We were taught that for every transmission, you shouldn't bet your paycheck that someone out there is NOT listening to what you are saying.

Be it the audio voyeur (hobbyist), or the person making a living at monitoring—news media, foreign powers (intelligence), or other malignant growths of society—someone, someplace is listening. If a person really believes that what he says over a radio (or a cell phone, for that matter) is secret and not being heard by anybody, then he is sadly mistaken and perhaps should be re-educated on the concept.

I have been listening to Utility stations for a long time (35 years), and have received my share of replies to my reception reports mentioning the ITU (International Telecommunications Union) and the third party "rule." This rule states:

...utility communications are not intended for public reception, and are intended to be a two-party exchange of information. A third party cannot be stopped from listening to the transmission, but can be severely fined or imprisoned for repeating or using to their own advantage, what they have heard, if prosecuted.

What does this mean to me as an individual? It means that if I hear something from a Utility station that I question as to whether or not it is something I shouldn't be hearing, I listen but I keep the information between my two ears.

In the United States, the ITU third-party rule has not been enforced, whereas in many other countries around the world it is! I have been in exchange of information with several people living in Europe who flatly tell me it is against their countries' laws to listen on THOSE bands, and fines/imprisonment could be brought against them if they did. Perhaps this rule should be enforced in this country. I for one hope it never will be, but as is usually the case, a few people spoil it for all the rest of us.

Perhaps it should be.

The 9/11 attacks have certainly changed the United States, but not the world. We have just simply become a part of the world's daily activities. Now that we have been dragged into reality, it has forever changed a lot of the freedoms we took for granted.

Case in point: I am (was) an avid railroad fan as well as an aviation fan, and would spend large portions of my time photographing planes or trains for my own (modeling) pursuits. Today, I better not be *caught* trying to take a picture of something, as I will likely be classified a terrorist (a guy with \$50K worth of camera equipment hanging around my neck and two Boston Terriers tagging along could certainly be confusedly mistaken for one). God help me if they ever find out I have a radio receiver! Yes, I am being a little overly dramatic, but I am trying to make a point. I no longer freely stand by the railroad tracks or hang at the visitors' area at my local airport because, for the time being, it has become politically incorrect to do so. I don't like it, but common sense tells me not to do it.

As far as radio monitoring goes the same concept sort of follows. Use common sense in what you do and hopefully things will not become ugly.

To sum up, as long as is radio, there will be listeners. What an individual does with what he hears is something that is based on the individual's ethics. If he does not have any, he tells everyone he meets; if he has some, he uses common sense in what is sharable and what is not.

So before you rush out to tell the world about what you have just heard, stop and think about it for a bit—does it really NEED to be told? If the answer is yes, then be willing to stand by your actions, and accept the results as whatever they may be. Common sense goes a long way!

This month's contributor's were Chris Gay (CG); Day Watson (DW); Dwight Simpson (DS2); Mark Cleary (MC); Murray Lehman (ML); and Ron Perron (RP3)

## Wrapping Up

This month's column marks the beginning of my fourth year writing the column. The last three years have been an interesting time, to say the least.

You have to remember that I came into the position of columnist with no contacts or special connections within the UTE world. I've never made any claims to expertise, because the whole point of this column is that the experts are you, the readers.

So what this column has reflected *your* input. I'll say it again—it's *your* column, and my job is to take what you send to me and put it together into a usable form.

Frankly what you don't see is the raw material that I have to work with. I get e-mails and letters from all over the world. Some are sharp and clean and others require a lot of interpretation to make sense of them. In all cases I have tried to include as much of the material as possible.

If you have sent in material and have not seen it, or not received a reply, don't take it as a rejection. I wish I had the luxury of many free hours (and a personal secretary)

to put into the column, but you must remember that this is a hobby publication and I work full time in addition to putting this column together.

What has been the most pleasant thing about the column has been the really good work and dedication of those people who have been faithfully contributing logs and articles for the past three years. Really and truly, I owe each of you a great deal of thanks and gratitude.

Likewise I've also enjoyed getting letters and e-mails from all over the world (I'm still hoping to hear from Antarctica one day). It's good to share the enjoyment of the radio-monitoring hobby with people, particularly now that I've been doing it for close to 40 years (along with 33 years of ham radio). A lot of changes have taken place in the way radio monitoring is practiced and I'm sure more changes are to come. Still, I get a thrill

### TUNING-IN (from page 4)

port comms every time there's a launch and subsequent landing. I remember the days of Apollo and Gemini and listening to all the NASA and military comms professionals who helped catapult us to where we are today. On July 20, 1969, I was working at WENT, a small radio station in upstate New York. Like many others, I'll never forget the moment Armstrong touched the Moon. We could just as easily have put a robot rover on the surface, but somehow I don't think the impact would have been the same. And had the Shuttle *Columbia* been an unmanned vehicle burning up in the earth's atmosphere at 12,500 mph, the impact wouldn't have been the same either. Perhaps that's just a *small* part of the legacy of the seven-person crew—that while unmanned missions do serve a purpose in some instances, it's the color, feel, warmth, and ability of humans to radio back our thoughts, prayers, and emotions from the vastness of space that begs us to continue the journey.

The Shuttle is not a perfect machine. Nor was the first tank or ICBM, but here we are in 2003, and we've managed to muster support for continued development of many expensive tools that can lead to our destruction in the flash of a second. We should continue development of a newer version of the aging Shuttle fleet *and* continue building the International Space Station, mankind's first major step into the cosmos. It's a step I'm sure, when our grandchildren's children look back at this time, will be viewed as an advancement as important as Neil Armstrong's 1969 lunar landing.

Shuttle *Columbia*'s seven-person crew included three ham radio operators. The tragedy killed Mission Commander Rick Husband, Pilot William McCool, Mission Specialist Michael Anderson, David Brown (KC5ZTC), Laurel Clark (KC5ZSU), Kalpana Chawla (KD5ESI), and Israeli Payload Specialist Ilan Ramon. Did you hear the launch on a local ham repeater? Did you know their names before the tragedy? Did you even *know* that there was a Shuttle launch?

As this is written it's still unclear what caused the tragedy. But the bigger tragedy would be if the almighty dollar becomes more important than life itself. What an insult to our explorers that would be. I hope the powers-that-be don't seriously entertain the notion that space exploration is one of those expendable budget items or that it should be relegated to machines. It's time our elected representatives realized that some things just aren't expendable and need the human touch. If *they* can't see beyond the next century, please let them know that you can! ■



HUMBER RADIO AT LOW TIDE

*This is a shot of Coastal Radio station GKZ after the great storm of 1953 at low tide! As shown in last month's column, the interior was completely flooded.*

each time I turn on my radio and log a new station or hear something interesting or unusual.

There have been critics as well over the past three years. I expected that when I took over; after all, the last columnist set very high standards with his work. That's why when my first column was published I announced that it would be an entirely new undertaking rather than being a continuation of the previous column.

Some people haven't liked the resulting changes or the content or even the fact that I'm the columnist. I have to tell you right now that any negative comments like those don't motivate me to change one little bit. If you have something *constructive* to contribute, great! I'll put it in and make it happen because the column is, after all, your column.

However, the bottom line is that I'm the guy who is putting in the hours needed to deliver a Utility radio column to you each month. So until someone comes forward to take my place, you're stuck with me.

So critics, let's work *together* rather than against each other. If you want quality content then you are going to have to roll up your sleeves and contribute it yourself rather than expect others to do it for you. I'll do my job by collecting and organizing contributed material. I've always kept my word on that and, as a result, many people have seen their efforts in print.

So, what's holding you back? Only yourselves I would think, given that the mission of this column to serve the reader's needs first!

Anyway, the revamp continues. As I have said before, it's going to be a while before I can start posting a solid schedule again. We do, however, have some new people waiting in the wings to be introduced to you. The request for new contributions—both logs and articles—has been taken seriously and I'm getting more all the time.

Don't forget you can write to me. The address is "Utility Radio Review," PMB 121, 1623 Military Rd. Niagara Falls NY 14304-1745.

So until next month, may all of your Utility monitoring sessions be enjoyable and productive. ■

## Remembering Our Astronaut Heroes

Last month, since we had just entered the 2003 aviation demonstration season, I started a series on the various military demo teams. I had hoped to do an article on the USAF Thunderbirds this month, followed by the UK Red Arrows and the Canadian Snowbirds. However, I am writing this in the shadow of our third major space disaster—the disintegration of the shuttle Columbia.

Our first space program deaths were the astronauts Virgil I. “Gus” Grissom (our most experienced astronaut), Edward H. White (the first American to “walk” in space and a personal friend of my father’s), and Roger B. Chaffee (preparing for his first space flight). Many of us remember their deaths in their Apollo I space capsule on pad 34-A at Cape Kennedy, later renamed Cape Canaveral, on January 27, 1967.

It was just a scant 19 years later when, on January 28, 1986, just 73 seconds after launch, the explosion of the shuttle *Challenger* took the lives of shuttle astronauts Francis R. “Dick” Scobee, Michael J. Smith, Judith A. Resnik, Ellison S. Onizuka, Ronald E. McNair, Gregory B. Jarvis, and school teacher Sharon Christa McAuliffe.

Then this February 1, 16 minutes before scheduled touchdown, the shuttle *Columbia*, our oldest and most used shuttle, disintegrated over the southwest United States, scattering debris over Texas and Louisiana, with more possible debris as far west as California.

When the Apollo fire occurred it was not the end of the mission to the moon. In fact, the redesign of the escape door and the altering of the atmosphere inside was accomplished rather quickly, and our next manned Apollo mission, Apollo 7, with astronauts Walter M. “Wally” Schirra, Donn F. Eisele, and R. Walter Cunningham was less than 22 months later. That mission, Apollo 7, circled the earth beginning October 11, 1968. Nine months after that was the first of six landings on the moon.

The majority of the readers of this column and the magazine remember exactly what they were doing when, on that cold January morning of 1986, our programming was interrupted as we saw the infamous forked rocket exhaust trail from the booster rockets of *Challenger*.

That time it took over two and a half years to redesign the shuttle boosters and make other improvements to the shuttle system, but, on September 29, 1988, the shuttle *Discovery* took back to the ether. This time the entire world was watching the launch. The one-hour, 38-minute delay for fuses and weather didn’t seem to assuage the nervousness. We learned much during this interim period, and, as usual, we were complacent—or at least the public was—when the shuttle was returning from the 113th shuttle mission.

