

Scanning - Shortwave - Ham Radio
Equipment - Computers



Monitoring Times

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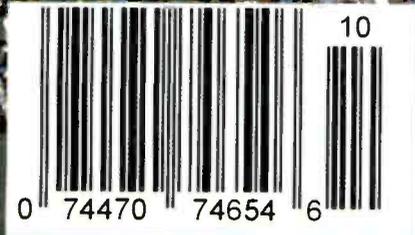
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Bienvenido a México

Mexico on MW, SW, FM, TV

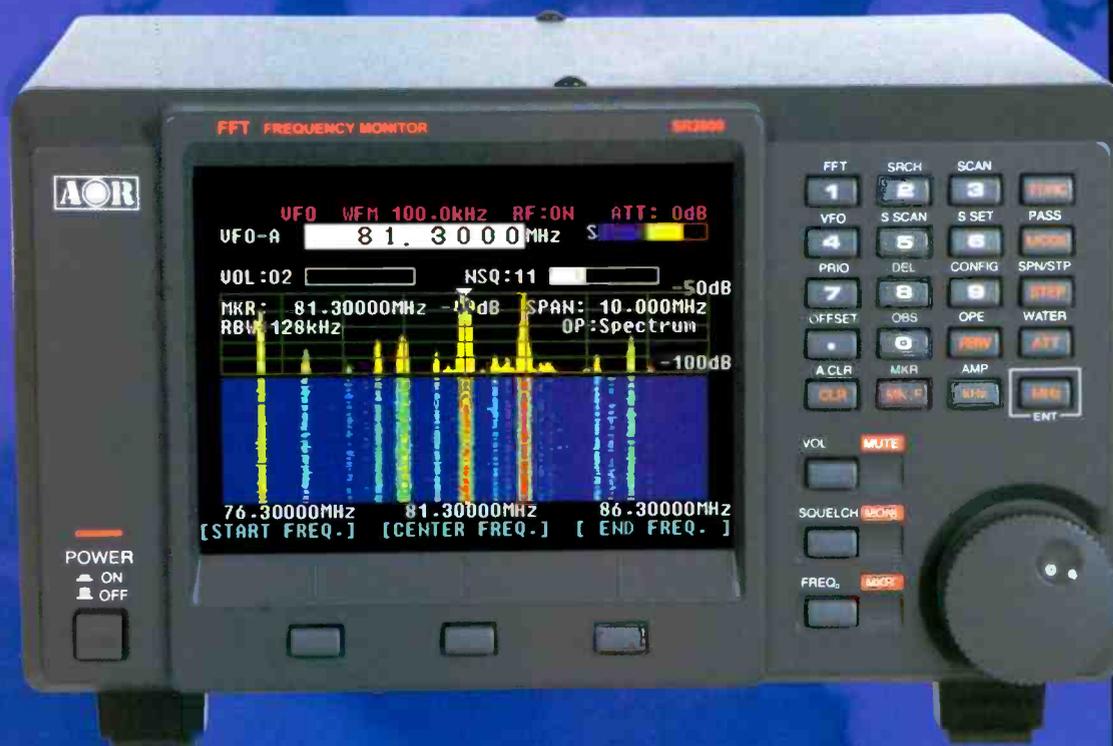
Also in this issue:

Winter Propagation Forecast
SI-TEX NAV-FAX 200 SW Receiver
Eton FR-300 Emergency Radio
Build a Better AM Antenna



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To explore WiNRADiO receiver choices and for further information about DRM technology, please visit www.winradio.com/drm where you can hear examples of DRM broadcast quality for yourself.



Cover Story

Bienvenido a México

By Gayle Van Horn

Welcome to Mexico! By radio, that is... Gayle Van Horn has been listening to Mexico since the days of Wolfman Jack and the "border blaster" stations that targeted the U.S. with rock and roll and miracle medicine in the 1960s, and she finally shares her experience with *MT* readers.

Monitoring Mexico still means deciphering fast-paced jingles and a wide variety of musical genres to identify a station, especially on medium wave. But you can catch our closest southern neighbor on shortwave, FM, and TV as well. This comprehensive overview covers them all, and provides the contact addresses for the shortwave broadcasters for a possible QSL card. Story starts on Page 10.

On our cover: Mexican Flag and National Palace in Zocalo Square, Mexico City. (Photo courtesy the Mexican Tourism Board)

C O N T E N T S

China's Broadcasting Industry 15
By Azizul Alam Al-Amin

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By Tomas Hood

Once again, NW7US takes us through the fall, winter, and spring seasons and details what kind of radio reception we can expect around the world. Propagation conditions are tracked for mediumwave and shortwave AM broadcasts and also for VHF and above. Some of the best meteor showers of the year occur during this time frame, producing meteor-scatter openings on VHF.

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Reviews:

Want a little tabletop shortwave receiver that is simplicity itself? Did you ever think to look in marine equipment for a radio? The SI-TEX NAV-FAX 200 may not have all the bells and whistles of your standard communications receiver, but on the other hand, it receives and decodes WEFAX, NAVTEX and RTTY. The latter function does require connection to a computer sound card via the data output jack to view the display. See page 70 for the review.

Hurricane season may be over (we hope), but there are plenty of other natural events which can take down the power grid. But you don't have to wait for an emergency

to appreciate the benefits of the self-powered Eton FR-300. Operating on wind-up power or AA batteries or optional power input, the FR-300 tunes AM, FM, and TV audio plus NOAA weather stations. (See page 65.)

Don't own an oscilloscope, signal generator, or any of those other fancy pieces of test equipment? Well, John Catalano has uncovered some very interesting "virtual" test instruments - and they're free! Since they use your sound card, they are limited to measuring audio and DC inputs only, but they can still be very helpful in analyzing audio circuits of receivers, audio amplifiers, DC circuits, etc. (See page 72.)



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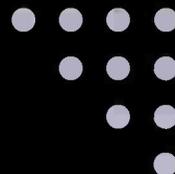
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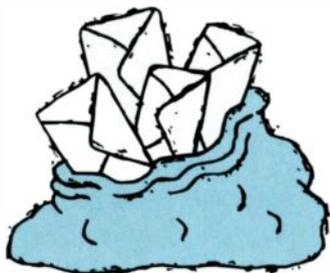
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TO THE EDITOR



MT Internet Excellence Award

Monitoring Times and Grove Enterprises have had a presence on the web since 1996, even though Grove had to become its own internet provider to do so – there was no internet provider in furthestmost western North Carolina in those days! Since then, the internet and email have transformed the way we do business and transformed the radio hobby itself.

Hobbyists have become increasingly sophisticated about making the Web work for them, and some dedicated individuals have created websites that are head and shoulders above the rest – usually for little compensation other than the satisfaction of creating a stellar product. Ten short years after we logged on, the Internet is such an integral part of our hobby that *MT* has created the *Monitoring Times Internet Excellence Award* to honor outstanding sites that come with our highest recommendation.

The very first site to receive the MT Internet Excellent Award is <http://www.RadioReference.com> – the creation of Lindsay Blanton. The RadioReference site grew up with trunking, coming on line to help the hobby figure out this new, puzzling technology. It has grown to become a huge database, including conventional frequency assignments, trunked radio system information, frequencies, and talkgroups, but it's more than that. You'll also find FCC License assignments and maps, 10-Code Lists, agency maps, files, downloads, links, and detailed agency information for most public safety, military, and local government activities, as well as hosting very active forums with over 145,000 posts.

Larry Van Horn, *MT*'s assistant editor and frequency guru, says when it comes to VHF/UHF, RadioReference is the first place he goes when he needs a radio reference.

All the data at RadioReference is free; however, you must register to access the Radio Reference Database and to post to the Radio Reference Forums.

Monitoring Times is proud to name Lindsay C. Blanton III as the recipient of the First Monitoring Times Internet Excellence Award for his RadioReference.com website. We invite our readers to visit Lindsay's site and to contribute, since all websites, including *MT*'s own, are largely dependent upon its users for the quantity and quality of the information found there. If you have a website you'd like to bring to the attention of *Monitoring Times* as deserving of an award, you are welcome to send your recommendation to editor@monitoringtimes.com

Embedded Ham Operators

Alan Dove's August editorial on "Embedded Technicians" promoted a plan in which public safety agencies are encouraged to ensure at least one of their members has a ham radio license and is trained to act as a back-up communicator in the event regular communications within the agency or between agencies should fail. We received several responses to the editorial as well as requests to reprint the article.

Alan adds, "The other feedback I've gotten so far (from one very knowledgeable government communications contractor and one former Motorola technician) has also been quite positive.

"Our local independent radio club, NYC-ARECS, is working on training embedded public safety hams in the nation's largest city already. We've been working a lot with the Coast Guard and its Auxiliary lately, and hope to get some city agencies involved in the near future, but it's slow going."

– Alan W. Dove, Ph.D., <http://home.earthlink.net/~alamwdove>

Here is some of the thinking stimulated by his article.

"Good Afternoon from Northern Michigan: Just flipped open the August 2005 copy of *MT* and was drawn to Alan Dove's thoughts on emergency communications and I have to say I think he's right on the money. Although I kind of cringed at the description regarding housecats, he is right. We have always been careful with that 1st responder image, as our group definitely [does not fit it], and the County knows it, and respects that. We train to arrive after the real responders, set up our equipment as needed for the job and stay where we are supposed to and do our job.

"Our tasking is slowly moving toward helping the Red Cross and Family Independence Agency personnel to take that load off the Sheriff's Dept., and that's great. We can move info confidentially and error free with packet.

"The embedded concept should work well. We are a very rural area with few hams, but with the local Fire Chief's son is studying for his Technician license, and with some interest shown in other County Departments, I think we'll have some hams scattered about soon.

"It has taken a number of years to achieve this, as the former EM for the county had other roles in mind and they didn't work. He's gone, we are here and growing. We'll know next week if the grant through the county is approved for three 2 meter stations complete with FM, packet, battery backup and antennas, but seeing as the County requested it, I'm optimistic.

"I think the key to our building success has

been the offering of knowledge and support, and not being the nerd who shows up with HTs and monitors draped around his gut. (And yes, I am no specimen of physical fitness.) Just my two bits worth."

– George Brand, WA8SCO

"I found Alan Dove's editorial extremely interesting and would like permission for reprint. I'd like to share his editorial with our regional managers and manufacturer's representatives on our land mobile side of the company.

"I started an internal newsletter due to repeated questions from our field sales people. I'm trying to get our people to think 'outside of the box' when it comes to applications.

"Alan's editorial is directly in this line of thinking when it comes to interoperability. I spent almost a week in Alaska at the ALMR Interoperability Summit listening to them talk about their system that is 99% federally funded and headed this week to Bangor, Maine, to a USDA exercise on P25 interoperability. While these systems are great, few rural departments can spend this kind of money, so interoperability is far more complex than people realize. Having public safety licensed in the AMR service would surely help alleviate some of the issues."

– Don Wingo, N6LHZ, Kenwood U.S.A. Corporation

"Excellent article Alan; I was going to do something similar, but you pretty much said it all. We have the same problem in South Dakota. Untrained EMS-FIRE-etc. in the radio field.

"The technicians that are supposed to be organizing this 35 million dollar Digital APCO-25 system do sloppy work. I was with Motorola 2-Way as a tech for many years in Minnesota. The caliber of discipline leaves a lot to be desired. I use *Trunker* as a hobby toy now and watch people dialing through the system trying to 'find' their right talk-group; they give up after hitting 5 or 6 unknowns, then power-off their radios to start all over again! All because of poor radio training if any at all.

"In an emergency situation, there's no time for playing with the radio; seconds count. The techs also have the radios programmed wrong. I see quite a few IDs come up that are assigned to different radios in across the state departments. Makes it a guessing game for the dispatchers with the monitor consoles watching radio traffic.

"Open mics are a common problem, radios programmed wrong, poor radio etiquette. Whaddya do, though? Or better yet – I guess the big question is how does a ham operator tell all these technicians and emergency people how to use their radios without insulting them?"

"Like you said, model railroaders can't repair

subway systems or shouldn't. Good analogy. Should we be teachers for emergency professionals?

"It's a sad situation, man...South Dakota is NOT emergency ready like New York and many other states.

"As for the analog to digital switch, everyone is always looking for each other all day long for nearly 4 years now since the Digital System was installed. I know: I'm home all the time on disability. I listen."

73. Thanks!

- Andrew Miller WB0OAF, Sioux Falls, SD

BCD396T and Milcom

"Congrats on another great issue (August). Your hurricane coverage is perfectly timed, as always. You also have some Miami Center freqs that I didn't have...I'll advise on any new confirmations.

"Also, I'm tempted to say that the Uniden 396 may be the best MilCom scanner to date. Besides the enormous memory that's letting me put all 1500 confirmed MilCom freqs (Florida statewide) in one place at one time, the sensitivity is beyond outstanding. Last night I was in Plantation, Florida, and received Homestead's ATIS. Even accounting for some ducting with all the thunderstorms we've had daily, this is a 45-mile line-of-sight distance. I've never received Homestead's ATIS beyond about 15-20 miles with the same antenna setup (roof mount 300 MHz unity gain whip).

"Today I was listening to aircraft conversing with Navy Key West tower (NQX /Boca Chica) while I was in the Dade-Broward area. That's about 150 miles line-of-sight (to an airborne target), again in the car with the same antenna. Previous hits related to NQX have only been on the Base Ops freq (338.0) when inbound aircraft are transiting the area and close to my location, or high-altitude traffic using the Tarpon range complex near Key West.

"The usual daily hits, including the Avon Park range complex as well as Miami Center, Miami Approach, Homestead tower and other (airborne) sites within about 100-125 miles of me, are just booming in.

"Will advise on SatCom and ISS hits as my programming continues."

- Robert Wyman

"I am glad to see that several field reports such as Robert's have borne out my *First Look* observations (July 2005) of the Uniden BCD396T. It truly is a great scanner. I would put it up against ANY of the wideband handhelds in the marketplace and it wipes out anything that does not have digital capability."

- Larry Van Horn

Rebanding

Many hobbyists have asked whether rebanding of the 800 MHz channels to reduce interference from cellular signals from Nextel will affect their scanners. Here is the statement from the Federal Communications Commission regarding the coming shift: "In general, reconfiguration will require licensees currently operating in the 806-809/851-854 MHz segment (former channels 1-120) or the 821-824/866-869 MHz segment (former channels 601-830) to change frequency. Licensees operating in the 809-815 MHz/854-860 MHz portion of the band will likely not need to change frequency. However, public safety licensees operating in the 815-816 MHz/860-

861 MHz segment (former channels 361-400) must be relocated out of this portion of the band unless they specifically request to remain on their current channel(s)."

Following is a "best guess" by *MT's* Assistant and Technical editor, Larry Van Horn, as to which scanners may be affected:

"As far as scanners go, the major impact of this new bandplan will be on Motorola 800 MHz analog systems and Motorola P25 digital systems that are forced to shift frequencies. No EDACS or Johnson LTR trunk systems are affected by this rebanding other than reprogramming the new frequencies, because of how scanners decode and track those systems.

"So, first the scanner owner has to determine if his system is even affected under rebanding. The best case scenario is that the scanner buff will have to learn the new frequencies for his system and reprogram that into his scanner.

"Firmware (the scanner's internal software) for trunking scanners following the Motorola format is based on each frequency being assigned a channel number in an internal software table in the scanner (the FCC assigned each of the 800 MHz frequencies a channel number 1 to 868). With this new rebanding, all the channel numbers are changing. Most of the newer scanners have the ability to update their firmware to change these tables of frequency = channel numbers. However, some cannot, due to the fact that their internal programming is not flash programmable.

"The major impact of rebanding to Uniden owners will be felt in tracking Motorola analog systems using the BC-235/245/895/780/250D/785 D scanners, and in tracking P25 systems using the 250D/785D scanners. The aforementioned scanners cannot be used on Motorola systems that have been rebanded, as their firmware cannot be flash upgraded. However, if your local system doesn't have to move, you will not see any changes.

"The BCT-8/898T/296D/796D/246T/BCD396T/BC330T can all be reflashed with software updates that will be available from Uniden on their website. (Of course, once rebanding takes place, the user will have to research the new frequencies, update his scanner with the latest software, and reprogram that trunk system to the new frequencies.

"Reportedly, the only 'safe' Radio Shack scanners are the Pro-2096 and Pro-96 (reflashed) and Pro-97/92 (reprogrammed). Any other RS scanner will have to be replaced if your Motorola system is impacted by the rebanding plan.

"A Google search found the following website that has a most excellent writeup and table of all the trunk scanners and what needs to be done: <http://www.wpascanner.com/reband/reband.htm>"

- Larry Van Horn

This page is open to your considered comments. Opinions expressed here are not necessarily those of *Monitoring Times*. Letters to the Editor may be rephrased or shortened for length and clarity. Please mail to Letters to the Editor, 7540 Highway 64 West, Brasstown, NC 28902, or email editor@monitoringtimes.com.
Happy monitoring!

-Rachel Baughn, KE4OPD, editor

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The Switch to Digital TV

In the push to convert the nation to digital television, there are no fewer than three bills in the House and Senate calling for a "hard deadline" for the switchover, more or less around the first of 2009. We enjoyed the following excerpt from a Keene, NH, *Sentinel* editorial:

"Proponents of the digital switchover compare this conversion to the transition from black-and-white to color TV more than 40 years ago. But color was a huge improvement in the attractiveness of television pictures, the TV sets involved were perfectly compatible, and still the transition took about 15 years.

"In the current circumstances, the pictures are only very good, the new digital channels have yet to demonstrate any appeal at all, the TV sets are incompatible, and the transition is being handled like a shotgun wedding.

"... the idea is to impose the expense and hassle of a conversion to digital TV in just a little more than three years. ...the National Association of Broadcasters [says] 'And we're ready.'

"To which millions of Americans might respond: Funny, nobody asked us."

Appealing to the FCC

As the switchover to digital television nears, appeals are picking up for the FCC to reconsider the rules it established five years ago for use of the analog TV channels 60-69 (in the 700 MHz spectrum) which are to be handed back for public safety and commercial use.

The 700 MHz guard band licensees claim, "The current upper 700 MHz band plan maximizes neither public utility nor economic value" since the blocks are limited to narrowband applications. They prefer a bandplan that would allow broadband services.

Meanwhile, the Rural Cellular Association would like a change to the plan for the channels that will be up for auction. They are also interested in establishing broadband services. The FCC already held an auction for 700 MHz rural band licenses in 2002. However, the rest of the licenses are expected to be auctioned by economic areas, which allows for only six licenses per block in the nation. The RCA would like this auction opened up to rural and metropolitan service areas as well.

48 megahertz of the spectrum to be returned has not yet been allocated by Congress or the FCC.

Rebanding

In the recently-negotiated swap to move cellular interference away from public safety communications, Nextel agreed to pay those public safety agencies which will need to change their frequencies and reprogram radios. The Transition Administrator team, which is to oversee this process, has received responses from only 50% of the 1036 licenses affected by the first wave of the 3-year transition. Agencies must file with a list of their equipment and replacement/rebanding costs

by deadline in order to be compensated. There is concern that many licensees are still unaware that they will be required to move unless they request otherwise.

In the 1 and 2 GHz spectrum, the FCC adopted an Order on Reconsideration which changed the band plan to better accommodate wireless services and technologies, including voice, data, video, and other wireless broadband services offered over Third Generation ("3G") mobile networks. It restructures the band by aligning the similar use spectrum blocks in order to enable operators to aggregate spectrum more easily and it removes a restriction on transmitter output power levels.

Broadband Policy

Everyone's getting on the "broadband wagon"! The Federal Communications Commission adopted an official policy statement that outlines four principles to encourage broadband deployment and preserve and promote the open and interconnected nature of public Internet: (1) consumers are entitled to access the lawful Internet content of their choice; (2) consumers are entitled to run applications and services of their choice, subject to the needs of law enforcement; (3) consumers are entitled to connect their choice of legal devices that do not harm the network; and (4) consumers are entitled to competition among network providers, application and service providers, and content providers. Although the Commission did not adopt rules in this regard, it will incorporate these principles into its ongoing policymaking activities. All of these principles are subject to reasonable network management.

SCANNING

New Florida Law

On June 8, the governor of Florida approved House Bill 1697 amending the Florida scanner law (state statute 843.16) to restrict the use of scanners in vehicles or places of business. Brian Cathcart KE4PMJ "The Scanner Dude" forwarded the following information:

1. The law now prohibits the mere transport of scanners or radios tuned to police and fire in vehicles (instead of just being "installed")
2. Added "fire rescue" to what is prohibited from monitoring
3. Changed the violation from a second degree misdemeanor to a first degree misdemeanor
4. Exceptions for amateur radio, news, and alarm companies are still in place.

You can find the amended law at Albert Pratts' website at: <http://www.qsl.net/k7fhp> and in this month's *Scanning Report*. You can also see the full law on the Florida legislative website at: http://www.flsenate.gov/session/index.cfm?Mode=Bills&SubMenu=1&BI_Mode=ViewBillInfo&BillNum=1697

"Florida scanner listeners. GET YOUR HAM TICKET if you don't have one already!"

Robert Wyman disagrees with those who believe that only hobbyists with amateur radio licenses will be exempted along with news media, etc. He says, "I'll be happy to go before a judge and show my FCC-issued GMRS license as proof of my being

'any radio station licensed by the FCC' as well as being a holder of a 'station license issued by the FCC,' since the law says amateur radio operator OR station license issued by the FCC.

"What they're really doing is hurting all the wives, husbands and children of public safety officials who enjoy listening to their chosen agencies while loved ones are on-duty, plus those public safety officials themselves who wish to listen while off-duty, plus all the emergency management and public safety volunteers who rely on reception, more so than transmission capabilities, to coordinate response efforts in times of disasters.

"Under this law, a government official will have to issue permits to all vehicles of citizen disaster volunteers, Red Cross personnel, fire-canteen volunteer groups and other non-amateur radio, non-FCC licensed personnel. Note that the law provides for permits for emergency vehicles but not emergency responders.

"Also, no provision exists for business locations such as Red Cross headquarters. Although not clearly written, one may possibly assume that a news media business location and alarm company business location may also be exempt."

BULLETIN BOARD

On Line

Martin Wishnewitz says, "I started a Yahoo Chat Group called distance_listening under Yahoo Groups. If anyone is interested to join this group, please contact me at distance_listening@yahoo.com for an invite. It might be nice for people with varied interests, beginners to experienced DXers in radio to have a place to meet and chat and post messages."

Dave Freeman wrote MT about his new website. "Don't know if you're interested in vintage AM-FM shows but if you are please see my new website for complete list of shows available on cassette or CDs. I currently have a sale going on selected radio shows." <http://www.musicradio-airchecks.com/>

DVRA Hamfest, October 2 at West Windsor, NJ, Ice Skating Center at Mercer County Park. Talk-in 146.67. abbott0903@hotmail.com or 609-882-2240; <http://www.w2zq.com>

Paris, TX, hamfest, October 8 at Red River Valley Fairgrounds, 8am. Talk-in 146.52. Richard Lenoir, KB5SCK 903-783-0968, <http://dfwtrafficnet.com>

Nutmeg Hamfest, October 9 at Wallingford, CT, Mountaintop Resort, 9am-3pm. Talk-in 147.36+ no PL. <http://www.nutmeghamfest.com>

"Communications" is compiled by editor Rachel Baughn KE4OPD, from newscippings and emails sent in by our readers. Many thanks to this month's great reporters: Azizul Al-Amin, Harry Baughn, Michael Carroll, Brian Cathcart, Bob Grove, Norman Hill, Bob Krueger, Sterling Marcher, Haskell Moore, Stephen Newlyn, Jerry None, Doug Robertson, Brian Rogers, Robert Thomas, Gayle Van Horn, Larry Van Horn, Martin Wishnewitz, Robert Wyman, Ed Yeary

Gene Hughes Retires *Police Call*

By Bob Grove

Another era has passed as Gene Hughes, founder and publisher of the revered *Police Call* directory of public safety frequencies, has announced the cancellation of the widely-read publication, which has sold in the millions. The widest distribution, for 30 years, has been through Radio Shack stores.

Gene started in his hobby decades ago when, as a 14-year-old, he was placed in a foster home. An uncle sent him a tabletop radio, and he would occasionally hear police dispatchers. He learned that he

was hearing images from the old nationwide 1700-1800 kHz police band, and soon had city maps, figured out the codes, and was monitoring police calls.

Serving in the Army during WWII, Gene was entitled to free tuition at UCLA. He earned extra cash as a news photographer, chasing police calls he heard on his converted car radio. This cash enabled him to buy a Hallicrafters SX-42 receiver which had frequency coverage up through 50 MHz, enabling him to listen to shortwave broadcasts as well as low-band police calls. He was delighted to hear his name read as a listener over Radio Moscow, but that fact brought a visit from the FBI!

Even though Gene's wife Mitzi reflected on his frequency-collecting hobby by saying, "No one else does anything so stupid!" Gene suspected that his collection might be profitable. *Police Call* began in Gene's home state of California; his initial entry was a press run of 800 copies of that 16-page list. But by 1974, the effort included all continental United States in nine volumes. No other radio hobby publication has endured that long, or has had such wide distribution.

Gene says he may be retiring *Police Call*, but he will remain active. A recipient of the 1998 California Crime Prevention Award, he is respected for his volunteer work with the Los Angeles Police Department, specializing in their neighborhood watch program and protection of the elderly. His presentations on bunco, con games, scams and crimes against children are well respected, as is his recent effort in conjunction with the American Association of Retired Persons (AARP) to curb telemarketing fraud against seniors, and burglary-prevention inspections.

As Gene closes his books, he offers this special acknowledgement: "A special thanks to all of *Police Call's* readers, and especially those who took the time to send us the extra information that enhanced the book's usefulness to everyone."

Our hats are off to Gene Hughes, whose reputation for excellence will endure.



LA Police Department communications center, 1940s



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Bienvenido a México (Welcome to Mexico)

By Gayle Van Horn

Whenever I listen to Mexico on shortwave or medium wave radio, I feel a flood of nostalgia from days gone by. My first log of Mexico was on an old General Electric table-top, tube radio. Besides the locals, powerful Mexican border stations could be heard every night.

I grew up in southwest Texas, about two hours east of Piedras Negras, Mexico. I didn't realize it at the time, but listening to Mexican border stations would leave a lasting impression and begin a hobby that is steeped in rich history and nostalgia.

During the 1960s, there were ten stations along the Mexican border which were known as border-blasters, transmitting with very high power and targeted to a United States audience. The stations were scattered from Tijuana to Tampico.

The most popular station, heard from coast to coast and into Canada, was XERF on 1570 kHz AM from Ciudad Acuna, just across the border from Del Rio, Texas. Disc jockey Bob Smith, a Brooklyn native who called himself Wolfman Jack, set the radio world on fire. Out of the night came a guttural voice spinning the deep south blues and rowdy rock tunes from a border-blasting super power of 500,000 kW. I can still hear him howling, "This is Wolfman Jack on XERF, Ciudad Acuna, Coahuila, Mexico." From his music to off-the-wall products, it was late night radio at its finest!

Mexico does not have the likes of the border blasters anymore, but the current broadcast scene is as diverse as this country is vast. Today's radio industry is represented by an enormous medium wave presence, in addition to FM, shortwave and television. Before we delve into it further, let's take a look at just what does that "XE" mean?

A word about "XE"

Briefly, "XE" is the Mexican prefix for all shortwave, medium wave, FM and television communications. Usually at the sign-on, at the top or half hour, and at sign-off, you will hear the station call sign as "XE..." as part of the station identification. On FM you will also find "XH" and "XU" call sign prefixes.

Mexico, like every country, is assigned call signs to identify their stations. In the early days, if a station was assigned only a three letter call, they would add a "W"

or duplicate the final letter of their call to indicate a shortwave repeater. For example, the broadcast band station in Veracruz was assigned "XEU" and the shortwave outlet was XEUW.

Today, the "XE" calls may also air together with station slogans (more on that later), which are catchy identifying phrases or words. In the event the station call is not mentioned, another trick is to listen for a network affiliation.

It's about time

Amid the fast-paced slogans and jingles, Mexican stations frequently announce the time, not in UTC, but in their regional time. The twenty-four hour system is used, but is frequently modified. For example, "5 por las 23" is not precisely the 24 hour system (2305), as it technically expresses only minutes before or past the hour.

For reporting purposes, it is important to identify which part of the day one is talking about. Identifying words such as, "de la mañana" (in the morning), "de la tarde" (in the afternoon), or "de la noche" (in the night, or at night) are mentioned during the time phrase. This is usually done at the end of the phrase, but may also come after the hour. When sending the station a reception report, remember to list the times in the station's local time and do not use UTC.

It's more than "Mexican" music

Mexican music is not always what it seems. Glance over some Mexican logs, either medium wave or shortwave, and you'll frequently notice a reference to "Mexican music." That is certainly the easiest term to use, but needs some clarification.

Mexico's music runs as deep as the cultures, traditions and people who gave them life. One of the first styles you're likely to hear is the romantic bolero singer, usually from a small group strumming on guitars.

Around Mexico City, folklorica and orchestra music are popular. The smooth and gutsy sound of "ranchera" music will remind you of country and western music; add a few trumpets and now you have "mariachi." Further south the mariachis add drums for a new sound. Stations in and around the state of Veracruz play the Jarocho harp music, giving it a liquid sound. Along the coastal states, "tropical" music relies heavily on the lively-fast paced cumbias, mambo and bamba. Further south, the marimba is as popular as it is in Guatemala, as well as rustic folk tunes influenced by Spanish and Indian heritage.

All of these styles have contributed to what has become a musical phenomena in Mexico as well as in south Texas, called Tejano music. Its distinctive norteña sound of the accordion has a lead vocalist or duet vocals with accompanying musicians, and is easy to identify. Some refer to Tejano as beer-drinking music or just plain dancing songs. Whatever your preference, Tejano remains a staple, just as likely to be heard on Mexican radio or on a dusty south Texas border station.

Mexicana on shortwave

By some standards, Metropolitan Mexico City is the largest urban center in the world, and it's one of my favorite cities to visit. The airplane view offers a myriad of streets, buildings, and open spaces encircled by mountains of snow-capped volcanoes which barely contain the city's expansive mass. Some call it the D.F. for the Federal District, while others just call it Mexico, as if the whole country could squeeze into its crowded streets.

It's amazing to visit the city and tour the sites of colorful markets, restaurants, museums and plazas. More than 20 million people live here in a constant hustle of perpetual motion, surrounded by both staggering poverty and luxury.

Besides AM, FM, and TV, Mexico City is home to three major shortwave broadcasters.

Radio Educación, the first educational and cultural medium wave station in Mexico City, intro-





Photo credit: Don Garlinger



duced a shortwave service in 1943 to enlarge its service area. The initial call sign and name was XEICM, La Voz del Mastero, using a half wave dipole antenna. By 1978, the station was controlled by the Secretariat de Educación Pública (SEP) adjusting the call to XEPPM as Radio Educación. It remains a government-owned station yet today.

Since its beginnings, Radio Educación has maintained its status as an educational and cultural radio station. It has retained its Mexican folk music programs and agricultural information. Depending on the transmission schedule, the national anthem is played at sign-on and sign-off, as well as relaying XEEP 1060 AM. Spanish language broadcast hours are 0000-1200 UTC. Although registered on 6185 kHz, monitoring has observed it on 6184.97, and the station's signal battles on this frequency with Vatican Radio, as well as experiencing co-channel interference from China Radio International via Sackville on 6190 kHz.

Letters should include Mexican return postage or one U.S. dollar and reports are accepted in English, Spanish, French and Italian.

The latest development from Radio Educación involves advancements in Digital Radio Mondiale (DRM). During the HFCC's February 2005 Conference in Mexico City, Radio Educación conducted tests of DRM on 26 MHz shortwave. The testing was conducted throughout the week-long conference with a low-power DRM transmitter sent from the Croatian company Riz. As a result of the successful test, the government gave permission for more extensive DRM tests both on 26 MHz shortwave and on mediumwave, involving both public and private stations. Testing results, to have been completed by this month, will be analyzed and a report submitted to the communications ministry.

Shortwave broadcasters will likely adopt DRM as there are no other digital systems in the pipeline, while the future of DRM on mediumwave is currently unknown. Jeff White of Radio Miami International commented, "If Mexico chooses DRM for medium wave, Brazil and other Latin American countries might do likewise." With Radio Edu-

cación setting the pace, will other stations follow their lead?

Radio Mil (XEOI) on 6010 kHz is operated by the Núcleo Radio Mil Network. It was the first Mexican shortwave station I logged by identifying their distinctive identification, "Radio Mil...transmitiendo en ondas larga y corta desde la ciudad de México."

The station was founded March 12, 1942, and through the years has used slogans such as, "La Pantera", "Tu Joven Romántico", and "Numero Uno en Música Tropical." Radio Mil operates 24-hours from México City and is logged consistently on 6010 kHz and 1000 kHz AM.

Send your report and return postage to the Radio Mil address in the Mexico SW Address Table.

Radio Transcontinental de América (XETA), from México City, is active on 4810 kHz, although their schedule tends to be slightly irregular from 0000-0500; 1200-0000 UTC. However, it has been heard from 0200-0300; 0800-0900 and 0950-1140 UTC. The station routinely identifies as, "Radio Transcon," in Spanish, English and French. The station, per their website (<http://www.misionradio.com>) welcomes reception reports.

Many of the Mexican universities operate one or more medium wave, FM, TV, and (until a few years ago) shortwave radio stations. Among the University radio stations scattered throughout Mexico, **Radio Universidad** (XEXQ), San Luis Potosí, is the only one active currently on shortwave. Spanish broadcast hours on 6045 kHz is at 0000-0500 and 1200-0000 UTC. Besides shortwave, they broadcast on 1460 kHz AM, and 88.5 MHz FM. For a few photos and FM listings consult <http://www.uaslp.mx/Plantilla.aspx?padre=1912>. Return postage is appreciated with your Spanish or English report.

Additional university stations may be heard via Real Audio at <http://www.publicradiofan.com> Click on the Stations by Location link for stations with audio available.

Radio Huayacocotla (XEJN), from the state of Veracruz, began airing in October 1965, thanks to the initiative of Hector Samperio, the priest of the Huayacocotla parish. It was the first radio school of Mexico, aimed at providing basic education to isolated regions and modeled after Colombia's successful Radio Sutatenza.

From the beginning, Radio Huayacocotla, known as "Radio Huaya," has broadcast on 2390 kHz, which includes shortwave coverage to Veracruz and other the Mexican states of Puebla, Querétaro, and Hidalgo.

Programming includes Mexico's traditional ranchera and norteña music, and segments on agriculture, education and culture, plus children's programs, soap operas, and news coverage.

Huayacocotla remains an important voice to the rural communities and has an established reputation of defending, training, and informing the indigenous campesino population. The campesinos are a mixture of Indian, Spanish and European people. Although the groups remain distinct, the activists within each group are trying to work together toward a common goal.

Through its programming, Radio Huayacocotla strives to promote local issues and support social organizations. Because of this view, it has provoked reactions from political bosses and local

landlords, who were manipulating the surrounding villages. In 1995, after an accusation of "sending coded messages," to the rebels, transmissions were suspended, under threat of censorship and suspension of broadcast for good. The "coded messages," consisted of community messages in indigenous languages for the campesinos in Tepehua, Otomic and Nahuatl. The station did return to the air within a month.

Despite the station's vital link to the rural villages, there remain areas where broadcast are not well heard and the station has attempted to increase its coverage. In recent months, the station has been granted an FM license. Some listeners have voiced their hope this does not predict the demise of shortwave. The station has been broadcasting on an irregular basis on 2390 kHz. Broadcasts are scheduled for Monday-Saturday 1200-1600 and 2100-0100 UTC. The station identifies as "Radio Huaya" and "La Voz de los Campesinos." Spanish or English reception reports are accepted, and currency or mint postage are preferred. A prepared QSL card is also a popular enclosure used by hobbyists.

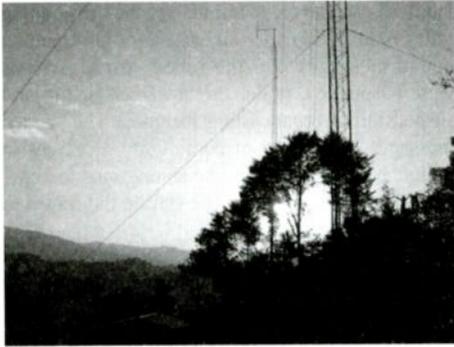
An Insurgent Voice from Chiapas?

Mexican clandestine activity, until recently, had been represented by **Radio Insurgente**, as the official voice of the Army Zapatista de Liberación. Declaring themselves "The Voice of Those Without Voice," they claimed to broadcast from the State of Chiapas, (or at least from the mountains of southeast Mexico). They use shortwave and FM to spread their ideas and the achievements of the Zapatista insurgency. Programming is broadcast in Spanish and indigenous languages with a focus on national and world news, music, and political messages to the poor and isolated villages.

Friday shortwave programming from the station was reported on 6000 kHz from 2100-2200 UTC, and is targeted to a world audience. Their programming is designed to inform the latter on



Ceremonial dancers in Zocola square.



Clandestine R. Insurgente antennas

developments in Chiapas, as well as advances in the Zapatista movement. Despite their claim of a world audience, shortwave operations have never been confirmed, with listeners speculating that the operation was strictly rhetoric. To further confuse hobbyists, the station recently announced that services on FM and shortwave, "have been suspended for an indefinite period of time."

This might be one to watch for to come on the air again, or at least you could download their MP3 file of one of their broadcasts at <http://www.radioinsurgente.org/>.

Silent voices

For a country the size of Mexico, it is unfortunate there are only five stations left on shortwave. Mexico, similar to countries from Central America, has decreased its presence on the shortwave bands. Radio Mexico International, once the official voice of Mexico, has eliminated its shortwave service after years of budget difficulties and ailing transmitters. It is unlikely it will return to shortwave. XEQK-Radio La Hora Exacta from Mexico City, has not activated, nor has XEFT La Jarocho from Veracruz. Will Mexico eventually lose their shortwave broadcast presence?

One aspect of the Mexican radio scene that continues to gather steam and gain in popularity is the proliferation of medium wave stations scattered throughout the country and along the California Baja.

And the AM list keeps growing

The Mexican medium wave scene is represented by hundreds, perhaps thousands of stations, in thirty-two states across the country. AM broadcasters in Mexico are comprised of privately owned stations with less than 200 watts, (called "flea-watt-powered stations" by DXers) to the power house stations from major Mexican networks. Many stations operate twenty-four hours, or some have a 1200-0700 UTC schedule. Each station broadcasts with its own distinctive voice and program format.

In the 1970's, the government declared radio to be a natural resource to be used to preserve the Mexican culture, and they haven't looked back since. In 1993, Mexico contained over 700 medium wave stations, and that number has continued to swell.

XEW, in Mexico City, is widely heard on 900 kHz, transmitting with a power of 250,000 watts. Another regional power house is XEWA on 540 kHz, which uses 150,000 watts from San Luis Potosí. Both stations are logged consistently throughout North America.

There are twenty-two radio networks throughout Mexico. Most of the AM and FM stations fall under the Grupo ACIR (Asociación de Concesionarios Independientes de Radio), IMER (Instituto Mexicano de la Radio), MVS or Núcleo networks. Each network operates from two to over 100 stations in small and major listening markets.

A word about slogans

As mentioned before, just as important as the station identification or jingle, is the station slogan and they are more prominent on medium wave and FM than on shortwave. Mexican stations are very proud of their name or slogan, which may be a single word or two, or a phrase or sound effect, played to distinguish their signal from the rest of the local stations in a market.

One example is XEPRS 1090 kHz, who was heard using a "pantera" slogan with a panther sound effect. A few slogan samples include:

AM: XEOK 900 kHz-Radio ACIR "La Bonita"; XEHN 1130 kHz-Rockola "Radio Cosa"; FM: XEQYE 89.7 MHz-Oye Radio "Siempre Hits"; XHVB 97.3 MHz-Extremo FM "Radio Núcleo." Slogans can occur at any time, and may replace all forms of identification until the top of the hour.

Reference aids

To learn more about what other DXers are hearing from Mexico on medium wave, consult the National Radio Club website at <http://www.nrcdxas.org/>. The NRC has served DXers since 1933 and is an excellent source for information on the AM radio hobby. Send your letters for subscription rates to DX News to: P.O. Box 5711, Topeka, KS 66605-0711.

Another source is the *World Radio TV Handbook* which has Mexico's medium wave listings by frequency. The *WRTH* is available through Grove Enterprises at <http://www.grove-ent.com>. Another source of station listings is the *IRCA Mexican Log*, available from the International Radio Club of America at <http://www.ircaonline.org/>

Whether you are starting to explore the Mexican broadcast frequency spectrum or a seasoned medium wave veteran, the *Grove Radio/Television Broadcast Directory* on CD-ROM is another excellent reference source. The AM broadcast (530-1700 kHz) and FM (88.1-107.9 MHz) station listings may be searched by frequency, call sign, location or any combination of key words. All of these reference sources are excellent aids to guide and inform you on your radio journey south of the border.

For a sample of what DXers have heard on medium wave, refer to MT's Mexico AM Logs in Table Three. While not a complete listing of what is available, it will give you an idea of stations that have been logged within the last year here in the U.S. and is a good starting point for compiling your own logbook of Mexican AM stations.





**Radio México
Internacional**

49 Mts. 5965 kHz.
31 Mts. 9705 kHz.

TPL 07 to 11 Hrs. and 14 to 23 Hrs.
UTC 13 to 17 Hrs. and 20 to 05 Hrs.



QSL

CATLE VAN BOBB
Thanks for your signal reporting code.
We have the pleasure of confirming your report on
our broadcast on _____ kHz Date _____
12/21/98 Mon 15:54
SINPO _____

WRITE US!
No. Box enclosed
Special Fee \$ 20
Copy Fee \$ 10
Year \$ 1

FM and TV

But what about Mexico's presence on FM and TV, you ask? Both of these forms of broadcasting are an entity unto themselves and deserve a closer look from a monitoring point of view.

In case you thought FM or TV DXing was possible only via "line-of-sight," there is a side of the radio hobby for those who are just as dedicated as medium wave or shortwave enthusiasts.

Frequencies above 54 MHz (the start of TV channel 2) normally support line-of-sight propagation only, but there are occasions each year when distant FM and TV signals from as far away as Mexico are received on ordinary FM radios and television sets using simple "rabbit ears."

The main contributing factor to enjoying this long distance delight of Mexican FM and TV station is being at the right place at the right time. Long distance reception of both broadcasting modes can be caused by sporadic-E or tropospheric ducting, known as "tropo" for short. Another possible Mexican propagation mode is through the "scattering" of the transmitted signal off the ionized paths left by meteors that have entered the earth's atmosphere. During years of high sunspot activity, frequencies as high as TV channel 2 can propagate via the F2 layer of the ionosphere, similar to a shortwave signal.

Sporadic-E clouds/reception can occur at any time of the year, but are most common from mid-May to late July, and just before and after the winter solstice. Prime time for Es (as this mode is also known in DX circles), is from mid-morning to noon and from late afternoon through the evening hours. When E's do occur in October, they usually favor the southwest and south regions.

The effects of tropo are caused by a temperature inversion in the troposphere, the atmosphere closest to the earth. Tropo is the common mode of distant reception on the FM band and TV channel 7 and higher.

Now is a time to watch for possible erratic weather, such as a tropical storm heading north or a sudden cool snap heading south, that might trigger a tropo opening. For a listing of commonly heard FM stations, refer to MT's Mexico FM Logs in Table Four.

RDS Will Be a Boon to the DXer

A recent development in FM—and what will be a boon to the DXers of that band—has been the advancement in RDS technology. The leading FM network in Mexico is Grupo ACIR. Grupo has recently entered a partnership with Clear Channel Communications. One of their plans for advancement is to implement RDS/RDBS digital technology. This has led to other large networks, including MVS Radio planning to install RDS technology to compete with Grupo ACIR. This development should aid FM DXers in identifying stations they

intercept from the region.

If you are interested in DXing FM or TV, point your internet browser to the Worldwide TV-FM Association website at <http://www.anarc.org/wtfda/>. The WTFDA promotes the observation, study and enjoyment of long distance propagation of TV and FM broadcast signals. Their website contains technical articles, databases, resources and member websites. To learn more about the club or for subscription information, consult their website or write to: Worldwide TV-FM DX Association, P.O. Box 501, Somersville, CT 06072.

If you are interested in an excellent FM radio guide get a copy of the *FM Atlas*, 19th edition by Bruce F. Elving. This guide has been a staple of FM DXers for many years and is available through Grove Enterprises at <http://www.grove-ent.com>.

Looking back at those early days of listening to Mexico's border-blasters brings back many fond memories. It was certainly a simpler time on radio and many of us will always remember what radio "used to be" in those good old days.

We may not have Wolfman Jack howling at the moon anymore, but Mexico's broadcast industry offers those willing to brave the language barrier many hours of listening and watching, enough to fill your logbooks and QSL albums.

When was the last time you tuned in to south of the border?