Those of us who remember the early Mercury, Gemini, Apollo, and Skylab missions, especially those of us who grew up in central Florida during those years, would be glued to the TV during the launch. During the countdown, I’d watch Walter Cronkite on WDBO-TV (now WKMG), the CBS affiliate in Orlando. At about 15 seconds after each of the launches, I would



*Space Shuttle Columbia sits on launch pad 39A at the Cape.*

go to the front door of my parents’ home, with the TV turned up, and watch the rockets rise from Cape Canaveral, some 35 miles due east.

Even today, 42 years after the earliest Mercury mission, people throughout Florida stop and look towards the cape when the launch of a shuttle occurs. Many local AM radio stations carry the launch countdown live. We here on the west coast of Florida, some 150 miles southwest of Kennedy Space Center, can see most of the launches, even during the bright daylight hours. In fact, during my tenure in the control tower at Albany, Georgia, we could see the occasional launch, some 275 miles southeast.

Unfortunately, from my visual vantage point here in St. Petersburg I cannot monitor the radio frequencies directly from



*The crew of the STS-107, Space Shuttle Columbia.*

the launch site. I must rely on the local ham repeater on 145.230. Many ham radio repeaters are authorized to rebroadcast the shuttle missions, during which times they are all that is carried over these repeaters. See "Shuttle Mission Repeater Frequencies" for a list that I've been able to compile of ham radio repeaters carrying the missions live. I can't attest that they are all still active and, undoubtedly, I'm missing some so please contact me so I can update this list. Thank you.

## A Reader's Experience...

I'd like to take a little space here to answer an e-mail I got earlier this month from Lew in Colorado. Lew writes:

Bill,

I had an interesting thing happen while monitoring air traffic the other day. I was working at the computer and so was not giving full

### Shuttle Mission Repeater Frequencies

<b>AL</b>		<b>IN</b>	2716	Eastern Test Range
Birmingham	145.150, 145.380	Indianapolis	2764	Eastern Test Range
Huntsville	147.100, 173.025		3041	Cape Radio Communications
<b>AR</b>		<b>KS</b>	3187	Eastern Test Range
Russelville	439.250	Wichita	4520	Eastern Test Range
			4805	Eastern Test Range
<b>AZ</b>		<b>ME</b>	4992	Cape Radio Range
Phoenix	421.250, 449.000	Portland		Communications
		York	5011	Eastern Test Range
<b>CA</b>			5145.5	ARIA Control
Los Angeles	52.640, 224.940,	<b>MN</b>	5180	Eastern Test Range
445.425, 446.575,	447.000,	Central	5246	Eastern Test Range
447.025,	447.400,	Twin Cities	5711	Eastern Test Range
447.475,	448.375,	Waseca	5810	Primary Call-In
448.500,	1241.250		5837	ARIA Control
Monterey Bay	145.585, 443.300	<b>MO</b>	6693	Support Aircraft
Northern	145.530	Gladstone	6889	ARIA Control
Redondo Beach	145.32	Kansas City	6937	Cape Radio Range
Sacramento	147.195			Communications
San Diego	449.450, 1277.25	<b>NJ</b>	7765	Eastern Test Range/Booster
San Francisco	427.250, 444.775	Central	443.400	Recovery Ships
San Joaquin Valley	52.22	Northern	146.610	8972
Santa Barbara	1277.000			8981
		<b>NY</b>	9043	Support Aircraft
<b>CO</b>		Albany	9132	Support Aircraft
Denver	147.225	Long Island	10780	Support Aircraft
			11205	Primary Call-In
<b>DC</b>		<b>OH</b>	11217	Support Aircraft
Washington	147.450	Dayton	11217	Cape Radio Communications
		Greenville	11407	ARIA I & 2
<b>FL</b>			11414	ARIA Control
Cape Canaveral	146.940	<b>OK</b>	11548	Cape Radio Communications
Clearwater Beach	442.075	Tulsa	13170	Support Aircraft
Dayton Beach	147.150		16246	ARIA Control Communications
Fort Lauderdale	442.650		20186	Miscellaneous Activities
Gainesville	146.900		20390	Cape Radio
Jacksonville	144.360	<b>PA</b>		
Lakeland	147.375	Pittsburg	145.470, 145.650	<b>(All in MHz)</b>
Largo	51.84, 145.23,			121.750
421.25		<b>SC</b>		Shuttle air-to-air
Macclenny	144.330	Orangeburg	146.805	rendevous/docking FM narrow
North Lauderdale	145.750			144.49
Orlando	147.150	<b>SD</b>		SAREX FM Packet Uplink
Spring Hill	443.95	Watertown	145.550	144.91
Vero Beach	145.130			SAREX FM Voice Uplink
<b>GA</b>		<b>TX</b>		144.95
Ashburn	147.285	Dallas	145.310, 146.600,	144.97
Atlanta	146.655, 147.345,	448.750		SAREX FM Voice Uplink
427.250		Houston	146.640	144.99
Forsyth	147.915			SAREX FM Voice
		<b>WI</b>		Downlink/SAREX FM Packet
<b>IA</b>		Wausau	146.820, 147.060,	Downlink:
Cedar Rapids	146.400, 444.300	421.250		Space Shuttle uplink/downlink
				pre-launch & landing AM
<b>IL</b>				mode/Air-to-ground, or suit to
Champaign/Urbana	146.880			Orbiter
Chicago	145.350			260.60
Downers Grove	145.350			Satellite downlink frequency
Morton Grove	145.350			for ARIA in past. FM narrow
Rolling Meadows	145.350			279.00
				Suit-to-Orbiter, or suit-to-suit
				296.80
				Air-to-ground, or Orbiter to suit
				310.20
				Eastern Test Range
		<b>(All in kHz)</b>		
		2622	Booster Recovery	
			Communications	
		2678	Cape Kennedy Range Control	

Of course if you're lucky enough to live in Central Florida, or along the Florida East Coast, you may try some of these frequencies:

**(All in kHz)**  
 2622 Booster Recovery  
 Communications  
 2678 Cape Kennedy Range Control

## NEW/CHANGED/DELETED FREQUENCIES

NEW			
<b>AK</b>			
Anchorage, Air Route Control Center (ZAN)			
Cape Romanzof High Sector	124.5/257.7		
Cold Bay High Sector	125.45/322.4		
Galena High Sector	134.55/278.8		
Kotzebue High Sector	132.35/281.5		
Palmer, Hunter Creek Airport (AK66)			
Unicom	122.7		
Pilot Point Airport (PNP)			
AWOS-3	118.375		
Willow, Long Lake Airport (AK69)			
Unicom	122.8		
Willow, Long Lake Seaplane Base (AK57)			
Unicom	122.8		
<b>AR</b>			
West Memphis Municipal (AWM)			
ASOS	118.175		
<b>CA</b>			
Calipatria, Cliff Hatfield Memorial (CLR)			
ZLA RCAG	128.69/291.7		
<b>DC</b>			
Washington, Potomac TRACON (PCT)			
Apch	126.1/338.25		
Apch	128.35/270.275		
Apch	391.1		
Washington, Washington AFSS (DCA)			
Snow Hill, MD RCO	122.6		
Charlottesville, VA, Buck's			
Elbow Mountain RCO	122.2/122.65		
Falls Church, VA RCO	122.2		
<b>FL</b>			
Bartow Municipal (BOW)			
AWOS-3	123.775		
Tampa, Vandenberg Airport (VDF)			
ILS Rwy 23 (I-VDF)	111.35		
<b>GA</b>			
Millen (LNH)			
NDB	205 kHz		
<b>IL</b>			
Freeport, Albertus (FEP)			
CD	121.85		
<b>MD</b>			
Crisfield, Crisfield Municipal (W41)			
Patuxent Apch	127.95/314.0		
<b>MI</b>			
Detroit Metropolitan/Wayne County Airport (DTW)			
Southeast GC	119.25		
<b>MS</b>			
Bay St Louis, Stennis International Airport (AYI)			
HANCO NDB (HS)	221 kHz		
ILS Rwy 18 (I-HAS)	110.35		
<b>MO</b>			
Mosby, Clay County Regional (GPH)			
CD	118.2		
<b>NE</b>			
Wayne, Wayne Municipal (LCG)			
Sioux City Apch	124.6		
<b>NV</b>			
Kingston, Kingston Airport (N15)			
CTAF	122.95		
<b>NC</b>			
Jacksonville, New River MCAS (NCA)			
Apch	118.575		
<b>OH</b>			
Fremont, Sandusky County Regional (S24)			
AWOS-3	119.575		
Jackson, James A. Rhodes (I43)			
AWOS-A	118.825		
Middle Bass, Middle Bass Island Airport (3T7)			
Unicom	122.8		
<b>TX</b>			
Bay City, Bay City Municipal (BYY)			
AWOS-3	118.075		
Dumas, Moore County (DUX)			
AWOS-3	118.075		
Freeport, Go Helitrans Heliport (97TE)			
Unicom	123.0		
Perryton, Ochiltree County (PYX)			
AWOS-3	118.175		
Waco, TSTC Waco (CNW)			
LC 255.7			
<b>CHANGED</b>			
<b>AL</b>			
Fort Rucker/Ozark (OZR)			
Apch		was 291.65, now 270.35	
<b>AZ</b>			
Phoenix Sky Harbor International TRACON (PHX)			
Apch		was 285.55, now 353.9	
<b>DE</b>			
Dover AFB (DOV)			
Dept Cntrl		was 324.5, now 323.0	
PMSV		was 352.5, now 342.0	
<b>GA</b>			
Marietta, Dobbins Air Reserve Base (MGE)			
LC		was 370.875, now 397.2	
<b>MI</b>			
Fruitport, Flying-A-Ranch Airport (39Z)			
Unicom/CTAF		was 122.8, now 122.9	
<b>MO</b>			
St. Louis, Lambert/St. Louis International Airport (STL)			
CD/Pre Taxi		was 119.5, now 127.55	
<b>NE</b>			
Omaha, Offutt AFB (OFF)			
L/C		was 348.4, now 279.625	
<b>NC</b>			
Cherry Point MCAS/Cunningham Field (NKT)			
West Apch		was 306.3, now 377.175	
Jacksonville, New River MCAS (NCA)			
Apch		was 311.6/315.6/345.2, now 346.325/350.225/353.875	
<b>OR</b>			
Klamath Falls Airport (LMT)			
Apch		was 233.7, now 270.8	
<b>SD</b>			
Martin, Martin Municipal Airport (9V6)			
Unicom/CTAF		was 123.0, now 122.9	
<b>VA</b>			
Norfolk Approach Control (ORF)			
Elizabeth City CGAS, NC (ECG)			
Franklin Municipal, John Beverly Rose, NC (FKN)			
Hampton, Langley AFB, VA (LFI)			
Suffolk, Municipal, VA (SFQ)			
Wakefield, Wakefield Municipal, VA (AKQ)			
Apch		was 249.9, now 269.42	
Fort Eustis, Felker AAF, VA (FAF)			
Newport News, Williamsburg International Airport (PHF)			
Apch		was 395.8, now 335.625	
Langley AFB, VA (LFI)			
Apch		was 372.1/395.8, now 370.925/335.625	
Melfa, Accomack County (MFV)			
Saluda, Hummel Field (W75)			
Apch		was 372.1, now 370.925	
Norfolk, Chesapeake Regional (CPK)			
Norfolk, Hampton Roads Executive (PVG)			
Apch		was 257.3, now 273.475	
Norfolk, Norfolk International (ORF)			
Apch		was 257.3/389.9/395.8, now 273.475/335.625	
Norfolk, Norfolk NAS (NGU)			
Apch		was 389.9/257.3/395.8, now 273.475/363.125/335.625	