Table One: Abbreviations

Cd. Ciudad
LV La Voz

Mexican State Abbreviations

AG Aguascalientes
BC Baja California
BS Baja California Sur
CH Chihuahua
CO Coahuila
DF Distrito Federal
DU Durango
GJ Guanajuato
HG Hidalgo
JL Jalisco
ME Estado de México
MI Michoacán
NL Nuevo León
QE Querétaro
QR Quintana Roo
SL San Luis Potosí

SN Sinaloa
SO Sonora
TB Tabasco
TM Tamaulipas
TX Tlaxcala
VE Veracruz
YU Yucatán
ZC Zacatecas

Table Two: Mexico SW Addresses

XEJN Radio Huayacocotla
"Radio Huaya", Dam Guiterres Najera s/n
Apartado Postal 13
92600 Huayacocotla, VE Mexico
<http://www.sjsocial.org/Radio/huarad.html>

XERTA Radio Transcontinental
Plaza de San Juan 5
Primer piso
Despacho 2
Esquia con Ayuntamiento
Centro, 06070 Mexico DF Mexico
<http://www.misionradio.com/>

XEQX Radio Universidad Onda Corta
Arista 245
Apartado Postal 456
78000 San Luis Potosí
SLP Mexico

XEPPM Radio Educacion Onda Cora
Apartado Postal 21-940
04021 Mexico DF Mexico

XEOI Radio Mil Onda Corta
NRM, Avda
Insurgentes Sur 1870
Col. Florida
01030 Mexico DF Mexico
(or) Atencion: Dr. Julian Santiago Diez de Bonilla
Apartado Postal 21-1000
04021 Mexico DF Mexico

Clandestine: Radio Insurgente
<http://www.radioinsurgente.org/>

Table Three: México AM Logs (frequencies in kHz)

540 XEBACH Tijuana BC
540 XEHS La Nortenita, Los Mochis SN
540 XESURF Oldies 540, Tijuana BC
540 XETX La Ranchera de Paquimes, Nuevo Casas
Grandes CH
540 XEWA W Radio, Monterrey NL
540 XEWF La Ponderosa, Tlalmanalco México DF
560 XEOC Radio Chapultepec, México DF
560 XEQAA La Ponderosa, Chetumal QR
560 XEXZ La Zeta de Zacatecas ZC
570 XEBJB La Estación del Barrilito/Radio Alegria,

Monterrey NL
570 XEUK UK-Caborca SO
580 XEMU La Rancherita del Aire, Piedras Negras CO
590 XEPH Sabrosita Tuya 590, México DF
590 XEXA EXA, Hermosillo SO
600 XEDN La Mexicana, Torreón CO
610 XEGS La Ley SN slogan, "La GS"
620 XEBU La Nortenita, Chihuahua CH
620 XENK Radio 620, México DF
620 XESS Radio Tropical, Ensenada BC
630 XEFB La Nueva-FB Romántica, Monterrey NL
640 XEJUA La Caliente, Cd. Juárez CH, slogan: "Radio
Recuerdo-Canal 640"
640 XEYQ Radio Uno, Fresnillo ZC
650 XETNT La Ley, Los Mochis SN, slogan: "Radio
65"
660 XEABC Radio 6-60, Cd. Delicias CH, slogan: "La
Tremenda, Numero Uno-Radio 660"
660 XEAR La Mexicana, Tampico TM
660 XEDTL 60 Mexico DF, slogan: "Tropicalismo
Canela 660"
660 XEEY La Consentida, Aguascalientes AG
670 XESOS Radio Uno, la Numero Uno, Agua Prieta
SO
670 XETOR Radio Ranchita, Torreón CO
680 XEFO Energia 6-80, Chihuahua CH, slogan:
"Energia 680"
680 XELG La Grande, León GJ
690 XEMA La Madre de Todos, Fresnillo ZC
690 XEN La 69, México DF
690 XERG La Deportiva 6-90, Monterrey NL
690 XETRA Extra Sports, Tijuana BC, slogan: "Fabulous
6-90"
700 XEECHT Etchojoa SO
700 XELX Radio Mexicana, Zitácuaro MI
710 XEMP Radio 7-10, México DF, slogan:
"Radio 710 Alma Musical"
720 XEDE Radio Fórmula, Primera Cadena Nacional,
Sahilillo CO
730 XEPQ La Sabrosita, Cd. Muzquiz CO
730 XEX Estadio W, México DF
740 XEGF Radio Fiesta, Gutierrez Zamora VE, slogan:
"La Comadre, Radio Fiesta"
750 XEOH La Chiquita, Camargo CH
750 XERASA San Luis Potosí SL
750 XETI Radio Fiesta, Las Mas Picuda, Tempool VE
750 XEURM Fiesta Mexicana, Uruapan MI
760 XEABC- ABC Radio, Mexico DF
770 XEHB La Rancherita, Hidalgo del Parral CH
770 XEACH Radio Fórmula, Monterrey NL
780 XEMF Radio Nostalgia, Monclova CO
780 XESS Ensenada BC
790 XEFE La Pura Ley, Nueva Laredo TM
790 XERC Formato Veinte-Uno, México DF, slogan:
"Formato 21"
800 XESPN Tijuana BC
810 XEFW Radio Estrella, Tampico TM
810 XERSV Radio Alegria, Cd. Obregón SO
810 XESB Santa Barbara CH, slogan: "Radio Mexi-
cana"
820 XEHQ Hermosillo SO, slogan: "La Explosiva"
820 XEMYS Mexicali BC
830 XEIK La Nortenita, Piedras Niegros CO, slogan:
"La Nortenita 830 AM"
830 XEITE Radio Capital, México DF
830 XELN La Super, Llagadora, Linares NL
830 XEVQ La Superestación/Navolato SN, slogan: "La
Grande de Sinaloa"
850 XEM Radio Exitos, Chihuahua CH
860 XEDU D-U la que gusta, Durango DU
860 XEMO La Ponderosa, Tijuana BC
860 XEUN Radio UNAM, México DF
870 XEAMO Amoe 870, Irapuato GJ
870 XETAR LV de la Sierra Tarahuamara, Guachochi
CH
880 XEPNK Canal 88/La Super Estación, Los Mochis
SN
880 XETC Estéreo Mayrán, Torreón CO
880 XEV Radio Fórmula, Primera Cadena Nacional,
Chihuahua CH
890 XENZ La Sinaloense, Culiacán SN
900 XEWB Veracruz VE
900 XEW W Radio, México DF
900 XEDT La Reina, Cd. Cuauhtémoc CH
900 XEOK Radio ACIR, Monterrey NL, slogan: "La
Bonita"
900 XEWB W Radio, Veracruz VE
920 XECQ C-Q/La Ranchera de Culiacán SN
920 XEHQ La Mejor, Hermosillo SO, slogan: "Radio
Capital" & "La Explosiva"
920 XEQD Radio Noticias 920, Chihuahua CH
920 XEDSS Ensenada BC
930 XERLA Santa Barbara BC
930 XEU La U de Veracruz, Veracruz VE



Mexico City's Palace of Fine Arts

940 XEQ Besame 940, México DF
 940 XEYJ La Y-J Mexicana, Salinas CO
 940 XEWV Fiesta Mexicali, Mexicali BC
 950 XEKAM Radio Formula, Tijuana BC
 960 XEFAMA Radio 960 Lo Foma, Cd. Camargo CH
 960 XEIQ Cd. Obregón SO
 960 XEK Nuevo Laredo TM
 970 XEEZ La Super Z, Caborca SO, slogan: "La Super Zeta"
 970 XERFR Radio Fórmula, Primera Cadena Nacional, Mexico DF
 980 XETU Radio Tampico, Tampico TM
 990 XECL Rockola 990, Mexicali BC
 990 XEER Cd. Cuauhtémoc CH
 990 XEHZ Radio 9-90, La Paz BS
 990 XET Monterrey NL, slogan: "La Grande de Monterrey"
 1000 XEMIL La Comadre, Los Mochis SN
 1000 XEOY Radio Mil, México DF
 1010 XEVK La Ke Buena, Torreón CO
 1020 XEKH Radio Centro, Querétaro QE
 1030 XELJ La Ke Buena, Lagos de Moreno JL, slogan: "Ke-Buena-AM"
 1030 XEMPM Radio Farma/El Fuerta, Los Mochis SN, slogan: "Radio Farma"
 1030 XEQR Granjas, México DF
 1030 XEYC Radio Fórmula, Cd. Juárez CH
 1040 XEBBB Zapopan JL
 1040 XEGR La Favorita, Jalapa VE
 1040 XEGYS Super Banda, Guaymas SO
 1040 XEHES Radio Luz, Chihuahua CH, slogan: "Ex-tasis Digital"
 1050 XED W Radio Mexicali, Mexicali BC
 1060 XEEP Radio Educacion, México DF
 1070 XESP Radio Juventud, Guadalajara JL
 1080 XEDY Radio Gallo, San Luis Rio Colorado SO
 1080 XETUL Radio Mexiquense, Tultitlán ME
 1090 XEAU Que Buena, Monterrey NL
 1090 XEMCA MCA 1090, Pánuco VE
 1090 XEPRS Tijuana BC, slogan: "Mighty 10-90"
 1090 XEWL La Romántica, Nuevo Laredo TM, slogan: "La Romántica 1090"
 1100 XETGO Tlaltenanga ZC
 1110 XEES Chihuahua CH
 1110 XERED Radio RED, México DF
 1110 XEVS Maxima, Hermosillo SO
 1120 XETR Panorámica, Cd. Valles SL
 1130 XEETCH Etchojoa SO
 1130 XEHN Rockola, Nogales SO, slogan: "Radio Casa"
 1130 XETOL Radio Lobo, Toluca ME
 1140 XEMR Radio 1140AM- Música Romántica, Monterrey NL
 1140 XESOS Radio Uno, Agua Prieta SO
 1150 XEJP El Fonógrafo, México DF
 1160 XEBE Inversa Radio, Perote VE
 1160 XEVW Radio Sensacion, Acambaro GJ
 1170 XEMDA La Ley 11-70, Monclova CO
 1170 XERT Voz 1170, Reynosa TM
 1170 XEUVA Aguascalientes AG
 1180 XEDCH Romántica 11-80, Cd. Delicias CH
 1180 XEFR Radio Felicidad, México DF
 1180 XEGN La Gigante, Piedras Negras VE
 1190 XECT Moreno, Monterrey NL, slogan: "Nucleo Radio Monterrey"; "W Radio"
 1190 XEPZ Radio Norteña, Cd. Juárez CH
 1210 XEBD Radio Centro, Jalapa VE
 1220 XEB La B Grande, México DF
 1240 XECG Radio Mexicana, Nogales SO
 1250 XEDL Hermosillo SO
 1250 XESJ Radio Saltillo, Saltillo CO
 1260 XEL La 1260 AM, México DF
 1260 XEOG Radio Ronchito, Ojinaga CH
 1260 XEMW San Luis Rio Colorado SO
 1270 XEAZ Tijuana BC
 1280 XEAW Teleradio, Doce-Ochenta AM, Monterrey NL
 1290 XEAP Romántica 1290, Cd. Obregón SO, slogan: "Radio Romántica"
 1290 XEDA Radio 13/La Fuerza de lo Palabra, México DF, slogan: "Radio Trece"
 1290 XEQIN LV de las Montañas/LV del Valle, San Quintín BC, slogan: "LV del Valle"
 1300 XESW Cd. Cd. Madera CH
 1300 XEXV Radio Capital, León GJ
 1310 XEAM La M Grande, Matamoros TM
 1310 XEVB Radio 13, Monterrey NL, slogan: "Radio Trece"
 1320 XECPN La Mexicana 1329, Piedras Negras CO, slogan: "La Mexicana"
 1320 XENET Radio Bienestar, México DF
 1320 XESR Santa Rosalia BC
 1330 XEAJ Trece-Treinta Radio, Saltillo CO
 1330 XEWQ La Superstation, Monclova CO
 1340 XEAA La Caliente, Mexicali BC, slogan: "Radio

Capital"
 1350 XELBL Radio Centro, San Luis Rio Colorado SO
 1350 XETB Radio Laguna, Torreón CO
 1350 XELBL San Luis Rio Colorado SO
 1350 XETM El Heraldo de la Frontera, Naco SO
 1350 XEQK La Radio de los Ciudadanos, México DF
 1370 XEHG Mexicali BC
 1380 XECO Ke Buena, México DF
 1390 XEQC Lv de Puerto Penasco SO
 1390 XERW Radio Fórmula, León GJ
 1410 XEBS Radio Sinfonala, México DF
 1410 XECF La Mexicana, Los Mochis SN
 1420 XEF Cd. Juárez CH, slogan: "Linea Deportiva"
 1420 XEH Rodio Tremenda, Monterrey NL
 1420 XEWE La Estación Familiar, Irapuato GJ
 1430 XEOX Cd. Obregón SO
 1430 XETT Radio Tlaxcala, Tlaxcala TX
 1430 XEWD Poder de la Radio, Cd. Miguel Alemán TM
 1440 XEEST La Reina del Hogar, México DF
 1450 XECU Radio Rancherita, Los Mochis SN
 1460 XECB Radio Ranchito, San Luis Rio Colorado SO
 1460 XEXQ Radio Universidad, San Luis Potosí SL
 1470 XEAI Metropoli Radio Fórmula, Tercera Cadena Nacional, Mexico DF
 1470 XERCN Radio Hispana, Tijuana BC
 1490 XEAA La AQ, Agua Prieta SO
 1500 XEDF Radio Fórmula, México DF
 1520 XEJCC Bonita, Cd. Juárez CH
 1530 XEUR Radio La UR 15-30, México DF, slogan: "Moriuchi Estéreo"
 1540 XEHOS La Ponderosa, Hermosillo SO
 1560 XEINFO Radio Monitor, México DF
 1560 XEJPV La Nueva Radio Vida, Cd. Juárez CH
 1570 XERF La Ponderosa, Cd. Acuña CO
 1590 XEVOZ Radio Reloj, México DF
 1630 XEUT Radio Universidad, Mexicali BC
 1700 XEPE La Romántica/LA Tremenda, Tijuana BC, slogan: "La Tremenda" (or) "Romantica, Amor 1700 AM"

92.3 XHTU Fiesta Mexicana, Tuxpan VE
 92.5 XHZS Radio Hits, Coatzacoalcos VE, slogan: "Radio Hits, la Explosiva"
 92.9 XEQ La Ke Buena, México DF
 93.1 XHCRA La Ponderosa, Tuxpan VE
 93.3 XHPS Exa, Veracruz VE, slogan: "EXA FM"
 93.5 XHPP Extreme FM, Pueblo Viejo Panuco VE
 93.7 XEJP Stereo Joya, México DF
 93.7 XHMRI Super Estéreo, Merida YU, slogan: "Éxitos al Aire 93.7"
 93.9 XHTXA Calor, Tuxpan, Tihiatlan VE, slogan: "Calor 93.9"
 94.5 XHIMER Opus 94, México DF
 94.9 XHTVH Villahermosa TB
 95.3 XHSH La Nueva Amor, México DF
 95.7 XHOTE Radio Mas, Ocozotepec VE
 95.7 XHUPC El Politécnico en Raído, México DF
 96.1 XEUN Radio UNAM, Mexico DF
 96.3 XHTNO Tulancingo HG
 96.5 XHRN La Nueva, Veracruz VE, slogan: "La Nueva RN, La Tropical"
 96.9 XEW W Radio, México DF
 96.9 XHHF Los 40 Principales, Yompico TM
 97.3 XHVB Extremo FM, Villahermosa TB, slogan: "Radio Núcleo"
 97.7 XERC Stereo 97-7, México DF
 98.5 XHDL Reporte 98.5, México DF
 99.3 XHMARA Merida YU
 99.3 XHPOP Digital 99, México DF
 99.5 XHEMZ Solo Amor, Emiliano Zapata TB
 99.7 XHPB MAR, Veracruz VE, slogan: "MAR FM"
 99.9 XHEMZ Emiliano, Zapata TB
 100.1 XHJT Tampico TM, slogan: "Best FM"
 100.1 XHMM Stereo Cien, México DF
 100.1 XHNE La Comadre, Coatzacoalcos VE
 100.5 XHVE La Mejor, Veracruz VE, slogan: "La Mejor 110.5"
 100.9 XHSON Beat 100.9, México DF
 101.7 XHPR Vox, México DF
 101.7 XEX Los 40 Principales, México DF
 101.7 XHPR Los 40 Principales, Veracruz VE
 101.9 XHRIC EXA, Poza Rica VE, slogan: "EXA FM"
 102.5 XHMVS MVS 102.5/Monitor V5, México DF
 102.7 XHPR Los 40 Principales, Poza Rica VE
 102.9 XHTS YA, Veracruz VE, slogan: "YA FM 102.9"
 103.3 XERFR Radio Fórmula 103, México DF, slogan: "FM 103"
 104.5 XEHU Shock FM, Martínez de la Torre VE
 104.9 XHEXA Exa FM, México DF
 105.5 XHTIO Radui Universidad, Tampico TM
 105.7 XHOF Reactor 105, México DF
 106.5 XHDFM Mix 106, México DF
 106.5 XHZUL Radio Más, Cerro Azul, VE
 106.9 XHQT La Ponderosa, Veracruz VE
 106.9 XHTVR El Color del Amor, Tuxpan VE
 107.3 XEQR La Z, México DF
 107.5 XHOM La Nueva Amor, Coatzacoalcos VE
 107.7 XHXAL Radio Más, Xalapa VE
 107.9 XHIMR Horizonte 108, México DF

Table Four: Mexico FM Logs (frequencies in MHz)

88.1	XHRED RED FM, México DF	
88.5	XHUSP Radio Universidad, San Luis Potosí SL	
88.9	XHHM Noticias, México DF	
88.9	XHM Azul 89, México DF	
89.3	XHMIA Merida YU, slogan: "Energy 89.3"	
89.7	XEOYE Oye 89.7, México DF, slogan: "Siempre Hits"	
90.5	XEDA Radio Imagen, México DF	
90.9	XUIJA Ibero 90.9, México DF	
91.3	XHFAJ Alfa Radio, México DF, slogan: "Alfa Radio 91.3"	
91.7	XHGLX Tijuana BC	
91.9	XHRLM Exa-FM, Cd. Mante TM, slogan: "Exa-FM 91.9"	
92.1	XHFO Universal Stereo, México DF	
92.1	HXYML 9-2-1, Merida YU, slogan: "Nueve-Dos Uno"	

Table Five: Mexican TV Logs

El Canal de las Estrellas Televisa,	XEW	2	http://www.esmas.com/canal2/
4tv Televisa	XHTV	4	http://www.esmas.com/canal4/
Canal 5 Televisa	XHGC	5	http://www.esmas.com/canal5/
TV Azteca 7	XHIMT	7	http://www.tvazteca.com.mx/
Galavisión Televisa	XEQ	9	http://www.esmas.com/galavision/
Once TV IPN	XEIPN	11	http://onctv-ipn.net/index.php
Azteca 13	XHDF	13	http://www.tvazteca.com.mx/
Canal 22	XEIMT	22	
Canal 28	XHRAE	28	
TV Mexiquense	XHPTP	34	http://www.mexiquense.mx
CNI Canal 40	XHTVM	40	
Televisa			http://www.esmas.com/televisionhome/

Table Six: Networks and Radio Stations

Best FM	http://www.best.fm/
EXA FM	http://www.exafm.com.mx/
Grupo ACIR	http://www.grupoacir.com.mx/
Imagen Informativa	http://www.imagen.com.mx/afiliados/
IMER	http://www.imer.gob.mx/
Los 40 Principales	http://www.los40.com.mx/
MVS Radio	http://www.mvsradio.com/
Nucleo Radio	http://www.nucleoradio.com/
Radio Fórmula	http://www.los40.com.mx/
Radio Monitor	http://www.monitor.com.mx/
W Radio	http://www.wradio.com.mx/

China's Broadcasting Industry

By Md. Azizul Alam Al-Amin

"Try your best to do broadcasting work well and serve the people of China and the whole world"- Mao Zedong



Since the launch of Reform and Opening policy by the "Little Great Man" Deng Xiaoping, the growth rate of China's economy has been much higher than the average growth rate of the world economy and than the growth rate of developed countries. The rapid rise of China's economic aggregate has advanced China's economic standing in relation to the world's economies. After entering the World Trade Organization, China enjoys a booming economic growth, national solidarity and social stability.

The rapid change in China has not only re-defined the country, but attracted attention from around the world. So the Chinese broadcasting authority is striving hard to better introduce China to the outside world. Its aim is to present China in an objective, lively and comprehensive manner and inform the world of the great changes happening in China as well as covering the country's long history and culture.

The world's second largest radio broadcasting market

According to a report in Xinhua Online, Nielsen Media Research has rated China the world's second largest radio broadcasting market, with more than 1,000 broadcasters for the 1.3 billion people in 340 million families. The report reveals that half of China's population above age 15 listen to radio broadcasts every week. In Beijing, nearly 50 percent of residents listen to the radio for 14.5 hours a week on average, and in Shanghai, about 93 percent of its people tune in radio programs for an average 14 hours a week.



China commits to DRM

Chinese Vice Minister Zhang Haitao said in the annual General Assembly of Digital Radio Mondiale, held in Hangzhou, April 2004, that China was committed to the introduction of digital radio because of its huge advantages over analogue radio: better quality, new services and tremendous power savings. China is in the process of selecting DRM for use on medium-wave, AM, and shortwave and wants to participate in its worldwide implementation.

Large-scale test transmissions have been carried out with great success, and China Radio International (CRI) and China National Radio are committed to DRM.

China to build new broadcasting satellite system

China Satellite Communications Corp. (China Satcom) said China's new-generation broadcasting satellite system Chinasat 9 will be put into operation in 2006. Two satellites for radio and television broadcasting will be launched before the end of 2006, one made by the Chinese and one manufactured by Alcatel Space. Chinasat 9, which is scheduled to be launched in late 2006 atop a Long March 3B carrier rocket, will enable 97 percent of Chinese residents to receive satellite broadcast signals with the help of an antenna 0.45 to 0.6 meters in length. The two satellites, both with a designed service life of 15 years, will form the new-generation broadcasting system.

China Radio International

Founded on December 3, 1941, China Radio International (CRI) is the nation's overseas broadcaster, owned and operated by the state. Its mission is to enhance friendship and understanding between the Chinese people and the rest of the world. In addition to its broadcasts in 43 languages, CRI also runs multimedia websites, TV programs and publishing houses. With the state-of-art tech-

nology and endless resources, China Radio International now stands as a 'Vanguard' in Chinese broadcasting arena. It is striving to produce diverse, high-quality, world-class and superlative programs to introduce the indigenous culture and traditions of Chinese nations, as well as China's rapid development, to the outside world.

Global Broadcasting

There are constant changes in the broadcasting scene around the globe. Nowadays some broadcasters are reducing their hours of transmission or even terminating some of their services due to limited funds. On March 27, 2005, the BBC (British Broadcasting Corporation), one of the leading radio stations in the world, reduced global access to its broadcasts by cutting the number of hours broadcast on SW in English, Arabic, Spanish and Portuguese.

It is interesting that, at the same time, China is in full swing to boost their broadcasting. China Radio International is dramatically increasing such access by actively embracing all distribution methods, including shortwave. CRI is planning to inaugurate a 24-hour English language news service.

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Propagation Outlook for October 2005 to March 2006 - Winter SW Broadcast Season -

By Tomas Hood NW7US

As the weather in the Northern Hemisphere begins to turn and the summer fades to autumn, many of us move inside to engage in our hobbies, hopefully one of them being radio. As we leave the summer season, we can expect a fair improvement on the higher shortwave frequencies (22 meters up through 11 meters). Many international shortwave broadcast stations change from their summer schedule to a winter schedule to take advantage of the seasonal change in propagation.

While the weather is still fair, tighten the hardware on your antenna system, check coax cables, and fine-tune your radio station. Get ready to reap the DX.

MW and HF Propagation Overview

When the autumn/winter DX season is in full swing, listeners throughout the Northern Hemisphere enjoy great shortwave (and medium wave, MW) DX, especially on the mid- to low-HF bands from early evening until late at night, and then again from early morning through high noon.

On December 21, 2005, at 1835 UTC, the Northern Hemisphere experiences the longest day of darkness. This is the Winter Solstice, marking the peak of the seasonal DX window on the shortwave bands and the medium wave band. Amateur radio operators enjoy this time of year by participating in the many international DX contests scheduled during this optimal season.

During the winter months the maximum usable frequencies (MUF) are generally higher during the daylight hours than during the summer daylight hours (for example, see the notes at <http://vesuvius.jsc.nasa.gov/er/seh/sun.html>). This provides short but strong openings on higher shortwave bands during the winter

day. Then, at night, the MUF dips down much lower than what would be seen during the summer nights.

Summertime MUFs are generally higher during the night hours than during the winter nights, due in part because the ionosphere stays energized through the short nights. Winter nights are longer, so recombination of the ionosphere (which results in a lowering of the MUF) is more complete.

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

Seasonally, the geomagnetic activity tends to quiet down during the winter months. The most active geomagnetic seasons are centered on the two equinoxes, in the spring and autumn. Combined with the seasonal decrease in geomagnetic activity, the eleven-year solar cycle geomagnetic activity is continuing its downward trend toward the end of the current cycle, which will occur sometime during 2007. This results in more stable and reliable propagation on the shortwave spectrum, especially on the lower frequencies.

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

The Winter Anomaly

There are actually two different "winter anomalies" in which changes in the D layer cause disruptions to normal winter propagation. First, there is a small winter anomaly that appears in connection with ionization at relatively low latitudes in the bottom of the D layer of the ionosphere. There, the electron densities in the winter happen to be less than should be expected. Second, the better known classic winter anomaly is present when the upper D layer, again at relatively low latitudes, has more ionization than should be expected during the winter. http://www.sciencemaster.com/physical/item/solar_glossary.php

Both of these effects are due to the slant compression of the geomagnetic field produced by the solar wind in the winter season. The standard winter anomaly is caused by the influx of a super solar wind that penetrates into the Earth's polar atmosphere down to E layer heights. There, it is concentrated through a funneling action at the winter pole of the distorted geomagnetic field, slowing down the winter polar vortex. An equator-ward motion of the polar air with its content of nitric oxide brings about the excess of ionization in the upper D layer at lower latitudes (Gian-Carlo Rumi, Italy <http://www.ingv.it/~wwwannali/rumi443.htm>). The end result of this winter anomaly is that the MW and lower frequency shortwave bands are attenuated much like you would expect during the summer season.

This winter anomaly also appears to happen in relationship with sudden stratospheric warming events <http://www.albany.edu/faculty/rgk/atm101/weather.htm>. The Space Weather reports provided by WWV and NOAA (and also found at <http://prop.hfradio.org>) list stratospheric warming events. On those days with stratospheric warming alerts, it is possible that the winter anomaly condition ex-

SHORTWAVE BROADCAST BANDS (AM)

2300-2495 kHz	120 Meters
3200-3400 kHz	90 Meters
3900-4000 kHz	75 Meters
4750-5060 kHz	60 Meters
5900-6200 kHz	49 Meters
7100-7350 kHz	41 Meters
9400-9900 kHz	31 Meters
11600-12100 kHz	25 Meters
13570-13870 kHz	22 Meters
15100-15800 kHz	19 Meters
17480-17900 kHz	16 Meters
18900-19020 kHz	15 Meters
21450-21850 kHz	13 Meters
25600-26100 kHz	11 Meters

AMATEUR BANDS

1800-2000 kHz	160 Meters
3500-4000 kHz	80 Meters
7000-7300 kHz	40 Meters
10100-10150 kHz	30 Meters
14000-14350 kHz	20 Meters
18068-18168 kHz	17 Meters
21000-21450 kHz	15 Meters
24890-24990 kHz	12 Meters
28000-29700 kHz	10 Meters

(from <http://www.monitoringtimes.com/html/mfSW.html>)

ists, causing a degradation of MW and low HF band propagation. (I'd love to hear real-world reports from you, if you can correlate such stratospheric warming events with a change in MW DXing. Drop me a letter or an email with your observations, please.)

Shortwave Propagation

During October, signals below 75 meters are still hard to hear under the seasonal static.

The static then steadily decreases as we move into the longer hours of darkness during the winter months. With the seasonal reduction in thunderstorms and atmospheric static noise in the Northern Hemisphere, it becomes easier to hear the weaker signal DX.

As we get closer to **January**, expect DX openings during the hours of darkness and into the sunrise period. Look for openings from Europe and the south if you are listening in the eastern half of the United States, and from the south, the Far East, Australasia, and the South Pacific if you are in the western half of the country.

Expect long-range DX on the *low bands*, starting close in right after sunset, and extending farther as the night develops. Signals here should peak from Europe and from a generally easterly direction around midnight. DX paths will move farther west through the night. By morning, openings from Asia should be common. For openings in a generally western direction, expect a peak just after sunrise. The band should remain open from the south throughout the night. Propagation in this band is quite similar to that expected on 41 meters, except that signals will be somewhat weaker on the average, noise levels will be a bit higher, and the period for band openings in a particular direction will be a bit shorter.

Forty-one meters should be the hottest DX band during the dark hours, as the seasonal static levels are lower than they were during the summer. The band should be open first for European DX in the eastern United States dur-

ing the late afternoon. Signals should increase in intensity as darkness approaches. During the hours of darkness, expect good DX openings from most areas of the world. Signals should peak from an easterly direction about midnight, and from a westerly direction just after sunrise. Excellent openings toward the south should be possible throughout most of the nighttime period.

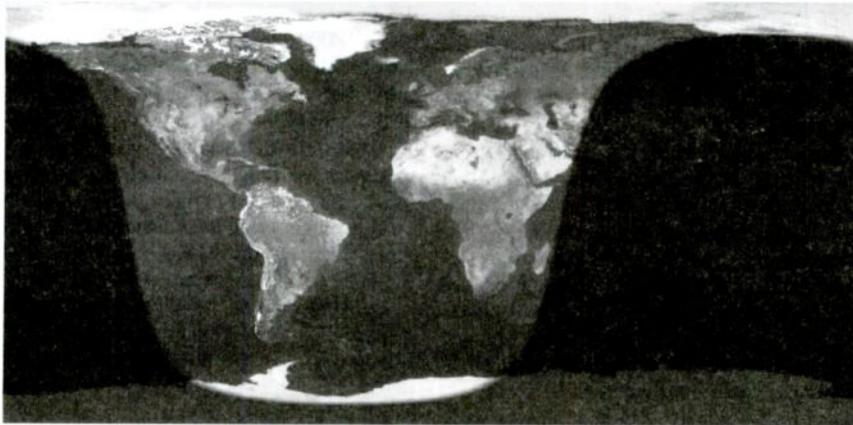
The all-season bands, *31 and 25 meters*, are crowded and signals are usually very strong and steady. These bands will often remain open into many areas late into the night and will open early in the morning, especially when part of the propagation path moves through sunlit regions. Twenty five meters is expected to be an excellent band for medium distance (500 to 1500 miles) reception during the daylight hours. Longer distance reception (up to 2000 to 3000 miles) should be possible for an hour or two after local sunrise, and again during the late afternoon and early evening. Heavy congestion will occur here since many international and domestic broadcasters make use of 25 meters.

Thirty-one meters, the backbone of worldwide shortwave broadcasting, will provide medium-distance daytime reception ranging between 400 and 1200 miles. During **November**, reception up to 2500 miles is possible during the hours of darkness, and until two to three hours after local sunrise. Thirty-one meters, too, is highly congested, making reception of weak, exotic signals a bit more of a challenge.

Twenty-two through 19 meters compete with 16 for the best daytime DX band during **October**. They will open for DX just before sunrise and should remain open from all directions throughout the day, with a peak in the afternoon. Nighttime conditions will favor openings from the south and tropical areas. Since the Southern Hemisphere has long daylight hours, DX paths on these bands from stations in the south will be common. The same will hold true for *25 through 19 meters* during **November and December**. Sixteen through 13 meters will be open occasionally during the first months from **October through December** when the 10.7-cm flux levels reach above 100 and stay there for a few days. This is not going to happen often, now that we are so close to the end of the current solar cycle. Paths from Europe and the South Pacific as well as from Asia (at least, during days of higher solar flux levels) are possible, especially on 16 meters. Look for best conditions from Europe and the northeast before noon and from the rest of the world during the afternoon hours. Reception from the South Pacific, Australia, New Zealand, and the Far East should be possible well into the early evening. When flux levels remain lower, these openings may be short-lived.

For *short-skip openings* during **December**, try 90 through 41 meters during the day for paths less than 250 miles, and 90 down to 120 meters at night for these distances. For openings between 250 and 750 miles, try 41 meters during the day, and both 90 and 120 at night. For distances between 750 and 1300 miles, 22 through 31 should provide daytime openings, while 41 down to 90 will be open for these distances from sunset to midnight. After midnight,

2005 Aug 24 14:31 UTC



Click in image to zoom in on that region

Satellite data provided by **The Living Earth** Inc. Earth Imaging
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Display Map, From Sun, From Moon, Night side
 Lat 10 56' North Long 37 10' West Alt: 151224377 km

[Choose satellite](#)

Image Living Earth NASA Visible Earth Topo map
 Clouds IR clouds Colour weather

The best propagation aid is a set of sunrise and sunset curves, since DX signals tend to peak when it is local sunrise at the easterly end of the path in question. A good Internet web site featuring a grayline map display is found at <http://www.fourmilab.to/earthview/> Follow the link, "map of the Earth," showing the day and night regions.

90 meters will remain open out to 1300 miles until sunrise. Try 31 and 41 meters again for about an hour or so after sunrise. For openings between 1300 and 2300 miles, openings will occur on 22 through 16 meters, with fewer on higher bands, during the daylight hours. During sundown to midnight, check 22 through 41 meters for these long-distance openings, and then check 41 down to 90 meters after midnight until sunrise. Try 41 and 31 meters again for an hour or so after sunrise.

Propagation changes again after January, as the hours of daylight increase. **March** is one of the optimal DX months. As the Spring Equinox approaches, the gray-line begins to run straight North and South. The return of sunlight to the polar north creates north-south openings on *11 through 25 meters*. However, since we are near the end of the solar cycle and the ionosphere is not as energized as during the peak years, east-west path openings on higher frequencies will be less frequent and shorter than the last few years.

By March, *16 meters* will still stay open long into the evenings. You will occasionally find 16 meters open all night long. Daytime paths will not degrade much until midsummer. You will see more early closures if you live closer to the North Pole.

Twenty-two and 19 meters will remain in excellent shape. Both short and long path circuits are reliable and solid. All nighttime paths are wide open during March. Prime time evening hours in the United States are sunrise hours across Russia, Africa, and both the Near and Far East. Expect a lot of short and long path DX from these areas of the world.

Between sunset and midnight, expect occasional DX openings on all bands between 15 and 41 meters when conditions are high. Conditions should favor openings from the east and south. These bands should peak for openings from Europe and Africa near midnight.

From midnight to sunrise, expect optimum DX conditions on 31 through 90 meters, and occasionally, 120 meters. Conditions should favor openings from the west and south. Some rather good openings on 19 and 22 meters should also be possible from the south and west during this time.

Noise levels are slowly increasing as we move toward the spring season. Geomagnetic storms will increase, disrupting the mid- and high-latitude ionosphere. During the Spring Equinox, Earth's magnetic field is sufficiently perturbed by solar wind particles flowing into the auroral zone (between 50 and 70 degrees north geographic latitude) to cause the ionosphere to be depleted.

MW Propagation

The Medium Wave AM Broadcast Band DX season is starting to perk up, now that we're having longer hours of darkness in the Northern Hemisphere. The FCC requires domestic broadcasters to reduce station power or to cease operating at night in order to limit interference with other AM broadcast stations. This can make the hunt for AM DX stations all the more challenging.

The wavelengths of AM radio signals vary

from a maximum of 556 meters (1825 feet) at 540 kilohertz (kHz), the lowest AM carrier frequency, to a minimum of 176 meters (580 feet) at 1700 kHz, the highest carrier frequency at the upper end of the AM expanded band.

During the hours of sunlight, the lowest layer of the ionosphere, the D layer, becomes highly energized. This causes the D layer to absorb radio waves. The more energized, the higher the frequencies that are absorbed, and the more intense the absorption over the range of frequencies absorbed. The lowest frequencies are usually totally blocked by the D layer during the day.

During the hours of darkness, the D layer loses its energy. At night, the D layer nearly disappears, allowing medium wave signals to pass through to then be reflected back by the E layer. During daytime hours when ionospheric reflection does not occur to any great degree, medium wave signals travel over the surface of the earth. This is known as "groundwave" propagation. Useful daytime AM broadcast reception is generally limited to a radius of no more than about 100 miles, even for the most powerful stations. However, during the hours of darkness, medium wave signals can travel over hundreds of miles by reflection from the ionosphere, a phenomenon called "skywave" propagation.

At least two things make AM DXing possible at night: The reduction in D layer absorption opens up the band to signals beyond the reach of ground wave propagation, and the possible decrease in local interference due to daytime stations going silent after dark.

However, at the same time, distant stations that you wish to catch are switching to lower power or modifying their antenna's directivity. Another phenomenon that can present a real challenge to MW DXing is lightning-related noise, as well as sporadic-D (Ds) absorption. During summer months in the northern Temperate Zone (where most of North America exists), there are a higher number of electrical storm events, causing broadband noise. Most of the energy of these electrical storms is concentrated at lower frequencies. These electrical storms can create ionization in the lower atmosphere, in the D layer of the ionosphere, causing medium wave radio signal absorption. This will occur at any time of day, even at night. Those signals that do make it to our receivers compete with the noise generated by these storms.

During the winter, however, along with the longer hours of darkness, there is a significant reduction in seasonal electrical storms, making conditions much better for long distance propagation of these medium wave broadcast signals.

When is the best time to look for MW DX? Most AM broadcast stations in the United States change from high power to low power after their local sunset. If you are trying to catch a station to your west, listen just prior to their local sunset time. You will be in the dark, and the D layer above you and somewhat to your west will be less dense and energized, allowing signals to skip off of the ionosphere. And, their higher power will help their signal propagate well because of the characteristics of nighttime

ionization. The idea is to maximize the degree of darkness between you and the station, while they're still on day power and pattern.

At the same time, any station to the west that has a favorable nighttime signal in your direction (in other words, they have significant night power and no deep null antenna pattern aimed at you) is a potential sunrise target. D layer absorption increases rapidly when in direct sunlight, and east of you begins to ionize, while west of you is still dark and free of D layer ionization. For a period of time around your local sunrise, the relative strength of stations to the west of you increases, while eastern stations will start to fade, allowing the western stations to emerge from underneath the interference from the east. On rare and exciting occasions, this period will last long enough for some western stations to go to their higher power and daytime pattern. Here, as with sunset, the time of month can also be critical, as the more darkness on the path, the better. Of course, take this same principle to figure out when to tune in for stations to your east.

To find out what daytime and nighttime operations are authorized for AM broadcast stations, conduct an AM Query at <http://www.fcc.gov/mmb/asd/amq.html> The Hours of Operation for the Record field for the station will indicate what hours the station may operate with the listed station parameters. Note that a station may have multiple records, for different daytime and nighttime operations.

Propagation on VHF and Above

It is still possible to catch some trans-equatorial propagation (TE) during **October**. TE favors stations located in a region that lies about 1800 miles on both sides of the magnetic equator. It is necessary, however, to keep in mind that the magnetic equator is not the same as the geographic equator.

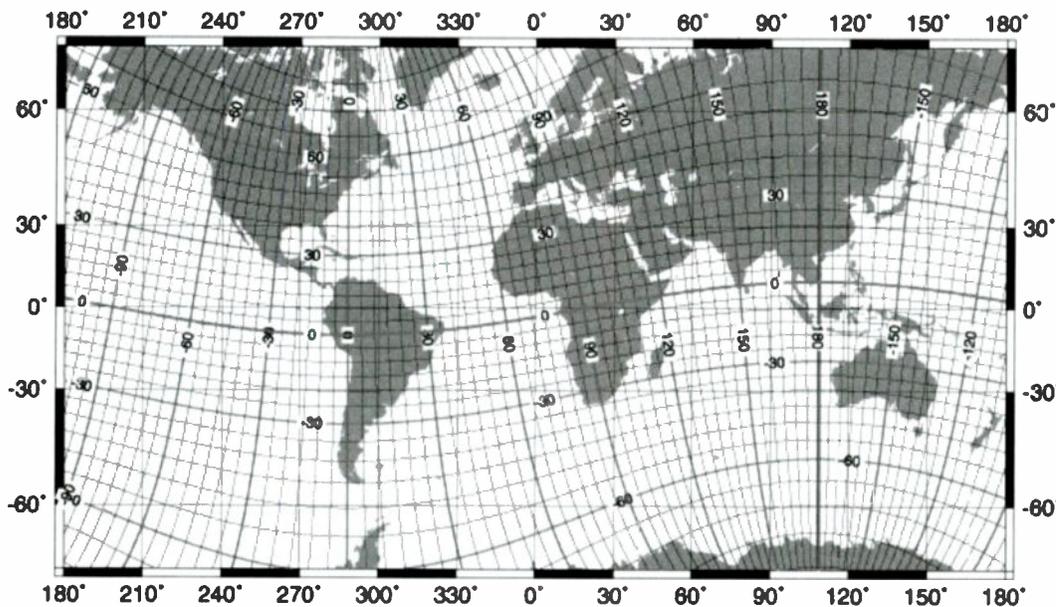
Moderate levels of *trans-equatorial propagation (TE)*, in which stations in the southern states and parts of the Caribbean will be able to work into the northern areas of South America, occur during the late afternoon. During peak years of a solar cycle, October is one of the best months for TE activity, especially later in the month. Since we are in the tail end of the decline from the current solar cycle's peak, these openings will be more rare than in previous years, but some exciting openings might occur.

Look for TE openings after sunset, between 8p.m. and 11p.m., local time. TE is caused by a wrinkling in the ionosphere above the magnetic equator that causes a double hop on the ionosphere from one side of the equator to the other, over the magnetic equator. Signals from 14 MHz up to 430 MHz can be propagated in this way.

Sporadic-E activity is sparse during October in the northern Temperate Zone (where much of the U.S. is located). If a sporadic-E opening should occur and link with a TE opening toward the south, expect a possible opening into Argentina, or even into Australia and the South Pacific. A slight increase in Sporadic-E

US/UK World Magnetic Chart -- Epoch 2000

Geomagnetic Coordinates



Units (Declination) : degree
 Contour Interval : 5 degrees
 Map Projection : Mercator

The magnetic equator is not fixed, but slowly changes. In this image the magnetic equator is the green line marked 0. (<http://www.ngdc.noaa.gov/seg/geomag/faqgeom.shtml>)

(Es) starts late in November and peaks in December, so keep your ears open for low-VHF (FM, TV carrier, and six-meter amateur) signals via this mode.

Quite a bit of meteor shower activity is expected in November and December, providing conditions for meteor-scatter openings on the VHF bands for distances up to about 1000 miles. When a meteor burns up in the atmosphere, its intense heat creates an ionized trail, making it possible for radio signals to propagate off of the ionized trail much like they would off of the ionosphere.

Shower Activity

The first shower on our calendar between October and March is the *Draconids*, active between October 6 and 10, and expected to peak on October 8. The shower could reach a very high rate of hourly meteors. The Draconids is primarily a periodic shower that has twice produced spectacular, brief, meteor storms in the last century – in 1933 and 1946. In 1999 a wholly unexpected minor outburst was witnessed from the Far East. Draconid meteors are exceptionally slow moving, a characteristic which helps set its meteors apart from background meteors. This shower could produce meteor scatter mode (Ms) propagation openings on VHF and UHF.

One of the largest yearly meteor showers occurs during November. Appearing to radiate out of the constellation of Leo on the night November 16, the *Leonids* are known to create intense meteor bursts. Since the source of the Leonids, the Tempel-Tuttle comet, passed

closest to the sun in February of 1998, the years following were expected to produce very strong displays. The greatest display since 1998 was the peak of 3,700 per hour in 1999. Every year since has been significantly less spectacular. However, a few forecasters think that we still might have a meteor storm with an hourly rate of thousands, within the next several years. If this year is typical, we'll see a rate of several hundred per hour. The large, spectacular visuals might only be 10 to 20 per hour, but when we are talking about meteor scatter radio propagation, we count any meteor-formed plasma clouds that will support VHF radio signals.

The best time to work meteor scatter off the Leonids is around 11:30p.m., local time, in the Northern Hemisphere. The shower should increase in rate the closer you get to midnight, and then move toward pre-dawn.

After the Leonids, the annual *Geminid* meteor shower from December 7 to December 17 will peak on December 13. This is one of the better showers, since as many as 120 visual meteors per hour (ZHR) may occur. Geminids is a great shower for those trying the meteor-scatter mode of propagation, since one doesn't have to wait until after midnight to catch this shower. The radiant rises early, but the best operating time will be after midnight local time. This shower also boasts a broad maximum, lasting nearly one whole day, so no matter where you live, you stand a decent chance of working some VHF/UHF signals off of a meteor trail.

Working Meteor Scatter

Meteors are particles (debris from a pass-

ing comet) ranging in size from a spec of dust to a small pebble, and some move slowly while some move fast. When you view a meteor, you typically see a streak that persists for a little while after the meteor vanishes. This "streak" is called the "train" and is basically a trail of glowing plasma left in the wake of the meteor. They enter Earth's atmosphere traveling at speeds of over 158,000 miles per hour. Besides being fast, the Leonids usually contain a large number of very bright meteors. The trains of these bright meteors can last from several seconds to several minutes. It is typical for these trains to be created in the E layer of the ionosphere.

Meteor scatter propagation is a mode where radio signals are refracted off of these trains of ionized plasma. Because the height of these plasma trains is in the E layer of the ionosphere, the range of a meteor scatter contact is between 500 and 1300 miles. The frequencies that are best refracted are between 30 and 100 MHz. However, with the development of new software and techniques, frequencies up to 440 MHz have been used to make successful radio contacts off of these meteor trains.

Lower VHF frequencies are more stable and last longer off of these ionized trails. A six-meter contact may last from a second to well over a minute. The lower the frequency, the longer the specific "opening" made by a single meteor train. Conversely, a meteor's ionized train that supports a sixty-second refraction on six meters might only support one-second refraction of a two-meter signal. Special high-speed digital modulation modes are used on these higher frequencies to take advantage of the limited available time, like high-speed CW, in the neighborhood of hundreds of words per minute.

Write Me

Do you have questions about space weather and radio propagation? Do you have observations about MW DXing, or Meteor Shower propagation that you would like to share? Please write me an e-mail message or a letter.

I also invite you to check out my propagation resource center (including discussion forums) on the Internet at <http://prop.hfradio.org> If you have a cellphone or other handheld device capable of reading WML, I have a WAP version of this resource center at <http://wap.hfradio.org> You can even sign up for my propagation eAlert service for free. These propagation eAlerts keep you informed of the various index numbers, in real-time. I wish you a happy radio-monitoring season!

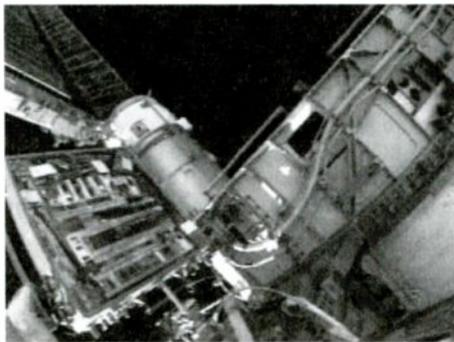
73 de NW7US, Tomas Hood (AA0WA)
prop-man@hfradio.org

ISS: New Opportunity for Beginners

The re-launch of America's Space Shuttle in July began a new opportunity for hams and monitors world wide. Brought to the International Space Station (ISS) was a suitcase-sized, self-contained amateur radio "satellite" called PC SAT2. The satellite is actually piggy-backed on the back side of a solar debris collector experiment such that it faces Earth and houses the ham gear.

PC SAT2 features a PSK31 digital transponder, an FM voice repeater, and a packet repeater for AX.25 packet messaging. The PSK31 transponder allows multiple, simultaneous users. The whole thing is the work of the U.S. Naval Academy's Amateur Radio Club, which is in charge of command, telemetry, and communications of the satellite.

Now is a good time for beginners to take a close look at the amateur satellites to broaden their understanding of space-based radio operations and increase their technical



PCSAT2 is literally a suitcase satellite affixed to the ISS doing double duty as an on-board experiment and amateur radio multi-mode "satellite." (Courtesy: USNA Amateur Radio Club)

expertise in this field. It's a monitoring and ham experience that's simply out of this world!

❖ Eyes to the Skies

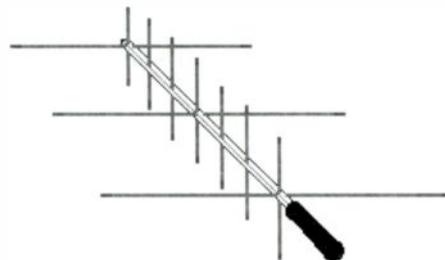
Talk of amateur radio satellites is usually enough to send beginners running for another hobby. Visions of cross-polarized Yagi arrays, terms such as azimuth and elevation angles, Acquisition of Signal, Loss of Signal, Doppler Shift, Keplerian element sets and cross-mode operation

makes learning Morse Code seem like a delightful pastime. And yet, the lure of making contact with the ISS can be a great motivator, convincing many a beginner to take the plunge.

The best way to learn about amateur radio satellites (AMSATs) is to do a little reading. There is a wealth of beginner information on the web (see below), and after a while you might feel encouraged to give it a try. Even if you're not a ham, there are some interesting challenges for monitoring enthusiasts. But, the best way to get started, as with all modes of amateur radio, is first to listen. If you can successfully receive signals from the various AMSATs, you'll feel a lot better about trying to transmit. And, getting started listening to AMSATs is much easier than trying to transmit. In some cases all you need is your hand-held scanner.

As to contacting the astronauts aboard the ISS, it's not impossible but they rarely spend time just rag-chewing. Most of their amateur radio contacts are done with the ARISS (Amateur Radio on the International Space Station) program. This is an outreach program specifically for educators involving NASA, AMSAT and the ARRL. Schools line up for years to contact the ISS and talk to the astronauts.

However, with the new PC SAT2, it's not going to be that hard for hams to contact each other using the ISS based satellite. You may not actually contact the astronauts, but you'll have the thrill of making a contact via the ISS.



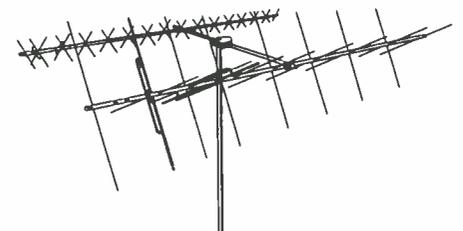
Work a satellite with a completely hand held station using your cross-band capable Handi-Talkie and the Arrow Antenna 146/437-10 hand-held antenna. (Courtesy: Arrow Antennas)

❖ Satellite Basics

There are a few basics about amateur satellites you need to know. First of all, they're not in geosynchronous orbit as are the communications satellites for C-band or DBS. AMSATs are, for the most part, in Low Earth Orbit (LEO) around 200 to 600 miles in altitude. That means they orbit the Earth about every 90 minutes. The problem is that they don't travel the same path each orbit, so it's important to be able to track the satellites to know where they are. Even when they come close enough to your location, you may have only a few minutes to monitor or work the satellite.

If you're just interested in tracking the ISS, this quick link (<http://www.heavens-above.com/>) gives you a nice graphic look at its current location. This may be enough to get you started. And, if you don't want to load satellite tracking software which is widely available, the AMSAT organization has a quick satellite pass prediction site which will give you the times of the next 10 passes for any of the active satellites for your exact location (<http://www.amsat.org/amsat-new/tools/predict/index.php>). You'll need to know the coordinates for your location.

Next, you'll have to know which AMSATs are actually operating. As of this writing there are 19 which are operational and partially operational. They range in age from the latest, PCSAT2 (July 2005), to the oldest AMSAT AO-7 (November 1974), and in capability from C'W to FM voice. All AMSATs transmit a beacon which is used by operators on Earth to ID the bird.



Hy-gain's Oscar Link 435 MHz/145.9 MHz antennas are complete with phasing lines, relays, and hardware capable of left and right hand circular polarity and can handle 200 watts. Just add a rotator, link it to your transceiver and computer and it's virtually hands-free operating. (Courtesy: Hy-gain Antennas)

The beacons may also transmit a stream of information which lets operators know the condition of on-board components. Some of these beacons are received in the HF bands; for example, AO-7 has a CW telemetry beacon operating at 29.502 MHz, RS-15's beacon is still heard occasionally at 29.352 MHz. Others are received in the UHF-FM band. FO-29 has a CW telemetry beacon on 435.795 MHz. Listen for the "digitalker" at 435.910 MHz FM.

As you monitor these satellite, you'll notice the peculiar shift in frequency which is caused by what's known as "Doppler shift" – the fact that the satellite is moving toward and away from you during any given pass. This is just one of the things that makes contacting the satellites a little tricky. You have to be able to track the satellite as it moves across your sky and compensate for the shift. There are well-developed computer programs which handle these tasks for you (see AMSAT web site) or you can do this manually.

❖ Serious Satellite Antennas

As you might expect, amateur radio satellite antenna arrays can get pricey. But, for monitoring you may be able to get by with just the rubber duck antenna on your scanner. The most you'll need is a simple ground plane for VHF/UHF.

Transmitting, of course, is a whole different game. Since most satellites will be uplinking and downlinking on VHF/UHF or vice versa, you'll need an antenna capable of both. The Arrow Antenna (so named because the elements are actually made from aluminum arrow shafts) is made to be hand held or mounted on a camera tripod to allow for casual outdoor AMSAT contacts. It costs about \$80. For year round, 'round the clock, all-weather contacts, you'll want something more permanent such as the Hy-gain Oscar Link antenna. The difference in price between the two is about \$500. To get the full use out of the Oscar Link you'll also need a mast, azimuth and elevation rotators, the controller, and a program to make it all work. Expect to spend a couple hundred dollars more.

❖ Launch Yourself into Space!

Tired of fighting the sunspot cycle doldrums? Looking for new challenges in your daily monitoring routine? Take a look at what the AMSATs offer. Load the downlink frequencies into your scanner and HF radio, and check out the passes for the available satellites. If you have questions or want to know more about what's happening in the world of AMSATs, check out the AMSAT forum on eHam.net (see below). And, to see what's been happening on the ISS, check out <http://www.ariss.net>.

❖ Attention Beginners, Old Timers and Crossword Puzzle Fans

If you're a crossword puzzle fan and a radio hobbyist, you must check out the Amateur Radio Crossword Puzzler By H. Ward Silver, N0AX, which appears twice monthly on the ARRL website home page (<http://www.arrl.org>). It's a lot of fun for radio fans to finally have their own crossword puzzle. You can even check out the crossword puzzle archives to catch up on the ones you missed (<http://www.arrl.org/htdig/?exp=1&q=crossword+puzzle&x=0&y=0>)!

For More Information: AMSAT Resources

Get the latest news on ISS and all other AMSATs direct from the source:
<http://www.amsat.org/amsat-new/index.php>

Find out the status of all current AMSATs:
<http://www.amsat.org/amsat-new/satellites/status.php>

"Success Tips for Using the ISS Voice Repeater" By Emily Clarke W0EEC
<http://www.arrl.org/news/features/2004/10/106/1>

"Working Your First Satellite":
<http://www.amsat.org/amsat-new/information/faqs/lang4..>

"Working the Easy Sats Down Under":
<http://www.qsl.net/vkejed/easysatvk.html>

View real time telemetry from PCSAT2 here:
<http://www.pcsat2.info/PCSat2Web/index.do>

eHam.net offers one of the few on-line forums where beginners can get answers regarding daily AMSAT operations.
<http://www.eham.net/forums/Satellites>

How to Tune in the International Space Station

Voice and Packet Downlink:
145.80 (Worldwide)
Voice Uplink:
144.49 for Regions 2 and 3 (The Americas, and the Pacific)
Voice Uplink:
145.20 for Region 1 (Europe, Central Asia and Africa)
Packet Uplink:
145.99 (Worldwide)
Crossband FM repeater downlink:
145.80 MHz (Worldwide)
Crossband FM repeater uplink:
437.80 MHz (Worldwide)
All frequencies are subject to Doppler shifting.

Listen for Shuttle/ISS on HF:
WA3NAN, the Goddard Amateur Radio Club, operates real-time audio of space missions on the high frequency (HF) bands at 3.86, 7.185, 14.295, 21.395, and 28.65 MHz and, if you happen to be in the Greenbelt, MD, area tune in on VHF at 147.45 MHz (FM).

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More on the Dummy Load

In my August column, I mentioned the use of light bulb for a "dummy load" to absorb the output power of a transmitter for casual test purposes. Gary Peterson, K0CX, of Rapid City, SD reminds us, however, that the resistance of a light bulb varies considerably as it heats up. Thus, if you're testing an SSB (single sideband) signal and listening to the signal on a receiver, considerable distortion will result. But for casual test purposes to see if the transmitter has output, or for checking the modulation of a full-carrier AM or FM signal, the light bulb works just fine.

Q. *I just purchased a Grove Scanner Beam; what sort of improvement should I expect over my Grove Scantenna? What kind of gain can I expect from my Scantenna to the beam? I have seen some amateur antennas mounted in the horizontal plane; what is the difference from being mounted vertical? (John Cowan, email)*

A. Most of the improvement you will notice between the Scanner Beam and the Scantenna will be at UHF, since that's where the highest gain and directivity are. An antenna increases gain in one direction by redirecting it from other directions. Thus, you will probably notice that some formerly-weak signals will be somewhat stronger in one direction, but some signals that are not in the favored direction will be weaker. That's why beam antennas are rotated toward their targets.

Since virtually all mobile communications at VHF and UHF are using vertical antennas, that's why the base receiving antennas are vertical as well; this is especially important for line-of-sight communications. For DX (long distance) communications (like on shortwave), the signals bend and reflect enough that they arrive mixed or angular, no longer perfectly horizontal or vertical. That's why you often see amateur beams with their elements in the horizontal directions, even if they are talking to mobile stations hundreds or even thousands of miles away that are using vertical whips.

For DX, the choice of vertical or horizontal polarization is more a matter of convenience.

Q. *I am planning to stack two Grove Scanner Beams. Should I "co-phase" the harness? Does it*

make a difference what lengths I use between the two antennas and the combiner? (John Cowan)

A. If the two antennas are facing the same direction and are in the same forward plane, the two conjoining lengths of coax merely need to be the same physical length.

Q. *A close friend of mine is homebound and enjoys listening to AM broadcast on his GE Superadio with its built-in loop antenna. Unfortunately, he lives in an apartment building and suffers from broadband noise. Is there some sort of filter he can add to the radio to eliminate the noise?*

A. It sounds like the noise is broadband RF, so it's coming in through the antenna; filtering won't help since the noise frequencies are the same as the desired frequencies.

The best solution would be to run a length of coax from the external antenna terminals leading outdoors to a random wire antenna suspended away from the building and away from power lines.

There may also be a possibility of using a Select-A-Tenna next to the radio. You would rotate the radio so that it receives the least amount of interference, then experimentally position the Select-A-Tenna around the set, adjusted to the same receive frequency, until the desired signal is loudest.

Q. *When I connect my computer's sound card to the speaker output of my radio, the sound through the computer speakers is great, but when I try to record the sound, it is very weak and distorted. Any suggestions? (Lionel Bryson, N4YYL)*

A. There are three common interconnection errors between sound cards and other audio equipment:

- 1) Mismatching a stereo jack or plug with a monaural jack or plug;
- 2) Mismatching impedances (like a 4 ohm speaker with a 1000 ohm line); and
- 3) Mismatching low- or high-level outputs with low- or high-level inputs.

My guess is that it has something to do with mono/stereo incompatibility, either at the plug and jack interface, or the stereo-audio lines connected to them are out of phase or possibly being shorted by the jack.

Q. *My cell phone manual says that in order to use my fax on it, the signal must be analog; why is that? Aren't there adaptors available? Can't I use it like a simplex transmitter? (J.J. Owens, Fayetteville, NC)*

A. Most existing facsimile machines use an analog protocol system with full-duplex forward error correction (confirmation of data streams from the receiving fax machine); this isn't compatible with the modern data levels and tones used in digital systems, nor with the one-way transmission on a simplex transmitter.

Yes, adaptors and modems are available for analog/digital conversion, but you would need to determine the actual analog and digital requirements for the fax and phone models you have for compatibility.

Q. *Does a 50-foot run of antenna coax for a scanner have much loss, or would it be better to shorten it to 12 feet? (J.L. Dono)*

A. The higher the frequency, and the longer the cable, the more the loss. If you were listening primarily to shortwave, you could use low-cost RG-58/U (CB mobile coax) of virtually any reasonable length, but if you listen to UHF (450/800 MHz), then better cable and shorter length is important. With good coax (RG-8/U foam, RG-8/M, or RG-6/U) 50 feet versus 12 feet will have little impact at those higher frequencies.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.) The current Ask Bob is now online at our website:
<http://www.monitoringtimes.com>

Gary Webbenhurst

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Is it time to take your radio hobby mobile? This month we look at some bright ideas that may be an incentive to more effectively install a handheld or mobile radio in your vehicle, or perhaps go back and re-install your radio(s).

58

Carefully and methodically think out the entire installation process. If possible, look at the mobile installations of fellow radio enthusiasts. Learn from their mistakes.

Think about where you will need to run your wiring, what radios to install, and the best matched antennas. A simple HT might do, but a permanently mounted mobile radio is nicer and more professional.

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What are your budget realities? Will you be using your existing radios or buying new ones?

Wires, a quality professional speaker, DC power strips, and mobile antennas can run the cost up very quickly. Realistically, how much can you afford? You can go small with just a handheld rig, or go large with a base station or mobile receiver/scanner/ham rig. Remember that you don't need to be a licensed ham to buy ham equipment. Just don't transmit without a license. Amateur radios usually offer superior selectivity and sensitivity, PL and DCS tone squelch, are computer programmable, have wide band receive, and many are reasonably priced. Yes, I know, they do not offer trunking.



Easy and cheap approach: HT scanner mounted on driver's window with a cheap metal bookend, shown with two types of optional window antennas for HTs.

If selecting a scanner, look for one that has a large display and bright, constant backlight. The inexpensive RS Pro 83 HT and Pro 51 mobile come to mind. A brand name Motorola™ speaker looks and sounds very professional. Consider mounting it on the driver's door post near your ear.

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Aesthetic and safety concerns must be addressed. Your equipment, wires, speaker, etc. should appear professionally and solidly installed. Carefully consider how to run wires/coax so they won't show or rub against metal or other objects that might eventually short out the power or signal. You can hide wires/coax under carpet,

under the dash, under door moldings, etc. When drilling through metal, be extra careful not to hit any vital car components. Metal antennas, their coax, or wiring must be properly installed to insure it is all weatherproof.

When installing radios, watch out for intruding into the airbag space; install nothing that might collide with your knees in an accident. Will you be carrying a handheld radio inside the vehicle? I recommend using a soft rubber duck. A metal telescoping antenna could impale a person in the event of an accident or even at a sudden stop. You can always secure other HT antennas in the vehicle for a quick antenna swap if the circumstances dictate.

Speaking of antennas, give some thought to how high your external antennas can be. The eight story parking garage at my doctor's office is limited to six feet six inches. What were they thinking? How about your own garage, or the fast food drive thru, or your mother-in-law's carport? On my last vehicle I used quarter wave spikes mounted as MNOs on the roof. On my new Ford Escape I stuck to one hood-mounted and two window (through glass) antennas. I also carry a six foot, high dB gain VHF/UHF magmount for those times I am out in the rural areas, camping, etc. Careful with magmounts; most are NOT intended to survive freeway speeds.

When running the coax through a door, look for a place with soft foam molding and close the door softly and try not to use that door routinely. I use the passenger door immediately behind the driver's seat. If you crush the coax, your signal is kaput. Running the magmount coax through a window is OK for the day, but not long term.

Plan on at least one "spare" antenna if you suddenly need to add another radio to your mobile operations, or a radio buddy calls "shotgun"! I keep the coax under the seat or the dash ready for immediate deployment.

61

For DC power, I ran a 10 gauge wire coated in plastic directly from my battery. It is hard to find a hole in the firewall anymore, so I had to run it up from the hood and into the driver's door. I ran it under the dash and



Ham 2 meter hood antenna, and direct battery DC power cables running from engine compartment to the inside of driver's area, under the dash over to the DC power strip. The Antenex screw on antenna can be easily swapped out for other bands.



DC Power strip installed in the passenger foot space on the side of the center console.

terminated it at a Mountain West DC power strip with Anderson™ connectors. I can now use it to hook-up any of my other electronic gear, as they all have Anderson connectors. I also carry a 12v deep cycle marine battery and power strip behind my driver's seat for backup power. Don't forget to fuse your power cables.

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Are you mobiling for both scanning and hamming? Is it legal in your state/township? Do you have an FCC license? For what bands? Amateur radio, public safety, business, GMRS? FRS and marine bands do not require a license, but still have some FCC restrictions. Do you just monitor? What radios will meet your needs? An amateur 2 meter, VHF/UHF dual band, or multi bands/HF? A quality scanner/receiver, a secondary scanner or electronic toys like GPS (or electronic compass), or Frequency Finder/Counter? (You gotta get one of these!)

63

Where to install your radios? On top of the dash is probably not wise, it is just too hot. Frankly, there is too much plastic in new vehicles, resulting in few good locations. Get on your back and take a good look under the dash. Perhaps under a seat or in the trunk if you have a radio with a detachable face. (I keep an old baseball cap over mine to hide the faceplate from wandering eyes.) My microphone and radio are under the cover to my center console.

If the radio is permanently mounted, can you access the speaker or the jack to re-program the radio? As for the radios, can you easily see the display, operate the radio, and reach the microphone? The mic holder can be attached with magnets, sticky tape, or screws. What works best? Test your radios before final installation. Take a short drive and listen for an engine whine or other interference issues. Talk to another ham operator and ask, how is your signal and audio quality?

Florida Restricts Scanner Use

In the United States we take it for granted that we are able to monitor the activities of our public officials. Unfortunately, some jurisdictions have placed impediments to that ability. The latest setback came from Florida in June.

On June 8th of this year, Florida Governor Jeb Bush signed House Bill 1697 into law. Buried in the thousands of lines of legislation were significant changes to Chapter 843 of Title XLVI of the Florida Statutes – changes that affect scanner users living in or visiting the state.

The new law has added transport of scanners to the previous restriction on installed radio equipment, which includes scanners. It also prohibits that equipment from being programmed for fire frequencies, in addition to the previously prohibited police frequencies. A strict reading of this law means that all scanners, including handhelds, may put the owner at risk, even if the scanner is turned off and stored in the trunk.

The penalty for violating this law has also changed, from a second degree to a first degree misdemeanor. This increases the maximum prison time from 60 days to a year and the maximum fine from \$500 to \$1,000.

The law identifies several exceptions, including alarm companies, full-time journalists, and amateur radio operators. If you're a scanner user in Florida and you don't have a ham radio license, this might be a good reason to go out and get one! If you do have a license, be sure to keep a copy in the car in case you're pulled over and the officer asks to see it.

The law as it exists on the books now is printed below, with the recent changes highlighted.

843.16 Unlawful to install or transport radio equipment using assigned frequency of state or law enforcement officers; definitions; exceptions; penalties.--

(1) A person, firm, or corporation may not install **or transport** in any motor vehicle or business establishment, except an emergency vehicle or crime watch vehicle as herein defined or a place established by municipal, county, state, or federal authority for governmental purposes, any frequency modulation radio receiving equipment so adjusted or tuned as to receive messages or signals on frequencies assigned by the Federal Communications Commission to police or law enforcement officers **or fire rescue personnel** of any city or county of the state or to the state or any of its agencies. Provided, nothing herein shall be construed to affect any radio station licensed by the Federal Communications System or

to affect any recognized newspaper or news publication engaged in covering the news on a full-time basis or any alarm system contractor certified pursuant to part II of chapter 489, operating a central monitoring system.

(2) As used in this section, the term:

(a) "Emergency vehicle" shall specifically mean:

1. Any motor vehicle used by any law enforcement officer or employee of any city, any county, the state, the Federal Bureau of Investigation, or the Armed Forces of the United States while on official business;
2. Any fire department vehicle of any city or county of the state or any state fire department vehicle;
3. Any motor vehicle designated as an emergency vehicle by the Department of Highway Safety and Motor Vehicles when said vehicle is to be assigned the use of frequencies assigned to the state;
4. Any motor vehicle designated as an emergency vehicle by the sheriff **or fire chief** of any county in the state when said vehicle is to be assigned the use of frequencies assigned to the said county;
5. Any motor vehicle designated as an emergency vehicle by the chief of police **or fire chief** of any city in the state when said vehicle is to be assigned the use of frequencies assigned to the said city.

(b) "Crime watch vehicle" means any motor vehicle used by any person participating in a citizen crime watch or neighborhood watch program when such program and use are approved in writing by the appropriate sheriff or chief of police where the vehicle will be used and the vehicle is assigned the use of frequencies assigned to the county or city. Such approval shall be renewed annually.

(3) This section shall not apply to any holder of a valid amateur radio operator or station license issued by the Federal Communications Commission or to any recognized newspaper or news publication engaged in covering the news on a full-time basis or any alarm system contractor certified pursuant to part II of chapter 489, operating a central monitoring system.

(4) Any person, firm, or corporation violating any of the provisions of this section **commits** a misdemeanor of the **first** degree, punishable as provided in s. 775.082 or s. 775.083.

❖ Ocean County, New Jersey

Hi Dan,

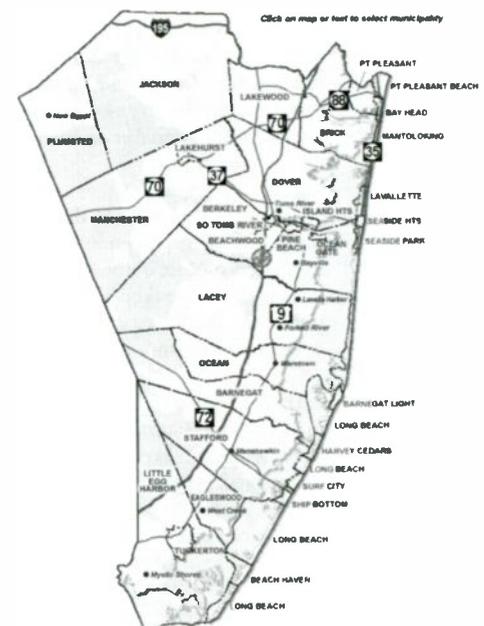
This is the first time I've visited your web site (<http://www.signalharbor.com>), very impressive! I am monitoring Ocean County, New Jersey; and these are current:

453.3250 Lakewood Police Dispatch
453.6000 Lakewood Police 2
453.8000 Lakewood Police 3

471.8750 Dover Township Police Dispatch
471.4750 Dover Township Police 2
471.9500 Dover Township Police 3
472.6750 Dover Township Police 4
471.6750 Dover Township Police 5
453.7125 Dover Township Police Tactical 1
453.9125 Dover Township Police Tactical 2
453.8875 Dover Township Police Tactical 3
453.9625 Dover Township Police Tactical 4
458.9125 Dover Township Police Tactical 6
458.8875 Dover Township Police Tactical 7
458.9625 Dover Township Police Tactical 8

There is occasional use of encryption on Lakewood's system and Dover Township uses it quite often. Toms River and Silverton are both part of Dover Township in Ocean County, New Jersey.

- TSchofield

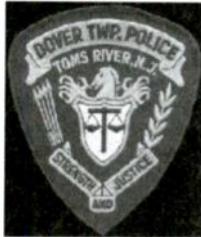


Ocean County is on the Atlantic coast, about 80 miles east of Philadelphia. Within the county, Lakewood and Dover Townships together have about 150,000 residents.

The main transmitter site for Lakewood is located in town at 800 Massachusetts Avenue. 453.8000 MHz is licensed to transmit from 1555 Pine Street, also in Lakewood. These signals are a mixture of analog and APCO-25 digital transmissions. A low band frequency, 45.12 MHz, is also licensed to Lakewood Township.

Dover Township is just south of Lakewood. The Police Department is licensed for a number of frequencies, including three additional UHF frequencies not listed above: 470.6500, 471.9250, and 472.2500 MHz.

The Dover Township Police Department at 225 Oak Avenue in Toms River is one of two transmitter sites. The other is at 1672 Church Road, also in Toms River, which is the Dover Township Public Works Building.



The tactical frequencies listed above, as well as the following six, are licensed to Dover Township for mobile operation: 158.9850, 159.0000, 159.0600, 453.8625, 453.9375 and 458.9375 MHz.

Ocean County operates a Motorola Type II analog trunked radio system licensed for the following frequencies: 506.6125, 506.6375, 506.6625, 506.6875, 506.7125, 506.7375, 506.7625, 506.7875, 506.8125, 506.8375,

508.0625, 508.0875, 508.1375, 508.1625, 508.1875 and 508.4375 MHz. You will need to program your scanner with a base of 505.0000 MHz, a spacing of 12.5 kHz and an offset of 380.

These frequencies are transmitted from six locations across the county: two in Toms River and one each in Barnegat, Lakewood, New Egypt and Tuckerton.

In addition, the following frequencies are licensed for transmission from the Court House on Hooper Avenue in Toms River: 509.6125, 509.6375, 509.6875, 509.7125, 509.7375, 509.7625, 509.8125, 509.8375, 511.0625, 511.0875, 511.1375, 511.1625, 511.1875 and 511.4375 MHz.

Decimal	Hex	Description	832	034	Ocean County Sheriff
32	002	Disaster (Common)	864	036	Ocean County Sheriff
64	004	Public Safety (Common)	896	038	Ocean County Sheriff
96	006	Public Works (Common)	928	03A	Monmouth and Ocean County (MONOC) Control
128	008	Ocean County Police (Common)	960	03C	Ocean County Sheriff (Radio Techs)
160	00A	Ocean County Emergency Management	992	03E	Ocean County Sheriff (Car-to-Car)
192	00C	Ocean County Emergency Management	1824	072	Corrections
288	012	Ocean County Police (Dispatch North)	2336	092	Security
320	014	Ocean County Police (Dispatch South)	2368	094	Security
352	016	Ocean County Police (Car-to-Car North)	4128	102	EMS Zone 1
384	018	Ocean County Police (Car-to-Car South)	4160	104	EMS Zone 2
416	01A	Ocean County Tactical	4192	106	EMS Zone 3
448	01C	Ocean County Tactical	4224	108	EMS Zone 4
512	020	Ocean County Police (Central)	4256	10A	EMS (Operations)
544	022	Ocean County Police (West)	4288	10C	EMS (Mutual Aid)
800	032	Ocean County Sheriff	5920	172	Ocean County Detectives
			5952	174	Ocean County Detectives
			9504	252	Roads (North)
			9536	254	Roads (Repair)
			9568	256	Roads (South)
			9600	258	Roads
			10016	272	Bridges
			10528	292	Engineering
			10560	294	Engineering
			10624	298	Mail Service
			12576	312	Parks
			12608	314	Parks
			14112	372	Building and Grounds
			16672	412	Vehicle Maintenance
			16704	414	Vehicle Maintenance
			13600	352	Ocean County Transit
			20512	502	Fire Zone 1
			20544	504	Fire Zone 2
			20576	506	Fire Zone 3
			20608	508	Fire Zone 4
			20640	50A	Fire Zone 5
			20672	50C	Fire Tactical 1
			20704	50E	Fire Tactical 2
			20736	510	Fire Tactical 3

Uniden BR330T

COMING SOON...THE UNIDEN BR330T HAND-HELD, WIDE-FREQUENCY-COVERAGE SCANNER!

Utilizing Trunk Tracker III capabilities combined with race-track features of the SC230, this new, function-packed scanner is designed for the sports enthusiast and public safety monitor alike! With continuous frequency coverage from 100 kHz through 1300 MHz (1.3 GHz, less cellular), you can tune in Motorola, LTR and EDACS analog trunking as well as AM, FM and TV broadcasting audio, and even use it for casual shortwave listening.

Store up to 2500 of your favorite channels into memory; set your scanner to respond instantly to any radio signal in its frequency range and display its frequency; use this scanner to respond to fire page-out tones; assign hot-keys for rapid selection.

Contact us for availability of this advanced scanner.



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Brasstown, NC 28902

* plus \$12.95 UPS Ground shipping in the U.S.



Order SCN30

\$ 289^{95*}

**Expected Delivery:
November, 2005**

Tuckerton, New Jersey

Also in Ocean County, the town of Tuckerton recently entered into an \$80,000 contract with Motorola to purchase mobile and portable radios for the town's ten police officers. Tuckerton is dispatched from Little Egg Harbor Township, which should have changed over to a digital system by the time you read this. Without the new radios, Tuckerton would not be able to communicate with the dispatch center. Little Egg Harbor transmits on 506.5875 and 506.8625 MHz.



If any readers are in Ocean County, please send me an e-mail to let me know if the Township has made the switch to digital.

❖ Selecting a Scanner

Hello,

I am a subscriber to Monitoring Times and saw your column in the July issue. I would like to ask your opinion, what is the best Bearcat Scanner that one could buy? Which model should be bought that allows full listening access to trunked / non-trunked systems etc.? Do you have a comparative report on scanners that I could obtain?

*Thanks for your assistance!
- Steve via the Internet*

Selecting the "best" scanner is always a subjective choice and depends on a number of factors, including the kinds of systems you want to monitor, your budget, and what type of scanner fits your lifestyle. You've narrowed the field somewhat by focusing on scanners made by Uniden (the Bearcat brand) and indicating that you're looking for one that can scan both trunked and conventional (non-trunked) systems.

All of the units I'm going to mention are capable of following the three most common analog systems, namely Motorola, EDACS (Enhanced Digital Access Communications System), and LTR (Logic Trunked Radio). In addition, with the proper cable, all of these models can be connected to a personal computer for automated scanning and frequency list management.

If you're looking for handheld scanner that you can carry around with you, there are several Uniden models to choose from.

Handheld Digital

If you need to be able to track APCO-25 digital systems, then there are three units to choose from. The newest is the BCD396T, which offers 6,000-channel memory storage, a *Close Call* signal capture feature, and continuous coverage from 25 kHz to 1.3 GHz (except for the blocked cellular telephone bands).

The second generation digital scanner is the BC296D. Although older than the BCD396T, this unit is fully capable of tracking and monitoring APCO-25 digital systems.

If you're on a budget, you may be able to find an inexpensive first generation unit, the BC250D. You'll need to be sure it has a BCi25D card to listen to APCO-25 systems. It will not be able to track the "pure" APCO-25 systems with 9600-baud control channels, but it does a good job on older APCO-25 systems that use a 3600-baud control channel.

All three of these units are also able to scan the Military Air band.

Handheld Analog

If APCO-25 systems are not in your listening area or you're not interested in them, there are two other choices from Uniden that might work. One is the relatively new BC246T and the other is the BR330T. Note that neither of these scanners is able to scan the Military Air band.

The BC246T comes in a compact package and has the *Close Call* signal capture feature.

The BR330T is still in development at Uniden, but is geared toward NASCAR racetrack scanning. If that's your primary area of interest, it looks like it's worth waiting for.

Base/Mobile Models

Uniden has a similar set of mobile/base units. The BC785D is the corresponding model to the BC250D. It also requires a BCi25D digital card in order to follow APCO-25 digital transmissions. Because it is an older unit, you have a good chance of finding one at a bargain price.

Speaking of bargains, the BC780XLT is nearly five years old now and, although it is not capable of monitoring APCO-25 systems, it does a great job on the three most common analog systems (Motorola, EDACS and LTR). As with many older models, you may be able to buy one from an owner that has upgraded to a newer scanner.

The BC796D is the base version of the BC296D and shares the same capabilities and features of its handheld counterpart, including full APCO-25 digital tracking and monitoring.

The BC898T and BCT8 are both analog-only scanners with coverage in selected bands. The BC898T covers a few more bands, including Military Air.

My recommendation, if you have the budget for it, is the BCD396T. It will give you the maximum number of features and the most flexibility in what and where to scan. Be warned that it is a complex scanner and reading the manual will be mandatory! The dynamic memory allocation scheme is different enough from other scanners that it will take some getting used to.

❖ Uniden Bearcat BC246T Firmware Update

For those of you that have already taken the plunge with the Bearcat BC246T, Uniden released a firmware upgrade for it in August. The BC246T was introduced in June 2004 with several innovative features, including a dynamic memory system and a nearby signal capture feature named *Close Call*.

The upgrade will bring the firmware to version 2.05.01 and provides a number of enhancements, including these highlights:

- Faster scanning speed on trunked systems by skipping systems that don't have an active control channel
- UHF television signals are ignored by search and *Close Call*
- Pre-loaded system information is brought up to date
- Added a Frequency Step option for trunked systems, giving the user the ability to enter an exact frequency even if it's not a default step size
- The *Close Call* pause is increased 10 seconds

The firmware update also fixes several audio and display bugs. To see a complete list of changes and download the update, go to: http://www.uniden.com/rn_productsupport_downloads.cfm?product=BC246T

Upgrades like this continue to demonstrate the viability of the newest scanner technology. A download from the Internet and a relatively simple upgrade process is all it takes to add features and correct defects. Just a few years ago such an upgrade would have required shipping the entire scanner to the manufacturer for a hardware modification. Older scanners could not be upgraded at all - you would put it on the shelf to collect dust after purchasing an entirely new receiver. Who says things aren't getting better?

That's all for this month. You can check my website at <http://www.signalharbor.com> for more detailed information on scanners, frequencies and other radio-related material. I also welcome electronic mail at danveeneman@monitoringtimes.com. Until next month, happy scanning!



SUMMARY OF UNIDEN SCANNERS

Model	Type	Digital	MilAir	Channels	List Price
BC246T	Handheld	No	No	1600	\$300
BC250D	Handheld	Limited	Yes	1000	Discontinued
BC296D	Handheld	Yes	Yes	1000	\$850
BCD396T	Handheld	Yes	Yes	6000	\$600
BR330T	Handheld	No	Yes	2500	Coming
BC780XLT	Base/Mobile	No	Yes	500	Discontinued
BC785D	Base/Mobile	Limited	Yes	1000	Discontinued
BC796D	Base/Mobile	Yes	Yes	1000	\$850
BC898T	Base/Mobile	No	Yes	500	\$300
BCT8	Base/Mobile	No	No	250	\$250

Big Savings on Radio Scanners

Uniden®

SCANNERS



Bearcat® 796DGV Trunk Tracker IV with free scanner headset

Manufacturers suggested list price \$799.95

CEI Special Price \$519.95

1,000 Channels • 10 banks • CTCSS/DCS • S Meter
Size: 6^{15/16}" Wide x 6^{9/16}" Deep x 2^{3/8}" High

Frequency Coverage: 25 000-512 000 MHz, 806.000-956 000 MHz (excluding the cellular & UHF TV band), 1,240,000-1,300,000 MHz

When you buy your Bearcat 796DGV TrunkTracker package deal from Communications Electronics, you get more. The GV means "Great Value." With your BC796DGV scanner purchase, you also get a **free deluxe scanner headphone** designed for home or race track use. Headset features independent volume controls and 3.5 mm gold right angle plug. The 1,000 channel Bearcat 796DGV is packed with features to track Motorola Type I/II/III Hybrid, EDACS, LTR Analog Trunk Systems and Motorola APCO 25 Phase I digital scanner including 9,600 Baud C4FM and CQPSK. Also features control channel only mode to allow you to automatically trunk many systems by simply programming the control channel. S.A.M.E. weather alert, full-frequency display and backlit controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory. PC Control and programming with RS232C 9 pin port (cable not supplied), Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more. Our CEI package deal includes telescopic antenna, AC adapter, cigarette lighter cord, DC cord, mobile mounting bracket with screws, owner's manual, trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, order magnetic mount antenna part number ANTMMBNC for \$29.95. For complete details, download the owners manual for the www.usascan.com web site. For fastest delivery, order on-line at www.usascan.com.

Bearcat® BCT8 Trunk Tracker III

Manufacturer suggested list price \$299.95

CEI Special Price \$169.95

250 Channels • 5 banks • PC Programmable
Size: 7.06" Wide x 6.10" Deep x 2.44" High

Frequency Coverage: 25 000-54 000 MHz, 108 000-174 000 MHz, 400 000-512 000 MHz, 806 000-823 995 MHz, 849 0125-868 995 MHz, 894 0125-956 000 MHz

The Bearcat BCT8 scanner, licensed by NASCAR, is a superb preprogrammed 800 MHz trunked highway patrol system scanner. Featuring TrunkTracker III, PC Programming, 250 Channels with unique BearTracker warning system to alert you to activity on highway patrol link frequencies. Preprogrammed service searches make finding interesting active frequencies even easier and include preprogrammed police, fire and emergency medical, news agency, weather, CB band, air band, railroad, marine band and department of transportation service searches. The BCT8 also has preprogrammed highway patrol alert frequencies by state to help you quickly find frequencies likely to be active when you are driving. The BCT8 includes AC adapter, DC power cable, cigarette lighter adapter plug, telescopic antenna, window mount antenna, owner's manual, one year limited Uniden warranty, frequency guide and free mobile mounting bracket. For maximum scanning enjoyment, also order the following optional accessories: External speaker ESP20 with mounting bracket & 10 feet of cable with plug attached \$19.95. Magnetic Mount mobile antenna ANTMMBNC for \$29.95.



Bearcat® BCD396T Trunk Tracker IV

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

APCO 25 9,600 baud compact digital ready handheld TrunkTracker IV scanner featuring Fire Tone Out Paging, Close Call and Dynamically Allocated Channel Memory (up to 6,000 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.40" Wide x 1.22" Deep x 5.35" High

Frequency Coverage:

25 000-512 000 MHz, 764 000-775 9875 MHz, 794 000-823 9875 MHz, 849 0125-868 8765 MHz, 894 0125-956 000 MHz, 1240,000 MHz -1300 0000 MHz

The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as Fire Tone Out Decoder. This feature lets you set the BCD396T to alert if your selected two-tone sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning. Close Call Radio Frequency Capture - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Useful for intelligence agencies for use at events where you don't have advance notice or knowledge of the radio communications systems and assets you need to intercept. The BCD396T scanner is designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS, LTR and EDACS analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. Dynamically Allocated Channel Memory - The BCD396T scanner's memory is

organized so that it more closely matches how radio systems actually work. Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 3,000 channels are typical but over 6,000 channels are possible depending on the scanner features used. You can also easily determine how much memory you have used and how much memory you have left. Preprogrammed Systems - The BCD396T is preprogrammed with over 400 channels covering police, fire and ambulance operations in the 25 most populated counties in the United States, plus the most popular digital systems. 3 AA NiMH or Alkaline battery operation and Charger - 3 AA battery operation - The BCD396T includes 3 premium 2,300 mAh Nickel Metal Hydride AA batteries to give you the most economical power option available. You may also operate the BCD396T using 3 AA alkaline batteries. Unique Data Skip - Allows your scanner to skip unwanted data transmissions and reduces unwanted birds. Memory Backup - If the battery completely discharges or if power is disconnected, the frequencies programmed in the BCD396T scanner are retained in memory. Manual Channel Access - Go directly to any channel. LCD Back Light - A blue LCD light remains on when the back light key is pressed. Autolight - Automatically turns the blue LCD backlight on when your scanner stops on a transmission. Battery Save - In manual mode, the BCD396T automatically reduces its power requirements to extend the battery's charge. Attenuator - Reduces the signal strength to help prevent signal overload. The BCD396T also works as a conventional scanner to continuously monitor many radio conversations even though the message is switching frequencies. The BCD396T comes with AC adapter, 3 AA nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, SMA/BNC adapter, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO or ESAS systems. Order on-line at www.usascan.com or call 1-800-USA-SCAN.

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25 000-54 000 MHz, 108 000-174 000 MHz, 216 000-224 9800 MHz, 400 000-512 000 MHz, 806 000-823 9875 MHz, 849 0125-868 9875 MHz, 894 0125-956 000 MHz, 1240 0000 MHz -1300 0000 MHz

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include Close Call Radio Frequency Capture - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Dynamically Allocated Channel Memory - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but over 2,500 channels are possible depending on the scanner features used. You can also easily determine how much memory is used. Preprogrammed Service Search (10) - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast radio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine, racing and weather frequencies. Quick Keys - allow you to select systems and groups by pressing a single key. Text Tagging - Name each system, group, channel, talk group



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E22: Spooky “Numbers”

“Numbers” refers to an entire class of shortwave station, which uses a technique dating to World War II to broadcast deeply encrypted material with absolutely no explanation whatsoever. These are presumably intended for low-level grunt spies recruited from the local population, who arouse less suspicion by using normal consumer-grade radios.

In order to be tuned in by untrained personnel on such simple equipment, “numbers” stations must go out of their way to attract attention. This makes them just that much more compelling. They get right in your face, or at least your ears, with hours of open carriers followed by endless (and endlessly strange) sounds, music, and computer voices. They also run the same paint-peeling power (and sometimes even the same transmitters) as do the international broadcasting stations.

E22?

In the “numbers” hobby jargon, E22 means the 22nd English-speaking station to be added to the venerable list maintained for years by the European Numbers Information Gathering and Monitoring Association (ENIGMA; more recently morphed into ENIGMA 2000). That’s all “E22” means, although the station was also nicknamed the “Arabic Man” for the accent of one of its live, English-speaking announcers.

E22 frequencies were and still are 15040 and 17386 kilohertz (kHz), in standard AM (amplitude modulation). No other frequencies have ever been used.

Though it had a huge signal, E22 was a comparatively little station. It just popped up in November of 1997, making only two broadcasts, spaced a week apart. These consisted mostly of a repeated, distinctive identifier, callup, or whatever it was. This used two letters in international radio phonetics, then one number. Then E22 vanished. Since these broadcasts have a way of coming back about a month after the hobby pronounces them dead, the designator was left open.

E22 apparently broadcast the same format once again in 2004, but it wasn’t widely heard. The same thing happened on July 6, 2005, when a listener who was after a more active numbers station came across this one on 15040 without knowing what it was. The discovery was put down as yet more numbers weirdness, and might have stayed that way had it not been for certain terrorism jitters. Finally, a Russian

listener found reference to E22 in an old newsletter.

A round-the-clock listening watch was set up. The next broadcast was on July 9th, at 1300 and 1400. This was followed on the weekend, July 16, with six broadcasts, and then four more on the 22nd. Nothing has been heard since.

It Gets Stranger:

Several recordings were posted to the Internet. They show a very strange station indeed. In fact, we’re looking at some of the most heavy-duty numbers weirdness in quite some time, all with an engineering quality rivaling the notorious Cuban stations for sheer tackiness.

“Arabic Man” is probably not a good name, since the current bunch of announcers (there are at least three) seem to have South Asian accents. Also, the station seems strongest in that direction. Let’s see what we know about this one so far:

Despite the awesome signal levels all over Europe, E22 sounds like the ultimate basement operation. Announcers are live people, not digitized voices or synthesizers. Most broadcasts start with a 1060 Hz audio tone. (No, not 1000, but 1060.) Then someone grabs a mike (with plenty of handling bumps) and intones “This is ...” followed by badly-pronounced international radio phonetics and the number. An example is “Papa November 8.”

One transmitter has a truly amazing hum at various harmonics of 50 Hz, with the strongest ones at 100, 250, and 300, then weak ones out to about 3000 Hz. This indicates an origin in a country with 50-Hz power. India and Pakistan have been suggested. It also indicates technical problems and a mike gain set way too hot, because the hum is at full level. Ouch!

The voices are all very distorted, with severe clipping. Inflections are all over the place, and mike technique is nonexistent. The hum goes down with each syllable of the announcer’s voice, then it ramps back up as the gain control opens. Sometimes, after the end of a repetition, we hear an odd grinding noise. Since this invariably comes one “beat” after the spoken group, I’ve decided that it’s distorted breathing, as processed further by the changing gain.

Background noises abound. A car is heard in one transmission, and off-mike voices in several. These are in a language that hasn’t been identified. At one point a woman actually gets on-mike and excitedly spouts something

extremely distorted, in an unknown tongue. Arabic has been suggested, but it also sounds the way Russian does on the radio. Nobody knows.

Given the current situation in the world, it’s probably a good idea to keep an ear on 15040 and 17386 for any possible return of E22.

❖ Coast Guard ALE

Ron Perron has been keeping tabs on an Automatic Link Establishment (ALE) net being used by the US Coast Guard. The frequencies to scan are 6790, 8980, 13221, 15084, and 17988 kHz upper sideband (USB). They can be decoded by Charles Brain’s remarkable PC-ALE program or by several multimode packages.

When this net appeared some months ago, it was apparently under development. One key player was TISCOM, the Coast Guard’s Telecommunication and Information Systems Command in Virginia. TISCOM vanished in February of 2005, and the net briefly went dead.

Now it’s active again, as a working net for Coast Guard District 17, Alaska. Communications Station Kodiak (NOJ) identifies as CGD17.

Various other district cutters, aircraft, and even the Attu (callsign ATU) and Saint Paul LORAN (Long Range Navigation) stations have been copied.

District 17 makes the second ALE net that serves one of the Guard’s 9 districts (the 17 districts were combined, dropping some district numbers). The other ALE net serves District 9 (Great Lakes), with control station CGD9 in Cleveland, OH.

It’s interesting to speculate on whether all of the districts will eventually have their own ALE networks. While we’re wondering, see you next month.