Virginia Beach, Oceana NAS/Apollo Soucek (NTU) Apch	was 389.9/372.1, now 370.925/363.125		
<b>DELETED</b>			
<b>AK</b>			
Candle, Candle 2 Airport (AK75)			
CTAF	122.9		
<b>CA</b>			
San Bernardino International (SBD)			
ASOS	124.175		
<b>DC</b>			
Washington ARTCC (ZDC)			
U.S. Arriv/Dept	132.55/256.8		
<b>IA</b>			
Fairfield, Estle Field Airport (IA61)			
CTAF	122.9		
Winfield, Port Paradise Farms Airport	(81A2)		
CTAF	122.9		
<b>ME</b>			
Dexter, Dexter Regional (1B0)			
Bangor CD	119.5		
Old Town, Dewitt Field (OLD)			
Bangor CD	119.5		
Pittsfield, Pittsfield Municipal Airport (2B7)			
Bangor CD	119.5		
<b>MO</b>			
Independence, Independence Memorial Airport (5MO2)			
Unicom	122.8		
Pennington Gap, Pennington Gap Airport (VG54)			
CTAF	122.9		
<b>WI</b>			
Mosinee, Central Wisconsin Airport (HWS)			
NDB	377 kHz		
<b>NEW/CHANGED/DELETED IDs/ABANDONED/ CLOSED AIRPORTS</b>			
<b>NEW</b>			
<b>AK</b>			
Palmer, Hunter Creek Airport	AK66		
Palmer, Pat-mar Strip	AK63		
Sutton, King Ranch Airport	AK59		
Wasilla, Fairview West Airport	AK58		
Willow, Long Lake Airport	AK69		
Willow, Long Lake Seaplane Base	AK57		
Willow, Winter Park Airstrip Airport	AK68		
<b>AZ</b>			
Hackberry, Music Mountain Air Ranch Airport	68AZ		
Kingman, Dunton Ranch Airport	73AZ		
Lake Havasu City, Spawr Heliport	71AZ		
Tucson, Regional Public Safety Training Academy Heliport	70AZ		
Wenden, Wood's Airstrip Airport	60AZ		
<b>CA</b>			
Los Angeles, Pacoima Dam Heliport	CN47		
<b>FL</b>			
Fernandina Beach, Baptist Medical Center of Nassau Heliport	FD91		
<b>GA</b>			
Atlanta, WGCL-TV Heliport	31GA		
Carrrollton, Flying W Farms Airport	6GA8		
Madison, Dream Team Airport	GA50		
Villa Rica, Tanner Medical Center Heliport	7GA7		
<b>HI</b>			
Pearl Harbor, K3 Helipad Heliport	02HI		
<b>IL</b>			
Marion, Heartland Regional Medical Center Heliport	5IL6		
Morris, Curranda Airport	LL39		
Paw Paw, Dunn Airport	LL54		
<b>KS</b>			
Wichita, Lifeteam 20 Heliport		48SN	
<b>LA</b>			
Glenmora, Jasmine Hill Airport		11LS	
Winnsboro, FMC Nr 1 Heliport		03LS	
<b>ME</b>			
Sangerfield, Morrel Field Airport		ME32	
<b>MA</b>			
Boston, Brigham & Women's Hospital Heliport		MA39	
Peabody, Metro-Swift Heliport		MA49	
Worcester, Worcester Medical Center Heliport		42MA	
<b>MO</b>			
Belton, Robinson Airport		MU26	
Broseley, Brown Field Airport		MU56	
<b>NH</b>			
Westmoreland, Pilgrim's Home Airfield Airport		2NH5	
<b>NV</b>			
Elmo, Llama Ranch Airport		03NV	
Kingston, Kingston Airport		N15	
<b>NC</b>			
Gastonia, North Carolina Helicopters Heliport		6NC6	
Maysville, Parker Field Airport		8NC7	
Whittier, Reagans Roost Ultralight		85NC	
<b>OH</b>			
Middle Bass, Island Airport		3T7	
<b>OK</b>			
Bray, Wolfe Field Airport		1OK3	
Lindsay - Bearden Private Airstrip Airport		3OK5	
Tulsa, Allied Heliport		OK12	
<b>PA</b>			
Kittanning, Stitt Airport		PN59	
<b>TX</b>			
Bedias, Jordan Ranch Airport		90TS	
Canadian, Split B Ranch Airport		TE04	
Crandall, Bennetts Airport		9TX2	
Cross Roads, Star Heliport		95TE	
Freeport, Go Helitrans Heliport		97TE	
Loving, Rob Airport		95TS	
Mullin, Carlisle Airport		7TE5	
Santo, Matthews Ranch Airport		86TE	
<b>VT</b>			
Vernon, Miller's Pleasure Airfield Airport		VT47	
<b>WI</b>			
Manitowoc, Woodland Airstrip Ultralight Airport		3WN7	
Plymouth, Aurora Valley View Medical Center Heliport		57WI	
<b>CHANGED</b>			
<b>AK</b>			
Candle, Candle 2 Airport			
was CDL, now AK75			
<b>AL</b>			
Fort Rucker/Goodman			
was IOC Stagefield AHP (25AL) now 10C AHP			
<b>AZ</b>			
Tucson			
was Regional Public Safety Training Heliport (70AZ)			
now Regional Public Safety Training Academy Heliport			
<b>AR</b>			
England, Bredlow Farm Airport			
was 5M2, now 17AR			
<b>AK</b>			
Garland, Reed-Joseph Land Company Airport			
was AR15, now 4AR4			
<b>CA</b>			
Agua Caliente Springs, was Agua Caliente Aprings (L54)			
now Agua Caliente			
<b>FL</b>			
Bellevue, was Jordan Airport (FL58)			
now Johary Airport			

Fernandina Beach, was Nassau General Hospital (FD91)  
now Baptist Medical Center of Nassau Heliport

**ID**  
Donnelly, was Donnelly Airport (U84)  
now Donald D. Coski Memorial

**IL**  
New Boston, was Russell Farms (69LL)  
now Maas Airstrip  
Oquawka, was Earl J Meyer Airport (LL23)  
now Meyer Airport

**KS**  
Sublette, was Sublette Flying Club Airport  
was 80KS, now 19S

**MI**  
New Haven, was Macomb Airport (57D)  
now Ray Community Airport

**MO**  
Independence, was Independence Memorial Airport  
was 3IP, now 5MO2

**NY**  
Binghamton, was Binghamton Regional/Edwin A Link Airport  
(BGM)  
now Greater Binghamton/Edwin A Link Field Airport

**NC**  
Concord, was Goodnight's Field (4NC8)  
now Buffalo Creek

**SC**  
Sumter, was Sumter Municipal Airport (SMS)  
now Sumter Airport

**TX**  
Bay City, was Bay City Municipal  
was 3R1, now BYY  
Krum, was Sackett's Vintage Flying Field (TE58)  
now Air Cowboy Field

Mount Pleasant, was Mount Pleasant Airport (OSA)  
now Mount Pleasant Regional Airport

**VA**  
Pennington Gap, was Lee County VG54  
now Pennington Gap Airport  
Pennington Gap Airport  
was VG54, now PTG

## ABANDONED/CLOSED/DELETED

<b>AK</b>	Glennallen, Brenwicks Airport	3Z5
<b>AR</b>	Jonesboro, John Parker Strip Airport	AR26
<b>FL</b>	Dundee, Lake Annie Seaplane Base	42FD
	Lake Hamilton Seaplane Base	89FD
	Vero Beach, Marsh Airstrip Airport	2FD2
<b>IL</b>	Marion, Marion Memorial Hospital Heliport	4IL1
<b>MO</b>	Verona, Home Place Landing Airport	MO22
<b>ND</b>	Amidon, Logging Camp Plateau Airstrip Airport	8NA4
	Ashley, Nitschke Field Airport	ND77
	Barney, Braaten Airstrip Airport	27ND
	Barney, Woodbury Airport	2NA4
	Bismark, Buffalo Commons Mediport Heliport	ND97
	Braddock, McLeish Landing Strip Airport	ND83
	Colfax, Hendrickson Farm Airport	2NA3
	Colfax, L. Thompson Airstrip Airport	NA82
	Dresden, Dresden Field Airport	02ND
	Edinburg, Windingland Private Airport	ND84
	Eldridge, F. Seckerson Airstrip Airport	NA83
	Embden, Hahn Field Airport	04ND
	Fairmont, Bickerdike Airstrip Airport	NA34
	Flasher, Jochim Ranches Airport	6NA3
	Fort Ransom, Falk Airstrip Airport	NA36
	Galesburg, Klessig Strip Airport	05ND
	Gardner, Swenson Airport	0ND2
	Garrison, Evenson's Airport	41ND
	Garrison, Miller Private Airstrip Airport	8NA8
	Montpelier, Circuit Rider Airport	90ND
<b>TN</b>	Knoxville, U T Medical Center Heliport	08TN
	Knoxville, University Tennessee Hospital Heliport	95A
<b>TX</b>	Allen, C C Flyers Airport	TX17
	Fort Worth, Saginaw Airport	F04
<b>VT</b>	Alburg, Greenwoods Airfield Airport	VT38

attention to the scanner when I heard an aircraft communicate to another aircraft, or maybe Denver Center, that he could hear an ELT [Emergency Locator Transmitter] signal on 121.50 MHz. Not knowing where the aircraft was, I gave 121.50 a try and sure enough there was an ELT.