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www.ominous-valve.com/uteworld.html

ABBREVIATIONS USED IN THIS COLUMN

AFB.....	Air Force Base
ALE.....	Automatic Link Establishment
AM.....	Amplitude Modulation
ARQ.....	Automatic Repeat Request teleprinting system
AWACS.....	Airborne Warning And Control System
CAMSLANT.....	Communication Area Master Station, Atlantic
CAMSPAC.....	Communication Area Master Station, Pacific
CW.....	Morse code telegraphy ("Continuous Wave")
DEA.....	US Drug Enforcement Administration
E3.....	Lincolnshire Poacher, musical folk tune callup
EAM.....	Emergency Action Message
FAX.....	Radiofacsimile
FBI.....	US Federal Bureau of Investigation
FEC.....	Forward Error Correction teleprinting system
FEMA.....	US Federal Emergency Management Agency
HFDL.....	High-Frequency Data Link
HF-GCS.....	High-Frequency Global Communications System
ICE.....	US Immigration and Customs Enforcement
JSTARS.....	Joint Surveillance Target Attack Radar System
MARS.....	US Military Affiliate Radio System
Meteo.....	Meteorological
MFA.....	Ministry of Foreign Affairs
MSK.....	Minimum-Shift Keying
PACKTOR.....	Packet Teleprinting Over Radio
PR.....	Puerto Rico
RTTY.....	Radio Teletype
SHARES.....	Shared Resources
SITOR-A.....	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B.....	Simplex Teleprinting Over Radio, FEC mode
Stanaq 4285.....	Wideband single-tone military radio modem
STS-114.....	Space Transportation System (Shuttle) flight 114
UK.....	United Kingdom
Unid.....	Unidentified
US.....	United States
USCG.....	US Coast Guard
V2a-c.....	Variants of Cuban female "Atencion!"

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations have their ENIGMA (European Numbers Information Gathering and Monitoring Association) designators in ().

- 318.0 "257"-Confirmed identifier of Differential Global Positioning System beacon, Chico, CA, with an MSK satellite correction stream at 0250. (Hugh Stegman-CA)
- 2252.0 "V-4-X"- US Navy, link coordination with "5-I-W," at 1251. (Mark Cleary-SC)
- 2772.0 November Foxtrot-US Navy, Link-16 coordination with Hotel, Lima, November, Sierra, and Papa, at 0133. (Cleary-SC)
- 3047.0 Tango Foxtrot-US Navy link coordination, possibly a battle group, at 0519. Similar traffic on 3048.4, at 1130. (Cleary-SC)
- 3167.4 "I-5-A"-US Navy, Link-11 coordination with "B-1-S," at 1049. (Cleary-SC)
- 3292.0 Cuban AM "numbers" station (V2a), 5-number groups at 0203. (Tom Severt-KS)
- 3392.0 NNNOKNJ-US Navy/Marine Corps MARS, net control at 0005. (Cleary-SC)
- 4018.5 Unknown-SITOR-B stations in an informal MARS net, at 0129. (Severt-KS)
- 4068.0 "D-2-R"-US Navy, Link-11 coordination with "Y-8-P" and "O-F-U," at 0146. (Cleary-SC)
- 4210.5 A9M-Hamala Radio, CW identifier in SITOR-A sync marker, at 1644. (Bob Hall-RSA)
- 4469.0 "Florida CAP 904"-US Civil Air Patrol, controlling Florida net at 1134. (Cleary-SC)
- 4490.0 USDAHQ-US Department of Agriculture, ALE sounding at 0120. AAT3BFMARS-US Army MARS, Ft. Detrick, MD, ALE sounding at 0351. (Day Watson-UK)
- 4583.0 DDK2-Hamburg Meteo, Germany, RTTY weather codes at 1828. (Watson-UK)

- 4601.5 0A-Irish Navy Haulbowline, traffic to unknown vessel in SITOR-A, at 1454. 78-Irish Navy vessel, rogering traffic in SITOR-A, at 1501. (Watson-UK)
- 4610.0 GYA-UK Navy, Northwood, FAX text of Terminal Aerodrome Forecasts at 1858. (Watson-UK)
- 4681.0 ZS-SNF-South African Airways flight 260, an A346, HFDL downlink messages for "08," Johannesburg, RSA, at 1730. (Bob Hall-RSA)
- 4739.0 Trident 13- US Navy F-3C, position for Fiddle, Jacksonville, FL, at 1335. (Cleary-SC)
- 4954.5 Unid-Station idling in PACTOR-I, then calling DE72C in an unknown mode, at 0954. (Watson-UK)
- 5264.0 KSC-Kennedy Space Center, FL, working King 1, probably a range safety HC-130, and Traveler, on STS-114 launch at 1407. (Cleary-SC)
- 5388.5 WF1-FBI Field Office, Washington, DC, ALE sounding at 1144. (Ron Perron-MD)
- 5711.0 DOD Cape-US Department of Defense, Cape Canaveral, FL, came from 10780, setting up radio guard with Booster Recovery Vessel Liberty Star for STS-114 launch, at 1130. (Severt-KS) Liberty Star, sending booster position to Booster Recovery Director, at 1448. (Cleary-SC)
- 5714.0 Tango Whiskey-Possible US Navy battle group, exercise net with Tango Bravo and several 1-letter callsigns, at 0106 and 0121. (Severt-KS) Tango Bravo-Possibly same unit, working Tango Whiskey at 0405. (Rick Baker-OH)
- 5717.0 CFH-Halifax Military, Nova Scotia, Canada, telling Halifax Rescue 313 to break off its search near the airport and return to base, at 2044. (Ken Maltz-NY)
- 5732.0 Service Center-US Customs, ALE callsign "TSC," working callsign C01, then to voice with "01," at 0054. CAMSLANT Chesapeake-USCG, VA, working Juliet 03 at 0415. (Severt-KS)
- 6367.0 HEB26-Berne Radio, Switzerland, CW identifier every 3 minutes, at 0239. (Maltz-NY)
- 6470.0 UWS3-Kiev Radio, Ukraine, working ships in fast CW, at 1935. (Watson-UK)
- 6496.0 CFH-Canadian Forces Meteo, Halifax, RTTY aviation weather codes at 0244. (Hall-RSA)
- 6622.0 Gander-Oceanic air traffic control, NFD, Canada, working American 174 at 0223. (Severt-KS)
- 6694.0 Pathfinder 03-Canadian Forces, passing ops-normal via Halifax Military at 0141. (Cleary-SC)
- 6715.0 S4JG-Canadian Forces, working Halifax Military at 1117. (Cleary-SC)
- 6797.0 Cuban AM "numbers" station (V2c), 5-number groups at 2207. (Severt-KS)
- 6903.0 VKA-Unknown military, broadcasting numerous EAMs between 0247 and 0353. (Severt-KS)
- 6952.0 FDI 8-French Air Force, Nice, France, CW marker at 0334. (Maltz-NY)
- 7361.5 R24485-Michigan National Guard helicopter, calling T3Z238 (3/238th Aviation, MI), ALE at 1850. (Perron-MD)
- 7527.0 Coast Guard 1720-USCG, assuming scene command and patching to District 7 Ops via Service Center (US Customs) that six aircraft are on the search at 1838. (Cleary-SC)
- 7632.0 NNN0TWT-US Navy/Marine Corps MARS, in Hurricane Dennis SHARES net at 1459. (Cleary-SC)
- 7778.5 LR1-FBI, Little Rock, AR, calling KC1 (Kansas City, KS), at 1203. (Perron-MD)
- 7880.0 DDK3-Hamburg Meteo, Germany, FAX surface chart at 1600. (Watson-UK)
- 8181.5 R24485-Michigan National Guard, calling MIASF1 (Michigan Aviation Support Facility #1), ALE at 1848. (Perron-MD)
- 8300.0 6WW-French Navy, Dakar, Senegal, usual RTTY "Voyez vous le brick..." test loop at 0545. (Stegman-CA)
- 8423.0 SVO-Olympia Radio, Athens, Greece, CW "DE SVO" marker at 0355. (Maltz-NY)
- 8431.0 TAH-Istanbul Radio, Turkey, CW identifier in SITOR-A sync marker, at 0357. (Maltz-NY)
- 8500.0 VTH1/5/7-Indian Navy, Mumbai, RTTY test loop at 2001. (Hall-RSA)
- 8502.0 NMG-USCG, New Orleans, LA, marine weather at 0359. (Maltz-NY)
- 8551.5 CTP-Portuguese Navy, Lisbon, RTTY markers at 1554. (Watson-UK)

- 8670.0 IAR-Rome Radio, Italy, CW marker at 0403. (Maltz-NY)
- 8788.0 WLO-Mobile Radio, AL, marine weather and traffic list at 0406. (Maltz-NY)
- 8807.0 Unid-Repeating string "893 23 0 25 230 25," in CW, apparently part of PACTOR on 8807.5, at 0918. (Watson-UK)
- 8807.5 3AC-Monaco Radio, PACTOR-II traffic list at 0928. (Watson-UK)
- 8834.0 "08"-HF DL ground station, Johannesburg, RSA, uplink to unknown aircraft at 1919. (Watson-UK)
- 8912.0 Razorback-US Customs, PR, working Omaha 547 on a vessel interception, at 1519. (Cleary-SC)
- 8942.0 FX0008-FedEx freighter, kept reporting HF DL position 180 north by 180 east, starting at 1640. AY2423-Finnair flight with HF DL positions for "07," Shannon, Ireland, at 1641, 1642, and 1647. (Watson-UK)
- 8971.0 Island 22-US Navy, breaking off an operation with Blue Star (US Navy, El Salvador) due to darkness, at 0041. (Cleary-SC)
- 8977.0 CO0037-Continental flight 37, HF DL position at 0945. (Watson-UK)
- 8980.0 Coast Guard 1712-USCG HC-130, on a search with District 7 Miami Ops, at 1802. (Cleary-SC)
- 8983.0 Coast Guard 2102-USCG helicopter working CAMSLANT on a search with CG 6538 and CG 6040, at 1148. (Cleary-SC)
- 8992.0 Red Talon 712-US Navy P-3C, Patch via Puerto Rico HF-GCS to Fiddle (USN, Jacksonville, FL), at 1953. (Cleary-SC) Glass Bowl-US military, giving 28-character EAM simulcast on 11175, at 2033. Raftsman-US military, came from 11175 for a patch via Offutt HF-GCS, at 2131. (Jeff Haverlah-TX)
- 9007.0 Stargate-US Air Force E-8 JSTARS, patch via Trenton Military to Peachtree (Robins AFB, GA), at 1802. (Cleary-SC)
- 9025.0 Coast Guard 1504-USCG HC-130, ALE-initiated patch to Miami Ops on a search, at 0200. CG 1504, ALE-initiated patch to District 7 on another search, at 1825. (Cleary-SC)
- 9106.0 KNY82-US National Communications System, KS, also on 15094, with ALE sounding at 1140. (Perron-MD)
- 9190.0 PR1-Venezuelan Navy, Radio Station #1, calling DHN (Hydrographic & Navigation Directorate), at 0226. CGA-Venezuelan Navy Headquarters, calling F22, Frigate *Almirante Brion*, at 2343. (Perron-MD) [Summer exercises brought heavy South American activity. -Hugh]
- 9323.3 Cuban AM "numbers" station (V2a or b), 5-number groups, frequency drifting both ways, at 0403. (Sevart-KS)
- 10100.7 DDK2/9-Hamburg Meteo, RTTY markers, also on 4583 and 7646, at 1746. (Hall-RSA)
- 10242.0 18C-US Joint Task Force, position for Panther (DEA, Bahamas), at 1819. LNT-USCG CAMSLANT, VA, ALE-initiated voice contact with J15/ Coast Guard 6015, at 1826. (Perron-MD)
- 10360.0 XAX-Unknown net of X-callsigns, sounding on this and 12057.5, ALE at 0108. (Perron-MD)
- 10493.0 WGY 912-FEMA, Mt. Weather, VA, no joy calling WGY 993 (Headquarters, DC), at 1239. (Cleary-SC)
- 10600.0 CUF-Venezuelan Unified Command of Forces, calling CLC32M (mobile communications, 32nd Infantry Brigade), ALE at 2302. (Perron-MD)
- 10780.0 Cape Radio-US Air Force, Cape Canaveral, FL, working Booster Recovery Vessel *Liberty Star* on STS-114 launch, went to 5711 at 1124. (Sevart-KS) *Liberty Star*, checking in with Cape Radio the day before, at 1855. (Allan Stern-FL)
- 10825.0 CONAKRY-French Embassy, Guinea, calling RABAT, French Embassy, Morocco, ALE at 1459. (Watson-UK)
- 11010.0 FDEFEN-Brazilian Navy Frigate *Defensora*, calling ERMNAT, Naval Radio Station Natal, six times in ALE, beginning at 0251. FINDEP-Frigate *Independencia*, calling ERM SAL, Salvador, seven times in ALE, beginning at 2204. (Watson-UK)
- 11086.5 GYA-UK Royal Navy, Northwood, FAX weather chart at 1400. (Watson-UK)
- 11108.0 FC6FEM-FEMA Region 6, TX, ALE sounding at 0347. (Watson-UK)
- 11173.0 RFGW-French MFA, Paris, Stanag 4285 message in 5-letter groups to D2Z, Budapest, Hungary, at 0900. (Watson-UK)
- 11175.0 Reach 3077-US Air Force KC-10A, patch to Rhein Main, Germany, via Sigonella HF-GCS, Italy, diverting to Frankfurt at 0153. (Cleary-SC) Dark 46-US Air Force B-1B, HF-GCS patch to Dyess AFB, at 0459. (Stern-FL) Teal 06-US Air Force Reserve "Hurricane Hunter," patch to Teal Ops via Croughton HF-GCS regarding arrival of them and Teal 04, at 0608. (Haverlah-TX)
- 11205.0 Teal 45-US Air Force Reserve WC-130 "Hurricane Hunter," working Smasher (Joint Task Force, Key West, FL), at 2304. (Cleary-SC)
- 11232.0 Goliath Alpha-US Air Force AWACS, attempted patch to Bar Candy, then tried 5800, no joy there either, at 1415. (Sevart-KS) Money 01-US Air Force, patch via Trenton to Tinker AFB Meteo for Ecuador weather, at 2153. (Cleary-SC)
- 11315.0 N580HA-Hawaiian Airlines flight 12, HF DL arrival info at 0359. HP1525-Copa Panama, HF DL log-on at 1321. (Glenn Blum-TX)
- 11384.0 CO0067-Continental flight 67, HF DL position for "07," Shannon, Ireland, at 1320. (Watson-UK)
- 11494.0 53A-DEA, securing radio guard with Panther at 2216. (Cleary-SC)
- 12579.0 NRV-USCG Guam, marine weather in SITOR-B at 0915. (Hall-RSA)
- 12745.5 JJC-Tokyo Radio, Japan, with Kyodo News FAX in Japanese and 60 lines/minute, at 1535. (Hall-RSA)
- 13200.0 Reach 550-US Air Force, requesting patch to Smasher via Puerto Rico HF-GCS, at 1951. Presidio-US military, patch via Ascension HF-GCS at 2207. (Cleary-SC)
- 13303.0 AT0561-Royal Air Maroc flight 561, HF DL downlink traffic for "17," Canary Islands, at 1155, 1158, 1159, 1212, and 1218. (Watson-UK)
- 13321.0 ZS-SFK-South African Airways flight 616, an A319, working Johannesburg in HF DL, at 1218. (Hall-RSA)
- 13375.0 Lincolnshire Poacher-British Intelligence, female voice with 5-figure "numbers" (E3), also on 16084, in progress at 1712. (Sevart-KS)
- 13907.0 Panther-DEA, Bahamas, ALE-initiated voice contact with USCG helicopter J16/ Coast Guard 6016, who then identified as "16C," on a test flight at 1836. (Perron-MD)
- 13927.0 Shark 82-US Joint Task Force, MARS patch via .AFA4DD to Smasher, at 1317. (Cleary-SC) JSTARS 61-US Air Force E-8, formatted traffic for Peachtree Ops, GA, via MARS patch at 1640. AIR-US Air Force MARS, radio check at 1725. (Stern-FL)
- 13977.0 AFA1EN-US Air Force MARS, administrative net with several stations at 1601. (Cleary-SC)
- 14325.0 W1SKU-Amateur controlling National Hurricane Watch net, taking Dennis observations from KF4FXP, Pensacola, FL, at 1507. (Cleary-SC)
- 14396.5 NNNOTWT-US Navy/Marine Corps MARS, control of SHARES net during Hurricane Dennis, at 1432. (Cleary-SC)
- 14582.0 BR1-Brazilian Army headquarters, Brasilia, calling MS1, Manaus, ALE at 2351. (Perron-MD)
- 14670.0 CHU-Dominion Observatory, Ottawa, Canada, standard time signals in reduced-carrier upper sideband, at 1424. (Watson-UK)
- 15016.0 Teal 06-US Air Force Reserve "Hurricane Hunter," patch to Guantanamo via Ascension HF-GCS, at 1906. (Cleary-SC)
- 15025.0 "03"-HF DL ground station, Reykjavik, Iceland, working L40282, Lauda Air flight 282, at 1328. CO0109-Continental 109, HF DL downlink message for 03, at 1330. (Watson-UK)
- 15043.0 HIK-US Air Force, Hickam AFB, HI, calling JTY (Yokota, Japan), at 0403. (Perron-MD)
- 15088.0 CAMSLANT-USCG, VA, calling Coast Guard 2131, at 1607. (Cleary-SC)
- 15867.0 EST-US Customs and Border Protection, calling D41, a P-3, in ALE, then encrypted voice, at 1608. (Perron-MD)
- 16806.5 NMC-USCG CAMSPAC Point Reyes, SITOR-B weather forecast at 1640. (Hall-RSA)
- 16830.5 SVO-Olympia Radio, Greece, CW identifier in SITOR-A marker, at 1656. (Hall-RSA)
- 16951.0 6WW-French Navy, Senegal, RTTY test loop at 1625. (Hall-RSA)
- 16984.0 Unid-Brazilian Navy, FEC hex-encoded message at 0305. (Sevart-KS)
- 18594.0 CBE-Possible USCG cutter, calling helicopter H13/ Coast Guard 1113, at 1949. (Perron-MD)
- 19692.5 ZSC-Probably Globe Wireless digital node, Capetown, RSA, Globedata markers at 1045. (Hall-RSA)

Radio/TV War with Venezuela?

A new satellite TV channel, TeleSur, started from Caracas July 24, with 51% majority ownership by the Hugo Chávez government in Venezuela and minority by Uruguay, Argentina and Cuba, to break the monopoly of US and European media in Latin America. It was subject to great controversy even before it started, not only in Latin America, but in the US.

Media Network reports: an amendment to the State Department finance bill for 2006/2007 passed in the US Congress authorizes the Broadcasting Board of Governors to initiate radio and television broadcasts to Venezuela for at least 30 minutes a day of balanced, objective, and comprehensive news programming. In response, Venezuelan President Hugo Chávez called the amendment another "desperate attack by the imperialists." Chávez said that Venezuela's government would "jam the signal" of any broadcasts from the United States. It wasn't yet clear whether the Bush Administration would request BBG to initiate such a service.

There was speculation the US service could be called R. Free Venezuela, or to be as offensive to them as we are to the dentroCubans, Radio Bolívar. Shucks, another name with an accent Anglos will be leaving out and mispronouncing. This overlooks the fact that the media are still free in Venezuela, with most of the privately owned networks anti-Chávez, and North American networks are available, unlike in Cuba.

TeleSur started with only 4 hours a day of programming, repeated. In Cuba, even this was condensed to a one-hour highlights reel on one existing channel.

Kim Andrew Elliott remarks: When a Member of Congress has issues with Country X, he/she introduces a bill to create Radio Free Country X, and other Members of Congress think: I don't know, seems like a good idea, and so it's approved, and that's why U.S. international broadcasting is the way it is. Except now it has to be Radio and TV Country X. Representative Connie Mack introduced an amendment to authorize the Broadcasting Board of Governors "to initiate radio and television broadcasts that will provide a consistently accurate, objective, and comprehensive source of news to Venezuela." Chávez then

vowed to "pulverize" any such services, presumably by jamming.

Venezuela's ambassador says, "Voice of America (TV) is broadcast on all Venezuelan cable and satellite carriers. Also, Fox News and CNN International are both broadcast on cable and satellite carriers in Venezuela. Venevisión and Globovisión, which are broadcast via the airwaves, also present the conservative Miami program of Andrés Oppenheimer and CNN en español." These new US broadcasts could include SW. It would be better for existing VOA services in Spanish to beef up coverage of Venezuela.

Henrik Klemetz reports: the Manager of Telesur, Aram Aharonian, was interviewed by Colombian radio network La W. In a promotional trailer for Telesur a woman was singing "ETA, ETA, ETA" in the shower. The interviewers asked if this had to do with the Spanish terrorist group ETA. "No," he replied, "it was merely a bad rendering of a Brazilian hit." Another part of the promotion showed Tirofijo, the aged Colombian terrorist leader. "Why, doesn't he exist? Isn't he part of the reality we are living?" retorted the Telesur manager. He sure is, the La W reporters answered, but so are anti-Chávez rallies, although none of this can be seen in this promotional feature.

Media Network reported: *The Miami Herald* editorialized strongly against the proposal. "It is no secret that President Hugo Chávez would like to stifle independent news reporting in Venezuela. But that's no reason for the United States to get involved in a fruitless propaganda war with this Andean demagogue. The Voice of America is there for those who want official US information broadcasts," and it adds that "Rep Mack's proposal could do more harm than good, handing President Chávez one more propaganda victory. It doubtless would be seen elsewhere in Latin America as US meddling in the internal affairs of a sovereign country that still enjoys full diplomatic relations with the United States."

Horacio Nigro, Uruguay, reports: On a visit to Uruguay, Pres. Chávez broached the idea of adding a Radiosur to compensate for TeleSur, which has had startup problems and getting on-air signals even in countries backing it such as Uruguay.

ARGENTINA The 5400-LSB relay had Radio Diez at 0226-0305, with Latin rhythms. Two short and one long time pip at hourtop amid music; low modulated apparent ID (Rich D'Angelo, PA, NASWA Flashsheet) These SSB relays pick up a variety of Buenos Aires stations. This one is originally on MW 710, yet just calls itself Radio 10 (gh)

BELARUS [non] Concern about the lack of a free press here led to plans for some surrogate radio services from the EU outside Belarus (altho there has long been American-sponsored RFE/RL). Deutsche Welle agreed to add a special service for Belarus, but only in the Russian language, to the objections of Belarus nationalists (gh) And a "Radio Free Belarus is likely to start broadcasting from Polish territory (Polskie Radio, via kimandrewelliott.com) Probably FM only (Bernd Trutenau, DXLD)

BOLIVIA Radio Virgen de Remedios, Tupiza, on yet another unexpected frequency, 5745.2, at 1110+, Spanish, religious program, distorted (Arnaldo Slaen, Argentina, Noticias DX) Also on 3338 at 1046, relaying Radio Católica Mundial, and heard around 0256, too (Alfredo Locatelli, Uruguay, Conexión Digital)

BRAZIL Rádio Gazeta, São Paulo, ceased transmitting Catholic programming of Rádio Canção Nova, when the contract expired, going to a musical format with priority to Brazilian songs, and continues to carry *Jornal da Gazeta AM Universitária* for an hour at 1000, 1600 and 0200, on 5955 (Célio Romais, Brasil, radioescutas) 15325 too? Brazil's only remaining 19mb station may not be active (gh)

BULGARIA The DRM B-05 schedule at <http://>

www.hfcc.org/data/B05drm.html includes interesting registrations "for new organisation" via Sofia at 1900-0600 on 5790, 0800-1900 on 11515, 1400-1900 on 11565, 0600-1900 on 13850, 0700-1700 on 15740, 1000-1400 on 17540, 0800-1200 on 21550 (Andy Sennitt, DXLD)

R. Varna weekly special, Sundays 2200-0400 UT Mondays, tentatively in B-05 season on 7600, 100 kW non-directional (Wolfgang Büschel, Germany, DXLD)

CANADA The piano fill music RCI has been using, such as for about a minute at 1304, 1330, 1404 and 1430 on 9515, 13655 and 17800 among other times, comes from *Marches, Waltzes & Rags of Scott Joplin* performed by William Albright, MusicMasters Classics, 01612-67102-2 © 1993 (Bill Westenhaver, RCI) There are 18 tracks with colorful titles such as *The Crush Collision March, Sunflower Slow Drag, Heliotrope Bouquet and Kismet Rag* (gh)

The Brazilian section of RCI set up a toll-free number for listeners in Brazil to call with programming comments and suggestions, but due to gross calls in very poor taste it had to be deleted. This reflects badly on Brazilian mores (Célio Romais, Panorama, @tividade DX)

CFVP Calgary, 6030, (relay of CKMX 1060), changed to a country format (Ricky Leong, AB, DXLD) In the clear on a Monday [when Cuban jammers and Marti take a break] 0441-0503, weak signal, all C&W songs. "A life time of county music, all in one place, AM 1060" and "All time county favorites, Classic County AM 1060" (Ron Howard, CA, DXLD) Also at 0631 the same Monday, ID as the "Country morning show," weak and faded within ten minutes (David Norrie, New Zealand,

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; A-05=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated

DXLD) Great catch; 100 watts (gh)

COLOMBIA La Voz de tu Conciencia, 6010, in an effort to reduce QRM to R. Mil, México, lowered its antenna to 10.5 meters, and might lower it another meter or two, to improve its vertical incidence for close-in coverage and reduce its low-angle radiation. The 5910 antenna has an azimuth 30 degrees away from 6010 (Russell Martin Stendal, LVTC, to Julián Santiago Diez de Bonilla, R. Mil, via Rubén Guillermo Margenet, DXLD)

CONGO DR [non] R. Okapi started an evening service in French. Sentech [SOUTH AFRICA] has two transmissions for Hirondele Foundation at 0400-0600 on 11690 and 1600-1700 on 11890, both confirmed as Radio Okapi (Iwao Nagatani, Japan, DXLD) Quite a few IDs heard between 1630 and 1635 (Mike Barraclough, DXLD) 11890 is 250 kW, 330 degrees, to continue in B-05; 11690 is 500 kW, 342 degrees, to move to 11670 (Observer, Bulgaria)

COSTA RICA unID on 5054.6V, Faro del Caribe? Aug 4 around 1000-1200 in Spanish (Kenji Takasaki, Japan, HCDX) 5054.59 at 0312, still too weak at 0716 (Ron Howard, CA, DXLD) From around 0815 fade-in (Craig Edwards, South Australia, HCDX) no ID heard in the morning, but definitely Faro del Caribe (Björn Malm, Ecuador, DXLD) I reconfirm it: TIFC, Faro del Caribe (Caribbean Lighthouse, as I heard an announcer call it many years ago), the oldest Costa Rican evangelical station. Transmission engineer Salvador López told me they were testing around the clock after a long time off the air, but then schedule will only be 0000-0400 and 1000-1600. No plans to resume 9645v (Raúl Saavedra, Costa Rica, DXLD) Had been off since July 2004 due to transmitter problems (Anker Petersen, Denmark, DSWCI DX Window)

CROATIA [non] Croatian Radio intends to use 6045 to NAM in B-05 season, 0200-0600 via Jülich, Germany, 100 kW 325 degrees (BCDX) Well, well! A broadcast band instead of a hamband! Previously used 7285 (gh)

CZECH REPUBLIC I've written to Radio Prague twice and received some unusual gifts: A 15-cm ruler with a small protractor on one end, and, more interestingly, a Radio Prague sponge. I'm not making this up. It was dry and pressed down into a fairly thin package (about 4 mm per the Radio Prague ruler), shaped like an art deco letter S. One side says "Come and Ride the Waves" in all of R. Prague's languages. Only when I turned it over did I see the inscription "For a perfect sponge just put in water" (Ted Schuerzinger, Swprograms) It's a supermarket! (gh)

ETHIOPIA [non] Voice of Delina in Tigrina schedule changed to 1800-1900 Sunday on 12130 via Armavir, Russia, 250 kW, 188 degrees. Tentative for B-05: 7590 or 7560 or 7530.

Tensae Ethiopia Voice of Unity in Amharic: 1500-1600 Daily (ex Sun-Fri) on 15660 via Samara, Russia, 250 kW, 199 degrees (Observer, Bulgaria)

FRANCE RFI keeps getting knocked off FM relays in African countries for political reasons, notably Ivory Coast (gh) Additional frequencies in French from 5 August: 0600-0700 13695, 0900-1100 15315, 1500-1600 15605, 1900-2100 11615, 2100-2200 9485 (Andy Sennitt, Media Network)

GERMANY If like me, you usually miss DW's underpublicized English DX program, because it is only monthly on the last Sunday, is a sub-show, and of course not broadcast to NAM on SW, you can retrieve it for perhaps a week following by going to audio on demand page <http://www.dw-world.de/dw/0,1595,4703,00.html#> and clicking on Mailbag and then skipping about 42 minutes into the file for ten minutes of the World DX Meeting, mostly about ham radio and propagation; 76 means "the Lord bless you," among the traditional numerical goodbyes by Wolfram Hess. It is on all Sunday English broadcasts of DW, the final airing each month UT Mon after 0800 (gh)

66-year-old Nazi and Holocaust denier Ernst Zuendel, deported from Canada to Germany last March, will be prosecuted in Mannheim from November at the earliest on 14 counts of inciting the masses. He broadcast on WRNO in 1993, WRMI in 1994, and around 2000 on WGTG; also briefly in 1996 on the 1386 kHz transmitter at Kaliningrad, ironically in East Prussia which Nazi Germany lost to the USSR. He was also interviewed in 1998 on Voice of the Islamic Republic of Iran (Dr. Hansjoerg Biener, World Of Radio)

GUATEMALA R. Verdad, Chiquimula, 4052.5, was off the air about 12 days, heard again July 27 at 0510-0550 during English hour, but weaker than usual (Manuel Méndez, Spain, DXLD) Strong here at 0345 the same date (Adán González, Venezuela, DXLD) e-mail from Dr. Madrid that lightning damaged transmitter putting it out of use, returned with just 250 watts (Christer Brunström, Sweden, Christian DX Report, HCJB DX Partyline)

GUYANA GBC returned to 3291.04, July 29 at 0900-0940 with pop music (Bob Wilkner, FL, HCDX) Had been silent a few months after flood (gh) But missing again the next couple days (Wilkner)

HONDURAS On 4819.15v, HRVC, LV Evangélica, reactivated July 23 at 0450-0740, preaching, songs, bath religious and ballads, many IDs (Ron Howard, CA, DXLD) Also heard next night in Denmark, 0220-0330 (Anker Petersen, HCDX) Very good signal here in Helena, MT at 0419. Good to hear them again! (Terry Palmersheim, KC7LDP, *ibid.*) Fading in around 0630 UT (Craig Edwards, South Australia, *ibid.*) At 0503; a wonderful QSLer (Manuel Méndez, Spain, DXLD) Very good after 0300 (Adán González, Venezuela, DXLD) HRVC gave me an account of how they had been off SW for 2 or 3 years - bad final amplifier tubes and not enough money to replace them. But God provided (Elmer Escoto, Honduras, DSWCI DX Window) Is associated with Voz Cristiana, <http://vozcristiana.com/> (José Bueno, Spain, playdx) Also at 1030-1130 phone in program (Robert Wilkner, FL, Japan Premium) Went on the air in 1960; HRVC stands for "Hoy Redime Vidas Cristo" (Asley Aguilar, Honduras DX Club)

HUTT RIVER PROVINCE PRINCIPALITY Hutt River plans to become a ham

radio and broadcasting paradise. Jim Linton, VK3PC reports that this is a self-proclaimed independent territory on Australia's mainland which plans to begin SW broadcasts and also seek amateur radio DXCC entity status. Just north of Geraldton, Western Australia, HRP claimed self-government 35 years ago and survives on a tourist-based economy. Unfortunately, the Australian Government does not recognize its independence. The HRP Director-General, Ministry of Electronic Communications, Eddie DeYoung has announced plans to set up a SW broadcast station possibly to be called Hutt River Radio, primarily with replays of old radio drama shows, music from yesteryear, readings from the world's newspapers for print handicapped listeners, and providing time-slots to non-government humanitarian aid organizations. A written application has been sent to the ITU seeking the H5 callsign block to be issued. More at <http://www.hutt-river-province.com> (Amateur Radio Newsline via John Norfolk) I don't see it being too big - the place is half a dozen buildings on a farm. I met the Prince when I was there a couple of years ago (Wayne Bastow, Australia, ARDXC) I can't imagine DXCC recognizing this if the Commonwealth of Australia does not - or can I? (gh)

INDIA A survey of India's missions all over the world came out with a startling revelation. None of the diplomats serving in foreign missions were aware of the existence of the External Services Division (ESD) of the All India Radio, let alone its usefulness in India's external affairs management (Dipankar Chakraborty in New Delhi, *The Statesman*, via Sakhti Vel, Andy Sennitt)

Public broadcaster Prasar Bharati is rethinking the ESD of AIR. Among suggestions being discussed is removing some obsolete languages, adding Japanese, German, Spanish and Korean. And the service must reach markets like the US, Canada, Latin America and Korea. Currently, ESD covers some countries in Asia, Africa, UK, Western Europe, New Zealand and Australia (Nivedita Mookerji, *Financial Express* via via Alokesh Gupta, Swapan Chakraborty)

A speaker from All India Radio says they hope to close the external radio service ASAP - it costs 10 million dollars a year and has no discernible audience (London AIB conference via Jonathan Marks' *Critical Distance* blog)

INDONESIA RRI Denpasar, Bali, heard on 3945 at 1129 July 26 with Indonesian pop song and gamelan, then Hindu religious program, 1200 ID, news from Jakarta, 1218 "Padamu Negeri" chorus. 1300 about the next local election, then music by request via phone. 1308 tune out then check at 1357 not heard anymore. On calling the station, staff confirmed repair at their transmitter site Latu (Tony Ashar, Indonesia, HCDX) Had been off the air for at least 12 years! (Anker Petersen, DSWCI DX Window) Some lists consider Bali a separate radio country (gh)

VOI on 15136v instead of 15150: they have 7 Marconi transmitters made in 1992/93 which they seem to use randomly; one is tuned 14 kHz down (Wolfgang Bueschel, Germany, World DX Club Contact) The 9525 transmission until 1400, then open carrier as noted before, disappeared at the end of July, but I could then detect a carrier on 15149.8 instead, clashing with Iran in the 1414-1606 period (gh, OK)

ITALY Radio Maria audible on analog 26000, from 1100 religious talk in Italian. Weak, fading in and out, but quite clear at times. Very surprised on picking up my headphones that evening at 2130, to find Radio Maria still audible on 26 MHz (Dave Kenny, England, BDXC-UK) Likely sporadic E, not dependent on daytime (gh)

[and non] IRRS-Shortwave B05 from Oct 30: Mon, Tue, Wed, Thu, Sat: 5775 at 2000-2130, 20 kW to Eu/AF/ME. Fri, Sun: 5775 at 2000-2300, 100 kW Eu/AF/ME. Sat: 15725 at 0900-1300, 50 kW to Eu/NA/ME. Sat & Sun: 13840 at 0800-1300, 20 kW, Eu/NA/ME. Latest updates at <http://www.nexus.org/NEXUS-IBA/Schedules> Note that we do not participate in HFCC (Alfredo E. Cotroneo, CEO, NEXUS-IBA, Milano, Italy via Alokesh Gupta, DXLD) 50 and 100 kW broadcasts are thought to be from some site outside Italy, such as Bulgaria or Romania, never confirmed by IRRS. If they participated in HFCC, true location of these would emerge (gh)

KENYA During my annual exercise to update the WRTM entry for Kenya (to assist Mauno Ritola, who does such a good job on the African entries), I confirmed that KBC has dropped its 0300-0700 transmission on 4915 (the only SW frequency still active from Kenya) and is now on air only at 0900-1900 M-F. This significantly cuts the opportunity for it to be heard in Europe (Chris Greenway, BDXC-UK) And even more so in North America! West coasters might get it by longpath in morning. Sunset in Kenya would be circa 1500 UT yearround (gh)

LAOS [non] Hmong Lao Radio, via WHRI South Carolina, 11785, Sat 1200-1300 and Sun 1300-1400 has a variety of music, some quite rustic, sounding like jew's harp, for instance, but mostly talk; announces address in St. Paul MN, where this frequency is aimed, 315 degrees, not at Laos. Obviously a domestic SW service; to pretend it were beamed from SC to Laos the azimuth would need to be closer to due north, er, north. Excellent reception here, if not in Laos (gh, OK) I wonder if the flute-like sounds often reported are throat-singing, a style common to these peoples, and if the jew's harp would ever be mentioned. Now it has: see <http://www.jewsharpguild.org> The Hmong people of Laos and Vietnam have a long history of making and playing their own style of the instrument, made of brass and classed as an idioglot. See <http://www.mouthmusic.com/trumps.htm#Hmong> These are wonderful instruments with a sound all their own (Mark D. Poss, CA, DXLD)

LIBERIA The Liberian Observer reports that the Liberia Broadcasting System has launched a fund drive to obtain a shortwave transmitter and television transmitters, in order to extend LBS broadcasts nationwide. The station's main building has been in ruins since the 1990 civil crisis (Andy Sennitt, Media Network)

Shortwave Broadcasting

LIBYA [non] LJB tentative B-05 via Issoudun, France, shows new 7320, which appeared already in July, at 1900-0400, for NW Africa (BCDX) None of its targets or azimuths on other frequencies are for NAM, all between 140 and 204 degrees (gh)

MADAGASCAR World Christian Broadcasting, of KNLS, announces beginning of construction of a broadcast center here. Charles Caudill, President, says they are confident in the future of SW and look forward to DRM usage worldwide. During November 2004, WCBC obtained 85 acres of land on Madagascar. Initial plans were to begin an Arabic service to add to English, Russian and Chinese from Alaska. But, after propagation studies showed that excellent signals could be put into WEu, S&W China, India, Indonesia, SAM, and of course, Africa, it was decided to expand the original plan. Construction will begin this October: three 100 kW transmitters, into four antennas; two 9-17 MHz 4/4/1, one 7-15 MHz 4/4/1 will be aimed to reach the areas of the world mentioned above. And a log periodic will broadcast directly to Madagascar, including government programs. At a projected cost of \$7,000,000, construction is expected to be completed early in 2008. WCBC studios are in Franklin, TN (NASB Newsletter via DXLD)

MAURITANIA 4845 was off for a few weeks, but back July 26 at 2122-2155 in Arabic, very good signal (Manuel Méndez, Spain, DXLD) Just in time for the coup d'état early on Aug 3 (gh) All state media broadcasts were interrupted from 0500 (Andy Sennitt, Media Network) Signed on late at 1930 with Qu'ran, 2007 Arabic talk about Mohamed, 2014 African language, then French about democracy (Jari Savolainen, Finland, DXLD, and Anker Petersen, Denmark, DSWCI DX Window) Scheduled to sign on at 0630, but not heard here (gh, OK)

NEW ZEALAND Following a 6-month internal review, National Radio makes changes in programming and presentation, to keep it dynamic, relevant and contemporary. Wayne Mowat continues to play an important role as anchor of *In Touch With New Zealand* which will focus on special outside broadcasts from throughout the country. Wayne's Music moves from weekday afternoons but continues as nostalgia listening Saturday and Sunday evenings. Evening news *Checkpoint* is extended from one hour to two. *Home Grown* is a new expanded music program, showcasing NZ contemporary music over three hours each Saturday afternoon. A revised National Radio program schedule is launched on Saturday 17th September. The birdcalls survive (RNZ via Scoop via Kim Elliott, DXLD)

Roughly 1/2 to 2/3 of RNZ's overall programming, and 3/4 of its English program consists of National Radio relays. Hope this doesn't mean it will dumb down its services like the CBC did in its overhaul (Rich Cuff, swprograms)

OMAN The Thumrait transmitter on 15140 of R. Sultanate of Oman, which came back July 10 including English hour at 1400, went off the air again around July 20. So the repair man has not done a very good job! I quite enjoyed listening to their English program, and reception was generally good. Let's hope they can coax the repairman to make the long journey back west and try again (Noel Green, England, DSWCI DX Window)

PAKISTAN R. Pakistan, 15100, put spurs on 15081 & 15119 at 1555 August 1 (Tim Bucknall, England, harmonics yahooogroup)

RUSSIA VOR Russian service to ME, 13855, accompanied by spurs 38.88 kHz away on 13816.12 and 13893.88 kHz. Moscow site, 250 kW, 190 degrees at 1400-1800. Heard on three receivers (Wolfgang Büschel, Germany, DXLD)

SINGAPORE RSI website changed to <http://www.rsi.sg> English 1100-1400 on 6080, 6150. Program schedule: <http://www.rsi.sg/english> (Alokesh Gupta, India, DXLD)

SLOVAKIA About 10 days before scheduled closure of RSI on SW, its website reported that the Radio Council had bound the director to continue SWBC. Jaroslav Reznik could not say for how long this status will be possible. It is now up to the state authorities to express clearly whether they are interested in a foreign broadcast service. Neither the Culture Ministry nor the Foreign Ministry seem interested in allocating sufficient means from their budgets (Media Network) Another meeting of the Radio Council was scheduled for August 24 (gh)

SOMALIA [non] Radio Waaberi is a new target program aimed at Somalia (in particular, Somaliland), produced by the California-based Waberi Broadcasting Services, Fri 1330-1400 via Jülich on 17550. <http://www.radiowaaberi.org> email: info@radiowaaberi.org (Bernd Trutenau, Lithuania, DXLD) Audio on demand in two formats (gh) Opens with a "Radio Miami International" announcement in English, so Jeff White must be broker for this (Jerry Berg, MA, NASWA Flashsheet) 100 kW, 130 degrees (Observer, Bulgaria)

SUDAN Frequency change for Radio Omdurman in Arabic at 1500-1900+9505 from Al Aitahab site, 90 degrees, ex 7200, from 1900 co-channel Radio Farda in Persian (Observer, Bulgaria) 10 over 9 here in Arabic at 1707 (Zacharias Liangas, Greece, DXLD)

Radio Peace received a partial/detail e-mail QSL from Peter Stover of Educational Media Foundation in about 6 hours for my follow-up e-mail report to him. This was for my reception on 4750 in March, 2004. Pete requested that DXers no longer send him e-mail audio attachments as it consumes too much hard drive space, just text reports. Also clarified which organizations were supporting Radio Peace, and Blessings for Obedience is not one of them. 4750 is 1 kW focused on Southern Sudan. 5895 is 2.5 kW focused on Nuba and the North (via George Maroti, NY, DXLD)

SWITZERLAND Now that Swiss Radio International is dead and buried, and even its successor, swissinfo, is reportedly in danger, SIS is truly "the only show in town." Switzerland in Sound is pledged to continuing the tradition

of radio in Switzerland in the English language, and as proof of that, I am happy and honored to announce that two good friends and former SRI colleagues, Peter Haller and Richard Dawson, are joining the SIS team. Peter will be responsible for a new monthly rubric entitled *Swiss Political Roundup*; Richard will prove that Switzerland has a healthy, world-class creative scene, and his contributions will be an enrichment to the SIS catalogue. See <http://www.switzerlandinsound.com> (Robert "Bob" Zanotti, founder and editor, Switzerland in Sound, DXLD)

SYRIA R. Damascus, English to Europe at 2005-2205 on 12085, and keeps alternating between 9330 and 13610. Listeners Overseas is at approx. 2040/2045 on Weds, maybe repeated one hour later. It's no letterbox, but one show lasting just a few minutes was about a Syrian expatriate living in Latin America, but longing for the Syrian life (Erik Køie, Copenhagen, DXLD)

TAJIKISTAN The U.S. BBG intends to negotiate a non-competitive contract with Continental Electronics Corporation, Dallas, for fabrication and shipping of a 500 kW SWBC transmitter (Model 420C) and ancillary equipment for installation at the Tajikistan Government's AOOT Teleradiocom SW facility in Yangiul [sic]. Continental shall also provide site support for installation and commissioning, as well as on-site training. In addition, BBG intends to negotiate a non-competitive contract with TCI, Fremont, CA for an antenna system at the same location (Fedbizopps via Ben Dawson, DXLD)

TANZANIA Not only was Zanzibar, q.v., reactivated on 11735, but also Dar-es-Salaam on 5050.10, heard mid-July at 1910 with African music, 1916 talk in Swahili (José Hernández Madrid, Spain, Noticias DX)

TIBET [non] Voice of Tibet in Tibetan and Chinese moved to 17563 via Tashkent, Uzbekistan, 100 kW, 131 degrees at 1100-1148, 1212-1300, 1302-1350, 1430-1518 (Observer, Bulgaria) Likely varies to avoid jamming (gh)

TURKEY The V. of Turkey broadcast on Thursdays at 1250 on 15225, 15535, carries the *Live from Turkey* phone-in program in addition to Tuesday at 1850 on 9785. On Thursday you have two 500 kW transmitters at your service. There are not enough callers to LFT. It is easy to get on the air and you can talk for 20 minutes if you want to. You will not be asked what you are going to talk about. VOT will pay for your phone call: you call them briefly and give your phone number; they will call you back and you can broadcast. This is far better than being a pirate (David Crystal, Israel, World DX Club Contact) Program booklet says, "We preen ourselves on hosting these two live segments which highlight your participation and your contribution as a strong factor of enrichment." (via Chris Williams, *ibid.*) Shows the only change for the fourth quarter is on Sundays, *Basket of News* replaced by *Witnesses To The Past*. If you lost the 2200 broadcast on 9830, it was scheduled to be replaced by 7300 from Sept 4 (gh)

USA WWRB will be filing with the FCC in the very near future for a construction permit to add another 100 kW transmitter, DRM broadcast capability and two or three additional antennas (Dave Frantz, WWRB, Aug 4, DXLD) We are fully DRM ready. While WWRB supports DRM operations, we do not currently offer DRM capabilities to our clients, for listeners must purchase extremely costly digital radio receivers. Our attitude towards Digital Radio Mondiale is to wait until it becomes more commonplace and less experimental (<http://www.wwrb.org/faq/faqindex.htm>)

WRNO's on-air goal was pushed back to September. Previous late-June date was thought to be a required deadline, but was not the case (George Thurman, TX, World Of Radio)

VIETNAM Little Saigon Radio (USA), as of mid-August was at 1500-1530 on 7380 (Nakhon Sawan, Thailand) and 15110 (Taiwan). (Bernd Trutenau, Lithuania, DXLD)

WESTERN SAHARA [non] From late July, Polisario Front, Rabuni [ALGERIA], was back on 7460 ex-7466 and also MW 700. During the Castilian hour at 2300 they stubbornly announce wrong frequencies, 7470 and 1550, altho on occasions, a silent carrier on 1550.2 kHz is detected evenings (Carlos Gonçalves, Portugal, DXLD) Radio Nacional de la República Árabe Saharaui Democrática again on 7460: 0600-0800 in Arabic, 1700-2300 in Arabic, co-channel RFA in Korean 2100-2300, 2300-2400 in Spanish (Observer, Bulgaria)

ZANZIBAR [and non] R. Tanzania Zanzibar is missing some days from reactivated 11735; at 1800 heard Brazilian R. Nova Visão instead (Steve Lare, MI, DXLD) R. Transmundial also heard at 1956-2000 (Manuel Méndez, Spain, DXLD) Zanzibar heard between 1500 and 1557 at equal level with co-channel TRT Ankara in Arabic, then clear (Wolfgang Büschel, Germany) Also collides with UN Radio in French 1700-1715 M-F (Observer, Bulgaria) Schedule hasn't settled yet. Sign-on seems to vary between 1400 and 1630, or even later. One day already on before 1500; a few days before from exactly 1600 (Thorsten Hallmann, Germany, DXLD)

ZIMBABWE unLD African on 6612 heard by Jim Solatie, Finland, around 0100, vernaculars with an English timecheck giving UT +2. Is second harmonic (or badly mistuned transmitter) from 3306; heard on 6612 around 2000 (Jari Savolainen, Finland, DXLD) Also at 0300 with improving strength (Björn Malm, Ecuador, DXLD) Much weaker on 3306 than 6612 at 0545 (David Pringle-Wood, Harare, Zimbabwe, DXLD) Believe transmitter mistuned, pushing most power out on 6612 (Jari Savolainen, DXLD) 3306 then running 24 hours with 200 kW so harmonic would be the same (Pringle-Wood) A few days later, R. Zimbabwe heard on 6600 instead, around 0215 past 0300 indicating the fundamental shifted to 3300 (John Sgrulletta, NY, BCDX) Well, Zimbabwe was jamming SW Radio Africa on 3300 for a while (gh)

Until the Next, Best of DX and 73 de Glenn!

0053 UTC on 11690

LITHUANIA: Radio Vilnius. Sign-on with item about transits between Lithuania and UK. Interview with airport security personnel to station identification at 0059. (Joe Wood, Greenback, TN; Sam Wright, Biloxi, MS)

0100 UTC on 15280

THAILAND: BBC relay. English service including ID, world and sports news to feature segments. **BBC Cyprus** relay 9825 at 0200; BBC monitoring from various locations as; 0300-6005, 7160, 9410; 0400-12095, 12035, 15575; 1600-9510, 12095, 15400, 15565; 1800-9510, 12095, 15310; 0900-6005, 9410, 12035, 15280, 15575. (Mike Kalez, Spokane, WA) **BBC** relay via **Ascension Island** 15400 at 1525. (Wood, TN)

0100 UTC on 11500

BULGARIA: Radio Bulgaria. Spanish service coverage of North and South American news topics. Station identification at 0102 to talk about Iraq. (Wood, TN) 11700, 2340-2348. (Harold Frodge, Midland, MI)

0207 UTC on 9480

RUSSIA: Radio Rossii. Russian news from male/female duo, including several field reports. Station ID at 0230. Fair signal, best in LSB. (Scott Barbour, Intervale, NH) Voice of Russia via Moldova 9655, 0102-0122 with *Moscow Mailbag*. (Wood, TN)

0245 UTC on 4990

SURINAME: Radio Apintie. English/Dutch mix of talk and promos. Pop music tunes to station identification and announcer's frequency quote. (Tom Banks, Dallas, TX) 0154-0314 (Rich D'Angelo, Wyomissing, PA/NASWA Flash Sheet).

0256 UTC on 6956.96

PERU: La Voz de Campesinos (tentative). Spanish text and music barely detectable. Partial "la voz..." audible at 0201. Poor signal. (Frodge, MI) Peru's **Radio Huanta Dos Mil** 4751.63, 1018-1030. (Chuck Bolland, Clewistown, FL/HCDX).

0300 UTC on 6940

ETHIOPIA: Radio Fana (tentative). Interval signal tune to sign-on at 0300. Brief announcements in vernacular language, followed by commentary. SIO 252 // 6210. (Frodge, MI) **Radio Ethiopia** 7110, 0256-0316. (Barbour, NH)

0320 UTC on 4780

DJIBOUTI: RTD. Arabic. Closing bits of call to prayers, followed by Koran recitations. Fair signal but readable. (Banks, TX)

0950 UTC on 5025

CUBA: Radio Rebelde. Spanish. Cuban music to world and national news bulletin at 1000. *Memorias de Rebelde* show to station ID. Trio of Cuban vocal tunes. (Arnaldo Slaen, Buenos Aires, Argentina) **Radio Nacional de Venezuela** via Cuba 11760 // 9600, 2351-2355*. (Frodge, MI) **Radio Habana** 6000, 0414-0419. (Wood, TN) 11760, 0048. (Wood, TN).

1020 UTC on 12085

MONGOLIA: Voice of. Regional vocals accompanied on wood instruments. Mix of English and Asian language for talk and script. Poor to fair signal. (Frank Hillton, Charleston, SC)

1030 UTC on 9795

USA: KLNS-Alaska. Bible give-away promo at tune-in with KNLS contact. Usual fare of pop music and testimonials. *DX Definition* segment at 1028 regarding utility DXing. Fair signal with 9790 splatter from Radio Netherland's Bonaire relay. (Barbour, NH) Additional USA stations logged; **WWCR** 7466, 2318-2330; **AFN/AFRTS** via **Key West**, FL 7811, 2333-2345. (Frodge, MI) **WYFR/Family Radio** 21525, 1605-1612 // 21455. **WHRI** 17640, 1620-1635. (Wood, TN) **WBOH** 5920, 0330-0340; **Radio Marti** in Spanish 13800, 1500-1510. (Wood, TN).

1046 UTC on 12130

GUAM: TWR. Vernaculars/Mandarin. Religious ballads and chat. Interval signal at 1100 followed by announcements in Mandarin. Booming signal. (Barbour, NH)

1050 UTC on 9580

AUSTRALIA: Radio Australia. *Fragile X* show on gene disorders, autism and treatments. (Bob Fraser, Belfast, ME) 21740, 2255-2300 with news of rugby football from UK/Sri Lanka teams. (Wood, TN) Aussie's **ABC Alice Springs** 4835, 0822-0830. (Ron Howard, Monterey, CA/NASWA Flash Sheet)

1523 UTC on 15190

EQUATORIAL GUINEA: Radio Africa. Religious music and program *Voice of Prophecy*. (Barbour, NH) **Radio Nacional-Bata** 5005, 2252-2255*. (Barbour, NH)

1610 UTC on 176845

MOROCCO: VOA relay. *English Studies* program with English lessons regarding US sports topics. **VOA Botswana** relay noted on 15245 with 1728 sign-on. (Wood, TN) **RTV Marocaine** 11920 at 0400. (Jim Ronda, Tulsa, OK/NASWA Flash Sheet) **Radio Farda** 9805, 0117-0122. (Wood, TN)

1637 UTC on 17490

CHINA: China Radio Int'l. English promos for program *Life in China*, followed by *Chinese Studio* program for English/Chinese lesson. Program off abruptly in mid lesson. SIO 444. (Frodge, MI) China's **Voice of the Strait-Fuzhou** 7280, 1033-1045 in Mandarin. (Barbour, NH)

1731 UTC on 6070

CANADA: CFRX. "News-Talk 10-10 CFRB" identification to news and weather update. Item about *Portuguese Parade* blocking the streets // 1010 **CFRB** fair. (Frodge, MI) **Radio Japan** Canadian relay 6120 at 1130; **China Radio Int'l** Canadian relay 6145 at 2220; **Radio Austria** Canadian relay 13755 at 1522. (Fraser, ME) **Radio Canada Int'l** via Sackville 13710, 0008-0028. ID as, "This is RCI celebrating 60 years of broadcasting." (Wood, TN)

1858 UTC on 12085

SYRIA: Radio Damascus. German/French service with lady's talk and musical bits. Vocal ballads then into French at 1908. Whisper quiet but clear, mild "hum." (Barbour, NH)

1950 UTC on 11860

IRAN: IRIB/Voice of Islamic Rep.: Male/female announcer's English segments to world news. (Fraser, ME)

2100 UTC on 11965

ASCENSION ISLAND: Star Radio. Sign-on with children's vocals, with clear ID. Newscast from male reader to religious and cultural events in Africa at 2111. Repeat of major events at 2115. African commentaries, religious theme telephone calls hosted by the Lutheran Church of Nigeria and the University of Nigeria. *Farm Forum* program to noted sign-off in mid program. Excellent signal. (Edward Kusalik, Coaldale, Alberta, Canada; D'Angelo, PA)

2122 UTC on 9525

HUNGARY: Radio Budapest. Interview during *Hungary Today* on organic farming and music festival. Station identification, schedule and contact info. (Barbour, NH)

2140 UTC on 7265

POLAND: Radio Polonia (tentative). Polish folk music at tune-in. Lady's program preview over flute music, followed by interview. Piano segments at 2151 into vocal ballads to sign-off at 2155. (Barbour, NH)

2231 UTC on 15145

PHILIPPINES: Voice of America relay. VOA *Special English* promo to news on Taiwan and Pakistan. (Banks, TX)

2235 UTC on 6009.78

COLOMBIA: La Voz de tu Conciencia. Spanish jingles to ads. Latin pops and ID at 2250 and 2300. Fair signal throughout tune-in. (Hillton, SC)

2312 UTC on 9737

PARAGUAY: Radio Nacional Paraguay. Piano mix in the genre of *Liberace*. Good reception until the static gremlins took out the signal! (Wood, TN)

2315 UTC on 4783

MALI: RTV Malienne. French service including two announcer's banter and national news. Pop Afro tunes and more of same until sign-off routine and national anthem at 0000. (Duane Hadley, Bristol, TN)

2321 UTC on 6090

ANGUILLA: Caribbean Beacon. Vintage fund-raising programming from the late Dr. Scott's library. (Wood, TN)

*Thanks to our contributors – Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times
(or e-mail gaylevanhorn@monitoringtimes.com)
English broadcast unless otherwise noted.*

Award Winning Radio

Granted, there is an oversupply of awards ceremonies and media programs where people in the business routinely slap each other on the back in apparent exchange for the same treatment sometime in the not-too-distant future. But such is truly not the case in the realm of international broadcasting. I know of only two such contests in the entire world – the **New York Radio Festivals** newyorkfestivals.com, held each June, and the **Third Coast International Audio Festival** thirdcoastfestival.org awards sponsored by Chicago Public Radio, taking place this month.

The New York competition is open to all; the Third Coast emphasizes audio documentary works. And, yes, a broadcaster can win in a competition like these only if the station or the program's producer chooses to enter it. Nonetheless, the programs so honored really do serve as a showcase for the very best in radio and, often either by extension or design, international broadcasting.

This year the New York Festival's **International Radio Programming and Promotion Awards** received around 500 entries from 32 countries. Entries are judged by panels of radio experts from stations and companies throughout the world for their production values, organization, presentation of information, creativity and use of the medium. It has been likened to the Oscars for the radio industry.

For the most part, commercial and public broadcasters tend to receive recognition for the categories in which one would intuitively expect them to excel. Prizes for coverage of breaking news, special investigative reports, popular music formats and specials and promotional spots tend to find their way to commercial broadcasters. Recognitions for excellence in general news coverage, documentary treatments, drama, craft and technique and other "long form" programming are usually won by public broadcasters.

A phenomenon that appears to be growing concerns the production or commissioning of programs by private foundations designed to focus on issues or topics of particular concern to them and their individual missions. While the overwhelming majority of radio programming is still produced in-house by stations and networks, there is a definite trend toward splitting the production and distribution streams, as well as co-productions between broadcasters and other ostensibly non-broadcast entities. Undoubtedly, this is due in large part to financial and editorial considerations, combined with the almost exponential expansion in distribution options, such as the internet, podcasting, and other new means of getting the message out.

❖ Making It in New York

Fans of international broadcasting will be pleased to learn that the international broadcasters had a prize haul in the New York contest this summer that far exceeded their portion of the broadcasting business. Honors went to the **Canadian Broadcasting Corporation**, **Radio Netherlands**, **Radio Free Asia**, the **Australian Broadcasting Corporation** (including **Radio National**), **Radio France Internationale**, the **British Broadcasting Corporation**, **Deutsche Welle**, **RTE Ireland**, **CFRB Toronto**, **Worldvision**, **Soundprint Media Center**, and **New Dimensions Broadcasting Network** – all of whom place programming on international broadcasting vehicles.

Radio Canada International cbc.ca and rcinet.ca

The fact that much of the CBC's programming finds its way onto RCI's schedule is a definite boon to shortwave listeners. The CBC was the big winner at the 2005 New York show. On checking the CBC web site in mid-August, every one of these award-winning programs (other than the specific newscasts cited) was archived for on-demand listening. My advice: give your ears and your brain a treat! To find them, just enter the name of each program in this excellent web site's search engine.

News Programs

(Best Newscast)
Gold World Medal
World Report (specifically, for a Dec. 26, 2004 broadcast)

(Best Investigative Report)

Finalist Certificate
The Current - "Keep Sweet" (about a breakaway Mormon sect in British Columbia)

(Breaking News Story)

Gold World Medal
"Tsunami"

Information/Documentary

(Business/Consumer Issues)
Finalist Certificate
Outfront - "Bonnie's Budget"

(Community Service)

Bronze World Medal
"It's a Girl's World: CBC Radio Forum"
Finalist Certificate
"Outfront in the Park"

(Educational)

Silver World Medal
Outfront - "A House of Many Rooms" (about multiple personality disorder)

(Health)

Gold World Medal
Outfront - "Catanonia's Incantations" (about catanonia schizophrenia)

(National/International Affairs)

Gold World Medal
The Sunday Edition - "The Goalkeepers of Sierra Leone" (the aftermath of civil war)

(Social Issues/Current Events)

Bronze World Medal
The Current - "Weighing the Balance" (child porn, civil rights and public safety)

(Human Relations)

Silver World Medal
The Sunday Edition - "A Complicated Friendship"
Bronze World Medal
"It's a Girl's World: CBC Radio Forum"

(Environmental Program)

Finalist Certificate
Quirks and Quarks - "Sonic Gloom" (effect of increasing sound levels on marine life)

Entertainment

(Best Drama Program)
Gold World Medal
Tapestry - "The Adventures of a Black Girl in Search of God" (adaptation of an award-winning play)

(Best Magazine)

Finalist Certificate
Global Village - "Celebrating 10 Years of Democracy in South Africa"

UN Dept. of Public Information Award

Silver Medal
The Sunday Edition - "The Goalkeepers of Sierra Leone"

All of these outstanding regular programs can be heard on shortwave via RCI. **World Report** airs every weekday morning at 1200 UT and weekends at 1300; **Global Village**, Sundays at 0100; **The Current**, weekdays at 1213; **Outfront**, Mondays-Thursdays at 1445; **Quirks and Quarks**, Saturdays at 1505; **The Sunday Edition**, Sundays at 1313; **Tapestry**, Sundays at 1905.

Radio Netherlands

rnw.nl

Seven global awards to a compact-sized broadcaster like RNW is quite an achievement, indeed. Most of these programs were first heard as part of the station's **Weekly Documentary** series that airs multiple times on Wednesdays into Thursdays UT via shortwave, the WRN channel 115 on **Sirius Satellite Radio** and via the internet. The **Research File** airs each Monday into Tuesdays (UT).

News Programs

(Best News Documentary/Special)
Bronze World Medal
"The Barrier" (about the wall being erected by Israel to seal off the Palestinian territories)

Information/Documentary

(Culture and the Arts)
Finalist Certificate
"Song of a Troubled Heart" (about Gustav Mahler's "most personal" musical work)

(Educational)

Gold World Medal

"Footnotes from the Field" (students visit the killing fields of the Great War)

(Health/Medical)

Silver World Medal

The Research File - "Musica Humana" (about Danish doctors and musicians creating a specially composed "sound environment" in hospitals to help patients recover better)

(National/International Affairs)

Silver World Medal

"Our Law" (about effects of violations of Geneva Conventions by all sides in Iraq and Afghanistan)

Finalist Certificate (in a joint production with Soundprint and WNYC)

"War and Forgiveness" (about the scars left by wartime atrocities)

(Environmental Program)

Bronze World Medal

The Research File - "Hot and Cold Science in Nature's Geological Laboratory" (about the interactions among the volcanoes, glaciers and people of Iceland)

Radio Australia

abc.net.au/rn or abc.net.au/ra

The ABC is another national public broadcaster that actively shares its domestic content with international listeners via its international service. Offerings from the network's various domestic networks have been consistently among the prominent honorees at both the New York and Chicago showcases recently, winning a total of seven gold medals the last three years in New York alone. Only **Encounter** and **The Science Show** are on the current **Radio Australia** schedule. However, **Radio National** is streamed over the internet so all of its programs can be heard both via live stream and from the network's considerable archives. Each of these award winners also is safely ensconced within those archives awaiting your listening pleasure.

Radio Australia airs **Encounter** on Sundays at 1305 UT and **The Science Show**, Sundays at 1405, repeated Tuesdays at 0405.

(Information/Documentary)

(Culture and the Arts)

Finalist Certificate

Radio Eye - "A Heart Ripped Open" (a profile of Australian jazz pianist Serge Ermoll)

(Profiles/Community Portraits)

Gold World Medal

Street Stories - "Tears Before Bedtime" (about the use of pain in sexual practice and expression)

(Religious Programs)

Bronze World Medal

Encounter - "Mamaloshen: Mother Tongue, Yiddish" (about the unique role of Yiddish in the expression of Jewish identity)

(Science and Technology)

Gold World Medal

The Science Show - "2024 Dreaming: Nine to Five Dreaming" (about visions of the workplace of the future)

(Environmental Program)

Gold World Medal (in a joint production with the BBC World Service)

Earthbeat - "Parched Lands" (four contrasting views of the world's dry lands and their people)

BBC World Service

bbc.co.uk/worldservice

One surprising realization that emerged from my surfing the New York Radio Festivals web site was the paucity of BBC programs receiving awards. Whether this is due to the Beeb not robustly participating in this competition, I can't say for sure.

I do know that the BBC's domestic radio networks annually dominate the UK-centered Sony Radio Awards. From that track record alone, one would expect them to be more prominent in New York than this. I have posed this question to the World Service Press Office and will report back their response when I receive it.

Despite the often frustrating (to some listeners) management decisions that result in the best parts of the World Service being in some respects harder to hear conveniently than they once were, it justifiably retains its longstanding reputation for programming excellence regardless of awards received, lost or deferred. Having said all that, the BBC did win one of the four Grand Awards, albeit for a program produced for its Radio 4 network and later broadcast on the World Service.

Grand Awards

Best Entertainment Program

BBC Radio 4 - "The Hitchhiker's Guide to the Galaxy, the Tertiary Phase: Life, The Universe and Everything"

Information/Documentary

(Educational)

Bronze World Medal

BBC World Service Afghan Education Project - "New Home, New Life: Episode 1648"

(Religious Programs)

Silver World Medal

"Exorcism" (a four-part documentary series asking why exorcism is experiencing a resurgence)

The latter one is a little difficult to find on the BBC web site, so type into your browser http://www.bbc.co.uk/worldservice/specials/1512_exorcism/index.shtml and the program's archive will appear in sequence by clicking on the subject panels on the left side of the page.

Deutsche Welle

dw-world.de

This station once had a prominent place on North American radios, but sadly has all but abandoned wireless to this hemisphere in English. It does maintain only the most basic presence via WRN—airing **Newslink** daily and **Inside Europe** on weekends. However, DW recently added **Newslink Plus** to the PRI World schedule on Sirius Satellite Radio, channel 108; so perhaps it is in the process of re-evaluating its distribution strategy for the Americas.

Formerly a prominent award winner in New York, DW was cited for only one program this year. DW has been among the world's foremost international radio broadcasters for decades. One hopes that its recent budget crises do not become exacerbated and cause the service to be diminished further.

Information/Documentary

(Profiles/Community Portraits)

Bronze World Medal

"At Home In Europe" (a continuing series looking at guest workers and other expatriates residing in Europe)

Apart from listening on the internet, "At Home in Europe" can be heard quite well via shortwave at 2145 each Wednesday in DW's broadcast to West Africa.

❖ Other Notable Winners

Among other prizewinners this year were

CFRB (and CFRX) Toronto in the News Documentary category; RTE Radio (no longer heard on shortwave, but still with quite a high profile on WRN on Sirius) with two awards, one each in the Information/Documentary classification on Social Issues/Current Events and the Silver World Medal for Drama; and **New Dimensions Broadcasting Network** (whose programming appears on US domestic shortwave from time to time, as well as internationally) with a series on the mechanics of democracy.

Radio Free Asia, once again, was the only U.S. international broadcaster—public or commercial—to garner recognitions. And Sirius won a fantasy battle of the satellite radio networks outpointing XM six to one, which included collecting gold, silver and bronze world medals.

Obviously, there's a wealth of good listening here! I strongly urge you to make it a point to check out the Festival web site.

❖ Sirius vs. XM

Following on to Sirius' big performance at the New York Festivals...

Having read quite a few reviews about the nation's (and soon Canada, too?) two satellite radio competitors that, depending on reviewer, favor one or the other, I decided to subscribe to both of them and do my own taste test. After over a year of both, this is where I come down on this contest.

If content is king (and shouldn't it be if you're a reader of this column?), then Sirius wins hands down in my book. It has three domestic public radio streams, the **BBC World Service** news stream, the **World Radio Network** linking to content from about two dozen international broadcasters and—soon—**CBC Radio One**. Its non-commercial music streams are varied, eclectic and professionally styled, while programmed and personalized by knowledgeable DJs that avoid making the streams sound mechanistic. In August, Sirius added the cheeky, Eurobeat-centered **BBC Radio One** to its line-up. In sports, Sirius offers play-by-play of every major pro hockey, basketball and football game, as well as multiple match coverage of *English Premier League* soccer and college football and basketball (in season) each week.

At this point XM's offerings, while fine and good as far as they go, simply lack the drive, innovative spirit and excitement of Sirius'. To me, it's clearly a weaker effort at this point. XM does hold a current technology advantage with smaller and more versatile receivers. But Sirius' radios hold a signal as efficiently as XM's and the radios all sound fine to me.

In sum, since better, more varied content is what I'm after—and I am, after all, an international broadcast fan—Sirius takes the brass ring. Just in case you wanted to know.

❖ Podcasting Update

Since the July column, Apple has embraced podcasting big time, incorporating a clever, easy to use subscription, and downloading features into its iTunes software (version 4.9) which is provided free to both Mac and PC users. For further information, consult <http://www.apple.com/ilife/itunes/>

Until the gales of November (may they not come early!), good listening!

October's Holiday DXing

Ask George Zeller, *MT's Outer Limits* columnist, and he'll remind you that October brings an excellent opportunity for pirate monitoring and QSLing. With this year's Halloween holiday on Monday, chances are, many pirates will broadcast their ghoulish specials anytime during the holiday weekend. North American pirates primarily use 6925 kHz, plus or minus 30 or 40 kHz. Pirates are also being reported active on 4000-4050, 5400, 7500, 8000 and 9290-9320 kHz. On occasion you might hear pirates on 13900, 15800 and 21800 kHz. European pirates favor 6200-6350 kHz.

Reception reports are sent through an intermediary, called a "maildrop," that is announced during the programming. For those new to the hobby, this alternative is to keep as much distance as possible

between the station and the broadcast authority in that country. For return postage, include three units of first class mint stamps for USA mail drops, or \$2.00 US dollars for European addresses.

If DXing less powerful medium wave stations intrigues you, fire up your radio. Called "graveyard" DXing, try monitoring after midnight on Monday mornings. This is the best time to monitor stations on 1230, 1240, 1340, 1400, 1450 and 1490 kHz medium wave.

QSLing requires the same courtesies as regular medium wave, and return postage is always appreciated with your personal letter or report. Who knows what you may unearth with a holiday weekend of pirates and graveyard DXing?!

AMATEUR RADIO

Iceland TF3WW, IOTA EU-021, 10 meters SSB. Full data color picture card. Received in ten days via ARRL bureau. (Larry Van Horn N5FPW, NC)

Mexico XE2OR, 20 meters SSB. Full data B&W card. Received in 11 days for SASE via QSL Manager W50ZI, Llewellyn P. Rose, P.O. Box 393, Junction, TX 76849. (Van Horn NC)

Sao Tome S9SS, 17 meters SSB. Full data color picture card from an MT friend, Charles Lewis-VOA Sao Tome. Received in 28 days for an email request. Normal route is via QSL Manager N4JR, Gerard N. Rossano, 798 County Rd 350, Hollywood, AL 35752-6731. (Van Horn NC)

BULGARIA

Radio Bulgaria, 9700 kHz. Color scenery postcard, plus personal letter with request of two IRCs in the future "to ease return postage." Received in 107 days for an English report. Station address: 4 Dragan Tsankov Blvd., Sofia 1040, Bulgaria. (Jim Peltz, Arcadia, CA)

CLANDESTINE

Radio Hoa-Mai (Voice of Hoa-Mai Foundation) via WHRI, 11550 kHz. Full data pdf. document file. Received in 24 hours after sending a follow-up inquiry for my June report to the following addresses, radio@hoamia.org, caulacbo@hoamai.org Received in 22 days, two postal type QSL folder cards for report to their US address; P.O. Box 4175, Garden Grove, CA 92842. (Edward Kusalik, Coaldale, Alberta, Canada; Arnaldo Slaen, Buenos Aires Argentina) <http://www.nvnp.org>; <http://www.hoamai.org>

CUBA

Radio Habana Cuba, 6000 kHz. Full data QSL # 6, plus bookmarks and pocket calendar. Received in six months for a English report. Station address: Apartado 6240, La Habana, Cuba. (John Vercellino, Downers Grove, IL)

JAPAN

Radio Canada Intl relay, 12035 kHz. Full data 60th Anniversary multicolored card signed by Bill Westerhaven, plus stickers and schedule. Received in 12 days for an English report. Station address: P.O. Box 6000, Montréal, Québec H2L 2M2 Canada. (Kusalik, CAN)

KOREA (DPR)

Voice of Korea, 9535 kHz. Large brown envelope including full data card, letter, schedule, radio pennant, lapel pin and latest copy of *Pyongyang Times*. The last time I received a reply it took over 20 years, yet this time the reply came in 78 days. Station address: External Service, Korean Central Broadcasting Station, Pyongyang, Democratic People's Republic of Korea. (Kusalik, CAN)

MEDIUM WAVE

KMBZ Kansas City, KS, 980 kHz AM. Partial data card signed by Ken Wolf, plus night coverage map and three bumper stickers from associated FM stations. Received in 91 days for an AM report. Station address: 4935 Belinder Rd., Westwood, KS 66205. (Patrick Griffith, Westminster, CO)

KOKC, 1520 kHz AM. Partial data *Verification of Reception* card unsigned, plus decals and pen. Received in eight days for an AM report and one US dollar (returned). Station address: 400 E. Britton Rd., Oklahoma City, OK 73114. (Bill Wilkins, Springfield, MO)

KCAP, 1340 kHz AM. Verification letter signed by Stan Evans-Program Director. Received in 45 days after follow-up report with CD. Station address: 110 East Broadway Street, Helena, MT 59601-4232. (Patrick Martin, Seaside, OR)

KXOR, 660 kHz AM. Verification letter signed by Randy Larson-Chief engineer, plus AM/PM coverage maps. Received in 29 days for CD report and an SASE. Station address: 895 Country Club Road # A-201, Eugenia, OR 97401. (Martin, OR)

PIRATES

Crystal Ship, 6855 kHz. Full data ship card signed by The Poet, plus pennant, Wanted Poster, and interview transcription. Received in 60 days for a pirate report one US dollar, and address label (used). QSL maildrop: Box 1, Belfast, NY 14711. (Wilkins, MO)

Ground Zero Radio, 6925 kHz. Full data card of atomic blast design # 4, plus station literature. Received in 74 days for a pirate report and three mint stamps. QSL maildrop: P.O. Box 69, Elkorn, NE 68022. (Joe Wood, Greenback, TN)

Undercover Radio, 6925 kHz. Full data card signed by "Dr. Benway", plus station litera-



ALWAYS IN
USB... THE
MANLIEST
OF ALL
MODES!

GAYLE

THANKS FOR THE REPORT.
REMAIN MANLY. IF YOU CAN ?

vs He-Man

GAYLE VAN HORN
**HE-MAN
RADIO**
QSL # 380
DATE OCTOBER 31 1993
TIME 22.1 - 23.00 UTC
FREQ 7415 KI2 55B

ture stating 300 watts. Received in 29 days for a pirate report and two US dollars. QSL maildrop: P.O. Box 293, Merlin, Ontario N0P 1W0 Canada. (Wood, TN)

WHGW 6925 kHz. E-QSL card and email letter from Mike. Received in two days for pirate report to: whgw6925@myway.com. (Larry McArdell, So. St. Paul, MN)

UTILITY

Bern Radio/HEB, 16912 kHz USB. Full data prepared QSL and letter signed by John Schrempft-Operations. Received in 56 days for a utility report and one US dollar. Station address: Riedernstr. 146, CH-3027 Bern, Switzerland. (R.C. Watts, Louisville, KY)



NAV-3, 7394.5 kHz USB. Full data 2005 Armed Forces Day card, unsigned, plus MARS decal. Utility report was for annual Armed Forces Day military-to-amateur cross band communications test. Received in 27 days with mint stamps and a flag decal. Station address: Ste 3A, NTCC Comm Center, Corpus Christi, TX 78419-5235 (Wilkins, CO)

HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Standard Time) 5, 6, 7 or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each hour.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 7:30 pm Eastern, 6:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes	
s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly
occ:	occasional
DRM:	Digital Radio Mondiale

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions.

But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFP)
me:	Middle East
na:	North America
pa:	Pacific
sa:	South America
va:	various

MT MONITORING TEAM

Gayle Van Horn
Frequency Manager

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Daniel Sampson

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Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo, *NASWA Flash Sheet*; *BCL News*; *Cumbre DX*; Glenn Hauser, *Enid, OK/DX Listening Digest*, Md. Azizul Alam, *Rajshahi, Bangladesh*; Daniel Sampson/*Prime Time-SW*; *DX Window*; *Observer*, Bulgaria; ODXA/DX Ontario; Larry Van Horn N5FPW, MT Asst. Editor; *Hard Core DX*; *NASWA Journal*; WWDX.

Shortwave Broadcast Bands

kHz	Meters
2300-2495	120 meters (Note 1)
3200-3400	90 meters (Note 1)
3900-3950	75 meters (Regional band, used for broadcasting in Asia only)
3950-4000	75 meters (Regional band, used for broadcasting in Asia and Europe)
4750-4995	60 meters (Note 1)
5005-5060	60 meters (Note 1)
5730-5900	49 meter NIB (Note 2)
5900-5950	49 meter WARC-92 band (Note 3)
5950-6200	49 meters
6200-6295	49 meter NIB (Note 2)
6890-6990	41 meter NIB (Note 2)
7100-7300	41 meters (Regional band, not allocated for broadcasting in the western hemisphere) (Note 4)
7300-7350	41 meter WARC-92 band (Note 3)
7350-7600	41 meter NIB (Note 2)
9250-9400	31 meter NIB (Note 2)
9400-9500	31 meter WARC-92 band (Note 3)
9500-9900	31 meters
11500-11600	25 meter NIB (Note 2)
11600-11650	25 meter WARC-92 band (Note 3)
11650-12050	25 meters
12050-12100	25 meter WARC-92 band (Note 3)
12100-12600	25 meter NIB (Note 2)
13570-13600	22 meter WARC-92 band (Note 3)
13600-13800	22 meters
13800-13870	22 meter WARC-92 band (Note 3)
15030-15100	19 meter NIB (Note 2)
15100-15600	19 meters
15600-15800	19 meter WARC-92 band (Note 3)
17480-17550	17 meter WARC-92 band (Note 3)
17550-17900	17 meters
18900-19020	15 meter WARC-92 band (Note 3)
21450-21850	13 meters
25670-26100	11 meters

Notes

- Note 1 Tropical bands, 120/90/60 meters are for broadcast use only in designated tropical areas of the world.
- Note 2 Broadcasters can use this frequency range on a (NIB) non-interference basis only.
- Note 3 WARC-92 bands are allocated officially for use by HF broadcasting stations in 2007. They are only authorized on a non-interference basis until that date.
- Note 4 WRC-03 update. After March 29, 2009, the spectrum from 7100-7200 kHz will no longer be available for broadcast purposes and will be turned over to amateur radio operations worldwide.

**GLENN HAUSER'S
WORLD OF RADIO**
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For the latest DX and programming news, amateur nets, DX program schedules, audio archives and much more!



0000 UTC - 8PM EDT / 7PM CDT / 5PM PDT

0000	0015	vi	Cambodia, National Radio	11940as		
0000	0015		Japan, Radio 17825no	6145na	13650as	17810as
0000	0027		Czech Rep, Radio Prague Intl	7345na	9440na	
0000	0030		Australia, Radio 15240po	9660as	12080as	13630pa
				17715as	17750pa	17775pa
0000	0030		Burma, Dem Voice of Burma		9435eu	
0000	0030		Egypt, Radio Cairo	11885na		
0000	0030	mtwhfa	Serbia & Montenegro, Intl Radio		9580va	
0000	0030		Thailand, Radio	9570va		
0000	0030		UK, BBC World Service	3915as	5970as	
			6195as 9410as	9740as	11945as	11955as
			15280as	15310as	15360as	17655as
			17790as			
0000	0030		USA, Voice of America	7215va	12140as	15185va
			15290va	17820va		
0000	0045		India, All India Radio	9705as	9950as	11620as
			11645as	13605as		
0000	0057		Canada, Radio Canada Intl		9690as	
0000	0059		Spain, Radio Exterior Espano		15385na	
0000	0100		Anguilla, Caribbean Beacon		6090am	
0000	0100		Australia, ABC NT Alice Springs		2310irr	4835do
0000	0100		Australia, ABC NT Katherine		5025do	
0000	0100		Australia, ABC NT Tennant Creek		4910do	
0000	0100		Australia, HCJB	15525as		
0000	0100		Canada, CFRX Toronto ON		6070do	
0000	0100		Canada, CFVP Calgary AB		6030do	
0000	0100		Canada, CKZJ St John's NF		6160do	
0000	0100		Canada, CKZU Vancouver BC		6160do	
0000	0100		Canada, Radio Canada Intl	13710am	9755am	11990am
0000	0100		China, China Radio Intl		6020na	7180as
			9570na	13600eu		
0000	0100		Costa Rica, University Network		5030va	6150vo
			7375va	9725va		
0000	0100		Cuba, Radio Havana	12000na		
0000	0100		Germany, Deutsche Welle		7130as	9505as
			9825as			
0000	0100		Guyana, Voice of	3290do		
0000	0100		Malaysia, Radio	7295as		
0000	0100	vi	Namibia, Namibian BC Corp	6060do	6175do	3270do
						3290do
0000	0100		Netherlands, Radio	9845na		
0000	0100		New Zealand, Radio NZ Intl		15720pa	
0000	0100	vi	Papua New Guinea, Wantok Radio Light		6137do	7120va
0000	0100		Sierra Leone, Radio UNAMSIL		6150do	
0000	0100		Singapore, Mediacorp Radio		5975am	
0000	0100		UK, BBC World Service		7440na	
0000	0100		Ukraine, Radio Ukraine Intl		7440na	
0000	0100		USA, AFRTS	4319usb	5466usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0000	0100		USA, KAIJ Dallas TX	5755na		
0000	0100		USA, KTBN Salt Lake City UT		7505na	15590na
0000	0100		USA, KWHR Naalehu HI		17510as	
0000	0100		USA, WBCQ Kennebunk ME		5105na	7415na
			9330na			
0000	0100		USA, WBOH Newport NC		5920am	
0000	0100		USA, WEWN Birmingham AL		5810vo	7425va
			13615va			
0000	0100		USA, WHRA Greenbush ME		7520na	
0000	0100	mtwhf	USA, WHRI Noblesville IN		7490am	9515am
0000	0100	as	USA, WHRI Noblesville IN		7315am	
0000	0100		USA, WINB Red Lion PA		9320am	
0000	0100		USA, WJIE Louisville KY		13595am	
0000	0100	twhfa	USA, WMLK Bethel PA	7385am		
0000	0100	sm	USA, WMLK Bethel PA	9955am		
0000	0100		USA, WTJC Newport NC		9370na	
0000	0100		USA, WWCR Nashville TN		3210na	5070na
			7465na	9985na	13845na	
0000	0100		USA, WWRB Manchester TN		3185na	5050na
			5085na	5745na	6890na	
0000	0100		USA, WYFR Okeechobee FL		6065na	9505as
			11835na	17805na		
0000	0100		Zambia, Christian Voice		4965of	
0030	0045	s	Germany, Pan American BC		9740as	
0030	0100		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	17715as	17750pa
			17775as			
0030	0100		Lithuania, Radio Vilnius		11690na	
0030	0100		Sri Lanka, SLBC	6005as	9770as	11905as
			15747as			
0030	0100		Thailand, Radio	5890na		
0030	0100		UK, BBC World Service		5970as	6195as
			9410as 9740as	11955as	15280as	15310as
			15360as	17790as		
0030	0100		USA, Voice of America	7215va	9780va	11760va
			15185va	15290va	17740va	17820va
0035	0100	sm	Austria, Radio Austria Intl		9870sa	
0043	0058	twhfa	Austria, Radio Austria Intl		9870sa	
0045	0100		Pakistan, Radio	9340as	11565as	
0055	0100		Italy, RAI Intl	11800na		

0100 UTC - 9PM EDT / 8PM CDT / 6PM PDT

0100	0115		Italy, RAI Intl		11800na	
0100	0115		Pakistan, Radio		9340as	11565as
0100	0127		Czech Rep, Radio Prague Intl		6200na	7345na
0100	0128	s	Hungary, Radio Budapest		9560na	
0100	0128		Vietnam, Voice of		6175na	
0100	0130	s	Australia, HCJB		15405as	
0100	0130		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	17715as	17750pa
			17775as			
0100	0130	mwfa	Belarus, Radio		5970eu	7210eu
0100	0130	s	Germany, Universal Life		9485as	
0100	0130	mtwhfa	Hungary, Radio Budapest		9590na	
0100	0130		Slovakia, Radio Slovakia Intl		5930am	9440am
0100	0130		Uzbekistan, Radio Tashkent		7190as	9715as
0100	0156		Romania, Radio Romania Intl		6040na	9690na
			11820na	15430na		
0100	0157		Netherlands, Radio		9845na	
0100	0159		Canada, Radio Canada Intl		9755om	11990am
			13710am			
0100	0200		Anguilla, Caribbean Beacon		6090am	
0100	0200		Australia, ABC NT Katherine		5025do	
0100	0200		Australia, ABC NT Tennant Creek		4910do	
0100	0200		Australia, Voice Intl		7355as	
0100	0200		Canada, CFRX Toronto ON		6070do	
0100	0200		Canada, CFVP Calgary AB		6030do	
0100	0200		Canada, CKZN St John's NF		6160do	
0100	0200		Canada, CKZU Vancouver BC		6160do	
0100	0200		China, China Radio Intl		6005na	6020na
			9570na	13640as		
0100	0200		Costa Rica, University Network		5030va	6150va
			7375va	9725va		
0100	0200		Cuba, Radio Havana		6000na	9820na
0100	0200		Guyana, Voice of		3291do	
0100	0200		Indonesia, Voice of		9525as	11785pa
0100	0200		Japan, Radio		5960as	11860as
			153235as	17560va	17685pa	17810as
			17825ca	17845as		
0100	0200		Malaysia, Radio		7295as	
0100	0200	vi	Namibia, Namibian BC Corp		6060do	6175do
						3270do
0100	0200		New Zealand, Radio NZ Intl		15720pa	
0100	0200		North Korea, Voice of		7140as	9345as
			11735am	13760as	15180as	9730am
0100	0200	vi	Papua New Guinea, Wantok Radio Light			7120va
0100	0200		Russia, Voice of		7180na	7250na
			15545na	15555na		9665na
0100	0200		Sierra Leone, Radio UNAMSIL		6137do	
0100	0200		Singapore, Mediacorp Radio		6150do	
0100	0200		Sri Lanka, SLBC		6005as	9770as
			15747as			11905as
0100	0200		UK, BBC World Service		6195as	9410as
			11955as	15280as	15310as	17790as
0100	0200		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0100	0200		USA, KAIJ Dallas TX		5755na	
0100	0200		USA, KTBN Salt Lake City UT		7505na	
0100	0200		USA, KWHR Naalehu HI		17510as	
0100	0200		USA, Voice of America	7115va	9885va	11705va
			11725va			
0100	0200		USA, WBCQ Kennebunk ME		5105na	7415na
			9330na			
0100	0200		USA, WBOH Newport NC		5920am	
0100	0200		USA, WEWN Birmingham AL		5810va	7425va
			13615va			
0100	0200		USA, WHRA Greenbush ME		5850na	
0100	0200	mtwhf	USA, WHRI Noblesville IN		7490am	9515am
0100	0200	as	USA, WHRI Noblesville IN		7315am	
0100	0200		USA, WINB Red Lion PA		9320am	
0100	0200		USA, WJIE Louisville KY		13595am	
0100	0200	twhfa	USA, WMLK Bethel PA	7385am		
0100	0200	sm	USA, WMLK Bethel PA	9955am		
0100	0200		USA, WTJC Newport NC		9370na	
0100	0200		USA, WWCR Nashville TN		3210na	5070na
			5765na	13845na		
0100	0200		USA, WWRB Manchester TN		3185na	5050na
			5085na	5745na	6890na	
0100	0200		USA, WYFR Okeechobee FL		6065na	9505as
0100	0200		Zambia, Christian Voice		4965of	
0105	0130	sm	Austria, Radio Austria Intl		9870am	
0110	0200		Libya, Voice of Africa		7230of	
0113	0130	twhfa	Austria, Radio Austria Intl		9870am	
0115	0130	a	Austria, Radio Austria Intl		9870sa	
0130	0200		Australia, HCJB		15405as	
0130	0200		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	17715as	17750pa
0130	0200	s	Belarus, Radio		5970eu	7210eu
0130	0200		Iran, Voice of the Islamic Rep		9495am	11875am
0130	0200		Sweden, Radio		6010na	9435va
0133	0200	twhfa	USA, Voice of America	7405va	9775va	13740va
0133	0200	sm	Austria, Radio Austria Intl		9870me	

Shortwave Guide



0143 0158 whfc Austria, Radio Austria Intl 9870na
 0145 0158 whfcs Albania, Radio Tirana 6115eu 7160eu

0200 UTC - 10PM EDT / 9PM CDT / 7PM PDT

0200	0227		Iran, Voice of the Islamic Rep	9495am	11875am
0200	0230		Australia, HCJB 15405as		
0200	0230		Austria, AWR Europe 9895as		
0200	0230	mtwfa	Belarus, Radio 5970eu	7210eu	
0200	0230	vi	Croatia, Croatian Radio 9925sa		
0200	0300		Anguilla, Caribbean Beacon 6090am		
0200	0300	whfha	Argentina, RAE 11710am		
0200	0300		Australia, ABC NT Alice Springs 2310irr	4835da	
0200	0300		Australia, ABC NT Katherine 5025do		
0200	0300		Australia, ABC NT Tennant Creek 4910da		
0200	0300		Australia, Radio 9660as	12080as	13630pa
			15240pa	15415pa	17750pa
			21725pa		
0200	0300		Australia, Voice Intl 7355as		
0200	0300		Bulgaria, Radio 9700na	11700na	
0200	0300		Canada, CFRX Toronto ON 6070do		
0200	0300		Canada, CFVP Calgary AB 6030do		
0200	0300		Canada, CKZN St John's NF 6160do		
0200	0300		Canada, CKZU Vancouver BC 6160do		
0200	0300		China, China Radio Intl 9580na		
0200	0300		Costa Rica, University Network 5030va	6150va	
			7375va 9725va		
0200	0300		Cuba, Radio Havana 6000na	9820na	12000nc
0200	0300		Egypt, Radio Cairo 7260na		
0200	0300		Guyana, Voice of 3291do		
0200	0300		Malaysia, Radio 7295as		
0200	0300	vi	Namibia, Namibian BC Corp 3270do	3290do	
			6060do 6175da		
0200	0300		New Zealand, Radio NZ Intl 15720pa		
0200	0300		North Korea, Voice of 4405as	13650as	15100as
0200	0300	vi	Papua New Guinea, Wantak Radio Light 7120a		
0200	0300		Philippines, Radio Pilipinas 11885va	15270vc	
0200	0300		Russia, Voice of 5945me	7180na	9665na
			9860na 15545na 15555nc	15595na	17660na
0200	0300		Sierra Leone, Radio UNAMSIL 6137do		
0200	0300		Singapore, Mediacorp Radio 6150do		
0200	0300		South Korea, Radio Korea Intl 9560va	11810so	
			15575va		
0200	0300		Sri Lanka, SLBC 6005as	9770as	11905as
			15747as		
0200	0300		Taiwan, Radio Taiwan Intl 5950na	9680na	
			11875as	15465as	
0200	0300		UK, BBC World Service 5975am	9750af	
			9825am	11760me	12095am
			15280as	15310as	15360as
			15310as	15360as	17790as
0200	0300		USA, AFRTS 4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13362usb
			12579usb	13362usb	13855usb
0200	0300		USA, KAIJ Dallas TX 5755na		
0200	0300		USA, KJES Vado NM 7555na		
0200	0300		USA, KTVN Salt Lake City UT 7505na		
0200	0300		USA, KWHR Naalehu HI 17510as		
0200	0300	mtwhf	USA, Voice of America 7115va	9885va	11705va
			11725va		
0200	0300		USA, WBCQ Kennebunk ME 5105na	7415na	
			9330na		
0200	0300		USA, WBOH Newport NC 5920am	5810va	7425va
0200	0300		USA, WEWN Birmingham AL 5810va	7425va	
			13615va		
0200	0300		USA, WHRA Greenbush ME 5850na		
0200	0300	mtwhf	USA, WHRI Noblesville IN 7490am	9515am	
0200	0300	as	USA, WHRI Noblesville IN 7315am		
0200	0300		USA, WINB Red Lion PA 9320am		
0200	0300		USA, WJIE Louisville KY 13595am		
0200	0300	whfha	USA, WMLK Bethel PA 7385am		
0200	0300	sm	USA, WMLK Bethel PA 9955am		
0200	0300		USA, WTJC Newport NC 9370na		
0200	0300		USA, WWCR Nashville TN 3210na	5070na	
			5765na 5935na		
0200	0300		USA, WWRB Manchester TN 3185na	5050na	
			5085na 5745na 6890na		
0200	0300		USA, WYFR Okeechobee FL 5985na	6065na	
			9505na 11835na 11855na		
0200	0300		Zambia, Christian Voice 4965af		
0215	0230		Nepal, Radio 3230as	5005as	6100as
			7165as		
0225	0235		Libya, Voice of Africa 7230af		
0230	0258	twhtas	Albania, Radio Tirana 6115eu	7160eu	
0230	0258		Hungary, Radio Budapest 9795na		
0230	0258		Vietnam, Voice of 6175na		
0230	0300	s	Belarus, Radio 5970eu	7210eu	
0230	0300		Sweden, Radio 6010na		
0245	0300		Myanmar, Radio 9730do		
0250	0300		Vatican City, Vatican Radio 7305am	9605am	
0256	0300		Turkey, Voice of 6140va	7270va	