I live about a mile from the Montrose Regional Airport and so gave a call out there to report the signal. I also called the closest FAA office in Grand Junction. They had me call the FAA in Denver. The folks at FAA sounded appreciative of my report.

About an hour and a half later, there was traffic on the Montrose Airport ground support frequency (156.00) requesting that a certain person in town be contacted by phone because they did not have a key to a particular hangar. About 20 minutes later, the ELT signal abruptly stopped. I surmise that an aircraft in the hangar, or perhaps an ELT on a work bench, was transmitting the signal.

I occasionally fly out of Montrose as an observer for Forest Service aerial fire detection flights and knew that if it was my aircraft in trouble I would not want things confused by a false alarm ELT transmitting from a plane sitting on the Montrose tarmac.

Keep up the interesting columns in *Pop'Comm*.

Lew

All aircraft flying must use an ELT capable of transmitting

on 121.5 and/or 243.0 MHz. They must be installed in such a manner that should the aircraft crash the emergency switch will automatically activate the transmitter, emitting its familiar—and loud—“whoop-whoop-whoop.” By transmitting on 121.5, military aircraft can monitor its harmonic of 243.0, thus allowing the military to assist in the search for downed civilian aircraft.

Occasionally the triggering mechanism might be a little light or perhaps the pilot may have made a rather hard landing and the ELT may be inadvertently activated. The pilot may not have known he set it off. So, out comes the Civil Air Patrol looking for it. If it's on the ramp or tarmac outside a hangar it's usually easy to find the ELT. However, if the aircraft is in a hangar, not only is it difficult to locate where the hangar is due to signals bouncing throughout the hangar, it's also difficult to locate the specific aircraft.

New digital ELTs are remedying that situation, but that's for another column. Thanks for the e-mail, Lew.

Keep listening, folks, and keep the questions coming. See you next month. ■

### Germany Ends North America And Pacific English SW Broadcasts

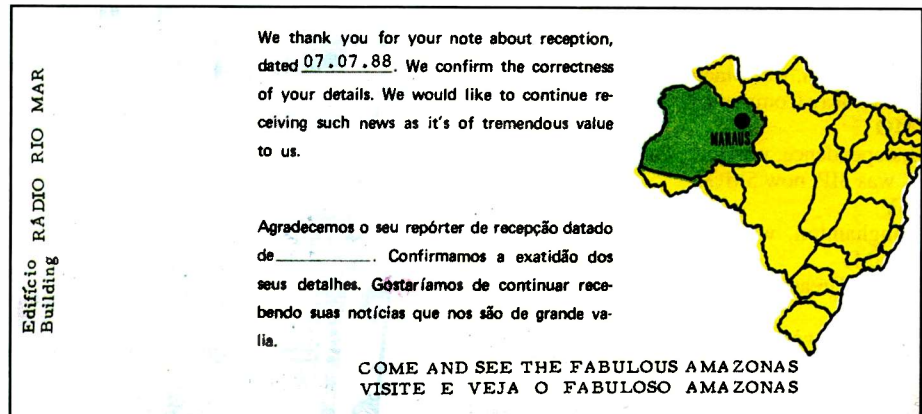
Those guys in the suits have done it to us again. Just like the BBC a couple of years ago, now Deutsche Welle decided to end its English language programming for North America and the Pacific effective at the end of March, so the deed has already been done. The same faulty “logic” was employed here as it was with the BBC’s decision: You can hear our programs on local stations, or via satellite, or over the Internet. You bet.

By summer DW will have revamped its English language programming; they call it a “facelift.” Well, here’s a memo to the dimwits at DW: You needn’t continue to mail us your radio/TV schedule.

The Far East Broadcasting Association says that over the remainder of this year they will be moving their programming to other stations around the world. This, they say, will “enable us to expand our programming base, get more ministry for our money; and reach a new audience of listeners.” But there is spin at work here. When you read on you find, “This means that the Seychelles station will wind down over the coming year.” FEBA is Seychelles’ station, not so much because it feels there are better opportunities to place programming elsewhere, but because of growing operational difficulties in the Seychelles. The antennas have about had it as far as usefulness is concerned, and the area around the site is being built up with more and more new housing (remember the problems Vatican Radio has had). To add to the woes, its electrical power is getting more and more expensive, as are license costs. The FEBA website still touts shortwave as virtually essential in reaching many parts of the world, but, in this case, FEBA has been on the air from the Seychelles Islands for three decades and is affiliated with the Far East Broadcasting Corporation, Philippines. If you haven’t bagged FEBA yet, you had best seek them out while you can.

Libya continues its relay arrangement via France. **Radio Jaramaiya/Voice of Africa** can currently be heard via the Radio France transmitters at Issoudoun from 1000 to 1100 on **21695**; 1100 to 1230 on **17695, 21485, 21675, and 21695**; 1230 to 1400 on **11675 and 21695**; 1400 to 1500 on **21675**; 1600 to 1700 on **15220 and 15615**; 1700 to 1800 on **15220, 15615, 15660, and 17880**; 1800 to 1900 on **9415, 11635, 11715, and 15615**; 1900 to 2030 on **11635, 11715, and 2030 to 2130 on 11635**. Oddly, one of Libya’s home-based transmissions, on 15435, has been quite poor over the last few months—when it’s there at all!

Gospel For Asia is a (relatively) new addition to the religious radio ranks. Based in Carrollton, Texas, their shortwave programs air over the Al Dhabbaya transmitter in Abu Dhabi (UAE)



*Ciro DeGenarro got this nice QSL from Radio Rio Mar, Brazil, back in 1988!*

at 1230 to 1330 on **15170** and 1600 to 1630 on **9785** and also at 2330 to 0130 on **6145**. GFA is also heard via Germany’s Wertachtel site as follows: 0030 to 0130 on **9490**; 2330 to 0030 on **9765**; 2330 to 0130 on **11680**; 1530 to 1630 on **15425** and 1430 to 1530 on **15680**. Their address is 1800 Golden Trail Ct., Carrollton, TX 75010.

The Sitkunai transmitter in Lithuania does more than simply handle Radio Vilnius broadcasts. Here’s what else you can hear: Radio Vilnius is active from 0000 to 0100 daily on **7325**. On Saturdays from 0800 to 0900 the transmitter carries the Fundamental Broadcasting Network on **9710**, then Radio Vilnius daily from 0900 to 1000. On Sundays the transmitter continues at 1100 to 1200 with a Persian language program, called Awaye Ashema, and picks up again at 1300 to 1400, with the German language religious program Univerelles Leban. Radio Barobari, also in Persian, is aired on **7470** at 1700 to 1755 daily, and Radio Vilnius shows up on **9875** from 2300 to 0000 daily.

If you should run across a Brazilian broadcaster on **5955, 9685, or 15325** be careful about the ID. Radio Gazeta, the station using these channels, has rented its time to Radio Cancao Nova, a Brazilian religious broadcaster. Cancao Nova operates its own station, active on **4825, 6105, and 9675**.

Radio Havana Cuba has instituted some programming in support of the left-wing Chevz government in Venezuela. RHC has been heard doing its thing on **15230** and parallel **15570** around 1600, in Spanish. Incidentally, one of our reporters notes that the English broadcasts have started saying “Havana” instead of “Habana.” It’s possible this may have been going on for quite awhile—we are not what you’d call regular listeners to this station. Anyone know if this is a recent change?

This month’s book winner is **Dave Jeffery of Niagara Falls, New York**, who receives a 2003 edition of *Passport to World*





wishes to thank you for your recent Reception Report, and has pleasure in confirming it with this Acknowledgement Card.

We hope that you will continue to enjoy listening to FEBA Radio.

QSL Secretary

*Deven Dugallo*

FEBA RADIO, P.O. BOX 234, SEYCHELLES, INDIAN OCEAN.

DATE *4th September 2002*

TIME *0345-0407* UTC

FREQUENCY *15535* kHz

METRE-BAND mb

*Your column editor can remember trying to find this one on the 19-meter band when it first signed on. Now it's nearly time to say goodbye to FEBA radio in the Seychelles.*

*Band Radio*, courtesy of Universal Radio. Get a copy of their giant wish book/catalog of radio goodies by calling them at 614-866-4267 or e-mailing to <dx@universal-radio.com> or horse-and-buggy them at 6830 Americana Parkway, Reynoldsburg, OH 43068.

Now here's the usual request for your logs, shack photos, station pictures, copies of QSL cards (or actual cards if you don't need them returned), schedules, pennants, and blah blah. (We really, really need illustrative material!) Logs should be by country, be double-spaced (at a minimum), and have your last name and state after each one. That's 'cause these things get cut up and sorted and, without your name on each slip, we cannot give you the credit you deserve!

We have a monster list this month. It took over 90 minutes just to cut and sort the logs...another reason why we regularly plead for clarity and cutting space.

So let's get on with it! All times are in UTC (GMT), which is 7 hours ahead of EST, 6 ahead of CST, etc. 0000 UTC equals 7 p.m. EST, 6 p.m. CST, 5 p.m. MST, and 4 p.m. PST. Broadcast languages are abbreviated with a double capital (SS = Spanish, FF = French, AA = Arabic, and so on). If no language is specified you may assume the language was English.

**ALBANIA**—Radio Tirana, **6115** heard at 0353. (Moser, PA) **6115//7160** at 0337. Anthem and off at 0357. (Burrow, WA) 7160 at 0342 "You are tuned to Radio Tirana." (Brossell, WI) **7270** at 0231. (DeGennaro, NY)

**ALGERIA**—RTV Algerienne, **7245** at 0931 with music and comments in AA. (DeGennaro, NY)

**ANGOLA**—Radio Nacional, **4950** tentative ID at 0342 in PP with lots of great African tunes. (Montgomery, PA) 0510 with news but low audio. (Unid. Reporter)

**ANGUILLA**—Caribbean Beacon, **6090** with University Network at 0150. (Moser, PA) 0208. Also **11755** at 2130. (MacKenzie, CA)

**ANTIGUA**—BBC relay, **5975** heard at 2300. (Paradis, ME) **6195** at 1053. Also in SS at 1107 on **9670**. (DeGennaro, NY) **15190** at 1400 and 1500. (Newbury, NE) Deutsche Welle relay, **9510** at 0944, off a minute later. Also **9690** at 1015 with classical music. (DeGennaro, NY) 0645 in GG. Also **11985** in GG at 0610. (Becker, WA) **12045** at 2300. (Newbury, NE)

**ARGENTINA**—RAE, **6060** in SS at 0935. (DeGennaro, NY) 11710 with sign on in EE, SS, GG at 0000. (Moser, PA) 0239 with DX program. (Strawman, IA) 0300. (Newbury, NE) Argentine military

## Abbreviations Used In This Month's Column

//	—	Parallel frequency
ABC	—	Australian Broadcasting Corporation
AFRTS	—	Armed Forces Radio Television Service
AFN	—	Armed Forces Network
AIR	—	All India Radio
anncr	—	announcer
anmt(s)	—	announcement(s)
BSKSA	—	Broadcasting Service of the Kingdom of Saudi Arabia
CNR	—	China National Radio
GOS	—	General Overseas Service
ID	—	identification
Int'l	—	international
IS	—	interval signal
Lang	—	language
LSB	—	lower sideband mode
NBC	—	National Broadcasting Corporation
OA	—	Peru, Peruvian
PBS	—	People's Broadcasting Station
Pgm	—	program
RRI	—	Radio Republik Indonesia
sked	—	schedule
SIBC	—	Solomon Islands Broadcasting Corporation
TOH	—	Top of the Hour
unid.	—	unidentified
USB	—	upper sideband mode
vern	—	vernacular (any local dialect or language)
VOA	—	Voice of America
VOIRI	—	Voice of the Islamic Republic of Iran

relay, **20275**, **//15820** carrying one of the Argentine domestic broadcasters in LSB at 0055 to past 0335. (Alexander, PA)

**ARMENIA**—Voice of Armenia, **9660** at 2000 with IS, anthem, ID, and into unid. language. (Burrow, WA) 2040 with news and commentary. (Paradis, ME) 2055 with sign off anmts, address and off at 2100. (Wood, TN)

**ASCENSION ISLAND**—BBC relay, **7160** at 0412. (Unid reporter) **12090** at 0000. (Newbury, NE) **12095** at 2250. (Brossell, WI) **15400** at 1959 and **17830** at 2000. (Jeffery, NY)

**AUSTRALIA**—Radio Australia, **6020** at 1200 and **9580** at 1300. (Newbury, NE) 6020 at 1320, **//11650**. (Brossell, WI) 1350. (Northrup, MO) 9580 at 1051. (DeGennaro, NY) 9580//11650 at 1110. (Moser, PA) **21740** at 2244. (Charlton, ON) ABC Northern Territories Service, Alice Springs, **3210** at 1518. (Miller, WA)

**AUSTRIA**—Radio Austria Int'l, **6155** in GG at 2215, into EE at 2228. (DeGennaro, NY) **7325** in GG at 0215. (Charlton, ON) Adventist World Radio via Austria, **9660** at 2129 with ID in several languages. (Moser, PA)

**BANGLADESH**—Bangladesh Betar, **4880** in unid language at 1340. (Miller, WA)

**BELARUS**—Radio Minsk, **6115** at 0429 in RR with music and comments. (DeGennaro, NY) **7210** at 0300 with news, music, comment. (Paradis, ME)

**BELGIUM**—Radio Vlaanderen Int'l, **5960** via Armavir, Russia in DD or Flemish at 2150 with American jazz vocals. (DeGennaro, NY) **11985** via Bonaire at 0359. (Moser, PA) 0402 with Brazilian guitar music. (Brossell, WI) RTBF, **9970** with pop instrumentals in FFF at 1010. (DeGennaro, NY)

**BOLIVIA**—Radio Mosoj Chaski, **3310** in Quechua at 0022. In the clear but very low audio level. (Strawman, IA)

**BOTSWANA**—Radio Botswana, **7255** at 0404 with news. (Moser, PA) VOA relay, **9775** with sports at 0424. (Moser, PA) **9885** to Africa at 0309 and **15545** in African dialect at 1742. (Jeffery, NY)

**BRAZIL** (All PP)—Radio Nacional da Amazonia, **9665** with call-in program at 1019. Also **11780** at 2131. (DeGennaro, NY) 2300, with

"Radio Nacional" ID at 2306. (Brossell, WI) 2320 with talks, music. (Charlton, ON) 0910. (Newbury, NE) 0212 to 0230 close. (Jeffery, NY) Radio Capixaba. Vitoria, **4935** with evangelical programming at 2237. (DeGennaro, NY) Radio Clube do Para, Belem, **4885** at 1011 with call-in program. (DeGennaro, NY) 0235 with fast talking man hosting request calls. (D'Angelo, PA) 0250 with ad blocks and Brasil pops. ID at 0300. (Strawman, IA) Radio Difusora Roraima, Boa Vista, **4875** at 1031. (DeGennaro, NY) 0254 with woman anncr and pop vocals. (D'Angelo, PA) Radio Brazil Central, Goiania, **4985** at 2230. (DeGennaro, NY) Radio Senado, Brasilia, **5990** at 0818 with legislative news. (Miller, WA) 0913 with pops. (DeGennaro, NY) Radio Nacional, Macapa, **4915** with music at 0416. (Jeffery, NY) Radio Difusora, Tabute, **4925** with various anmts at 1032. (DeGennaro, NY) Radio Difusora do Amazonas, **4805** at 1022 with anmts, news at 1022. (DeGennaro, NY) Radio Cancao Nova, **4825** at 0010 with religious music, sermon. //6105 and 9675. All frequencies were slightly unstable. (Alexander, PA) Radio Educacao Rural, Campo Grande, **4755** at 0050. (Strawman, IA) Radio Anhanguera, Goiania, **11830** with discussion at 2353. (Miller, WA) Radio Nacional Sao Gabriel, **3375.1** at 0932 with anmts, ads, vocals. (D'Angelo, PA)

**BULGARIA**—Radio Bulgaria, **7400//9400** at 0000 with frequencies, ID. (Moser, PA) 9400 at 0000 with IS, ID, schedule. (Burrow, WA) **15700** in GG at 1130. (DeGennaro, NY)

**BURKINA FASO**—Radio Burkina, **5030** at 0653 in FF. (Miller, WA)

**CANADA**—CHU time station, **7335** at 0712. (Becker, WA) 1100. (DeGennaro, NY) CKZU Vancouver, **6160** relay domestic CBU at 0737. (Becker, WA) Radio Canada Int'l, **9515** with news at 1400. (Northrup, MO) **9515//13655//17710** at 1527. (Moser, PA) **13650** at 2100. (Newbury, NE) CBC, **9625** at 1640. (DeGennaro, NY)

**CHINA**—China Radio Int'l, **5990** (via Havana, gld) //13680 (via Canada—gld) at 2317. (Charlton, ON) **7405** at 1415. (Newbury, NE) **9730** via French Guiana with business expansion in China at 0406. (Moser, PA) **11875** in possible CC at 1017. (DeGennaro, NY) **11965** in AA at 2105. (Brossell, WI) **17720** (via Cuba—gld) at 1400. (Brossell, WI) China National Radio, **11835** in CC at 0050; **11890** in JJ at 0048 and **11915** in CC at 0035. (Mackenzie, CA) Xizang (Tibet) PBS—**4905** at 0002, listed a s in Tibetan, seemed a news format. (Strawman, IA) **6110//6200//7385** at 1630 in EE with music, narrative. Poor modulation. (Burrow, WA)

**CANARY ISLANDS**—Las Palmas Full Gospel Church, **6715 USB** at 2308 with music and church services; just above the noise level. (Strawman, IA)

**CHILE**—Voz Cristiana, **9635** with evangelical message and sign off at 1059. **11890** at 1025 with evangelical message and music with post office box number in Miami (2889—gld) for correspondence. Off at 1059. Also

**11935** at 1136. (DeGennaro, NY) **17680** at 1228. (Jeffery, NY) 1720. (Wood, TN) 2320. (Charlton, ON) Faro del Caribe, **5054.4** at 1116 in SS with music and comments from listeners. (DeGennaro, NY) World University Network, **9725** with Gene Scott in EE to NA at 0643. (Becker, WA)

**CROATIA**—Voice of Croatia, **7285** via Germany at 0343: "The Voice of Croatia presents the news in English." (Brossell, WI) **9925** via Germany at 2024 and 0424 with news in Croatian. (Miller, WA) 0007 with EE news, "Croatian Radio" ID at 0013 and into SS. (Burrow, WA)

**CUBA**—Radio Havana Cuba, **6000** in EE at 0200. (Paradis, ME) 0435 with classical music. (Newbury, NE) **6180** in SS at 1142 and **9600** in SS at 1150. (DeGennaro, NY) **9820** in EE at 0624. (Becker, WA) **15120** at 2215 in SS. (Wood, TN) Radio Rebelde, **5025** in SS at 1131. (Jeffery, NY)

**CYPRUS**—BBC relay, **12035** at 0320 with QRM from HCJB. (MacKenzie, CA) **12095** at 2325. (Charlton, ON) **21660** at 1531. (Moser, PA) 1634. (Wood, TN)

**CZECH REPUBLIC**—Radio Prague, **6200** in EE at 0222. **7345** at 2250 and **9880** in GG at 1115. (DeGennaro, NY) 7345 with news at 2230. (Paradis, ME) 0159 with frequencies, IS, national news. (Moser, PA) 0204. (Charlton, ON) 7345//**9435** at 0400 with schedule, ID, news. (Burrow, WA) **21745** at 1740. (Newbury, NE)

**DOMINICAN REPUBLIC**—Radio Cima Cien, **4960** in SS with music at 0426. (Jeffery, NY) Radio Pueblo, **5009.8** heard at 0015 with SS phone talks, promos, IDs, pops. (Alexander, PA)

**ECUADOR**—Radio Buen Pastor, Saraguro, **4815** at 1027 with songs and anmts in Quechua. (DeGennaro, NY) La Voz del Napo (p) **3279.5** with man/ woman in news-like format at 0333. (Strawman, IA) Radio Quito, Loja, **4919** at 1059 with SS and music. (DeGennaro, NY) 1123. (Jeffery, NY) Radio Centro, **3289.9** at 0810 with SS talk, ads, promos, Andean style music. No sign of Guyana on either **3290** or **5950** for the past month or two. (Alexander, PA) Radio Federacion, Sucua, **4960** at 1120 with popular Quechua music. (DeGennaro, NY) 0048 with religious music, talk in local language, vocals. Off with bouncy march tune at 0059. (Alexander, PA) Radio Oriental, Tena, at 1025 with SS anmts, many IDs, Andean vocals. No sign of Radio Coatan (Guatemala) on **4780**. (Alexander, PA) HCJB, **6050** in Quechua at 1030. **11755** in EE at 1040. **11960** at 1139 and **12005** in EE at 1142. (DeGennaro, NY) **9745//21455** at 0015. (MacKenzie, CA) 0130. (Moser, PA) 0633 in GG to Europe. (Becker, WA) 12055 at 1213 with sports news. (Newbury, NE)