0300 UTC - 11PM EDT / 10PM CDT / 8PM PDT

0300	0320		Vatican City, Vatican Radio 7305am	9605am
0300	0327		Czech Rep, Radio Prague Intl 7345na	9870na
0300	0330		Egypt, Radio Cairo 7260na	
0300	0330		Myanmar, Radio 9730do	
0300	0330		Philippines, Radio Pilipinas 11885va	15270va
0300	0330		Thailand, Radio 5890na	
0300	0330		USA, KJES Vado NM 7555na	
0300	0330		USA, Voice of America 4930af	6080af
			9885af 12080af 17895af	7290af 7340af
0300	0330		Vatican City, Vatican Radio 9660af	
0300	0350		Turkey, Voice of 6140va	7270va
0300	0355		South Africa, Channel Africa 6150af	
0300	0400		Anguilla, Caribbean Beacon 6090am	
0300	0400		Australia, ABC NT Alice Springs 2310irr	4835da
0300	0400		Australia, ABC NT Katherine 5025do	
0300	0400		Australia, ABC NT Tennant Creek 4910do	
0300	0400		Australia, Radio 9660as	12080as
			15240pa	15415pa
			15415pa	17750pa
			21725pa	
0300	0400		Australia, Voice Intl 13685as	
0300	0400	DRM	Canada, BBC World Service 11955na	
0300	0400	whfcs	Canada, CBC NQ SW Service 9625na	
0300	0400		Canada, CFRX Toronto ON 6070do	
0300	0400		Canada, CFVP Calgary AB 6030do	
0300	0400		Canada, CKZN St John's NF 6160do	
0300	0400		Canada, CKZU Vancouver BC 6160do	
0300	0400		China, China Radio Intl 9690am	9790am
			11870as	15110as
0300	0400		Costa Rica, University Network 5030va	6150va
			7375va 9725va	
0300	0400		Cuba, Radio Havana 6000na	9820na
0300	0400		Guyana, Voice of 3291do	
0300	0400		Japan, Radio 21610pa	
0300	0400		Malaysia, Radio 7295as	
0300	0400		Malaysia, Voice of 6175as	9750as
0300	0400	vi	Namibia, Namibian BC Corp 3270do	3290do
			6060do 6175do	
0300	0400		New Zealand, Radio NZ Intl 15720pa	
0300	0400		North Korea, Voice of 3560as	7140as
			9730as	
0300	0400	vi	Papua New Guinea, Wantak Radio Light 7120va	
0300	0400		Russia, Voice of 5900na	7180na
			9860na 15545na 15555na	15595na
0300	0400	vi	Rwanda, Radio 6055do	
0300	0400		Sierra Leone, Radio UNAMSIL 6137do	
0300	0400		Singapore, Mediacorp Radio 6150do	
0300	0400		South Africa, Channel Africa 3345af	
0300	0400		Sri Lanka, SLBC 6005as	9770as
			15747as	
0300	0400		Taiwan, Radio Taiwan Intl 5950na	15215va
			15320va	
0300	0400	vi	Uganda, Radio 4976da	5026do
0300	0400		UK, BBC World Service 3255af	5975am
			6005af 6190af 6195eu	7160af
			9750af 11760me 17760as	11765af
			12095as	15280as
			15575me	17760as
0300	0400	vi/mtwhf	UK, Sudan Radio Service 9625va	
0300	0400		Ukraine, Radio Ukraine Intl 7440na	
0300	0400		USA, AFRTS 4319usb	5446usb
			7590usb	7812usb
			12133usb	12579usb
			12579usb	13362usb
0300	0400		USA, KAIJ Dallas TX 5755na	
0300	0400		USA, KTVN Salt Lake City UT 7505na	
0300	0400		USA, KWHR Naalehu HI 17510as	
0300	0400		USA, WBCQ Kennebunk ME 5105na	7415na
			9330na	
0300	0400		USA, WBOH Newport NC 5920arr	
0300	0400		USA, WEWN Birmingham AL 5810va	7425va
			13615va	
0300	0400		USA, WHRA Greenbush ME 5850na	
0300	0400	mtwhf	USA, WHRI Noblesville IN 7490am	9515am
0300	0400	as	USA, WHRI Noblesville IN 7315am	
0300	0400		USA, WINB Red Lion PA 9320arr	
0300	0400		USA, WJIE Louisville KY 13595am	
0300	0400		USA, WMLK Bethel PA 7385am	
0300	0400		USA, WTJC Newport NC 9370na	
0300	0400		USA, WWCR Nashville TN 3210na	5070na
			5765na 5935na	
0300	0400		USA, WWRB Manchester TN 3185na	5050na
			5085na 5745na 6890na	
0300	0400		USA, WYFR Okeechobee FL 6065na	9505na
			11740na	15255na
0300	0400		Zambia, Christian Voice 4965af	
0300	0400	vi	Zimbabwe, ZBC Corp 5975do	
0330	0345		Hungary, Radio Budapest 9625eu	9655eu
0330	0345		Israel, Kol Israel 7545va	17600va
0330	0357		Czech Rep, Radio Prague Intl 9445va	11600va
0330	0358		Vietnam, Voice of 6175am	
0330	0400		UAE, Emirates Radio 12005na	13675na
0330	0400	mtwhf	USA, Voice of America 7290af	12080af
			17895af	

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0330 0400 USA, Voice of America 4930af 6080af 9885af

0400 UTC - 12AM EDT / 11PM CDT / 9PM PDT

0400	0430	Australia, Radio	9660as	12080as	13630pa
		15240pa	15515pa	17750pa	21725pa
0400	0430	France, Radio France Intl		7315af	11700af
0400	0430	Sri Lanka, SLBC	6005as	9770as	11905as
		15747as			
0400	0430	USA, Voice of America 4930af	4960af	6080af	7290af
		9575af 9885af	11835af	12080af	17895af
0400	0456	Romania, Radio Romania Intl		9780va	11820va
		15140vo	17860vo		
0400	0457	Netherlands, Radio	6165na	9590na	
0400	0458	New Zealand, Radio NZ Intl		15720pa	
0400	0500	Anguilla, Caribbean Beacon		6090am	
0400	0500	Australia, ABC NT Alice Springs		2310irr	4835do
0400	0500	Australia, ABC NT Katherine		5025do	
0400	0500	Australia, ABC NT Tennant Creek		4910do	
0400	0500	Australia, Voice Intl	13685as		
0400	0500	Canada, CBC NQ SW Service		9625na	
0400	0500	Canada, CFRX Toronto ON		6070do	
0400	0500	Canada, CKZN St John's NF		6160do	
0400	0500	Canada, CKZU Vancouver BC		6160do	
0400	0500	China, China Radio Intl		9590na	9690na
		9755na			
0400	0500	Costa Rica, University Network		5030va	6150va
		7375va 9725va			
0400	0500	Cuba, Radio Havana	6000na	9820na	
0400	0500	Germany, Deutsche Welle		7170af	11945as
		15445as			
0400	0500	Guyana, Voice of	3291da		
0400	0500	Malaysia, Radio	7295as		
0400	0500	Malaysia, Voice of	6175as	9750as	15295as
0400	0500	Namibia, Namibian BC Corp		3270do	3290do
		6060do 6175do			
0400	0500	Nigeria, Radio/Kaduna		6090do	
0400	0500	Papua New Guinea, Wantok Radio Light		7120va	
0400	0500	Russia, Voice of	5900na	1780na	15545na
		15555na	15595na	17660na	
0400	0500	Rwanda, Radio	6055do		
0400	0500	Sierra Leone, Radio UNAMSIL		6137do	
0400	0500	Singapore, Mediacorp Radio		6150do	
0400	0500	South Africa, Channel Africa		3345af	
0400	0500	Uganda, Radio	4976do	5026do	7196do
0400	0500	UK, BBC World Service		3255af	6005af
		6195eu 7160af	9410va	11760eu	9410va
		11760me	11765af	12035af	15310as
		15280as	15360as	15420af	15575me
		17760as	17790as	21660as	
0400	0500	UK, Sudan Radio Service		9625va	
0400	0500	USA, AFRTS	4319usb	5446usb	5765usb
		7590usb	7812usb	12133usb	12579usb
		12133usb	12579usb	13362usb	13855usb
0400	0500	USA, KAIJ Dallas TX	5755na		
0400	0500	USA, KTBN Salt Lake City UT		7505na	
0400	0500	USA, KWHR Naalehu HI		17510as	
0400	0500	USA, WBCQ Kennebunk ME		5105na	7415na
		9330na			
0400	0500	USA, WBOH Newport NC		5920am	
0400	0500	USA, WEWN Birmingham AL		5810va	7425va
		13615va			
0400	0500	USA, WHRA Greenbush ME		5850na	
0400	0500	USA, WHRI Noblesville IN		5835am	7465am
0400	0500	USA, WHRI Noblesville IN		5835am	
0400	0500	USA, WJIE Louisville KY		13595am	
0400	0500	USA, WMLK Bethel PA 9265eu		9955eu	
0400	0500	USA, WMLK Bethel PA 7385am			
0400	0500	USA, WTJC Newport NC		9370na	
0400	0500	USA, WWCR Nashville TN		3210na	5070na
		5765na 5935na			
0400	0500	USA, WWRB Manchester TN		3185na	5050na
		5085na 5745na	6890na		
0400	0500	USA, WYFR Okeechobee FL		6065na	6855eu
		7355eu 9505eu	9715eu		
0400	0500	Zambia, Christian Voice		4965af	
0400	0500	Zimbabwe, ZBC Corp	5975do		
0430	0500	Australia, Radio	9660as	12080as	13630pa
		15240pa	15415pa	15515va	17750pa
		21725pa			
0430	0500	Nigeria, Radio/Ibadan	6050do		
0430	0500	Nigeria, Radio/Kaduna		4770do	
0430	0500	Nigeria, Radio/Lagos	3326do	4990do	
0430	0500	Serbia & Montenegro, Intl Radio		9580vo	
0430	0500	Swaziland, TWR	3200af	4775af	
0430	0500	USA, Voice of America 4930af		4960af	7290af
		11835af	12080af	17895af	9575af
		Italy, RAI Intl	6110af	7235af	9800af
0445	0500	Vatican City, Vatican Radio		11625af	13765af
0459	0500	New Zealand, Radio NZ Intl		11820pa	

0500 UTC - 1AM EDT / 12AM CDT / 10PM PDT

0500	0507	twfhas	Canada, CBC NQ SW Service	9625na	
0500	0520		Vatican City, Vatican Radio	4005eu	5885eu
			7250eu		
0500	0530		Australia, Radio	9660as	12080as
			15160pa	15240pa	15515va
0500	0530		France, Radio France Intl		9825af
0500	0530	vl	Rwanda, Radio	6055do	
0500	0530		UK, BBC World Service	6005af	6190af
			11765af	11940af	11955me
			12035af	12095va	15280as
			15420af	15575me	17760as
			21660as		17790as
0500	0530		UK, BBC World Service	6005af	6195af
			9410va	11940af	11955as
			15310as	15360as	17640af
			17790as	17885af	21660as
0500	0530		Vatican City, Vatican Radio		9660af
0500	0555		South Africa, Channel Africa		9685af
0500	0600		Anguilla, Caribbean Beacon		6090am
0500	0600		Australia, ABC NT Alice Springs		2310irr
0500	0600		Australia, ABC NT Katherine		5025do
0500	0600		Australia, ABC NT Tennant Creek		4910do
0500	0600		Australia, Voice Intl	13685as	
0500	0600	DRM	Austria, Virgin Radio	9720eu	
0500	0600		Bhutan, BBS	6035as	
0500	0600		Canada, CFRX Toronto ON		6070do
0500	0600		Canada, CKZN St John's NF		6160do
0500	0600		Canada, CKZU Vancouver BC		6160do
0500	0600		China, China Radio Intl		6190na
			9590af 11710af	11880as	15350as
			17505af	17540as	15465as
0500	0600		Costa Rica, University Network	5030va	6150va
			7375va 9725va		
0500	0600		Cuba, Radio Havana	6000va	6060va
			11760va		9550va
0500	0600		Germany, Deutsche Welle		9630af
			15410af	17800af	9700af
0500	0600		Guyana, Voice of	3291da	
0500	0600		Japan, Radio	5975eu	6110na
			15195as	17810as	21755pa
0500	0600		Malaysia, Radio	7295as	
0500	0600		Malaysia, Voice of	6175as	9750as
0500	0600	vl	Namibia, Namibian BC Corp		3270do
			6060do 6175do		3290do
0500	0600		New Zealand, Radio NZ Intl		11820pa
0500	0600		Nigeria, Radio/Ibadan	6050do	
0500	0600		Nigeria, Radio/Kaduna		4770do
0500	0600		Nigeria, Radio/Lagos	3326do	4990do
0500	0600		Nigeria, Voice of	15120af	6090do
0500	0600	vl	Papua New Guinea, Wantok Radio Light		7120va
0500	0600		Russia, Voice of	17665pa	21790pa
0500	0600		Sierra Leone, Radio UNAMSIL		6137do
0500	0600		Singapore, Mediacorp Radio		6150do
0500	0600		South Africa, Channel Africa		7240af
0500	0600		Swaziland, TWR	3200af	4775af
0500	0600	vl	Uganda, Radio	4976do	5026do
0500	0600		UK, BBC World Service		6195eu
			12095eu	15565eu	15575me
0500	0600	vl/mtwhf	UK, Sudan Radio Service		11795va
0500	0600		USA, AFRTS	4319usb	5446usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13362usb
0500	0600		USA, KAIJ Dallas TX	5755na	
0500	0600		USA, KTBN Salt Lake City UT		7505na
0500	0600		USA, KWHR Naalehu HI		9510as
0500	0600		USA, Voice of America 4930af		6080af
			12080af	13645af	6180af
0500	0600		USA, WBCQ Kennebunk ME		7415na
0500	0600		USA, WBOH Newport NC		5920am
0500	0600		USA, WEWN Birmingham AL		5850va
0500	0600		USA, WHRA Greenbush ME		7490na
0500	0600		USA, WHRI Noblesville IN		7315am
0500	0600		USA, WJIE Louisville KY		13595am
0500	0600		USA, WMLK Bethel PA 9265eu		9955eu
0500	0600		USA, WMLK Bethel PA 7385am		
0500	0600		USA, WTJC Newport NC		9370na
0500	0600		USA, WWCR Nashville TN		3210na
			5765na 5935na		5070na
0500	0600		USA, WWRB Manchester TN		3185na
			5085na 5745na		5050na
0500	0600		USA, WYFR Okeechobee FL		6855eu
0500	0600		Zambia, Christian Voice		4965af
0500	0600	vl	Zimbabwe, ZBC Corp	5975do	
0505	0520	m	Austria, Radio Austria Intl		17870me
0505	0530	as	Austria, Radio Austria Intl		17870me
0515	0600		Zambia, Christian Voice		9555af
0525	0600	vl	Ghana, Ghana BC Corp		3366do
0530	0600		Australia, Radio	9660as	12080as
			15160pa	15240va	15415as
			17750as		15515pa
0530	0600		Thailand, Radio	17690va	

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0530	0600		UK, BBC World Service	6005af	6190af/7160af
			9410af 11765af 11940af	11955as	15310cs
			15360as 15420af	17640af	17760as
			17790as 21660as		
0530	0600	mtwhf	UK, BBC World Service	17885af	
0545	0600	twh	Austria, Radio Austria Intl	17870me	
0545	0600	vl	Rwanda, Radio	6055do	

0600 UTC - 2AM EDT / 1AM CDT / 11PM PDT

0600	0605	vl	Croatia, Croatian Radio	13820na	
0600	0615	as	South Africa, TWR	11640af	
0600	0630		France, Radio France Intl	11665af	15160af
			17800af		
0600	0645	mtwhf	South Africa, TWR	11640af	
0600	0655		South Africa, Channel Africa	15440af	
0600	0700		Anguilla, Caribbean Beacon	6090am	
0600	0700		Australia, ABC NT Alice Springs	2310irr	4835da
0600	0700		Australia, ABC NT Katherine	5025do	
0600	0700		Australia, ABC NT Tennant Creek	4910do	
0600	0700		Australia, Radio	9660as	13630as
			15160pa 15240va	15415as	15515pa
			17750va		
0600	0700		Australia, Voice Intl	15335as	
0600	0700	DRM	Austria, Virgin Radio	9720eu	
0600	0700		Canada, CFRX Toronto ON	6070do	
0600	0700		Canada, CFVP Calgary AB	6030do	
0600	0700		Canada, CKZN St John's NF	6160do	
0600	0700		Canada, CKZU Vancouver BC	6160do	
0600	0700		China, China Radio Intl	9590af	11710af
			11870me 11880as	13620me	15350as
			15465as 17490eu	17505af	17540as
0600	0700		Costa Rica, University Network	5030va	6150va
			7375va 9725va 11870va		
0600	0700		Cuba, Radio Havana	6000va	9550va
			11760va		
0600	0700		Germany, Deutsche Welle	6140eu	7170af
			15275af 17860af		
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do
0600	0700		Guyana, Voice of	3291do	
0600	0700		Japan, Radio	7230eu	11715as
			11760as 13630va	15195as	17870pa
			21755pa		
0600	0700		Liberia, ELWA	4760ca	
0600	0700		Malaysia, Radio	7295as	
0600	0700		Malaysia, Voice of	6175as	9750as
0600	0700	vl	Namibia, Namibian BC Corp	3270do	3290do
			6060do 6175do		
0600	0700		New Zealand, Radio NZ Intl	11820pa	
0600	0700		Nigeria, Radio/Ibadan	6050do	
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do
0600	0700		Nigeria, Radio/Lagos	3326do	
0600	0700		Nigeria, Voice of	15120af	
0600	0700	vl	Papua New Guinea, Wantok Radio Light		7120va
0600	0700		Russia, Voice of	17665pa	21790pa
0600	0700	DRM	Russia, Voice of	15780eu	
0600	0700		Sierra Leone, Radio UNAMSIL	6137do	
0600	0700	irreg/ vl	Sierra Leone, SLBS	3316do	
0600	0700		Singapore, Mediacorp Radio	6150do	
0600	0700	vl	Solomon Islands, SIBC 5020do	9545do	
0600	0700		South Africa, Channel Africa	7240af	
0600	0700		Swaziland, TWR	4775af	9500af
0600	0700		UK, BBC World Service	6005af	6190af
			11765as 11955as	12095as	
			15310as 15360as	15400af	15565as
			15575me 17640af	17790as	21660as
0600	0700	as	UK, BBC World Service	17885af	
0600	0700		USA, AFRTS	4319usb	5765usb
			7590usb 7812usb	12133usb	12579usb
			12133usb 12579usb	13362usb	13855usb
0600	0700		USA, KAIJ Dallas TX	5755na	
0600	0700		USA, KTBN Salt Lake City UT	7505na	
0600	0700		USA, KWHR Noalehu HI	9510as	13700as
0600	0700		USA, Voice of America	6080af	7290af
			12080af 13645af		
0600	0700		USA, WBCQ Kennebunk ME	7415na	
0600	0700		USA, WBOH Newport NC	5920am	
0600	0700		USA, WEWN Birmingham AL	5850va	7425va
			7570va		
0600	0700		USA, WHRA Greenbush ME	7490na	
0600	0700		USA, WHRI Noblesville IN	7315am	7465am
0600	0700		USA, WJIE Louisville KY	13595am	
0600	0700		USA, WMLK Bethel PA	9265eu	9955eu
0600	0700		USA, WRMI Miami FL	7385om	
0600	0700		USA, WTJC Newport NC	9370na	
0600	0700		USA, WWCR Nashville TN	3210na	5070na
			5765na 5935na		
0600	0700		USA, WWRB Manchester TN	3185na	
0600	0700		USA, WYFR Okeechobee FL	5810eu	7355eu
			9680eu 11530eu	11580eu	
0600	0700	vl	Vanuatu, Radio	4960do	
0600	0700		Yemen, Rep of Yemen Radio	9780me	

0600	0700		Zambia, Christian Voice	9555af	
0600	0700	vl	Zimbabwe, ZBC Corp	5975do	
0630	0645		Vatican City, Vatican Radio	4005af	5885af/7250af
			9645eu 11740ca 15595ca		
0630	0656		Romania, Radio Romania Intl	9655eu	11830eu
0630	0700		Bulgaria, Radio	11600eu	13600eu
0630	0700	as	Germany, Bible Voice Broadcasting	5945eu	
0630	0700		Vatican City, Vatican Radio	11625af	13765ca
			15570va		
0645	0700	s	Albania, TWR	11865eu	
0645	0700	s	Monaco, TWR	9870eu	

0700 UTC - 3AM EDT / 2AM CDT / 12AM PDT

0700	0705		New Zealand, Radio NZ Intl	11820pa	
0700	0727		Czech Rep, Radio Prague Intl	9880eu	11600eu
0700	0730		Slovakia, Radio Slovakia Intl	9440as	15460pa
0700	0730		UK, BBC World Service	11760me	15575me
0700	0800	mtwhf	Albania, TWR	11865eu	
0700	0800		Anguilla, Caribbean Beacon	6090am	
0700	0800		Australia, ABC NT Alice Springs	2310irr	4835do
0700	0800		Australia, ABC NT Katherine	5025do	
0700	0800		Australia, ABC NT Tennant Creek	4910do	
0700	0800		Australia, HCJB	11750au	
0700	0800		Australia, Radio	9660as	12080as
			15160pa 15240va	15415as	17750pa
0700	0800		Australia, Voice Intl	15335as	
0700	0800	DRM	Austria, Virgin Radio	9720eu	
0700	0800		Canada, CFRX Toronto ON	6070do	
0700	0800		Canada, CFVP Calgary AB	6030do	
0700	0800		Canada, CKZN St John's NF	6160do	
0700	0800		Canada, CKZU Vancouver BC	6160do	
0700	0800		China, China Radio Intl	11880as	13710eu
			i 5350as 15465as	17490eu	
0700	0800		Costa Rica, University Network	5030va	6150va
			7375va 9725va 11870va		
0700	0800		Eqt Guinea, Radio Africa	15190af	
0700	0800		France, Radio France Intl	15605af	
0700	0800	as	Germany, Bible Voice Broadcasting	5945eu	
0700	0800		Germany, Deutsche Welle	6140eu	4915do
0700	0800	vl	Ghana, Ghana BC Corp	3366do	
0700	0800		Guyana, Voice of	3291do	
0700	0800	vl/as	Italy, IRRS	13840va	
0700	0800		Liberia, ELWA	4760do	
0700	0800		Liberia, Star Radio	9525af	
0700	0800		Malaysia, Radio	7295as	
0700	0800		Malaysia, Voice of	6175as	9750as
0700	0800	mtwhf	Monaco, TWR	9870eu	
0700	0800		Myanmar, Radio	9730do	
0700	0800	vl	Namibia, Namibian BC Corp	3270do	3290do
			6060do 6175do		
0700	0800		Nigeria, Radio/Ibadan	6050do	
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do
0700	0800		Nigeria, Radio/Lagos	3326do	
0700	0800	vl	Papua New Guinea, Wantok Radio Light		7120va
0700	0800		Russia, Voice of	17495pa	21790pa
0700	0800	DRM	Russia, Voice of	15780eu	
0700	0800		Sierra Leone, Radio UNAMSIL	6137do	
0700	0800	irreg/ vl	Sierra Leone, SLBS	3316do	
0700	0800		Singapore, Mediacorp Radio	6150do	
0700	0800	vl	Solomon Islands, SIBC 5020do	9545do	
0700	0800		South Africa, Channel Africa	7240af	
0700	0800	DRM	Sri Lanka, Deutsche Welle	21675as	
0700	0800		Swaziland, TWR	4775af	6120af
0700	0800		Swaziland, TWR	4775af	9500af
0700	0800		Taiwan, Radio Taiwan Intl	5950na	
0700	0800		UK, BBC World Service	6005af	6190af
			11940af 11765af	11955as	12095af
			15310as 15360as	15400af	15485af
			17760as 17790as	17830af	21660as
0700	0800		USA, AFRTS	4319usb	5446usb
			7590usb 7812usb	12133usb	12579usb
			12133usb 12579usb	13362usb	13855usb
0700	0800		USA, KAIJ Dallas TX	5755na	
0700	0800		USA, KTBN Salt Lake City UT	7505na	
0700	0800		USA, KWHR Noalehu HI	9510as	13700as
0700	0800		USA, Voice of America	6080af	7290af
0700	0800		USA, WBOH Newport NC	5920am	13645af
0700	0800		USA, WEWN Birmingham AL	5850va	7475va
			7570va		
0700	0800		USA, WHRI Noblesville IN	7315am	7465om
0700	0800		USA, WJIE Louisville KY	13595am	
0700	0800		USA, WMLK Bethel PA	9265eu	9955eu
0700	0800		USA, WRMI Miami FL	7385om	
0700	0800		USA, WTJC Newport NC	9370na	
0700	0800		USA, WWCR Nashville TN	3210na	5070na
			5765na 5935na		
0700	0800		USA, WWRB Manchester TN	3185na	
0700	0800		USA, WYFR Okeechobee FL	5985va	6855va
			7355va 9505va 9715va	9930va	
0700	0800	vl	Vanuatu, Radio	4960do	
0700	0800		Zambia, Christian Voice	9555af	

Shortwave Guide



0706	0800		New Zealand, Radio NZ Intl	9885pa		
0715	0750	a	Albania, TWR	11865eu		
0715	0750	a	Monaco, TWR	9870eu		
0730	0800		Georgia, Radio Georgia	11805eu		
0730	0800	as	Guam, TWR/KTWR	15255as		
0730	0800	as	UK, BBC World Service	15575me	17885af	
0740	0800	mtwhf	Guam, TWR/KTWR	15225as		

0800	0900		Zambia, Christian Voice	9555af		
0815	0900	os	Guam, TWR/KTWR	11840as		
0830	0900		Australia, ABC NT Katherine	2485do		
0830	0900		Australia, ABC NT Tennant Creek	2325do		
0830	0900		Australia, Radio	5995as	9590as	
			9710as 12080pa	13630pa	15240pa	15415pa
			17750pa			

0800 UTC - 4AM EDT / 3AM CDT / 1AM PDT

0800	0815	a	Germany, Bible Voice Broadcasting	5945eu		
0800	0820	mtwhfs	Albania, TWR	11865eu		
0800	0820	s	Monaco, TWR	9870eu		
0800	0830		Australia, ABC NT Katherine	5025do		
0800	0830		Australia, ABC NT Tennant Creek	4910do		
0800	0830		Australia, Radio	5995as	9590as	
			9710as 12080pa	13630pa	15240pa	17750pa
0800	0830	as	Australia, Radio	15415va		
0800	0830	s	Germany, Bible Voice Broadcasting	5945eu		
0800	0830		Liberia, ELWA	4760do		
0800	0830		Malaysia, Voice of	6175as	9750as	
0800	0830		Myanmar, Radio	9730do		
0800	0830		Swaziland, TWR	4775af	6120af	9500af
0800	0900		Anguilla, Caribbean Beacon	6090am		
0800	0900		Australia, ABC NT Alice Springs	2310irr	4835do	
0800	0900		Australia, HCJB	11750ou		
0800	0900		Australia, Voice Intl	15335as		
0800	0900	DRM	Austria, Virgin Radio	9720eu		
0800	0900		Bhuthan, BBS	6035as		
0800	0900		Canada, CFRX Toronto ON	6070do		
0800	0900		Canada, CFVP Calgary AB	6030do		
0800	0900		Canada, CKZN St John's NF	6160do		
0800	0900		Canada, CKZU Vancouver BC	6160do		
0800	0900		China, China Radio Intl	11880as	13710eu	
			15350as	15465as	17490eu	17540as
0800	0900		Costa Rica, University Network	5030va	6150va	
			7375va 9725va	11870va		
0800	0900		Eqt Guinea, Radio Africa	15190af		
0800	0900		Germany, Deutsche Welle	6140eu		
0800	0900	vi	Ghana, Ghana BC Corp	3366do	4915do	
0800	0900	mtwhf	Guam, TWR/KTWR	11840as		
0800	0900		Guyana, Voice of	3291do		
0800	0900		Indonesia, Voice of	9525as		
0800	0900	vi/os	Italy, IRRS 13840va	15725al		
0800	0900		Liberia, Star Radio	9525af	11785pa	15150al
0800	0900		Malaysia, Radio	7295as		
0800	0900		Malaysia, Voice of	15295as		
0800	0900		New Zealand, Radio NZ Intl	9885pa		
0800	0900		Nigeria, Radio/Ibadan	6050do		
0800	0900		Nigeria, Radio/Kaduna	4770do	6090do	
0800	0900		Nigeria, Radio/Lagos	3326do	4990do	
0800	0900	vi	Pakistan, Radio	15100eu	17835eu	
0800	0900		Papua New Guinea, Catholic Radio	4960do		
0800	0900		Papua New Guinea, NBC	4890do		
0800	0900	vi	Papua New Guinea, Wantok Radio Light	7120va		
0800	0900		Russia, Voice of	17495pa	17635pa	21790pa
0800	0900	DRM	Russia, Voice of	15780eu		
0800	0900	irreg/ vi	Sierra Leone, Radio UNAMSIL	6137do		
0800	0900		Sierra Leone, SLBS	3316do		
0800	0900		Singapore, Mediacorp Radio	6150do		
0800	0900	vi	Salomon Islands, SIBC 5020do	9545do		
0800	0900	s	South Africa, Radio League	7205af	17565af	
0800	0900		South Korea, Radio Korea Intl	9570as	9640eu	
0800	0900	DRM	Sri Lanka, Deutsche Welle	21675as		
0800	0900		Taiwan, Radio Taiwan Intl	9610pa		
0800	0900		UK, BBC World Service	6190af	11760me	
			11940af	11955as	15310as	15360as
			15400af	15485af	15575me	17640eu
			17760as	17790as	17830af	17885af
			21470af	21660as		
0800	0900		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0800	0900		USA, KAIJ Dallas TX	5755na		
0800	0900		USA, KNLS Anchor Point AK	11870as		
0800	0900		USA, KTBN Salt Lake City UT	7505na		
0800	0900		USA, KWHR Naalehu HI	9510as	13700as	
0800	0900		USA, Voice of America 6080af	7290af	13645af	
0800	0900		USA, WBOH Newport NC	5920am		
0800	0900		USA, WEWN Birmingham AL	5850va	7425va	
			7570va			
0800	0900		USA, WHRI Noblesville IN	7315am	7520am	
0800	0900		USA, WJIE Louisville KY	13595am		
0800	0900		USA, WMLK Bethel PA 9265eu	9955eu		
0800	0900		USA, WRMI Miami FL 7385am			
0800	0900		USA, WTJC Newport NC	9370na		
0800	0900		USA, WWCR Nashville TN	3210na	5070na	
			5765na 5935na			
0800	0900	s	USA, WWRB Manchester TN	9320na		
0800	0900		USA, WWRB Manchester TN	3185na	5085na	
0800	0900		USA, WYFR Okeechobee FL	5950af	5985af 6855af	
			9930af			
0800	0900	vi	Vanuatu, Radio	4960do		

0900 UTC - 5AM EDT / 4AM CDT / 2AM PDT

0900	0915	vi	Ghana, Ghana BC Corp	3366do	4915do	
0900	0927		Czech Rep, Radio Prague Intl	21745va		
0900	0930		Australia, Radio	9580as	9590as	15240as
0900	0930	os	Australia, Radio	15415va		
0900	0930		Guam, TWR/KTWR	11840as		
0900	1000		Anguilla, Caribbean Beacon	6090am		
0900	1000		Australia, ABC NT Alice Springs	2310do	4835irr	
0900	1000		Australia, ABC NT Katherine	2485do		
0900	1000		Australia, ABC NT Tennant Creek	2325do		
0900	1000		Australia, HCJB	11750ou		
0900	1000	DRM	Australia, Voice Intl	11955as		
0900	1000		Austria, Asian Sound	11815eu		
0900	1000		Canada, CFRX Toronto ON	6070do		
0900	1000		Canada, CFVP Calgary AB	6030do		
0900	1000		Canada, CKZN St John's NF	6160do		
0900	1000		Canada, CKZU Vancouver BC	6160do		
0900	1000		China, China Radio Intl	15210pa	17490eu	
			17690pa			
0900	1000		Costa Rica, University Network	5030va	6150va	
			7375va 9725va	11870va		
0900	1000		Eqt Guinea, Radio Africa	15190af		
0900	1000		Germany, Deutsche Welle	6140eu		
0900	1000		Guyana, Voice of	3291do		
0900	1000	vi/as	Italy, IRRS 13840va	15725al		
0900	1000		Malaysia, Radio	7295as		
0900	1000		Malaysia, Voice of	15295as		
0900	1000	vi	Namibia, Namibian BC Corp	3270do	3290do	
			6060do 6175do			
0900	1000	DRM	Netherlands, Radio	7240eu		
0900	1000		New Zealand, Radio NZ Intl	9885pa		
0900	1000		Nigeria, Radio/Ibadan	6050do		
0900	1000		Nigeria, Radio/Kaduna	4770do	6090do	
0900	1000		Nigeria, Radio/Lagos	3326do	4990do	
0900	1000	vi	Pakistan, Radio	15100eu	17835eu	
0900	1000		Papua New Guinea, Catholic Radio	4960do		
0900	1000		Papua New Guinea, NBC	4890do		
0900	1000	vi	Papua New Guinea, Wantok Radio Light	7120va		
0900	1000	irreg/ v'	Rwanda, Radio	6055do		
0900	1000		Sierra Leone, Radio UNAMSIL	6137do		
0900	1000		Sierra Leone, SLBS	3316do		
0900	1000	vi	Singapore, Mediacorp Radio	6150do		
0900	1000	DRM	Salomon Islands, SIBC 5020do	9545do		
0900	1000		Sri Lanka, Deutsche Welle	21675as		
0900	1000		UK, BBC World Service	6190af	6195va	6195va
			9605as 9740as	11760me	11940af	15310as
			15360as	15400af	15485af	15575me
			17640eu	17760as	17790as	17830af
			17885af	21470af	21660as	
0900	1000		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0900	1000		USA, KAIJ Dallas TX	5755na		
0900	1000		USA, KTBN Salt Lake City UT	7505na		
0900	1000		USA, KWHR Naalehu HI	9510as	9930as	
0900	1000	vi	USA, Voice of America 9520va	15205va	17745va	
0900	1000		USA, WBOH Newport NC	5920am		
0900	1000		USA, WEWN Birmingham AL	5850na	7425na	
0900	1000		USA, WHRI Noblesville IN	7520am	9495am	
0900	1000		USA, WJIE Louisville KY	7490am	13595am	
0900	1000		USA, WRMI Miami FL 9955am			
0900	1000		USA, WTJC Newport NC	9370na		
0900	1000		USA, WWCR Nashville TN	5070na	5765na	
			5935na 9985na			
0900	1000	s	USA, WWRB Manchester TN	9320na		
0900	1000		USA, WWRB Manchester TN	3185na	5085na	
0900	1000	vi	USA, WYFR Okeechobee FL	5985af	6855af 9755af	
0900	1000		Vanuatu, Radio	4960do		
0900	1000	vi/s	Zambia, Christian Voice	9555af		
0905	1000		Greece, Voice of	9420eu	11645eu	15630eu
			15650eu	21530eu		
0930	0945		Israel, Kol Israel	15640va		
0930	1000		Australia, Radio	9580as	9590as	15240as
			15415pa			
0930	1000	s	UAE, Radio UNMEE	21460af		
0930	1000		Vatican City, Vatican Radio	5885eu		

1000 UTC - 6AM EDT / 5AM CDT / 3AM PDT

1000	1030		Australia, Voice Intl	13685as		
1000	1030		Guam, AWR/KSDA	11930as		
1000	1030		Mongolia, Voice of	12085as		

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1000	1057	Netherlands, Radio 13820va	7315va	9790va	12055va		
1000	1059	New Zealand, Radio NZ Intl		9885pa			
1000	1100	Anguilla, Caribbean Beacon		11775sam			
1000	1100	Australia, ABC NT Alice Springs		2310do	4835irr		
1000	1100	Australia, ABC NT Katherine		2485do			
1000	1100	Australia, ABC NT Tennant Creek		2325do			
1000	1100	Australia, HCJB	15405as				
1000	1100	Australia, Radia	9580as	9590as	15240as		
		15415pa					
1000	1100	DRM	Austria, Asian Sound	11815eu			
1000	1100		Canada, CFRX Toronto ON		6070do		
1000	1100		Canada, CFVP Calgary AB		6030do		
1000	1100		Canada, CKZN St John's NF		6160da		
1000	1100		Canada, CKZU Vancouver BC		6160da		
1000	1100		China, China Radio Intl	15210pa	17490eu		
			17690pa				
1000	1100		Costa Rica, University Network	5030va	6150va		
			7375va 9725va	11870va	13750va		
1000	1100	DRM	Germany, Deutsche Welle		6140eu		
1000	1100		Guyana, Voice of	3291do	5950do		
1000	1100		India, All India Radio	13695as	15020as	15410as	
			17800as	17895as			
1000	1100	vl/as	Italy, IRRS 13840va	15725af			
1000	1100		Japan, Radio	6120na	9695as	11730as	
			17585eu	17720va	21755pa		
1000	1100		Malaysia, Radio	7295as			
1000	1100		Malaysia, Voice of	15295as			
1000	1100	DRM	Netherlands, Radio	7240eu			
1000	1100		Nigeria, Voice of	15120af			
1000	1100		North Korea, Voice of	3560as	11710as	11735as	
			13650ca	15180ca			
1000	1100		Papua New Guinea, Catholic Radio	4960do			
1000	1100		Papua New Guinea, NBC	4890do			
1000	1100	vi	Papua New Guinea, Wantok Radio Light		7120vo		
1000	1100		Singapore, Mediacorp Radio	6150do			
1000	1100	vi	Solomon Islands, SIBC 5020do	9545do			
1000	1100		South Africa, Channel Africa	11825af			
1000	1100	DRM	UK, BBC World Service	7320eu			
1000	1100		UK, BBC World Service	6190af	6195va		
			9605as 11760me	11940af	15310as	15360as	
			15485af	15575me	17640as	12640me	
			17760as	17790as	17885af	21470af	
			21660as				
1000	1100	as	UK, BBC World Service	15400af	17830af		
1000	1100		USA, AFRTS	4319usb	5446usb	5765usb	
			7590usb	7812usb	12133usb	12579usb	
			12133usb	12579usb	13362usb	13855usb	
1000	1100		USA, KAJI Dallas TX	5755na			
1000	1100		USA, KNLS Anchor Point AK		9795as		
1000	1100		USA, KTBN Salt Lake City UT		7505na		
1000	1100		USA, KWHR Naalehu HI		9930as		
1000	1100		USA, Voice of America 9705va		15205va	17745va	
1000	1100		USA, WBOH Newport NC		5920am		
1000	1100		USA, WERN Birmingham AL		5745na	7425na	
1000	1100		USA, WHRI Noblesville IN		7520am	9495am	
1000	1100		USA, WINB Red Lion PA		9320am		
1000	1100		USA, WJIE Louisville KY		7490am		
1000	1100		USA, WRMI Miami FL 9955am				
1000	1100		USA, WTJC Newport NC		9370na		
1000	1100		USA, WWCN Nashville TN		5070na	5765na	
			5935na 15825na				
1000	1100	s	USA, WWRB Manchester TN		9320na		
1000	1100		USA, WWRB Manchester TN		3185na	5085na	
1000	1100		USA, WYFR Okeechobee FL		5950na	5985na	
			6855na 9755na				
1000	1100		Zambia, Christian Voice		9555af		
1030	1045	mtwhf	Ethiopia, Radio	5990af	7110af	9704af	
1030	1057		Czech Rep, Radio Prague Intl		9880eu	11615eu	
1030	1058		Vietnam, Voice of	7285as			
1030	1100		Iran, Voice of the Islamic Rep		15660as	17660as	

1100 UTC - 7AM EDT / 6AM CDT / 4AM PDT

1100	1104	vi	Pakistan, Radio	15100eu	15190eu	17635eu	
1100	1127		Iran, Voice of the Islamic Rep		15660as	17660as	
1100	1128		Vietnam, Voice of	9840as	7220as	7285as	
1100	1130		Australia, HCJB	15405as			
1100	1130		Australia, Radio	5995as	6020as	9475as	
			9560as 9580as	9590as	12080as	15240pa	
1100	1130		UK, BBC World Service		6190af	11940af	
			15400af	15485af	17830af	17885af	
			21470af				
1100	1157		Netherlands, Radio	11675na			
1100	1159	a	Germany, Universal Life		6055me		
1100	1200		Anguilla, Caribbean Beacon		11775sam		
1100	1200		Australia, ABC NT Alice Springs		2310do	4835irr	
1100	1200		Australia, ABC NT Katherine		2485do		
1100	1200		Australia, ABC NT Tennant Creek		2325do		
1100	1200		Australia, Voice Intl	13685as			
1100	1200	DRM	Austria, Asian Sound	11815eu			
1100	1200	as	Canada, CBC NQ SW Service		9625na		
1100	1200		Canada, CFRX Toronto ON		6070do		

1100	1200		Canada, CFVP Calgary AB		6030do		
1100	1200		Canada, CKZN St John's NF		6160do		
1100	1200		Canada, CKZU Vancouver BC		6160do		
1100	1200		China, China Radio Intl	17490eu	11750na	13650eu	
1100	1200		Costa Rica, University Network		5030va	6150va	
			7375va 9725va	11870va	13750va		
1100	1200		Ecuador, HCJB	12005am		21455am	
1100	1200	DRM	Germany, Deutsche Welle		6140eu		
1100	1200		Germany, Overcomer Ministries		6110eu		
1100	1200	vl/as	Italy, IRRS 13840va	15725af			
1100	1200	vi	Italy, IRRS 13840va	15725af			
1100	1200		Japan, Radio	6120na	9695as	11730as	
1100	1200		Malaysia, Radio	7295as			
1100	1200		Malaysia, Voice of	15295as			
1100	1200		New Zealand, Radio NZ Intl		9885pa		
1100	1200		Nigeria, Voice of	15120af			
1100	1200		Papua New Guinea, Catholic Radio		4960do		
1100	1200		Papua New Guinea, NBC		4890do		
1100	1200	vi	Papua New Guinea, Wantok Radio Light			7120va	
1100	1200		Singapore, Radio Singapore Intl		6080as	6150as	
1100	1200		South Africa, Channel Africa		11825af		
1100	1200		Taiwan, Radio Taiwan Intl		7445as		
1100	1200	DRM	UK, BBC World Service		7320eu		
1100	1200		UK, BBC World Service		6195as	9740as	
			11760me	11865am	15310as	15575me	
			17640va	17760as	17790as		
1100	1200		Ukraine, Radio Ukraine Intl		15675eu		
1100	1200		USA, AFRTS	4319usb	5446usb	5765usb	
			7590usb	7812usb	12133usb	12579usb	
			12133usb	12579usb	13362usb	13855usb	
1100	1200		USA, KAJI Dallas TX	5755na			
1100	1200		USA, KTBN Salt Lake City UT		7505na		
1100	1200		USA, KWHR Naalehu HI		11555as		
1100	1200		USA, Voice of America 9705va		15205va	17745va	
1100	1200		USA, WBOH Newport NC		5920am		
1100	1200		USA, WERN Birmingham AL		5745na	11530na	
			13615na				
1100	1200		USA, WHRI Noblesville IN		7520am	9495am	
1100	1200		USA, WINB Red Lion PA		9320am		
1100	1200		USA, WJIE Louisville KY		7490am		
1100	1200		USA, WRMI Miami FL 9955am				
1100	1200		USA, WTJC Newport NC		9370nc		
1100	1200		USA, WWCN Nashville TN		5070na	5935na	
			7465na 15825na				
1100	1200	s	USA, WWRB Manchester TN		9320na		
1100	1200		USA, WWRB Manchester TN		3185na	5085na	
1100	1200		USA, WYFR Okeechobee FL		5950va	5985va	
			7355va 9550va	9625va	9755va		
1100	1200		Zambia, Christian Voice		9555af		
1125	1200		Vatican City, Vatican Radio		15595me		
1130	1159	o	Germany, Universal Life		6055me		
1130	1200	as	Australia, HCJB	15405as			
1130	1200		Australia, Radio	5995as	6020as	9475as	
			9560as 9580as	9590as	12080as	15700eu	
1130	1200		Bulgaria, Radio	11700eu			
1130	1200	t	UAE, Radio UNMEE	21550af			
1130	1200		UK, BBC World Service		6190af	11940af	
			15485af	17830af	17885af	21470af	
1130	1200		Vatican City, Vatican Radio		17515me		
1145	1200	vl	Libya, Voice of Africa	17695af	21675af	21695af	

1200 UTC - 8AM EDT / 7AM CDT / 5AM PDT

1200	1215	vl	Cambodia, National Radio		11940as		
1200	1230	as	Australia, HCJB	15405as			
1200	1230		France, Radio France Intl		17815af	21620af	
1200	1230		Malaysia, Voice of	15295as			
1200	1230		UAE, AWR Africa	15135as			
1200	1230		Uzbekistan, Radio Tashkent		7285us	15295as	
			17775as				
1200	1259		Canada, Radio Canada Intl		9660as	15170as	
1200	1259		New Zealand, Radio NZ Intl		9885pa		
1200	1259		Poland, Radio Polonia	9525eu	11850eu		
1200	1300		Anguilla, Caribbean Beacon		11775sam		
1200	1300		Australia, ABC NT Alice Springs		2310do	4835irr	
1200	1300		Australia, ABC NT Katherine		2485do		
1200	1300		Australia, ABC NT Tennant Creek		2325do		
1200	1300		Australia, Radio	5995as	6020as	9475as	
			9560as 9580as	9590as	12080as	15240pa	
1200	1300		Australia, Voice Intl	13685as			
1200	1300	DRM	Austria, Classic Gold	11815eu			
1200	1300	as	Canada, CBC NQ SW Service		9625na		
1200	1300		Canada, CFRX Toronto ON		6070do		
1200	1300		Canada, CFVP Calgary AB		6030do		
1200	1300		Canada, CKZN St John's NF		6160do		
1200	1300		Canada, CKZU Vancouver BC		6160do		
1200	1300	mtwhf	Canada, Radio Canada Intl		9515am	13655am	
			17800am				
1200	1300		China, China Radio Intl		9730as	9760pa	
			11760pa	11980as	13650eu	13790eu	
			17490eu				
1200	1300		Costa Rica, University Network		9725va	11870va	

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1200	1300		13750va			
1200	1300		Ecuador, HCJB	12005am	21455am	
1200	1300	vi/o	Italy, IRRS 15725va			
1200	1300		Malaysia, Radio	7295as		
1200	1300	DRM	Netherlands, Radio	7240no		
1200	1300		Nigeria, Voice of	15120af		
1200	1300		Papua New Guinea, Catholic Radio		4960do	
1200	1300		Papua New Guinea, NBC		4890do	
1200	1300	vi	Papua New Guinea, Wantok Radio Light		7120va	
1200	1300		Singapore, Radio Singapore Intl		6080os	6150os
1200	1300		South Korea, Radio Korea Intl		9650va	
1200	1300		Taiwan, Radio Taiwan Intl		7130as	
1200	1300	DRM	UK, BBC World Service		7320eu	
1200	1300		UK, BBC World Service		6190af	9605om
				11760me	11865om	11940af
				15485af	15565eu	15575me
				17640me	17830me	17885af
1200	1300		USA, AFRTS	4319usb	5446usb	5765usb
				7590usb	7812usb	12133usb
				12133usb	12579usb	13855usb
1200	1300		USA, KAIJ Dallas TX	5755na		
1200	1300		USA, KNLS Anchor Point AK		9615os	
1200	1300		USA, KTBN Salt Lake City UT		7505na	
1200	1300		USA, KWHR Naalehu HI		11555as	
1200	1300		USA, Voice of America 6160va		9645va	9760va
				15240va		
1200	1300		USA, WBCQ Kennebunk ME		17495na	
1200	1300		USA, WBOH Newport NC		5920am	
1200	1300		USA, WEWN Birmingham AL		5745na	11530na
				13615na		
1200	1300		USA, WHRA Greenbush ME		15310na	
1200	1300	as	USA, WHRI Noblesville IN		9840am	11785am
1200	1300		USA, WINB Red Lion PA		9320am	
1200	1300		USA, WJIE Louisville KY		7490am	
1200	1300		USA, WRMI Miami FL 7385am			
1200	1300		USA, WTJC Newport NC		9370na	
1200	1300		USA, WWCR Nashville TN		7465na	13845na
				9985na	15825na	
1200	1300	s	USA, WWRB Manchester TN		9320na	
1200	1300		USA, WYFR Okeechobee FL		5950na	5985na
				17505na	17750na	
1200	1300		Zambia, Christian Voice		9555af	
1205	1220	m	Austria, Radio Austria Intl		6155va	13730va
				17715va		
1215	1230	twhf	Austria, Radio Austria Intl		17715va	
1215	1300		Egypt, Radio Cairo	17835as		
1230	1245	mtwhf	Guam, TWR/KTWR	11750as		
1230	1258		Vietnam, Voice of	9840os	12020as	
1230	1300		Australia, HCJB	15405as		
1230	1300		Bangladesh, Banglo Betar		7185as	
1230	1300		Sweden, Radio	13580va	15240na	15735va
1230	1300		Thailand, Radio	9600va		
1230	1300		Turkey, Voice of	15225eu	15535va	
1235	1300	as	Austria, Radio Austria Intl		17715va	
1245	1300	twhf	Austria, Radio Austria Intl		6155eu	13730eu
				17715va		

1300 UTC - 9AM EDT / 8AM CDT / 6AM PDT

1300	1327		Czech Rep, Radio Prague Intl	13580eu	21745af	
1300	1329		Canada, Radio Canada Intl	9660os	15170os	
1300	1330	DRM	Canada, Radio Canada Intl	7240eu		
1300	1330		Ecuador, HCJB	12005om	21455am	
1300	1330		Egypt, Radio Cairo	17835os		
1300	1335		Turkey, Voice of	15225eu	15535va	
1300	1356		Romania, Radio Romania Intl		11830eu	15105eu
1300	1357	DRM	China, China Radio Intl		7250va	11810va
1300	1400		Anguilla, Caribbean Beacon		11775am	
1300	1400		Australia, Radio	5995os	6020as	9560pa
				9580pa	9590pa	
1300	1400		Australia, Voice Intl	13685as		
1300	1400	DRM	Austria, Premur	11815eu		
1300	1400	as	Canada, CBC NQ SW Service		9625na	
1300	1400		Canada, CFRX Toronto ON		6070do	
1300	1400		Canada, CFVP Calgary AB		6030do	
1300	1400		Canada, CKZN St John's NF		6160do	
1300	1400		Canada, CKZU Vancouver BC		6160do	
1300	1400	as	Canada, Radio Canada Intl		9515am	13655am
				17800am		
1300	1400		China, China Radio Intl		9650am	11760po
				11900pa	11980as	13790eu
				17490eu	17625co	15260am
1300	1400		Costa Rica, University Network		9725va	11870vo
				13750va		
1300	1400		Germany, Deutsche Welle		6140eu	
1300	1400	vi/a	Italy, IRRS 15725va			
1300	1400		Jordan, Radio		11690na	
1300	1400		Malaysia, Radio	7295as		
1300	1400	DRM	Netherlands, Radio	7240eu		
1300	1400		New Zealand, Radio NZ Intl		6095pa	
1300	1400		Nigeria, Voice of	15120af		
1300	1400		North Korea, Voice of	4405eu	9335eu	11710na
				13760no	15245eu	

1300	1400		Papua New Guinea, Catholic Radio		4960do	
1300	1400		Papua New Guinea, NBC		4890do	
1300	1400	vi	Papua New Guinea, Wantok Radio Light		7120va	
1300	1400		Singapore, Radio Singapore Intl		6080os	6150os
1300	1400		South Korea, Radio Korea Intl		9700os	9770os
1300	1400	DRM	UK, BBC World Service		7320eu	
1300	1400		UK, BBC World Service		6190af	6195as
				9740os	11760me	11940af
				15420af	15485af	15565va
				17640va	17760as	17790as
				17885af	21470af	
1300	1400		USA, AFRTS		4319usb	5446usb
					7590usb	7812usb
					12133usb	12579usb
1300	1400		USA, KAIJ Dallas TX		5755na	
1300	1400		USA, KTBN Salt Lake City UT		7505na	
1300	1400		USA, KWHR Naalehu HI		11555as	
1300	1400		USA, Voice of America 9645va		9760va	
1300	1400		USA, WBCQ Kennebunk ME		17495na	
1300	1400		USA, WBOH Newport NC		5920am	
1300	1400		USA, WEWN Birmingham AL		5745na	11530na
				13615na		
1300	1400		USA, WHRA Greenbush ME		15310na	
1300	1400	mtwhf	USA, WHRI Noblesville IN		15285am	
1300	1400		USA, WINB Red Lion PA		12133am	12570am
1300	1400		USA, WJIE Louisville KY		7490am	
1300	1400		USA, WRMI Miami FL 7385am			
1300	1400		USA, WTJC Newport NC		9370na	
1300	1400		USA, WWCR Nashville TN		7465na	13845na
				9985na	15825na	
1300	1400		USA, WYFR Okeechobee FL		11830va	11865va
				11910va	17750va	
1300	1400		Zambia, Christian Voice		9555af	
1330	1400	as	Australia, HCJB	15405as		
1330	1400	irreg	Cuba, Radio Havana	9550va	12000va	13680va
1330	1400		Guam, AWR/KSDA	11980as		
1330	1400	mwhta	Guam, AWR/KSDA	15275as		
1330	1400		India, All India Radio	9690as	11620as	13710as
1330	1400		Laos, National Radio	7145as		
1330	1400		Sweden, Radio	15240na	15735va	
1330	1400		Uzbekistan, Radio Tashkent		7285as	15295as
				17775as		

1400 UTC - 10AM EDT / 9AM CDT / 7AM PDT

1400	1415		Russia, FEBA	9500as		
1400	1430		Australia, Radio	5995as	6080as	7240as
				9590as	9625pa	
1400	1430	mtwhf	Germany, Deutsche Welle		15725na	
1400	1430		Oman, Radio Oman	15140as		
1400	1430		Thailand, Radio	9830vo		
1400	1430	DRM/f	UK, Radio France Intl	9770eu		
1400	1430	DRM/o	UK, Radio NZ Intl	9770eu		
1400	1459	as	Canada, Radio Canada Intl		9515am	13655am
				17800am		
1400	1500		Anguilla, Caribbean Beacon		11775am	
1400	1500		Australia, Voice Intl	15205as		
1400	1500	as	Canada, CBC NQ SW Service		9625na	
1400	1500		Canada, CFRX Toronto ON		6070do	
1400	1500		Canada, CFVP Calgary AB		6030do	
1400	1500		Canada, CKZN St John's NF		6160do	
1400	1500		Canada, CKZU Vancouver BC		6160do	
1400	1500		China, China Radio Intl		9590as	11675os
				11765as	13685af	13740no
				13790eu	17630af	17650eu
1400	1500	DRM	China, China Radio Intl		9610va	
1400	1500		Costa Rica, University Network		9725va	11870va
				13750va		
1400	1500		France, Radio France Intl		9580va	15615va
1400	1500		Germany, Deutsche Welle		6140eu	
1400	1500	vi/o	Greece, Voice of	9375eu	9420eu	9775eu
				12105eu	15630eu	15650eu
1400	1500		India, All India Radio	9690os	11620os	13710as
1400	1500	vi/a	Italy, IRRS 15725va			
1400	1500		Japan, Radio	7200as	11730os	11840pa
1400	1500		Jordan, Radio	11690no		
1400	1500		Malaysia, Radio	7295as		
1400	1500		Netherlands, Radio	9345vo	9890va	11835va
1400	1500		New Zealand, Radio NZ Intl		6095pa	
1400	1500		Nigeria, Voice of	15120af		
1400	1500	vi	Papua New Guinea, Wantok Radio Light		7120va	
1400	1500	DRM	Russia, Voice of	9480eu		
				6205as	7390as	9745as
				11755as	15605as	17645as
1400	1500		Singapore, Mediacorp Radio		6150do	
1400	1500		South Africa, Channel Africa		11825af	
1400	1500		Taiwan, Radio Taiwan Intl		15265as	
1400	1500	DRM	UK, BBC World Service		7320eu	
1400	1500		UK, BBC World Service		6190af	6195os
				7105os	9740as	11940af
				15485af	15565va	17640va
				17830af	21470af	21660af
1400	1500		USA, AFRTS		4319usb	5446usb

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1400	1500		7590usb	7812usb	12133usb	12579usb	
1400	1500		12133usb	12579usb	13362usb	13855usb	
1400	1500		USA, KAIJ Dallas TX	13815na			
1400	1500		USA, KJES Vado NM	11715na			
1400	1500		USA, KNLS Anchor Point AK		9555as		
1400	1500		USA, KTBN Salt Lake City UT	7505na		15590na	
1400	1500		USA, KWHR Naalehu HI	11555as			
1400	1500		USA, Voice of America	6160va	7125va	9760va	
1400	1500		USA, WBCQ Kennebunk ME		17495na		
1400	1500		USA, WBOH Newport NC		5920am		
1400	1500		USA, WEWN Birmingham AL		9955na	11530na	
1400	1500		USA, WHRA Greenbush ME		15310na		
1400	1500		USA, WHRI Noblesville IN		9840am	15285cm	
1400	1500		USA, WINB Red Lion PA		13570am		
1400	1500		USA, WJIE Louisville KY		7490am		
1400	1500		USA, WRMI Miami FL	7385am			
1400	1500		USA, WTJC Newport NC		9370no		
1400	1500		USA, WWCR Nashville TN		9985no	12160ro	
1400	1500		USA, WYFR Okeechobee FL	13845na	15825na		
1400	1500		USA, WYFR Okeechobee FL	13695va	17750va		
1400	1500		Zambia, Christian Voice		9555of		
1415	1430		Nepal, Radio	3230as	5005as	6100as	
1430	1500		Australia, Radio	5995as	6080as	7240as	
1430	1500	a	Germany, Pan American BC	9475as 9590pa	9625pa	15650as	
1430	1500	DRM/s	UK, BYU Radio	9565eu			
1430	1500	DRM	UK, Radio Australia	9770eu			
1430	1500	DRM/f	UK, Radio Korea Intl	9770eu			

1500 UTC - 11AM EDT / 10AM CDT / 8AM PDT

1500	1515		Russia, FEBA	7320as			
1500	1528	s	Hungary, Radio Budapest		6025eu	9655eu	
1500	1528		Vietnam, Voice of	9550va	9840va	12020va	
1500	1530		Mongolia, Voice of	12015eu			
1500	1530		UK, BBC World Service		6190af	6195as	
1500	1530		UK, BBC World Service		7105as 11690af	11860af	11940af 12095af
1500	1530		UK, BBC World Service		15310as	15400af	15420af 15485af
1500	1530		UK, BBC World Service		17790as	17790as	21470af 21490af
1500	1530		UK, BBC World Service		21660af		
1500	1555		South Africa, Channel Africa		17770af		
1500	1557		Canada, Radio Canada Intl		11772as	15360as	
1500	1557		Netherlands, Radio	9345va	9890va	11835va	
1500	1559	as	Canada, Radio Canada Intl		9515am	13655am	
1500	1600		Anguilla, Caribbean Beacon		11775am		
1500	1600		Australia, Radio	5995as	6080as	7240as	
1500	1600		Australia, Radio	9475as 9590pa	9625pa		
1500	1600		Australia, Voice Intl	15205as			
1500	1600	as	Canada, CBC NQ SW Service		9625no		
1500	1600		Canada, CFRX Toronto ON		6070do		
1500	1600		Canada, CFVP Calgary AB		6030do		
1500	1600		Canada, CKZN St John's NF		6160do		
1500	1600		Canada, CKZU Vancouver BC		6160do		
1500	1600		China, China Radio Intl		6100af	7160as	
1500	1600		China, China Radio Intl		11775as	11965eu	13640eu 13685af
1500	1600		China, China Radio Intl		13740no	17490eu	
1500	1600	DRM	China, China Radio Intl		9610va		
1500	1600		Costa Rica, University Network		9725va	11870va	
1500	1600		Costa Rica, University Network		13750va		
1500	1600	a	Germany, Bible Voice Broadcasting		17510as		
1500	1600		Germany, Deutsche Welle		6140eu		
1500	1600	vi/ os	Greece, Voice of	9375va	9420va	9775va	
1500	1600		Greece, Voice of	12105va	15630va		
1500	1600		Guam, TWR/KTWR	12105as			
1500	1600		Japan, Radio	6190as	7200as	9505va	
1500	1600		Japan, Radio	11730as			
1500	1600		Jordan, Radio	11690no			
1500	1600		Malaysia, Radio	7295as			
1500	1600		New Zealand, Radio NZ Intl		6095pa		
1500	1600		North Korea, Voice of	3560a2	4405eu	9335eu	
1500	1600		North Korea, Voice of	11710na	13760va	15245va	
1500	1600	vi	Papua New Guinea, Wantok Radio Light		7120va		
1500	1600		Russia, Voice of	4965me	4975me	7315af	
1500	1600		Russia, Voice of	7325me	9810eu	11985me	
1500	1600		Singapore, Mediacorp Radio		6150do		
1500	1600		South Africa, Channel Africa		11825af		
1500	1600		UK, BBC World Service		15565eu	15575me	
1500	1600	DRM/f	UK, Radio Taiwan Intl	9770eu			
1500	1600	vi/ mtwhf	UK, Sudan Radio Service		15530va		
1500	1600		USA, AFRTS	4319usb	5446usb	5765usb	
1500	1600		USA, AFRTS	7590usb	7812usb	12133usb	12579usb
1500	1600		USA, AFRTS	12133usb	12579usb	13362usb	13855usb
1500	1600		USA, KAIJ Dallas TX	13815na			
1500	1600		USA, KJES Vado NM	11715na			
1500	1600		USA, KTBN Salt Lake City UT		15590na		
1500	1600		USA, KWHR Naalehu HI		11555as		

1500	1600		USA, Voice of America	7125va	9825va	9850af	
1500	1600		USA, Voice of America	15195va	15445va	15580af	17715va
1500	1600	mtwhf	USA, Voice of America	9645vo	13690va	15105va	
1500	1600		USA, WBCQ Kennebunk ME		17495na		
1500	1600		USA, WBOH Newport NC		5920am		
1500	1600		USA, WEWN Birmingham AL		9955na	11530na	
1500	1600		USA, WHRA Greenbush ME		17640na		
1500	1600		USA, WHRI Noblesville IN		12020am	15285am	
1500	1600	as	USA, WINB Red Lion PA		9740am		
1500	1600	mtwhf	USA, WINB Red Lion PA		13570am		
1500	1600		USA, WJIE Louisville KY		7490am		
1500	1600		USA, WRMI Miami FL	7385am			
1500	1600		USA, WTJC Newport NC		9370no		
1500	1600		USA, WWCR Nashville TN		9985no	12160no	
1500	1600		USA, WYFR Okeechobee FL	13845na	15825na		
1500	1600		USA, WYFR Okeechobee FL	15520va	15770va	11830va	11910va
1500	1600		Zambia, Christian Voice		9555af		
1505	1520	m	Austria, Radio Austria Intl		13775na		
1505	1530	as	Austria, Radio Austria Intl		13775na		
1515	1530	twhf	Austria, Radio Austria Intl		13775na		
1515	1600		Russia, FEBA	7320as			
1530	1600	mwh	Germany, Bible Voice Broadcasting		17510as		
1530	1600		Iran, Voice of the Islamic Rep		9635as	11650as	
1530	1600	f	Russia, FEBA	9850as			
1530	1600		Russia, TWR	7535eu	7560as		
1530	1600	mtwhf	South Korea, Radio Korea Intl		15725na		
1530	1600		UAE, AWR Africa	15225as			
1530	1600		UK, BBC World Service		6190af	11940af	
1530	1600		UK, BBC World Service	12095af	15400af	15485af	21470af
1530	1600		UK, BBC World Service	21660af			
1530	1600		USA, Voice of America	6160va	9590va	9760va	
1530	1600		USA, Voice of America	9845va 12040va	15550va		
1530	1600		Vatican City, Vatican Radio		12065as	13765as	
1530	1600		Vatican City, Vatican Radio	15235as			
1535	1300	as	Austria, Radio Austria Intl		13775na		
1540	1600	mtwhf	Germany, Bible Voice Broadcasting		13590me		
1545	1600	m	Austria, Radio Austria Intl		13775na		
1545	1600	twhf	Austria, Radio Austria Intl		13775na		
1545	1600	as	Germany, Bible Voice Broadcasting		13590me		

1600 UTC - 12PM EDT / 11AM CDT / 9AM PDT

1600	1615	mtwhf	Germany, Bible Voice Broadcasting		13590me		
1600	1615		Pakistan, Radio	4790va	5027af	5080va	
1600	1615		Pakistan, Radio	11570va	15100va		
1600	1627		Czech Rep, Radio Prague Intl		5930eu	17485af	
1600	1627		Iran, Voice of the Islamic Rep		9635as	11650as	
1600	1628		Vietnam, Voice of	7280va	9550va	9730va	
1600	1630	a	Germany, Pan American BC		13820me		
1600	1630		Guam, AWR/KSDA	11640as	11680as		
1600	1630		Guam, TWR/KTWR	12105as			
1600	1630		Jordan, Radio	11690na			
1600	1630		Myanmar, Radio	9730do			
1600	1645		Russia, FEBA	9850as			
1600	1650		New Zealand, Radio NZ Intl		6095pa		
1600	1700		Anguilla, Caribbean Beacon		11775am		
1600	1700		Australia, Radio	5995as	6080as	7240as	
1600	1700		Australia, Radio	9475as 9710as			
1600	1700		Australia, Voice Intl	11840as	13635as	15205as	
1600	1700	DRM/s	Austria, CVC International		9705eu		
1600	1700	a	Canada, CBC NQ SW Service		9625na		
1600	1700		Canada, CFRX Toronto ON		6070do		
1600	1700		Canada, CFVP Calgary AB		6030do		
1600	1700		Canada, CKZN St John's NF		6160do		
1600	1700		Canada, CKZU Vancouver BC		6160do		
1600	1700		China, China Radio Intl		6100af	9570af	
1600	1700		China, China Radio Intl		11900af	11965eu	13760eu
1600	1700	DRM	China, China Radio Intl		17490eu		
1600	1700		Costa Rica, University Network		11870va	13750va	
1600	1700		Ethiopia, Radio	5990af	7110af	7165af 9560af	
1600	1700		Ethiopia, Radio	9704af 11800af			
1600	1700		France, Radio France Intl		7170af	15160af	
1600	1700		France, Radio France Intl	15605af	17605af		
1600	1700	as	Germany, Bible Voice Broadcasting		13590me		
1600	1700		Germany, Deutsche Welle		6140as	7225as	
1600	1700		Germany, Deutsche Welle	17595as			
1600	1700	vi	Germany, Overcomer Ministries		9845eu		
1600	1700		Greece, Voice of	7475vo	9420vo	12105vo	
1600	1700		Greece, Voice of	15630va	17705va		
1600	1700		Malaysia, Radio	7295as			
1600	1700		North Korea, Voice of	3560va	9990me	11545vo	
1600	1700	vi	Papua New Guinea, Wantok Radio Light		7120va		
1600	1700		Russia, Voice of	6070vo	9405as	11640as	
1600	1700		Russia, Voice of	11985af	12055vo	12115va	15540vo
1600	1700		South Korea, Radio Korea Intl		5975va	9870va	
1600	1700		Taiwan, Radio Taiwan Intl		11815as		
1600	1700		UK, BBC World Service		3915as	5975as	
1600	1700		UK, BBC World Service	6190af 6195as	7160as	9410eu	9510as
1600	1700		UK, BBC World Service	11940af	12095vo	15105as	15310as

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			15400af	15420af	15485af	15565va			
			17790as	17820af	17830af	21470af			
1600	1700	DRM/w	21490af	21660af					
1600	1700	DRM/f	UK, BYU Radio	9770eu					
1600	1700	vl/ mtwhf	UK, NHK/Radio Japan	9770eu					
1600	1700		UK, Sudan Radio Service		15530va				
1600	1700		UK, Voice Africa	13820af					
1600	1700		USA, AFRTS	4319usb	5446usb	5765usb			
			7590usb	7812usb	12133usb	12579usb			
			12133usb	12579usb	13362usb	13855usb			
1600	1700		USA, KAIJ Dallas TX	13815na					
1600	1700		USA, KJES Vado NM	11715na					
1600	1700		USA, KTBN Salt Lake City UT		15590na				
1600	1700		USA, KWHR Naalehu HI		11555as				
1600	1700		USA, Voice of America	4930af	6160va	7125va			
			9700va	9760va	9825va	9850af	12080va		
			13600va	15195va	15445va	15580af			
			17895va						
1600	1700		USA, WBCQ Kennebunk ME	9330na	17495na				
1600	1700		USA, WBOH Newport NC	5920am					
1600	1700		USA, WEWN Birmingham AL	15685va	15745va				
1600	1700		USA, WHRA Greenbush ME	17640na					
1600	1700		USA, WHRI Nablesville IN	12020am	15285am				
1600	1700	as	USA, WINB Red Lion PA	9740am					
1600	1700	mtwhf	USA, WINB Red Lion PA	13570as					
1600	1700		USA, WJIE Louisville KY	7490am					
1600	1700	mtwhfa	USA, WMLK Bethel PA	9265eu					
1600	1700		USA, WRMI Miami FL	7385am					
1600	1700		USA, WTJC Newport NC		9370na				
1600	1700		USA, WWCR Nashville TN	9985na	12160na				
			13845na	15825na					
1600	1700		USA, WWRB Manchester TN	9320na	12170na				
1600	1700	mtwhf	USA, WWRB Manchester TN	15250na					
1600	1700		USA, WYFR Okeechobee FL	6085va	11830va				
			11865va	13695va	15520va	17750va			
			18980va	21455va	21525va				
1600	1700		Zambia, Christian Voice	4965af					
1615	1630		Vatican City, Vatican Radio	4005eu	5885eu				
			7250eu	9645me	15595me				
1615	1700	as	UK, BBC World Service		11690af				
1630	1645	h	Germany, Bible Voice Broadcasting	13590me					
1630	1700		Egypt, Radio Cairo	11880af					
1630	1700	t	Germany, Bible Voice Broadcasting	13590me					
1630	1700		Guam, AWR/KSDA	11975as					
1630	1700		Slovakia, Radio Slovakia Intl	5920eu	7345eu				
1651	1700		New Zealand, Radio NZ Intl	6095pa					

1700 UTC - 1PM EDT / 12PM CDT / 10AM PDT

1700	1710	mtwh	Moldova, Radio PMR	5960eu					
1700	1720	f	Moldova, Radio PMR	5960eu					
1700	1727		Czech Rep, Radio Prague Intl		5930eu	17485af			
1700	1728		Vietnam, Voice of	9725eu					
1700	1730		France, Radio France Intl		15605af	17605af			
1700	1730	DRM	Netherlands, Radio	5955eu					
1700	1730		Swaziland, TWR	3200af					
1700	1745		UK, BBC World Service		3255af	6005af	6190af		
			9630af	12095af	15105af	15400af	15420af		
			17820af		17830af				
1700	1755		South Africa, Channel Africa	15325af					
1700	1759		Poland, Radio Polonia	5965eu	7285eu				
1700	1800		Anguilla, Caribbean Beacon	11775am					
1700	1800		Australia, Radio	5995as	6080as	9475as			
			9580as	9710as					
1700	1800		Australia, Voice Intl	11840as	13635as	15205as			
1700	1800	a	Canada, CBC NQ SW Service		9625na				
1700	1800		Canada, CFRX Toronto ON		6070do				
1700	1800		Canada, CFVP Calgary AB		6030do				
1700	1800		Canada, CKZN St John's NF		6160do				
1700	1800		Canada, CKZU Vancouver BC		6160do				
1700	1800		China, China Radio Intl	9695eu		11940eu			
			13760eu						
1700	1800	DRM	China, China Radio Intl		12080va				
1700	1800		Costa Rica, University Network		11870va	13750va			
1700	1800		Egypt, Radio Cairo	11880af					
1700	1800		Eat Guinea, Radio Africa		15190af				
1700	1800	wf	Germany, Bible Voice Broadcasting	13590me					
1700	1800	as	Germany, Bible Voice Broadcasting	9430me					
1700	1800	DRM	Germany, Deutsche Welle	6140eu					
1700	1800		Germany, Overcomer Ministries	9845eu					
1700	1800	vi	Greece, Voice of	7475va	9420va	12105va			
			15630va	17705va					
1700	1800		Japan, Radio	9535va	11970eu	15355af			
1700	1800		Malaysia, Radio	7295as					
1700	1800		New Zealand, Radio NZ Intl		6095pa				
1700	1800		Nigeria, Voice of	15120vo					
1700	1800	vi	Papua New Guinea, Wantak Radio Light			7120vo			
1700	1800		Russia, Voice of	7390eu	9405os	9820eu			
			9890eu	11510af	11985af				
			Russia, Voice of	11675eu					
1700	1800	as	UK, BBC World Service		3915as	5975as			
1700	1800		6195eu	7160os	9510os	12095va	15310as		

			15565va						
1700	1800	vl/ mtwhf	UK, Sudan Radio Service						
1700	1800		UK, Voice Africa	13820af					
1700	1800		USA, AFRTS	4319usb	5446usb	5765usb			
			7590usb	7812usb	12133usb	12579usb			
			12133usb	12579usb	13362usb	13855usb			
1700	1800		USA, KAIJ Dallas TX	13815na					
1700	1800		USA, KTBN Salt Lake City UT		15590na				
1700	1800		USA, KWHR Naalehu HI		11555as				
1700	1800		USA, Voice of America	6160va	7125va	9345va			
			9850af	15410af	15580af				
1700	1800		USA, WBCQ Kennebunk ME	9330na	17495na				
1700	1800		USA, WBOH Newport NC	5920am					
1700	1800		USA, WEWN Birmingham AL	15685va	15745va				
1700	1800		USA, WHRA Greenbush ME	17640na					
1700	1800		USA, WHRI Nablesville IN	12020am	15285am				
1700	1800	as	USA, WINB Red Lion PA	9740am					
1700	1800	mtwhf	USA, WINB Red Lion PA	13570am					
1700	1800		USA, WJIE Louisville KY	7490am					
1700	1800	mtwhfa	USA, WMLK Bethel PA	9265eu					
1700	1800		USA, WMLK Bethel PA	15265eu					
1700	1800		USA, WRMI Miami FL	7385am					
1700	1800		USA, WTJC Newport NC		9370na				
1700	1800		USA, WWCR Nashville TN	9985na	12160na				
			13845na	15825na					
1700	1800	mtwhf	USA, WWRB Manchester TN	9320na	12170na				
1700	1800		USA, WWRB Manchester TN	15250na					
1700	1800		USA, WYFR Okeechobee FL	6085va	11830va				
			11865va	13695va	15520va	17750va			
			18980va	21455va	21525va				
1730	1800		Bulgaria, Radio	9500eu	11500eu				
1730	1800		Guam, AWR/KSDA	9385me					
1730	1800		Liberia, ELWA	4760do					
1730	1800		Philippines, Radio Pilipinas		11720va	15190va			
			17720va						
1730	1800		Swaziland, TWR	3200af	9500af				
1730	1800		Sweden, Radio	6065va					
1730	1800	mtwhf	USA, Voice of America	4930af	11975af	17895af			
1730	1800		Vatican City, Vatican Radio	11625af	13765af				
			15570af						
1740	1800	as	USA, Voice of America	4930af	11975af	17895af			
1745	1800		Bangladesh, Bangla Betar	7185eu					
1745	1800		India, All India Radio	7410eu	9445af	9950eu			
			11620eu	11935af	13605af	15075af			
			15155af	17670af					
1745	1800	vi	Libya, Voice of Africa	15220af	15615af	15660af			
			17695af						
1745	1800		UK, BBC World Service		3255af	6190af			
			12095af	15105af	15400af	15420af			
			17820af	17830af	21470af				

1800 UTC - 2PM EDT / 1PM CDT / 11AM PDT

1800	1810		Zanzibar, Radio Tanzania		11735af				
1800	1815	a	Germany, Bible Voice Broadcasting		11965as				
1800	1828		Vietnam, Voice of	7280va	9730vo				
1800	1830	w f	Austria, AWR Europe	15280af					
1800	1830	DRM/a	Canada, Voice of NASB		11900na				
1800	1830		Egypt, Radio Cairo	11880af					
1800	1830								

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1800	1900	Germany, Overcomer Ministries	13810me	
1800	1900	India, All India Radio 7410eu	9445af	9950eu
		11620eu	11935af	13605af
		15155af	17670af	
1800	1900	Liberia, ELWA	4760da	
1800	1900	Malaysia, Radio	7295as	
1800	1900	Nigeria, Voice of	15120va	
1800	1900	North Korea, Voice of	4405eu	13760eu
1800	1900	Papua New Guinea, Wantak Radio Light		7120va
1800	1900	Philippines, Radio Pilipinas	11720va	15190va
		17720va		
1800	1900	Russia, Voice of	9480eu	9745af
		11510af		9890eu
1800	1900	Taiwan, Radio Taiwan Intl	3965eu	
1800	1900	UK, BBC World Service	6195eu	9410eu
		12095me	15310me	
1800	1900	USA, AFRTS	4319usb	5446usb
		7590usb	7812usb	5765usb
		12133usb	12579usb	12579usb
		12133usb	12579usb	13855usb
1800	1900	USA, KAIJ Dallas TX	13815na	
1800	1900	USA, KTBN Salt Lake City UT	15590na	
1800	1900	USA, Voice of America	4930af	11975cf
		15410af	1580af	17895af
1800	1900	USA, WBCQ Kennebunk ME	7415na	9330nc
		17495na		
1800	1900	USA, WBOH Newport NC	5920am	
1800	1900	USA, WEWN Birmingham AL	11530va	13615va
		15685va	15745va	
1800	1900	USA, WHRA Greenbush ME	17640na	
1800	1900	USA, WHRI Noblesville IN	15285am	15785am
1800	1900	USA, WINB Red Lion PA	9740am	
1800	1900	USA, WINB Red Lion PA	13570am	
1800	1900	USA, WJIE Louisville KY	7490am	
1800	1900	USA, WMLK Bethel PA	9265eu	
1800	1900	USA, WMLK Bethel PA	15265eu	
1800	1900	USA, WRMI Miami FL	7385am	
1800	1900	USA, WTJC Newport NC		9370na
1800	1900	USA, WWCR Nashville TN		9975na
		13845na	15825na	12160na
1800	1900	USA, WWRB Manchester TN		9320na
		12170na		11920na
1800	1900	USA, WWRB Manchester TN	15250na	
1800	1900	USA, WYFR Okeechobee FL	13695eu	13730eu
		13800eu	17525eu	18980va
1800	1900	Yemen, Rep of Yemen Radio	9780me	
1800	1900	Zambia, Christian Voice	4965af	
1815	1830	Libya, Voice of Africa	9485af	11635af
		11860af	15660af	11715af
1830	1845	Sweden, IBRA Radio	9485eu	
1830	1900	Greece, Voice of	7475va	9420va
		15630va	17705va	12105va
1830	1900	Serbia & Montenegro, Intl Radio	6100eu	
1830	1900	Slovakia, Radio Slovakia Intl	5920eu	6055eu
1830	1900	South Africa, AWR Africa	9590af	
1830	1900	Turkey, Voice of	9785eu	
1830	1900	UK, BBC World Service	6005af	3255af
		6190af	9410af	3915as
		15400af	15420af	9630af
				12095af
1845	1858	Albania, Radio Tirana	6115eu	21470af
1845	1900	Congo, RTV Congolaise	4765af	5985af
1851	1900	New Zealand, Radio NZ Intl	9845pa	

1900 UTC - 3PM EDT / 2PM CDT / 12PM PDT

1900	1915	Congo, RTV Congolaise	4765af	5985af
1900	1920	Turkey, Voice of	9785eu	
1900	1925	Israel, Kol Israel	11590va	15615va
1900	1928	Hungary, Radio Budapest	3975eu	15640va
1900	1928	Vietnam, Voice of	7280va	6025eu
1900	1930	Germany, Bible Voice Broadcasting	6015me	
1900	1930	Germany, Bible Voice Broadcasting	9430af	
1900	1930	Germany, Universal Life	13820me	
1900	1930	Lithuania, Radio Vilnius	9710eu	
1900	1930	Philippines, Radio Pilipinas	11720va	15190va
		17720va		
1900	1945	India, All India Radio	7410eu	9445af
		11620eu	11935af	9950eu
		15155af	17670af	13605af
1900	1950	New Zealand, Radio NZ Intl	9845pa	
1900	2000	Anguilla, Caribbean Beacon	11775am	
1900	2000	Australia, Radio	6080as	7240as
		9580as	9710as	9500as
1900	2000	Australia, Voice Intl	11685as	
1900	2000	Canada, CFRX Toronto ON	6070do	
1900	2000	Canada, CFVP Calgary AB	6030do	
1900	2000	Canada, CKZN St John's NF	6160do	
1900	2000	Canada, CKZU Vancouver BC	6160do	
1900	2000	Canada, Radio Canada Intl	17765am	
1900	2000	China, China Radio Intl	7295va	9440cf
		11940eu		
1900	2000	China, China Radio Intl	12080va	
1900	2000	Costa Rica, University Network	11870va	1375Cva
1900	2000	Eq Guinea, Radio Africa	15190af	

1900	2000	Germany, Deutsche Welle	13780af	15520af
1900	2000	Germany, Overcomer Ministries	13810ms	
1900	2000	Ghana, Ghana BC Corp	3366do	4915do
1900	2000	Italy, IRRS 5775va		
1900	2000	Liberia, ELWA	4760do	
1900	2000	Malaysia, Radio	7295as	
1900	2000	Namibia, Namibian BC Corp	3270do	3290do
		6060do	6175do	
1900	2000	Netherlands, Radio	7120af	9895af
		17810af		11655af
1900	2000	Netherlands, Radio	15315na	17660na
1900	2000	Nigeria, Radio/Ibadan	6050do	17735na
1900	2000	Nigeria, Radio/Kaduna	4770do	6090do
1900	2000	Nigeria, Radio/Lagos	3326do	4990do
1900	2000	Nigeria, Voice of	7255va	
1900	2000	North Korea, Voice of	4405eu	9975eu
		11535eu		11910eu
1900	2000	Papua New Guinea, Catholic Radio	4960do	
1900	2000	Papua New Guinea, NBC	4890do	
1900	2000	Papua New Guinea, Wantak Radio Light		7120va
1900	2000	Russia, Voice of	7380eu	9890eu
1900	2000	Sierra Leone, Radio UNAMSIL	6137do	
1900	2000	Sierra Leone, SLBS	3316do	
1900	2000	Solomon Islands, SIBC	5020do	9545do
1900	2000	South Africa, Radio League	3215af	
1900	2000	South Korea, Radio Korea Intl	5975va	7275eu
1900	2000	Sri Lanka, SLBC	6010eu	
1900	2000	Swaziland, TWR	3200af	
1900	2000	Thailand, Radio	7155eu	
1900	2000	Uganda, Radio	4976do	5026do
1900	2000	UK, BBC World Service	6190af	3255af
		6195eu	9410va	6005af
		15310me	15400af	9630af
1900	2000	USA, AFRTS	4319usb	17830af
		7590usb	7812usb	5446usb
		12133usb	12579usb	5765usb
		12133usb	12579usb	12133usb
		12133usb	12579usb	12579usb
		12133usb	12579usb	13855usb
1900	2000	USA, KAIJ Dallas TX	13815na	
1900	2000	USA, KJES Vado NM	15385na	
1900	2000	USA, KTBN Salt Lake City UT		15590na
1900	2000	USA, Voice of America	4930af	6040af
		9850af	11975af	9670va
		15445af	15580af	13760af
				15410af
1900	2000	USA, WBCQ Kennebunk ME	7415na	9330na
		17495na		
1900	2000	USA, WBOH Newport NC	5920am	
1900	2000	USA, WEWN Birmingham AL	11530va	13615va
		15685va	15745va	
1900	2000	USA, WHRA Greenbush ME	15665na	
1900	2000	USA, WHRI Noblesville IN	15285am	15785am
1900	2000	USA, WINB Red Lion PA	9740am	
1900	2000	USA, WINB Red Lion PA	13570am	
1900	2000	USA, WJIE Louisville KY	7490am	
1900	2000	USA, WMLK Bethel PA	9265eu	
1900	2000	USA, WMLK Bethel PA	15265eu	
1900	2000	USA, WRMI Miami FL	7385am	
1900	2000	USA, WTJC Newport NC		9370na
1900	2000	USA, WWCR Nashville TN		9975na
		13845na	15825na	12160na
1900	2000	USA, WWRB Manchester TN		9320na
		12170na		11920na
1900	2000	USA, WWRB Manchester TN	15250na	
1900	2000	USA, WYFR Okeechobee FL	3230af	6085af
		13695af	13800af	17845af
		18930af	18980va	
1900	2000	Zambia, Christian Voice	4965af	
1900	2000	Zimbabwe, ZBC Corp	5975do	
1915	1930	Libya, Voice of Africa	11635af	11715cf
1925	1945	Armenia, Voice of	4810eu	9965as
1930	1945	Libya, Voice of Africa	11715af	
1930	2000	Belarus, Radio	7105eu	7280eu
1930	2000	Germany, Bible Voice Broadcasting	9430af	
1930	2000	Iran, Voice of the Islamic Rep	7205eu	9800eu
		9925af	11860af	
1930	2000	Sweden, Radio	6065va	
1930	2000	UK, Salama Radio	11885va	
1935	1955	Italy, RAI Intl	5960eu	9845eu
1945	2000	Canada, Vatican Radio		9800na
1945	2000	Rwanda, Radio	6055do	
1950	2000	Vatican City, Vatican Radio	4005eu	5885eu
		7250eu	9645eu	
1951	2000	New Zealand, Radio NZ Intl	11725pa	

2000 UTC - 4PM EDT / 3PM CDT / 1PM PDT

2000	2027	Czech Rep, Radio Prague Intl	5930eu	11600va
2000	2027	Iran, Voice of the Islamic Rep	7205eu	9800eu
		9925af	11860af	
2000	2030	Australia, Voice Intl	11685as	
2000	2030	Canada, Vatican Radio		9800na
2000	2030	Mongolia, Voice of	12015eu	
2000	2030	Swaziland, TWR	3200af	
2000	2030	UK, Salama Radio	11885va	
2000	2030	USA, Voice of America	4940af	9850af

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2100	2200		USA, WWRB Nashville TN 13845na 15825na	9975na	12160na	2215	2230	vl	Croatia, Croatian Radio	9925na	
2100	2200		USA, WWRB Manchester TN 12170na	9320na	11920na	2223	2228		Libya, Voice of Africa 7320af		
2100	2200	mtwhf	USA, WWRB Manchester TN	15250na		2230	2257		Czech Rep, Radio Prague Intl	7345na	9415na
2100	2200		USA, WYFR Okeechobee FL 17725va 17795va	11565va	13800va	2230	2300	as	Canada, Radio Canada Intl	9525as	9870as
2100	2200		Zambia, Christian Voice	4965af		2230	2300	DRM	12035as		
2100	2200	vl	Zimbabwe, ZBC Corp 5975do			2230	2300		Australia, HCJB 15525as		
2105	2159		Spain, Radio Exterior Espana			2230	2300		Canada, Radio Sweden	9800na	
2115	2130	vl	Libya, Voice of Africa 11635af	9570va	9840va	2230	2300		Guam, AWR/KSDA 11850as	15320as	
2115	2200		Egypt, Radio Cairo 9990eu			2230	2300		USA, Voice of America 9570va	13755va	15145va
2130	2145	tf	UK, BBC World Service	11720am		2245	2300		India, All India Radio 9705as	9950as	11620as
2130	2156		Romania, Radio Romania Intl 9645eu 11940na	7165eu	9535eu				11645as 13605as		
2130	2158	mtwhfa	Albania, Radio Tirana 7120eu								
2130	2200		Australia, ABC NT Katherine	5025do		2300	0000		Anguilla, Caribbean Beacon	6090am	
2130	2200		Australia, ABC NT Tennant Creek	4910do		2300	0000		Australia, ABC NT Alice Springs	2310do	4835irr
2130	2200	mtwhfa	Canada, CBC NQ SW Service	9625na		2300	0000		Australia, ABC NT Katherine	5025do	
2130	2200		Sweden, Radio 6065va	7420va		2300	0000	as	Australia, ABC NT Tennant Creek	4910do	
2130	2200		Uzbekistan, Radio Tashkent 11905eu	5060eu	9715eu	2300	0000	DRM	Australia, HCJB 15525as		
						2300	0000	smtwhf	Bulgona, Radio 9700na	11700na	
						2300	0000		Canada, BBC World Service	9800na	
						2300	0000		Canada, CBC NQ SW Service	9625na	
						2300	0000		Canada, CFRX Toronto ON	6070do	
						2300	0000		Canada, CFVP Calgary AB	6030do	
						2300	0000		Canada, CKZN St John's NF	6160do	
						2300	0000		Canada, CKZU Vancouver BC	6160do	
						2300	0000		China, China Radio Intl	5915as	5990am
						2300	0000		6145na 7180as 13680na		
						2300	0000		Costa Rica, University Network	13750va	
						2300	0000		Cuba, Radio Havana 9550na	12000na	13680na
						2300	0000		Egypt, Radio Cairo 11885na		
						2300	0000		Germany, Deutsche Welle 15135as	5955as	9890as
						2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do
						2300	0000		Guyana, Voice of 3291do		
						2300	0000		India, All India Radio 9705as	9950as	11620as
						2300	0000		11645as 13605as		
						2300	0000	vl	Malaysia, Radio 7295as		
						2300	0000		Namibia, Namibian BC Corp 6060do 6175do	3270do	3290do
						2300	0000		New Zealand, Radio NZ Intl	15720pa	
						2300	0000		Papua New Guinea, Catholic Radio	4960do	
						2300	0000		Papua New Guinea, NBC	9675do	
						2300	0000	vl	Papua New Guinea, Wantok Radio Light		7120va
						2300	0000	irreg/ vl	Sierra Leone, Radio UNAMSIL	6137do	
						2300	0000		Sierra Leone, SLBS 3316do		
						2300	0000	vl	Singapore, Mediacorp Radio	6150do	
						2300	0000		Samoa Islands, SIBC 5020do	9545do	
						2300	0000		UK, BBC World Service	5975om	
						2300	0000		USA, AFRTS 4319usb	5446usb	5765usb
						2300	0000		7590usb 7812usb	12133usb	12579usb
						2300	0000		12133usb 12579usb	13362usb	13855usb
						2300	0000		USA, KAIJ Dallas TX 13815na		
						2300	0000		USA, KTBN Salt Lake City UT	15590na	
						2300	0000		USA, Voice of America 12140as		
						2300	0000		USA, WBCQ Kennebunk ME 9330na	5105na	7415na
						2300	0000		USA, WBOH Newport NC	5920am	
						2300	0000		USA, WEWN Birmingham AL	9355va	9975va
						2300	0000		USA, WHRA Greenbush ME	7520na	
						2300	0000	mtwhfa	USA, WHRI Noblesville IN	9495am	
						2300	0000		USA, WINB Red Lion PA	9320am	
						2300	0000		USA, WJIE Louisville KY	7490am	13595am
						2300	0000	as	USA, WRMI Miami FL 7385am		
						2300	0000		USA, WRMI Miami FL 9955am		
						2300	0000		USA, WTJC Newport NC	9370na	
						2300	0000		USA, WWRB Nashville TN 12160na 13845na	7465na	9985na
						2300	0000		USA, WWRB Manchester TN 5085na 5745na 6890na	3185na	5050na
						2300	0000		USA, WYFR Okeechobee FL 17750va	11740va	15255va
						2300	0000		Zambia, Christian Voice	4965af	
						2300	2315		Nigeria, Radio/Kaduna	4770do	6090do
						2300	2315		Nigeria, Radio/Lagos 3326do		
						2300	2330		Australia, Radio 9660as	12080as	13620as
						2300	2330		13630pa 15230po	15240pa	21740pa
						2300	2330		UK, BBC World Service	3915as	5965as
						2300	2330		6195as 9605as 9740as	11945as	11955as
						2300	2330		15280as		
						2300	2330		USA, Voice of America 9570va	13755va	15145va
						2300	2356		Romania, Radio Romania Intl 9645eu 11940na	6140eu	7265eu
						2330	0000		Australia, Radio 9660as	12080as	13620as
						2330	0000		13630pa 15230po	15415pa	17750pa
						2330	0000		17795po 21740pa		
						2330	0000		Burma, Dem Voice of Burma	9435eu	
						2330	0000		Lithuania, Radio Vilnius	9875na	
						2330	0000		UK, BBC World Service	9740as	11945as
						2330	0000		11955as 15280as		
						2330	0000		USA, Voice of America 7260va	13725va	
						2330	2353		Vietnam, Voice of 9840as	12020va	

2300 UTC - 7PM EDT / 6PM CDT / 4PM PDT

Air Force MARS Shift & Frequency Potpourri

According to a public domain source on the internet, the Air Force MARS aircraft phone patch net has shifted their net frequencies by 100 kHz. It is not known at this early stage if this applies to all the AF MARS frequencies or just their aircraft phone patch nets (we believe the former to be true).