**EGYPT**—Egyptian Radio TV/Radio Cairo, **9475** at 0200 with ID, music, "The Holy Koran and Its Meaning." (Paradis, ME) 0211. (Charlton, ON) 0258 with ID, into dramatic readings and short stories. (Burrow, WA) 0306. (Miller, WA) **9855** in AA at 2205. Also

**9990** in EE at 2122. (DeGennaro, NY) **9990** in AA at 0330. (Brossell, WI) 2200. (Newbury, NE) 0002. (Moser, PA) **17675** in AA at 1730. (Wood, TN)

**EL SALVADOR**—Radio Imperial, **17835.3** at 0010 with SS ballads, campo music, SS anmts, many IDs at 0019, 0020 and 0024. Occasional deep fades. (Alexander, PA)

**ENGLAND**—BBC, **6195** heard at 0328. (Moser, PA) 0338. (Jeffery, NY) **12095** with cricket scores at 1700. (DeGennaro, NY)

**ETHIOPIA**—Radio Fana, **6209.9** at 0356, //6940. Man with tentative ID at 0400. (Alexander, PA)

**FINLAND**—YLE/Radio Finland, **15400//17660** at 1310 with presumed news in Finnish. (Brossell, WI)

**FRANCE**—Radio France Int'l, **6175** in SS at 1022. (DeGennaro, NY) **7135** at 0340. (Brossell, WI) **9790** in FF to West Africa at 0628. (Becker, WA) **9805** in FF at 2300. And **11710** via Gabon at 0633. (Newbury, NE) **11670** in FF at 1108. (Moser, PA). **11955** via Gabon in FF at 1946. (Miller, WA) 0614 to Africa in FF. (Becker, WA) **15300** in FF at 1216. (Jeffery, NY) **15605** to Africa at 1600. (Paradis, ME)

**GABON**—Africa Number One, **15475** in FF with high-life music at 1735. (Brossell, WI) **17630** news and futbol scores. (DeGennaro, NY)

**GERMANY**—Deutsche Welle, **5910**, via Irkutsk, Russia, in GG at 1137. (Miller, WA) at 0326 and **6120** via Portugal at 0505. (Moser, PA) **6100** via Canada in GG at 0532. (Newbury, NE) **9735** to Australia/New Zealand in GG at 0640 and **12035** in FF to Africa at 0510. (Becker, WA) **11615** in Romanian at 1017. And **13780** in GG at 1100. Also **21840** in EE at 1615. (DeGennaro, NY) **11945** in GG at 2139. (MacKenzie, CA) **12000** via Portugal in GG at 2257. (Charlton, ON) **13810** (via Russia—gld) in unid language at 1340 and **13780** in GG at 1335. (Northrup, MO) **17650** in GG at 1338. (Jeffery, NY) Deutschlandradio, **6005** at 0222 with cabaret music and man anncr in GG. (Wood, TN) Overcomer Ministry, **13810** at 1330. (Northrup, M)

**GHANA**—Ghana Broadcasting Corp., **4915** at 2145 with high-life music and IDs as "You are listening to music from Radio Ghana," tribal drums and time pips at top of the hour. (Wood, TN)

**GREECE**—Voice of Greece, **9420** in Greek at 2050. (DeGennaro, NY) 2200. (Newbury, NE) **9425** in Greek at 2110, //15650 not heard. **17705** via Delano, CA with Greek music heard at 2113. (MacKenzie, CA)

**HAWAII**—AFRTS, **6350** at 0635. (Newbury, NE) 0734. (Becker, WA) **10320** at 0320. (Brossell, WI) KWHR, **17510** with religious programming at 0010. (Jeffery, NY)

**HONDURAS**—Radio Luz y Vida, **3250** at 0545 with local rustic music. (Alexander, PA) Radio Misiones Int'l, **5010** with music and religious messages in SS at 1045. (DeGennaro, NY) Radio Litoral, **4832** with SS music at 1110. (DeGennaro, NY)

**HUNGARY**—Radio Budapest, **9835** at 0205 telling people to stay off the streets at night. (Charlton, ON) 0331 with "Inside Central Europe." (Miller, WA)

**INDIA**—All India Radio, **4960** (Ranchi, gld) at 1319 with Hind vocals, //4840. (Strawman, IA) **9445** (Alagarh) with news at 2100, **9950** (Delhi) at 2148 and **11620** (Aligarh) in RR at 1645. (DeGennaro, NY) **9595** (Delhi) at 2100. (Burrow, WA) 0321 with Hindi music. Also **11620** (Bangalore) in HH at 2117 (Miller, WA) **11585** in presumed Hindi at 1315. (Brossell, WI) **11620** at 2145 with music, ID, and news at 2200. (Paradis, ME) 1755, //13605. (Newbury, NE) **13605** in unid. Language at 0024. Also **15075** in Hindi heard at 0334. (MacKenzie, CA)

**INDONESIA**—Voice of Indonesia, **11784.9** at 1933 in FF. (Miller, WA) 2000–2100 with EE news, commentary, ID, mailbag, schedule, address, music, brief news summary and off 2057. (Alexander, PA; Burrow, WA) (Seems earlier reports on **9525** being the only frequency in use were wrong.—gld)

**IRAN**—VOIRI, **6120** at 0209 with news commentary and translations of Farsi poetry into EE. (DeGennaro, NY) **9650** in SS at 0219. (Moser, PA) **11740** at 2130 with ID, anthem, schedule, Koran and interpretation, news. Also **9780** at 2202. (Burrow, WA) **11950** with sign on and Koran at 1330. (Brossell, WI)

**IRELAND**—RTE, **6155** (via UK, gld) at 0142, item about a post-mortem and ad for the Irish Times. (Moser, PA)

**ISRAEL**—Kol Israel, **6280** at 0501. (Moser, PA) **7545** at 0245 and **9390** at 2052. (DeGennaro, NY) **11605** at 2009. (Miller, WA) **17535** in HH at 1350. (Brossell, WI) 1650 in HH. (Wood, TN) Galei Zahal, **6973** in HH playing American standards heard at 0200. (Paradis, ME)

**ITALY**—RAI Int'l, **6110** (via Ascension—gld) with conversation in II at 0212. (MacKenzie, CA) **9710/11880** at 2024 with bird chirps IS, ID at 2025. (Burrow, WA) **11800** with news at 2256. (Miller, WA)

**JORDAN**—Radio Jordan, **11690** with pop music, ID at 1608. Relay of domestic 96.3 FM in EE. (Burrow, WA) 1715 with "Jordan Weekly," IDs. RTTY QRM. (Alexander, PA)

**JAPAN**—Radio Japan/NHK **6110** (via Canada—gld) at 0510 with news, ID. (Burrow, WA) **6120** via Canada at 1106 with domestic news. And **9530** via French Guiana in JJ at 0847. Also **9660** via UK in GG at 1103. (DeGennaro, NY) **6145** in JJ to Russia at 0739. And **9835** to U.S. at 0621. Also **11915** in GG to Europe at 0613. (Becker, WA) **9505** with news at 1408. And **11705** via Canada at 1500. (Newbury, NE) **11665** in JJ at 2121. (MacKenzie, CA) **11830** at 2100 with "Hello From Tokyo." (Paradis, ME) **17835** at 0055 sign on with IS and into EE at 0100. //11880, **15325**, **17685**, **17845**. (Alexander, PA) Radio Tampa, **6055** in JJ at 0741. (Becker, WA)

**KUWAIT**—Radio Kuwait, **11990** in AA at 1655. (DeGennaro, NY) 1909 in EE. (Charlton, ON) 1911 with commentary, American music. (Moser, PA) 1930 "Radio

Kuwait Presents." (Miller, WA) **13620** in AA at 1537. (Moser, PA)

**LESOTHO**—Radio Lesotho, **4800** at 0300 with possible anthem and ID, pipe organ, man with prayer in vernacular. (Montgomery, PA) 0335 with long talk, male vocals at 0358, Three plus one time pips at 0401 and woman with news. (D'Angelo, PA)

**LIBERIA**—Radio Veritas, **5470** at 0740 with high-life music, EE birthday greetings, IDs. (Alexander, PA) Radio Liberia, **6100** at 0744 with African pops, program preview, personal messages, IDs, and "Radio Liberia" and "International Service of Liberia Communications Network." (Alexander, PA)

**LIBYA**—Radio Jamahiriya/Voice of Africa, **11635** (via France) at 1822 with EE news and IDs 1822-24, 1923-25 and 2121-23. //15435 weak. FF news follows EE. (Alexander, PA) 15435 in AA at 1708. (Charlton, ON) 1735. (Brossell, WI) 2117. And **21675** (via France—gld) in AA at 1211. (DeGennaro, NY)

**LITHUANIA**—Radio Vilnius, **9875** with news in Lithuanian monitored at 2304. (Miller, WA) 2330 with news items in EE. (Moser, PA)

**MADAGASCAR**—RTV Malagasy, **5010** at 0253 with open carrier, IS, and man with opening ID at 0257, then choral national anthem, opening anmts, and tribal vocals. Almost gone by 0312 tune out. (D'Angelo, PA) 0308 with ID, man with anmts, Malagasy tunes with female anncr. Still going past 0330. (Montgomery, PA) Radio Netherlands relay, **11655** in DD heard at 2115, //21590 via Bonaire. (MacKenzie, CA)

**MALAYSIA**—Radio Malaysia/Radio 4, **7295** at 1641 with musical dedications, news at 1700, anthem at 1704, "Radio 4—89.9 FM" ID at 1705. (Burrow, WA)

**MALI**—RTV Malienne, **4784.4** monitored heard at 0658 with local folk music and FF talk. Much weaker on //4835.4. (Alexander, PA)

**MAURITANIA**—Radio Mauritanie, **4845** in AA at 2215. (DeGennaro, NY) 0000 with AA news and comment, occasional music. (Paradis, ME) 0319 with AA talk. (Jeffery, NY) 0650 with prayers in AA. (Miller, WA) **7245** with AA music at 0853. (Newbury, NE)

**MEXICO**—Radio Educacion, **6185** in SS with Mexican vocals at 0025. (MacKenzie, CA) Mexi-pops at 0827. (Newbury, NE) 1031. (DeGennaro, NY)

**MOLDOVA**—Voice of Russia relay, **7125** with RR talks heard at 0340. (Brossell, WI)

**MOROCCO**—17845 heard at 1945. (MacKenzie, CA) RTV Marocaine, **7135** at 2319 with news in AA. (Wood, TN)

**NETHERLANDS**—Radio Netherlands, **7125** with news in DD at 0640. (Newbury, NE) **11655** at 1902 with talk of persecution in Angola. (Charlton, ON) 1939. (Miller, WA) **15220** (via Canada—gld) with "EuroQuest" program. (Paradis, ME)

**NETHERLANDS ANTILLES**—Radio Netherlands Bonaire relay, **6165** at 0005,

//9845. (MacKenzie, CA) 0523. (Newbury, NE) 1132 in SS. (DeGennaro, NY) **9625** in DD to Australia/NZ at 0655. (Becker, WA) **17605** with program about romance novels at 1939. (Jeffery, NY)

**NEW ZEALAND**—Radio New Zealand Int'l, **11675** with news, NZ weather, and "National Radio" ID at 0003. (Burrow, WA) "Cadenza" heard at 0037. (Jeffery, NY) 0343. (MacKenzie, CA) 0819 on archeology in Egypt. (Newbury, NE) 0942 with news items. (DeGennaro, NY)

**NICARAGUA**—Radio Miskut, **5770** at 0055 with SS talks, pops. Reduced carrier USB. (Alexander, PA)

**NIGERIA**—Voice of Nigeria, **7255** at 0645 with Afro-style music. (Newbury, NE) **15120** at 1929 with music, ID. (Charlton, ON) 2154 in unid. Language. (Miller, WA)

**NORTH KOREA**—Voice of Korea, **6575** in RR to Russia at 0731. (Becker, WA) **9335** with patriotic vocals at 1045. (Newbury, NE) **11335** in EE at 1903. (Burrow, WA)

**NORWAY**—Norwegian Radio, **9945** in NN with BeeGees tune at 0325, ID and into Radio Denmark. (Brossell, WI) **13800** with interview program in NN. (Northrup, MO)

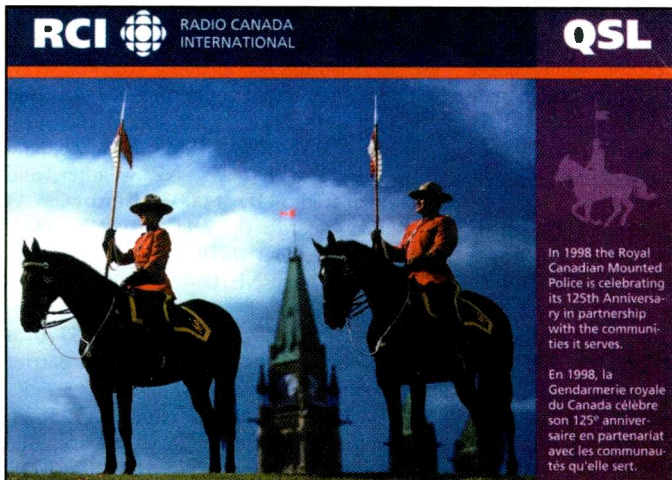
**PAKISTAN**—Radio Pakistan, **11570** heard at 1558 with IS, time pips, talk. (Burrow, WA)

**PAPUA NEW GUINEA**—NBC, **4890** with elections coverage heard at 1305. (Newbury, NE)

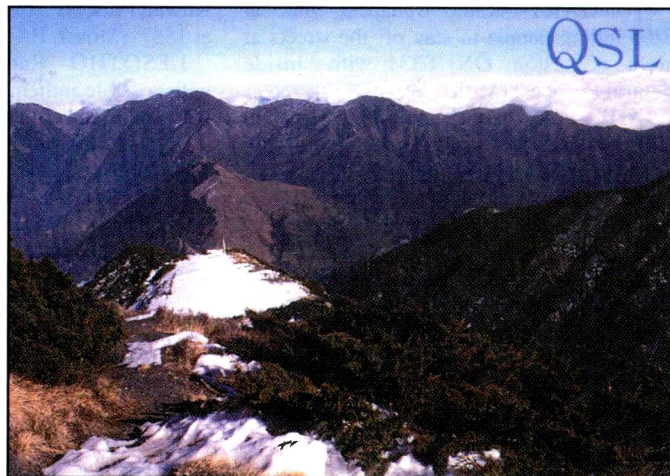
**PARAGUAY**—Radio Nacional, **9735** in SS with Latin music heard at 0056. (Miller, WA)

**PERU**—Radio Andina, Huancayo **4996** in SS/QQ at 1028 with commercials. WWV QRM. (DeGennaro, NY) Radio Horizonte, Chachapoyas, **5019.9** at 1952 with vocals, ID. Splatter from R. Rebelde-5025. (D'Angelo, PA) Radio Tarma, **4775** at 1040 with commercials in SS. (DeGennaro, NY) 1040 with man anncr and huaynos, commercials, ID, birthday greetings. (D'Angelo, PA) Radio La Hora, Cusco, **4856.2** at 1016 with man/woman in SS, ID at 1020, vocal and flutes. (D'Angelo, PA) Radio Huanta 2000, Huanta, **4748** in QQ at 1047. (DeGennaro, NY) 1040 in SS with rustic OA vocals. (D'Angelo, PA) Radio San Antonio, Callalli, **3375.1** at 0945 with SS talk and anmts, ID by woman at 1001. Mainly under the Brazilian here. (D'Angelo, PA) Radio Cultural Amauta, **4955** at 1030 with SS talks, OA folk music, echo anmts. (Alexander, PA) 1052 with continuous vocals to man with ID over flute music and ad string. (D'Angelo, PA) Radio Melodia, Arequipa, **5996.7** at 0815 with continuous OA folk music, ID jingle at 0834. (Alexander, PA) Radio Union, Lima, **6114.9** at 0835 with continuous OA folk music, canned IDs as "Union, La Radio." (Alexander, PA)

**PHILIPPINES**—VOA relay, **6110** at 1350. (Newbury, NE) **11760** at 2330. (Paradis, ME) **11895** with news at 2300. (Brossell, WI) Radio Pilipinas, **11730** at 1927 with news in Tagalog. (Miller, PA) **15120/15270** at 0258 with domestic news, ID at 0307: "Radio



*This RCI QSL celebrated 125th anniversary of the Royal Mounted Police.*



*Taiwan must be a beautiful place because endless scenic views grace so many of Radio Taipei International's QSL.*

Pilipinas, Philippine Broadcasting Service—PBS.” Ends at 0330. (Burrow, WA) Radio Veritas Asia, **9520** in CC at 1051. (Newbury, NE) 1055 in CC. (DeGennaro, NY) **11820** in II at 2300. (Miller, WA) 2309 with religious hymns and talk in unid. Language. (Brossell, WI)

**PORTUGAL**—RDP Int'l, **9755** in PP at 0816, //**9815, 13770** at 0000 in PP. (Newbury, NE) **11655** in PP at 0024. (Miller, WA) **15540** in PP at 1350. (Brossell, WI) **21655** at 1200. (Paradis, ME) **21725** in PP heard at 1219. (DeGennaro, NY)

**PUERTO RICO**—AFRTS, **6458.5** with “Car Talk” heard at 1038. (DeGennaro, NY)

**ROMANIA**—Radio Romania Int'l, **9510** with news in EE at 2302. (Wood, TN) **17720** with interview program in PP at 1345. (Brossell, WI) **17790** with news, comment at 1400. (Paradis, ME)

**RUSSIA**—Voice of Russia, **6155** in EE at 0217. **12020** with jazz to 0959 close. (DeGennaro, NY) 6155 with news at 0217. 12020 with news at 0308. (MacKenzie, CA) **7180** at 0200 with news, Russian history. (Paradis, ME) **11820** with editorial at 0902. (Newbury, NE) **9765** with “News and Views” at 0211. (Moser, PA) **12010** to U.S. at 0500 and 12020 to USA at 0506. (Becker, WA) Radio Studio, **5920** with IDs in multiple languages at 2255, woman with closing anmts, jingles, and EE ID. Doff at 2300. (D'Angelo, PA) Radio Rossii, **7320** in RR at 0715 via Magadan and **7200** via Yakutsk, at 0724. (Becker, WA) **17600** in RR at 1340. (Brossell, WI)

**RWANDA**—Deutsche Welle relay, **15275** at 1902 with ID at 1904 and “Religion and Society.” (Moser, PA) **15410** with “Newslink” at 2106. (Jeffery, NY) **17765** at 2140 on German public opinion. (Brossell, WI)

**SAO TOME**—VOA relay, **11655** to Africa at 0618. (Becker, WI) **11775** in FF at 2100 underneath University Network. (Brossell, WI)

**SAUDI ARABIA**—BSKSA, **11820** with AA talk at 2134. (Brossell, WI) **21705** in AA at 1215. (DeGennaro, NY)

**SEYCHELLES ISLANDS**—FEBA Radio, **11640** heard at 1645 in unid. African dialect, song and “What a Friend” IS. Off at 1700. (Brossell, WI)

**SINGAPORE**—Radio Singapore, **9600** at 1102 with news. (Newbury, NE) BBC relay, **9740** with news at 1001. (DeGennaro, NY)

**SLOVAKIA**—Radio Slovakia Int'l, **5930** at 0158 with EE ID and into FF at 0200. (DeGennaro, NY)

**SOLOMON ISLANDS**—SIBC, **5020** carrying BBC programming at 1132. (Miller, WA) 1310. (Newbury, NE)

**SOUTH AFRICA**—Channel Africa, **9525** at 1602 with news, IDs. Also **11710** at 0500, closing at 0501. (Burrow, WA) **17870** in FF at 1851, ending at 1855. (Charlton, ON) **21760** at 1303 with woman and news. (Montgomery, PA) Adventist World Radio, **9650** with religious music at 0420. (Moser, PA) **11970** to West Africa at 0525. Multi-lingual ID at 0530 sign off. (Becker, WA) BBC relay, **3255** at 0330 with

morning greetings and African news. (Montgomery, PA) **15400** with at 0359 with IS, ID and into unid. African dialect. (Brossell, WI)

**SOUTH KOREA**—Radio Korea Int'l, **9560** (via Canada, gld) with news at 0201. (Charlton, ON)

**SPAIN**—REE, **6055** in SS at 0128. //**9540, 9620, 11815, 11945, 15160**. (MacKenzie, CA) 6055 in EE at 0033. (Burrow, WA) 9620 at 2300. **11880** via Costa Rica at 0203. (Newbury, NE) **17595** in SS at 1148, **21540** in SS at 1203, **21610** in AA at 1747. (DeGennaro, NY)

**SRI LANKA**—VOA relay, **9645** with news at 1745. (Strawman, IA) **13865** in CC at 0005. (MacKenzie, CA) **19010** taking phone calls in unid. Language at 1600. (Paradis, ME)

**SWEDEN**—Radio Sweden, **9495** at 0239, apartment dwellers complaining about not having enough heat. (Charlton, ON) 0335 on Swedish economy. (Brossell, WI) **13765** in Swedish (?) at 1445. (Northrup, MO) 18960 at 1241 with news at 1241. (MacKenzie, CA)

**SWITZERLAND**—Swiss Radio Int'l, **13790** via Germany, in AA at 1708. (DeGennaro, NY) **15220** via Germany in FF heard at 1848. (Moser, PA)

**SYRIA**—Radio Damascus, **13610** in SS/CC heard at 0020. (MacKenzie, CA)

**TAIWAN**—CBS, **11645** with man/ woman in CC at 1320. (Brossell, WI) Radio Taipei Int'l, **7130** at 1205 with Pacific Rim news. //**9610**. (Newbury, NE) **11550** at 1637 with program for women, language lesson. (Burrow, WA)

**TAJIKISTAN**—Radio Dushanbe, **7245** at 1005 with news in RR. (Miller, WA)

**THAILAND**—Radio Thailand, **9535** at 1423 ending EE broadcast at 1430. (Newbury, NE) **13695** with EE news. (Strawman, IA) **15460** at 0300 with IS, “HSK9, Radio Thailand World Service.” (Burrow, WA) BBC relay, **17615** with “World Briefing” at 0021. (Jeffery, NY)

**TUNISIA**—RTT Tunisienne, **7190** at 0418 with AA talk, music. (Brossell, WI) 0642 in AA and **7275** in AA at 0654. (Newbury, NE) **12005** in AA at 1825. (DeGennaro, NY)

**TURKEY**—Turkish Meteorological Station (p) **6900.1** at 0514 with non-stop Turkish music. Not heard in many years. (D'Angelo, PA) Voice of Turkey, **5980** in TT at 2155. Also 9460 in TT at 2101. (DeGennaro, NY) **6020** at 0357 with IS, IDs to 0400, schedule, address, program preview, news. (Burrow, WA) 6020 at 0400 with news. (Moser, PA) **17815** with program about mountains and caves in Turkey. (Brossell, WI)

**UNITED ARAB EMIRATES**—UAE Radio, Dubai, **12005//13675** at 0333 with weather and feature on Muslim culture. (Moser, PA) **13630//13675** in EE at 1605 with “Saladin, the Hero of Islam” series. Into AA at 1619. (Burrow, WA) Adventist World Radio via Abu Dhabi, **15520** in unid African dialect at 1740. (Brossell, WI)

**UKRAINE**—Radio Ukraine Int'l, **5905** with EE news, comment at 2200. (Alexander, PA) **6020** at 0415. (Moser, PA) **7375** at 0350 with

IS and ID at 0401 and into EE news. (MacKenzie, CA) **9810** at 0405 with news, ID, "Ukrainian Diaries." (Burrow, WA)

**UZBEKISTAN**—Radio Tashkent **11905** at 2130 with IS, frequencies, music bridge, news. (Burrow, WA) Radio Netherlands relay, **12070** in unid language at 1345. (Brossell, WI)

**VATICAN**—Vatican Radio, **6205** via Russia in CC to East Asia at 2244 close. Also **9585** in RR at 2112. (DeGennaro, NY) **7250** in FF to Europe at 0720. (Becker, WA) **7305** in SS at 0350. (Brossell, WI) **13765** in AA at 1440. (Northrup, MO)

**VENEZUELA**—Radio Tachira, **4830** in SS at 0314 with commercials, time check, ID, lively vocals. (D'Angelo, PA)

**VIETNAM**—Voice of Vietnam, **5920** in VV at 1140. (Miller, WA) **6175** via Canada in presumed VV at 0436. (DeGennaro, NY) **7145/9730** in EE at 1601. (Burrow, WA)

**YEMEN**—Republic of Yemen Radio, **9779.6** in EE at 1801 with international and domestic news. (Burrow, WA) In AA at 2247. (Newbury, NE)

**YUGOSLAVIA**—Radio Yugoslavia, **6100** with news and features at 2200. (Paradis, ME) **7115** at 0115. Off at 0128. (Paradis, ME) **7130** at 0207. Montenegro gets independence in three years. (Charlton, ON)

**ZAMBIA**—Radio Zambia, **6265** at 0344 with ID, mailing address, local music, ID again as "Radio One" at 0351. (Montgomery, PA) 0350 with heavily accented EE. African music. (Burrow, WA) 0401 with tribal vocals, "You are listening to the Zambian National Broadcasting Corporation, Lusaka," then news. (D'Angelo, PA) 1640 with music and unid. Language. (Miller, WA)

**ZANZIBAR** (Tanzania)—Radio Tanzania Zanzibar, **11734** at 1859. Time pips at top of hour were nine seconds slow. (Strawman, IA) 2055 with music and anmts in presumed Swahili. Anthem at 2059 and off. (Brossell, WI) 2055 in listed Swahili, local music, short 40-second anthem and off. (Alexander, PA)

Another terrific showing! Glasses raised, hats off, and high fives to all of the following:

Mike Miller, Issaquah, WA; Rich D'Angelo, Wyomissing, PA; Jerry Strawman, Des Moines, IA; Stewart MacKenzie, Huntington Beach, CA; Bruce Burrow, Snoqualmie, WA; Ed Newbury, Kimball, NE; Robert Brossell, Pewaukee, WI; Dave Jeffery, Niagara Falls, NY; Pete Becker, Clarkson, WA; Ciro DeGennaro, Feure Bush, NY; Bob Chandler, Windsor, ON; Brian Alexander, Mechanicsburg, PA; Mark Northrup, Gladstone, MO; Ray Paradis, Pittsfield, ME; Bill Moser, New Cumberland, PA; Joe Wood, Gray, TN and Robert Montgomery, Levittown, PA.

Thanks to each one of you! Until next month—good listening! ■

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## readers' market

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## Open Up And Say "Bzzzzzzzzzz"

For those of you who like to calculate the number of days between my writing this column and the day it hits the newsstands, Cowfield County Virginia is under two feet of snow this Monday morning, and the drivers here in the Old Dominion, while they are otherwise good people, should not be on the roads. They are not used to snow.

Now I am older and wiser and prefer to stay home while others choose to cozy up to their insurance claim departments on snowy days. I think back to some cars I have owned and the lessons each taught me. James Thurber once wrote of *The Car We Had To Push*. I don't remember owning one that I *didn't* push at one time or another. It's my inherent frugality and the way I'm always trying to get more miles-per-dollar out of one car than the one I just got rid of.

One of the most electrically unique cars was a Dodge with a positive ground system. Yes, they really did put the "+" terminal to the chassis and the "-" terminal to all the connections which would usually get a positive voltage. Needless to say, it confused people with meters, made do-it-yourself installations difficult if not impossible, and blew the socks of the newly available transistorized aftermarket radios. Really. Poof!

Those were also the cars that had left-handed threads on the wheel lugs on the left side of the car, while the rest of the civilized world had done just fine with right-handed threads all around. It makes me think that Dodge's chairman of the board had skipped all the physics courses when he went to engineering school.

I was fortunate as a youngster in that I had a '64 MGB when I was about 20. I was a brand new radioman in the Coast Guard, and of course I knew everything there was to know about radio, except why my AM radio made a horrible buzzing sound when I went under a bridge, while most other AM radios (FM was not quite here yet) merely got quiet.

Soon I learned about signal-to-noise ratio, or "desired-to-undesired" ratio. The truth was that my MG's little engine put out a whole lot of electrical "engine noise" which I normally didn't hear because I was stationed in New York City and lived among some of the strongest and most plentiful AM radio signals in the world.

I've got to be honest with my readers: for a while, I thought there were strong electrical fields buzzing under all these railroad bridges where I drove, but one day I had the car in a friend's concrete block garage and found the buzzing took over my radio. I asked him what kind of electrical field might be inside the garage and he told me, "Just the lights." I drove the car in and out of the garage, listening to the radio and was sure he was mistaken. With the car outside, and the noise gone, engine and radio still running, I raised the hood. The noise returned with a vengeance.

This was one of those "Eureka" moments, like Archimedes had in the bathtub (or Bernoulli had at the airport). I had found the enemy and he was me! My engine was making all that electrical noise. And when there was no strong signal to cover it up (when I was under a bridge or in a garage where the AM wavelengths wouldn't fit) all I heard was the engine noise.

Well, I *did* actually go to a store—I think it was a Lafayette Radio store—and bought a noise filter for the car. It really did work (though the engine noise still got into the antenna when the hood...er...bonnet was up).

Now that did give me a bit of useful information for the future. Many years later, I watched as a friend crawled under the dashboard of his too-small pickup truck to install an AM-FM radio. Once he got everything in place inside, he couldn't find a place to power the thing, so he fed his wires under the dashboard, through the firewall and ran them up to the battery terminals. I encouraged him to fuse the "hot" line, and he did, and I told him he didn't have to take the ground wire all the way to the negative terminal on the battery and could just connect it to some bare metal under the dash.

When he finally got the unit powered up, the engine noise was all-powerful, and only the strongest stations were audible through the buzz. My friend was not versed in electronics or radio theory.

"Close the hood," I said.

"No, not yet. I've gotta find out what's causing all this noise."

"It's your entire ignition system," I said.

"No, it's probably this cheap alternator I just had replaced."

"Close your hood," I said.

"Well, I'm sure not gonna stop looking for this problem now!" he said. "I have to go to town and get a noise filter for this alternator. Can we take your car?"

"Sure," I said, "but if we take yours, you won't need to buy the filter." I said.

"What are you talking about?" he said.

"Listen. We'll take your truck. Want me to drive?" I asked.

"No, of course not. I can drive just fine," he said. "You close the hood."

I waited until he was seated behind the wheel, radio still buzzing away, and closed the hood. Archimedes would have yelled "Eureka" once again, but my friend muttered some kind of religious phrase. "You must have jarred a wire loose somewhere!" he said.

It was difficult explaining the situation to someone who didn't want to believe it, but, eventually, after closing and opening the hood quickly, then slowly, then quickly again (like a child trying to see if the light goes out inside the refrigerator), he finally closed the hood and said "Well I'll be dipped in honey and smeared with ants! You're right."

He always was one to pay an honest compliment. ■

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