The AF MARS phone patch net is a great place to catch a variety of military aircraft running official, quasi-official and personal traffic from the plane to ground stations. Here are the current frequencies for the net:

13927.1 kHz	Primary Call
14389.1 kHz	Secondary Call
7633.6 kHz	Call (night)
4557.1 kHz	Call (night)

❖ Frequency Potpourri

This month we will dig into the *Milcom* mailbag. We have a lot of frequency updates to share from around the country. One thing that will become obvious from some of the listings below is that the exodus of aeronautical activity from the 380-400 MHz band is continuing. If you are used to monitoring an air frequency in this band and you no longer hear activity on it, then more than likely it has been moved as part of the changeover of this subband from aeronautical to land mobile services.

As part of this restructuring, the use of xxx.x25 and xxx.x75 frequencies are on the rise. I would recommend, if you have a spare military air scanner in the shack, that you might want to program it to conduct a 25 kHz step search from 225-380 MHz looking for new activity. You should also be on the look-out for new NFM LMR activity spaced 12.5 kHz in the 380-400 MHz range.

First, *Milcom* regular "The Researcher" checks in with an extensive list of frequency changes and other goodies:

Fort Worth ARTCC
290.300 Brownwood RCAG, TX (ex-380.050)

Memphis ARTCC
257.750 Nashville RCAG, TN Ultra High (ex-306.300)
318.800 Fort Smith RCAG, AR (ex-380.300)

Beale AFB, CA (KBAB)
256.025 940ARW/314ARS Command Post "Tahoe Control"

Barksdale AFB, LA (KBAD)
278.300 Tower
373.625 Metro (Weather)

Birmingham International Airport, AL (KBHM)
317.725 Tower

W. K. Kellogg Airport, MI (KBTL)
126.825 CTAf

Dover AFB, DE (KDOV)

373.000 Departure Control (ex-323.000)
Simmons AAF, NC (KFBG)
46.750 Range Control Operations
139.350 Range Control Operations
249.900 Range Control Operations
Tipton Airport (Fort Meade), MD (KFME)
123.925 AWOS-3
Fort Smith Regional Airport, AR (KFSM)
353.575 Razorback Approach/Departure Control (ex-380.150)

Gray AAF, WA (KGRF)
32.775 UAV Operations "Shadow Ops"
379.100 Base Operations "Rattlesnake Radio"

Homestead Air Reserve Base, FL (KHST)
257.675 Ground Controlled Approach (GCA)

Klamath Falls (Kingsley Field), OR (KLMT)
118.200 Tower (ex-118.500)

Memphis International Airport, TN (KMEM)
138.950 164AW/155AS Command Post (ex-138.100)
341.750 164AW/155AS Command Post (ex-341.600)

Minneapolis-St. Paul International Airport, MN (KMSP)
252.100 934AW/96AS Command Post "Abstain Ops"
282.675 934AW/96AS Pilot-to-Dispatcher "Viking Ops" (ex-351.200)

Myrtle Beach International Airport, SC (KMYR)
254.350 Remote Communications Outlet (RCO)

New River MCAS, NC (KNCA)
288.325 ATIS (ex-285.325/265.200)

Lakehurst NAES/Maxfield Field, NJ (KNEL)
307.050 Ground Control (ex-352.400)

NAS Corpus Christi, TX (KNGP)
127.900 ATIS (ex-138.900)
251.100 Tower OLF Waldron (ex-264.400)
257.850 Ground Control Primary (ex-348.000)
284.600 Ground Controlled Approach <U-10> (ex-278.800)
290.900 ATIS (ex-268.400)
314.300 Clearance Delivery (ex-314.800)
317.550 Seagull Control (ex-320.400)
343.500 Metro (weather) (ex-344.600)
346.650 Base Operations (ex-346.800)
354.800 Ground Controlled Approach <U-11> (ex-380.800)
363.200 Seagull Control (ex-362.200)

Cairns AAF, AL (KOZR)
148.600 Goldberg Stagefield Tower West
149.800 Brown Stagefield North
316.000 Goldberg Stagefield Tower East
357.100 Brown Stagefield North
361.175 Goldberg Stagefield Tower West
391.800 Skelley Tower

Plattsburgh International Airport, NY (KPBG)
396.100 Approach/Departure Control

Ellsworth AFB, SD (KRCA)
289.400 Approach Control (ex-396.000)

Los Alamitos AAF, CA (KSLI)
126.200 Operations/Advisory Service
237.200 Operations/Advisory Service

Cape Canaveral AFS Skid Strip, FL (KXMR)
143.500 Tower
239.050 Tower (ex-393.000)
USS Wasp (LHD-1)
408.125 LMR Simplex channel
408.700 LMR simplex channel

Thanks to "The Researcher" for a great list of active milair frequencies.

❖ Eglin/Tyndall AFB Freqs

Norman Bixler, who resides in the Florida Panhandle, shares the following Eglin AFB and Tyndall AFB, Florida, frequencies he has recently monitored.

290.900 Eglin AFB Mission Control
308.900 Tyndall AFB Full Scale Drone Control
341.700 Tyndall AFB Approach Control
349.700 Tyndall AFB Sub Scale Drone Control
394.800 Eglin AFB Water ranges aircraft aerial refueling

Thanks, Norman, for an interesting freq list from an active military aircraft area.

❖ Army Air Fields AAF

Recently on the *Milcom* newsgroup, a member posted the following list of selected frequencies for Army Air Fields: Here is the first part of that list.

Bicycle Lake AAF (Ft Irwin), CA 41.000 41.500
118.175 126.200 281.450 339.850
Butts AAF (Ft Carson), CO 41.500 125.500
229.400 239.300
Cairns AAF (Ft Rucker), AL 135.200 261.200
371.350
Camp Blanding Resv (Starke), FL 47.050
123.000 241.000 277.450
Laguna AAF (Yuma Proving Grounds), AZ 126.200
242.175 241.000
Los Alamitos (JFTB), CA 45.500 123.850
233.800 251.150
Redstone AAF, AL 126.200 126.950 290.275
Robinson AFF (Camp Robinson), AR 41.500
126.200 241.000
Sierra Vista Muni Libby AAF (Ft Huachuca), AZ
122.950 124.950 284.750

We will have more of these listings in next month's column.

❖ FAA ARTCC Frequency List

In this month's FAA Air Route Traffic Control Center report we are going to take a look at the Boston, Cleveland, and Indianapolis Centers. For the background on the Air Route Traffic Control Centers, see the June 2005 issue of *MT*.

So until next month, 73 and good hunting.

Table One: ARTCC FREQUENCY LIST - Boston, Cleveland, Indianapolis

Boston ARTCC			Litchfield, MI		
Augusta, ME	134.950/307.000	High	120.450/360.700		Low
Barnstable, MA	127.825/370.900	High	134.650/343.800	Low Discrete	
128.750/290.300	Low: Approach/Departure Services		135.725/277.400	High	
132.900/387.100	Low: Approach/Departure Services		281.425	Low Discrete	
243.000	Low/High: Military Emergency		285.625	Low Discrete	
307.300	High (AR-608)		Mansfield, OH	133.375/290.275	High
321.300	High: Special Use < Amber 6 >		134.900/317.700	Low Discrete: Approach/Departure Services	
Berlin, NH	135.700/282.200	Low/High: Approach/Departure Services	369.900	High: Special Use < Amber-5 >	
Bucks Harbor, ME	133.450/269.300	Low/High	Moon Township, PA	133.075/276.400	Ultra High
290.500	Low		134.475/254.275	Low Discrete: Approach/Departure Services	
Burlington, VT	118.825/251.075	High Discrete (Yankee-Laser ATCAA)	317.450	High	
120.350/380.300	Low/High Discrete: Approach/Departure Services		369.250	High	
Calverton, NY	124.525/379.850	Low Discrete	385.500	Low	
Caribou, MA	121.500/243.000	Low/High: Civilian/Military Emergency	Morgantown, WV	126.950/239.300	Low Discrete: Approach/Departure Services
124.750/239.050	Low Discrete		Mount Hope, OH	120.600/298.925	Low Discrete: Approach/Departure Services
Concord, NH	128.325/348.700	Low Discrete	243.000	Low/High: Military Emergency	
Cumington, MA	132.650/379.100	Low Discrete	Paris, OH	128.150/284.675	Low Discrete: Approach/Departure Services
Gardner, MA	123.750/338.200	Low Discrete: Approach/Departure Services	Saginaw, MI	127.700/307.800	Low Discrete: Approach/Departure Services (AR-206L)
134.700/381.400	Low				
Houlton, ME	120.250/346.400	Low Discrete: Approach/Departure Services/High Oceanic Control (Atlantic)	133.875/269.525	High	
128.050/319.100	High Oceanic Control (Atlantic)		369.900	High: Special Use < Amber-5 >	
Hyannis, MA	133.450/269.300	Low/High Discrete: Oceanic Control (Atlantic)	Sandusky, OH	119.325/261.500	Ultra High
Islip, NY	132.300/346.300	Low Discrete	119.875/348.675	High	
135.800/259.100	Low		127.900/327.000	Low Discrete: Approach/Departure Services	
Kingston, NY	134.200/256.900	Low	132.450/298.950	Low (AR-217 ARCP)	
Lake George, NY	121.350/393.100	Low Discrete	371.950	Low	
128.325/348.700	High		Warren, PA	119.725/307.150	High
133.625/354.100	High (Occasional AWACS operations)		132.925/351.850	Ultra High	
135.325/360.600	High		134.125/316.100	High	
Lebanon, NH	134.700/381.400	Low Discrete: Approach/Departure Services	Waterford, PA	132.400/323.200	Low Discrete: Approach/Departure Services
Melrose, ME	119.250/281.500	Low	Waterville, PH	128.625/379.200	Low Discrete: Approach/Departure Services (AR-218)
133.325/353.700	Low		Wayland, NY	124.325/353.850	Low: Approach/Departure Services
135.550/370.900	Low Discrete		125.875/338.350	Low: Approach/Departure Services	
Millinocket, ME	128.050/319.100	High	127.475/346.350	Low Discrete: Approach/Departure Services	
Montpelier, VT	135.700/282.200	Low Discrete: Approach/Departure Services	243.000	Low/High: Military Emergency	
Portland, ME	128.200/322.400	Low Discrete: Approach/Departure Services	316.050	Ultra High	
Rockdale, NY	126.475/388.800	High	338.250	Low	
133.250/279.500	Low: Approach/Departure Services		369.900	High: Special Use < Amber-5 >	
Saint Albans, ME	120.250/346.400	Low Discrete: Approach/Departure Services	Unknown:	133.525/263.025, 128.025/323.250, 120.325/335.525, 121.075/307.325, 291.675, 379.350, 379.950	
124.250/290.500	Low Discrete: Approach/Departure Services				
128.050/319.100	High				
243.000	Low/High: Military Emergency				
321.300	High: Special Use < Amber 6 >				
Shelton, CT	125.575/343.800	High Oceanic Control (Atlantic)			
128.100/351.700	Low				
134.000/317.700	Low Discrete				
135.075/306.300	Low				
Turin, (Rome), NY	120.350/380.300	Low/High			
123.875/323.000	High				
133.250/279.500	Low Discrete				
135.250/377.100	Low: Approach/Departure Services				
243.000	Low/High: Military Emergency				
321.300	High: Special Use < Amber 6 >				
Utica, NY	124.125/232.400	High			
Waterboro/					
South Acton, ME	128.200/322.400	Low: Approach/Departure Services			
118.550/285.400	Low				
263.050	Low Discrete: Approach/Departure Services				
Woodstock, CT	118.425/277.400	High			
124.850/307.900	Low Discrete: Approach/Departure Services				
127.650/257.925	Low				
133.425/307.600	Low/High				
135.325/398.900	Low				
Special Air Use Sectors	377.150 380.150				
Cleveland ARTCC			Indianapolis ARTCC		
Algonac, MI	126.525/244.575	High Discrete	Bluefield, VA	126.575/257.850	Low: Approach/Departure Services
132.250/269.200	Low Discrete		Brookville, OH	120.575/307.900	High
134.775/285.525	High		135.125/282.300	Low/High	
278.800	Low		135.800/351.800	Low	
380.600	Low		Charleston, WV	119.525/385.600	High
Altoona			127.400/269.600	Low: Approach/Departure Services	
(Blue Knob), PA	121.200/299.200	Low: Approach/Departure Services (AR-218/220 ARCP)	134.225/307.300	High	
124.400/327.100	Low Discrete: Approach/Departure Services		Evansville, IL	128.300/284.650	Low: Approach/Departure Services
128.450/307.100	Low: Approach/Departure Services		132.525/379.900	High	
132.125/363.075	High		Henryville, IN	124.775/269.450	Low: Approach/Departure Services
Belmont, OH	120.400/257.975	Low Discrete: Approach/Departure Services	133.050/278.500	High	
125.425/307.075	High/Low		134.275/352.000	Ultra High	
135.175/291.600	Ultra High (AR-217/220 Exit)		Indianapolis, IN	119.550/251.100	Low Discrete
Bloomington, OH	269.925	High	124.525/319.800	Low	
284.625	Low		128.375/317.525	High	
Bradford, PA	126.725/291.650	Low Discrete: Approach/Departure Services	132.775/269.050	Ultra High	
Carleton, MI	119.950/269.500	Low Discrete: Approach/Departure Services	133.425	Low	
134.775/354.100	High (AR-206H)		243.000	Low/High: Military Emergency	
243.000	Low/High: Military Emergency		Livingston, TN	126.925/319.150	Ultra High Discrete
Chardon, OH	120.775/298.950	Low Discrete: Approach/Departure Services	134.675/323.200	High Discrete	
Detroit North, MI	120.075/282.250	Ultra High	London, OH	120.475	Low
369.900	High: Special Use < Amber-5 >		124.800/380.200	Low	
Dubois, PA	126.725/291.650	Low Discrete: Approach/Departure Services	128.775/346.300	Ultra High	
Dunkirk, NY	125.200/263.100	Low Discrete	134.000/290.590	Low Discrete: Approach/Departure Services	
Finley, OH	126.975/281.475	High	243.000	Low/High: Military Emergency	
135.100/291.725	Low: Approach/Departure Services		London 2, OH	121.325/246.000	Low: Approach/Departure Services
Flint, MI	126.750/348.750	Low Discrete: Approach/Departure Services	126.575/253.500	Low Discrete: Approach/Departure Services	
127.700/290.425	Low Discrete: Approach/Departure Services		Lynch, KY	126.575/257.850	Low: Approach/Departure Services
Holland, NY	118.625/306.900	High	Marietta, OH	125.550/398.900	Low Discrete: Approach/Departure Services
120.625/322.550	Ultra High		Marmet		
Jackson, MI	127.300	Low Discrete	(Charleston), WV	127.400/269.600	Low Discrete
			134.225/307.300	Ultra High	
			132.325/385.600	High	
			Merwyn		
			(Cincinnati), OH	123.925/281.400	Low Discrete
			134.700/239.250	Ultra High Discrete	
			135.575/290.500	Low: Approach/Departure Services	
			Muncie, IN	120.650/299.600	Low Discrete: Approach/Departure Services
			New Hope, KY	121.175/353.650	Low Discrete: Approach/Departure Services
			124.625/394.100	Low/High	
			Portsmouth, OH	120.275/363.200	High
			124.225/327.050	Low Discrete: Approach/Departure Services	
			127.100/290.400	Low Discrete: Approach/Departure Services	
			Rosewood, OH	128.075/269.000	Low Discrete: Approach/Departure Services
			Rossville, IN	134.600/319.200	Low
			Terre Haute, IN	132.200/307.100	Low Discrete: Approach/Departure Services
			134.175/270.300	High	
			Tri City (Damascus), TN	124.575/290.550	High
			Winchester, KY	123.775/263.050	Ultra High
			126.375/343.650	Low Discrete	
			128.225/317.750	High	
			Zanesville, OH	124.450/370.900	Low Discrete: Approach/Departure Services
			125.075/353.525	High	
			126.350/353.500	Low	
			132.825/343.600	High	
			133.775/363.025	Ultra High	
			Unknown:	127.025/250.200 363.025	

State-by-State: Moving Southwest

The Rocky Mountains seem to form a formidable barrier against AM radio frequencies (RF). If you live in the West you may not realize just how hard the next six states are to log from the East. If you live in the East, you won't need any convincing!

New Mexico:

The Land of Enchantment is home to two 50,000-watt stations. Both share frequencies with major East Coast stations – KOB-770 with New York's WABC, and KINF-1020 with Pittsburgh's KDKA. In both cases, the Eastern stations were there first, so the Western stations are required to use directional antennas to prevent interference. Some Eastern DXers have heard these stations near sunrise or sunset, but loggings are very rare.

A handful of less-powerful stations operate daytime-only on clear channels. KNMX-540 Las Vegas, KSWV-810 Santa Fe, and KHAC-880 Tse Bonito have been logged to the east of New Mexico at sunrise or sunset. All of these are still rather rare. I still need New Mexico for my log, though I've come very close with a logging of KIJN Farwell, Texas (which is *right on* the NM border...) If you have a New Mexico station in your log, consider yourself very lucky!

Arizona:

Arizona should be almost as hard to hear as New Mexico – except for KTNN. This station, at Window Rock on the Navajo Nation, operates on 660 kHz with 50,000 watts fulltime. This station shouldn't be audible in the east on night pattern, as they protect WFAN New York by nulling their radiation in that direction. However, on many occasions KTNN is in fact quite strong here in Nashville. Their programming – which includes Native American music and occasional talk in the Navajo language – certainly stands out on the dial. KTNN is by far your best shot at logging Arizona in the East.

Another Arizona station that occasionally makes the trip east is KMIK-1580 Tempe. KMIK is also 50,000 watts fulltime, non-directional during the day and directional, not favoring the east, at night. On several occasions I've heard a station I'm pretty sure was KMIK. Unfortunately, they're a Radio Disney outlet that will be difficult to ID. Other Arizona stations that have been heard east of the Rockies include Phoenix-area KMIA-710, KFNX-1100, and KPXQ-1360, and Tucson's KFLT-830 and KUAZ-1550. Most of these

are likely to be sunrise/sunset loggings only, though KMIA and KFNX have been heard at night.

Colorado:

Colorado is probably the easiest of this bunch. Of course, that's largely because the Centennial State's largest city lies just east of the Rockies. KOA-850 Denver is 50,000 watts non-directional. With decent propagation it should be audible anywhere in North America – if you don't have a stronger nearby signal on 850. Unfortunately, many Easterners do. If you're one of them, try Colorado's two expanded-band frequencies. 1650 is KBJD, Denver, with contemporary Christian programming. 1690, unfortunately, is Radio Disney, but with patience it may be your key to a Colorado ID. Call letters are KDDZ, Arvada.

For those in the Midwest, some other Colorado stations that may be worth trying include KGHF-1350, Pueblo; KLMR-920, Lamar; and KNZZ-1100, Grand Junction. KSIR-1010, Brush, is 25,000 watts daytime with a directional pattern that *favors* the East. Surprisingly, this station is not reported very often.

Utah:

The DX situation in Utah is similar to that of Colorado. The 50,000-watt non-directional station is KSL-1160, Salt Lake City. KSL is no longer the easy catch it was before nighttime operation of stations like WYLL, Chicago, or WVNJ in New Jersey. I do still hear KSL regularly here in Tennessee, though. Also like Colorado, Utah features two expanded-band stations. KXOL-1660 airs "old oldies"; KBJA-1640 is a Spanish-language station.

An honorable mention for Utah should go to KLO-1430, Ogden. While I haven't heard KLO in the East, it seems to be present pretty much everywhere I go in the West. Finally, remember last time I mentioned a new station on the air near Salt Lake City, KUTR-820. This station's 50,000-watt daytime directional pattern favors the East and should be audible, at least in the Midwest, at sunset.

Nevada:

Good luck.... My sole logging of the Silver State stems from a temporary demonstration station operated at the National Association of Broadcasters convention in

Las Vegas about ten years ago. They used a frequency in the then-empty expanded band.

Nevada has several high-powered stations but none of their antenna patterns favor the East. Probably the most often-reported station is KXNT-840, Las Vegas. They aren't supposed to be audible in the East on either day or night facilities, but it seems to happen. Antenna pattern out of whack? Strange local ground conditions? Reradiation off the casinos? Who knows.

Two other powerful Nevada stations are KDWN-720, also in Las Vegas, and KKOH-780, Reno. KHWG-750 Fallon is reported new to the air. A permit exists for new station KWWN-1100, Las Vegas (20,000 watts daytime with a pattern favoring the east). Assuming this station is built, it may be DXable from the east. Also, new stations are more likely to engage in test broadcasts. This is a good reason to be an NRC and/or IRCA member; club membership is the best way to learn of this kind of breaking news while it's still possible to take advantage of it.

Omissions and Corrections:

I hate it when I miss something... In June, I managed to miss one of Tennessee's 50,000-watt stations. Maybe more embarrassing, this station is right in my backyard; I drive past their transmitter just about every day on my way to work! Adam Lock brought my attention to this omission. If his name is familiar, it's because his station, WNQM-1300 Nashville, is co-owned and co-sited with shortwave outlet WWCR. (They also own WMQM-1600 Memphis, which I did manage to mention in June, making WNQM's omission that much more embarrassing!)

WNQM's 50,000-watt non-directional daytime signal carries religious programming. They switch to Spanish-language at night, but with a highly-directional antenna favoring the east-southeast and a power reduction to

Best bets for logging the southwestern states:

New Mexico: . KOB-770, KINF-1020, KSWV-810
Arizona: KTNN-660, KMIK-1580
Colorado: KOA-850, KBJD-1650
Utah: KSL-1160, KXOL-1660, KBJA-1640
Nevada: KXNT-840



WHOW-1520/95.9, Clinton, Illinois

5,000 watts. The daytime signal covers a lot of territory and is well worth looking for at sunrise/sunset. Take a look at the photos of both F. W. Robbert Broadcasting stations (as well as WWCW and several other stations) on http://www.wwcr.com/fwr_press_releases.html.

Next time, we go on to the Golden State. There are enough powerful AM targets here to warrant an entire column for one state. Here's hoping you're hearing at least some of our targets as we swing west...

❖ IBOC News

In May, the National Radio Systems Committee approved IBOC as the U.S. standard for digital radio broadcasting. I will admit to wondering what the point is, given that the FCC already routinely authorizes IBOC operation... No additional major AM stations have been reported adding IBOC. Indeed, a few AM stations have *dropped* IBOC recently. To be honest, I doubt they intend to do so permanently; I suspect they're making transmitter changes before re-enabling the digital signal. Some AM stations that have dropped IBOC have since re-activated it.

❖ Oops

The biggest reason more Eastern DXers haven't heard Colorado is because closer stations on 850 generate too much interference to hear Denver's KOA. One source of this interference shouldn't have been there, and will be \$11,000 poorer as a result. On June 1st, the FCC fined MB Communications, owners of WYLF-850 Penn Yan, NY, for operating at illegally high powers. (And for not having a secure gate protecting the public from access to the high voltage at the tower base.)

It is, unfortunately, not particularly unusual for the FCC to catch a station operating at illegally high power at night. Usually, these violations amount to the station leaving their daytime facilities on after sunset. What was unusual about the WYLF violation is that they were running excessive power during the *day* as well. WYLF's authorized daytime power is 1,000 watts; at night, they're expected to drop to 45 watts.

The FCC notice (on <http://www.fcc.gov/eb/Orders/2005/DA-05-680A1.html>) doesn't specify how much power they were actually running. The notice does state that the Commission had reason to believe that, even after receiving and replying to a Notice of Apparent Liability, WYLF continued to use excessive power.

❖ It's Baaack...

Younger readers may not be familiar with the term "payola." The practice, apparently

fairly common in the 1960s, involved record companies paying DJs to play their records on the radio. New York State's Attorney General Eliot Spitzer alleges that at least four record companies may have paid stations to get additional airplay for their music. One company, Sony BMG, has agreed to donate \$10,000,000 to charity to settle the charges against them. According to a *Daily News* article forwarded by Robert Thomas, Sony paid as much as \$1,000 to get a new song played on a station.

It's unclear to me from the articles how this practice is illegal under New York law. However, it is definitely contrary to FCC regulations! Regulation 73.1212 requires broadcast stations to disclose to the audience when material is being broadcast in return for payment. (The brief :10, :30 and :60-second commercials you hear are exempt, as the Commission figures it's obvious they're being paid for!)

Spitzer suggested the FCC should consider revoking the licenses of radio stations that commit especially flagrant violations of these regulations. Only one fine, for \$8,000, has been levied for payola since 1995. Commissioner Jonathan Adelstein is investigating the allegations; the Commission has issued a statement on http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-260158A1.doc. It seems unlikely any station will actually lose its license. Large fines are far more likely.

❖ Moving

One of Patrick Griffith's locals is moving one step up the dial. In a late July visit to the KLZ-560 transmitter site near Denver, Patrick saw three concrete bases for the towers being added to allow KLDC to share the site. KLDC currently operates from a different location with 1,000 watts daytime on 800 kHz. At the new site, they will increase power to 2,200 watts - and move to 810 kHz. The old site will be kept; a 4th tower will be added to the three already there, and the nighttime power increased from seven watts to 430. The night pattern will favor the southeast; Southern DXers should keep an ear open for this station.

In a vaguely related story, on a visit to Neenah, Wisconsin, in July I noted a "for

sale" sign on the WHBY-1150 site. The station has moved 3-1/2 miles to the southwest and increased power from 5,000 watts to 20,000 (25,000 at night). The pattern very much favors the north, which means you probably won't notice the difference unless you live in Green Bay or Central Ontario (or Europe...) Some DXers have, however, noted WHBY stronger than normal at places to the south, like Chicago. 1150 has always been an interesting frequency to DX.

❖ Till next month

Hearing anything interesting? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

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Marine Meanderings

V E3GO, this is CY0AA, you are 59 at Sable Island."

As I listened to Lee, who has been operating from the Graveyard of the Atlantic, I could not help but realize how much I receive from my radio hobby. The knowledge I have gained and the information I have obtained from amateur radio as well as from monitoring has been of great value. Like most listeners who monitor marine communications, I am a ship enthusiast and enhance my hobby through radio.

Recently, the Hurricane Watch Net at 14.325 MHz USB provided some interesting information about approaching storms. The reports from affected areas gave graphic details about the effects of the hurricane and also gave useful information to the Hurricane Center in Miami, Florida. Bulletins helped plot the position and track of these tropical monsters. Look for this net to be operational whenever a hurricane has developed. Their web site <http://www.hwn.org> provides excellent storm information and tells when the net is operational.

As always, the Maritime Mobile Service Net, 14.300 MHz USB, is ready to handle traffic and provide bulletins. This daily net really can be very informative and provides interesting listening. For example, recent check-ins included Dick, KB1HTU, on a 40-foot cutter near Bristol, Rhode Island; Andy, KB3EFY, on a sailboat in Chesapeake Bay; and KG4UKY east of the Azores.

I even have my 2 meter rig tuned to the local FM repeater. There have been several yachts traveling in the Thousand Islands area. I have been able to provide useful information, such as giving Ron, VE3SEP, up-to-date information on some strong thunderstorms in the area around his location at Camelot Island.

The VHF Marine channels have been active.



The tug *Anglian Lady* pushing a tank barge upbound from lock 7.

I have been monitoring at home as well as on the tour boats of the Kingston and the Islands Boat Line. As a captain, I want to be as up-to-date as possible on what is happening in our area. Every day I have been on board we have heard calls for help from pleasure craft. In fact, we had a maximum seaway size lake freighter go aground in the American Narrows recently. This provided some interesting listening and useful information. The Seaway was closed for some time, because the freighter had punched a hole in her forepeak.

I also monitor the marine traffic and keep track of what ships are in the system. I have been doing this for many years and also send the data to a website (<http://www.boatnerd.com>) for Great Lakes ship enthusiasts. In fact, it was through a fellow boatnerd (as we are known), that I got the chance to do this column.

If you are traveling through the Great Lakes Seaway area, all the traffic control is done on four VHF channels: Channel 11 156.55 MHz, Channel 12 156.6 MHz, Channel 13 156.65 MHz, and Channel 14 156.7 MHz. Marine enthusiasts will also note that Channel 13 is reserved for bridge to bridge communications, but is used for ship control in the upper St. Lawrence Seaway area. Seaway Clayton and Seaway Sodus are the stations you will hear. Another reminder: Canadian Coast Guard radio stations use channels 21B (161.65 MHz) and 83B (161.775 MHz) for continuous marine weather broadcasts. Severe weather warnings and safety notices are also broadcast on these channels.

Radio traffic also allows me to be at the right place at the right time to add to my marine photo collection. For example, I was at the Welland Canal when the brand new *CSL Assiniboine* was down-bound with her first cargo. I was also able to find out when the new Coast Guard Search and Rescue vessel arrived in Kingston. Monitoring has allowed me to photograph new vessels, unique vessels, ships carrying unusual cargoes, and even vessels on their last trip before being scrapped.

Teaching courses for the marine radio license and the required Canadian pleasure craft operator certificate also resulted from my radio hobby.

Unfortunately, I was unavailable for the Night of Nights for KPH. This is on July 12 every year and commemorates the last U.S. marine CW transmissions. I have improved my low frequency antenna as and I am determined to log this station

next opportunity. I also missed the Islands on the Air and the Lighthouse/Lightship weekends on amateur radio.

❖ Marine Digital Monitoring

My hobby and the courses I teach have given me an interest in marine digital communications. Recently, the Seaway has mandated that transiting vessels must have an Automatic Information System installed. AIS continually gives out information on all ships in the area. Ships with this system installed receive the information which is fed into the ship's electronic chart systems so that the other vessels appear on the screen.

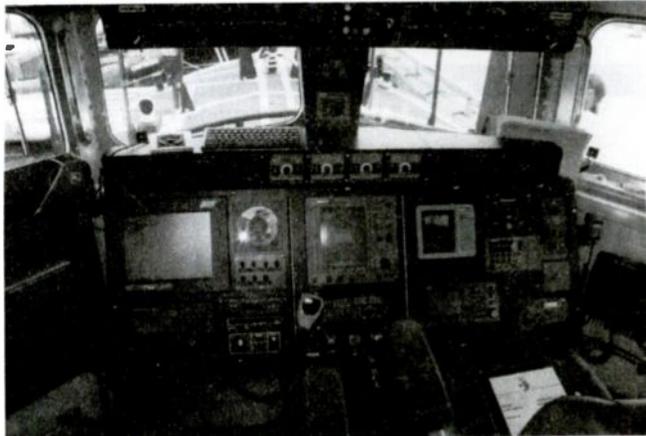
I have been wondering about decoding these digital VHF transmissions and am pleased to have had input from several readers and enthusiasts who report success using ShipPlotter. The program is available by download for a 21-day free trial at www.coaa.co.uk/shipplotter.htm

With your radio's output connected to your computer sound card, ShipPlotter can decode AIS transmissions, but there is one hitch. The signal is wide and requires output from the discriminator stage of your FM receiver. If you do not have a radio with a discriminator output or a computer-hosted receiver like WinRadio, <http://www.discriminator.nl/index-en.html> has modification information for the majority of receiver/scanners.

If you would like to see if AIS is active in your area, the system broadcasts on two marine frequencies: Channel 87 161.975 MHz and Channel 88 162.025 MHz. I am already installing a new VHF antenna and plan to modify a receiver so I can try the signals in my area.

Wray Lemke, who works for Mt. Pleasant Radio Co., wrote that he is trying to set up for AIS monitoring in Mt. Pleasant, South Carolina, since the system is mandatory in US ports. He added that the Charleston pilots are on channel 14 and have a tower at a 500-ft elevation which achieves ranges of 200 miles on a regular basis. (Now I know why the signal was so strong when I copied it in Myrtle Beach!) Wray has worked in Marine electronics for 26 years and I was happy to have his positive comments about my column.

Another digital mode is DSC (Digital Selective Calling), which can be copied on HF frequencies. Although it has not yet been installed on VHF in North America, it is coming, and it won't be long before DSC starts showing up on VHF in the coastal and Great Lakes areas. Canadian Coast Guard Great Lakes ships are already equipped with DSC VHF radios, and several commercial vessels in this area are buying DSC radios when they have to replace a marine radio. VHF radios with the DSC



Modern electronics in the new CCG Cutter Cape Hearn

feature are readily identified by the red emergency button. As I have previously written, all new Canadian marine radio licenses include a section on DSC and other new marine radio equipment.

DSC and Navtex can be decoded by DSCdecoder, another program available on a 21-day free trial basis from <http://www.coaa.co.uk/dscdecoder.htm>.

Dick Holland, K2HX, wrote to comment on the ShipPlotter and DSCdecoder programs. He said that he deciphered Digital Selective Calling (DSC) on 8414.5 kHz and Navtex on 6314 kHz using DSCdecoder. He did not do any VHF DSC decoding as there is no activity in his area of northern New York. He said his PK232DSP modem did a better job of decoding on weak signals, but the computer program gave usable results. He has added a discriminator output to his R-7000 receiver to feed the audio from the receiver to the computer. After some audio and detector adjustments in the program, he is getting signals, but some information is garbled. However, he is ten miles away from the lake and this may be the reason.

Frank Frisk reported success with the program using a modified scanner. Neil Schultheiss, the founder of the *boatnerd* website reported success with the program when he was close to the navigating channel.

❖ **New Canadian Coast Guard Vessel**

As a member of the Coast Guard Auxiliary, I was recently privileged to have some training on the new 47-ft motor lifeboat the *CCGC Cape Hearne*. This ship is modeled after a successful United States Coast Guard design with some Canadian modifications. The electronics aboard this vessel are quite impressive. The VHF radio system is a DSC type radio made by Icom. An aircraft

radio is also installed so they can contact aircraft during searches, etc. They also have a Radio Direction Finder (RDF), Differential GPS, electronic charts, depth sounder, autopilot and other useful devices. The RDF is capable of getting directions on a wide range of frequencies. In fact, while training, we were asked to get a bearing on a station which was continuously transmitting a carrier on channel 16 (156.8 MHz). This is the distress and calling channel for VHF marine radio.

I also noted they had an HF radio aboard. This is part of a standard equipment package for this class of vessel. Apparently HF radio is occasionally used on the Lakes by Canadian Coast Guard vessels. It is possibly used during winter icebreaking operations on the Great Lakes when VHF radio does not provide enough range. I would like to do some research on this in preparation for monitoring this winter, and would welcome any input from readers on frequencies that have been monitored or references for more information.

❖ **Reader Input**

I was also pleased to hear from Kevin Carey, WB2QMY, in Rochester, NY. He is a Sr. Communications Specialist with Microwave Data Systems, as well as being a fellow *Monitoring*

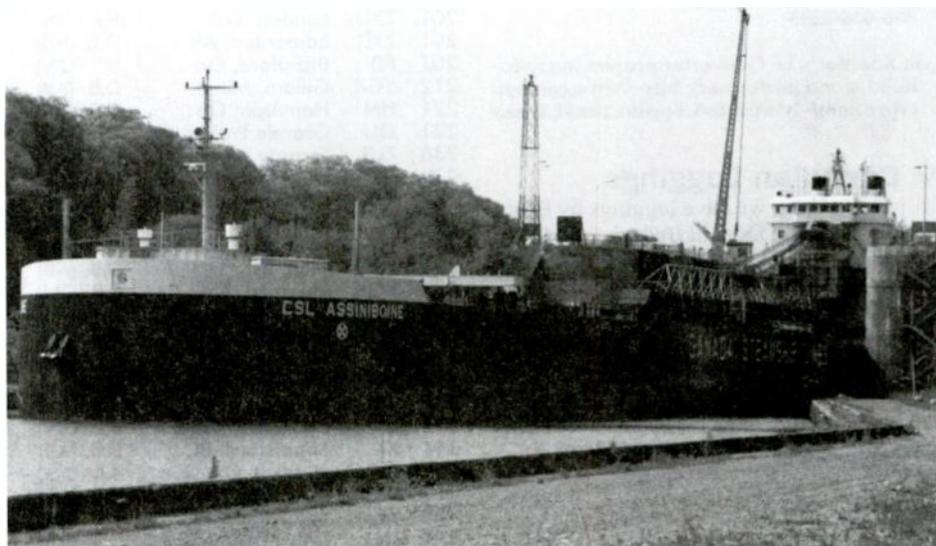
Times columnist. I appreciated his compliments on my column and the fact he used to work CW with Chuck Millar, the former holder of my amateur radio call sign. Hopefully we can have a chat on CW this fall season when we both get our antenna system maintenance done. Kevin also mentioned the new fast ferry service between Rochester and Toronto. The *Spirit of Ontario* (nicknamed the Cat) is a catamaran ferry which can run at 40 knots. I hope to take a trip on this vessel before the summer is out.

Again, I welcome input and suggestions from readers. Any marine frequencies which you monitor (HF or VHF) in your area would be appreciated. By the time you read this column, I will have returned from an Alaskan cruise out of Seattle Washington in August. My wife and I will be visiting, among other ports, the Anchorage area as well as Prince Rupert, British Columbia. These are new ports for us to visit. You can be sure my trusty Icom T90A, VHF marine handheld and Grundig Yachtboy will be part of the luggage.

Presently, I am monitoring marine channel 10 (156.5 MHz) for some interesting communications. The Canadian Navy Frigate, *HMCS Toronto*, is visiting Kingston tomorrow. I want to know the details of her location, since I will be Captain on the *Island Belle* which is making some shuttle trips to and from the vessel. As I have said, radio monitoring can be very useful!

Please excuse me for ending the column on a sad note, but a friend and fellow amateur radio operator became a silent key on Aug. 4th. N3FK, Frank Kelly, was very involved in the Maritime Mobile Service Net and I was fortunate to meet him on a couple of occasions in Myrtle Beach, SC. I will miss the friendly QSOs on 20 meters and the helpful information he provided. He was a great help to many new amateurs. A moment of silence was observed on 14.300 in his honor.

Smooth Sailing and 73s, Ron VE3GO



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Getting On the Band

Getting below 500 kHz used to be quite a challenge. It was hard to find a radio with a Longwave position on the bandswitch, and when you did, performance was often mediocre at best. Many pioneers resorted to homebrewing their own gear or using expensive surplus equipment to cover LF.

Today, things are different. For listening above 100 kHz, there are numerous models of receivers to choose from, both new and used. But what do you do if you're using an older rig that doesn't cover longwave? Or what if you want to explore the rich territory below 100 kHz?

For a fraction of the cost of new equipment, you can add a simple outboard converter to your existing receiver (or ham transceiver) that will extend its tuning range well into the longwave band. In fact, most converters allow you to tune far lower in frequency than you could with a standalone receiver. My LF Engineering converter, for example, provides coverage all the way down to 10 kHz.

Installing a converter is easy. No modification to your receiver is necessary. You simply connect an antenna to the converter's input and connect the output to your receiver's antenna jack (see Figure 1). It's important to use shielded cables between the converter and your receiver to prevent "bleed-through" of unwanted HF signals.

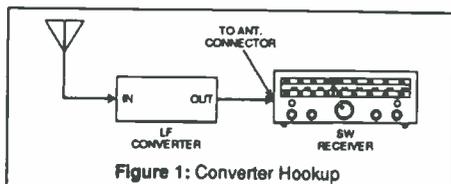


Figure 1: Converter Hookup

A converter works by "moving" the LF band to a range that can be tuned by your shortwave receiver, say 3500-4000 kHz. (This is the basic heterodyne principle at work, which is used in virtually all modern receivers.) You'll know the actual frequency you are listening to by just doing some quick math. In the example above, you'd simply subtract 3500 from your receiver's dial reading to determine the LF frequency. In other words, 3600 equals 100 kHz, 3700 equals 200 kHz, and so on. This is easier than it sounds and quickly becomes second nature.

A word of caution is in order if you hook up a converter to a transceiver. Even a short burst of transmitted energy into the converter would quickly destroy it. To avoid

this, disconnect your microphone and key before connecting a converter, and hands off the Tune/manual key button!

There are several options available if you want to try an LF converter with your receiver. These range from kits to ready-made commercial units, and even homebrew projects. Listed below are some websites where you can learn more. Also, don't rule out an occasional search at the online auction place. I saw a Heathkit model for sale there while preparing this text. Hamfests are another good possibility.

Jackson Harbor Press (LF Converter kit):
<http://jacksonharbor.home.att.net/lfconv.htm>
1418 Foss Rd, Washington Is, WI 54246

LF Engineering Co. (Many LF products, including converter boards, antennas, and converter/antenna combination systems):
<http://www.lfengineering.com/>
17 Jeffery Rd, East Haven CT 06513;
860-526-4759

Palomar Engineers (Long-time manufacturer of LF converters and other RF accessories):
<http://www.palomar-engineers.com/VLF/vlf.html>
Box 462222, Escondido, CA 92046
760-747-3343

Ramsey Electronics (Huge selection of electronic kits, including the "Low-Bander" LF converter): <http://www.ramseyelectronics.com>
590 Fishers Station Dr, Victor NY 14564;
800-446-2295

Lyle Koehler's LF Converter project (easy-to-build, good performer): <http://www.computerpro.com/~lyle/proto/LFproto.htm#LFconv>

❖ Canadian Loggings

This month, we have loggings by Bruce Priems (ON) and Donald Budesheim (AB). I don't recall ever having both coasts of Canada represented in the same issue before! Thanks to both of you for taking the time to send your loggings. Loggings are always welcome at *Below 500 kHz*, and may be e-mailed to the address in the masthead. (If you prefer, you can also send them by postal mail – see address information at front of magazine.)

❖ Web Tips

Looking for some homebrew LF projects for the cooler months? Jacques d'Avignon



Figure 2. Photo of RYV/371 kHz, Watertown, WI (Courtesy of Tom Wrensch, WI)

(ON) passes along this interesting website for those longing to heat up the soldering iron: <http://www.geocities.com/ko6bb/homebrew.html>

Below 500 kHz reader Ken Alexander (VE3HLS) now has his *Sounds of RFI* website running on the ARRL's website at: <http://www.arrl.org/tis/info/rfigen.html>. This site is a valuable tool in identifying the origin of many RF interference sources. Identification is often the first step in resolving it.

See you next month, 73, and best LW DX.

Table 1. Selected Beacon Loggings

Freq.	ID	Location	Heard By
200	UAB	Anahim Lake, BC	D.B. (AB)
201	ZXU	London, On	B.P. (ON)
201	ZXD	Edmonton, AB	D.B. (AB)
207	FD	Brantford, On	B.P. (ON)
212	YGX	Gillam, MB	D.B. (AB)
221	HM	Hamilton, On	B.P. (ON)
221	QU	Grande Prairie, AB	D.B. (AB)
236	ZLB	Toronto, On	B.P. (ON)
242	ZT	Port Hardy, BC	D.B. (AB)
245	CB	Cambridge Bay, NU	D.B. (AB)
248	KZ	Buttonville, On	B.P. (ON)
248	WG	Winnipeg, MB	D.B. (AB)
260	YSQ	Atlin, BC	D.B. (AB)
272	YQA	Muskoka, On	B.P. (ON)
272	XS	Prince George, BC	D.B. (AB)
305	YQ	Churchill, MB	D.B. (AB)
326	VV	Warton, On	B.P. (ON)
332	VT	Buffalo Narrows, SK	D.B. (AB)
335	ZKF	Wellington, On	B.P. (ON)
344	CL	Cleveland, Ohio	B.P. (ON)
344	XX	Abbotsford, BC	D.B. (AB)
353	QG	Windsor, On	B.P. (ON)
353	LWT	Lewiston, MT	D.B. (AB)
356	ZF	Yellowknife, NT	D.B. (AB)
371	ITU	Great Falls, MT	D.B. (AB)
400	QQ	Comox, BC	D.B. (AB)
406	2S	High Prairie, AB	D.B. (AB)

Osama Bin Laden on Clandestine Internet TV

As first reported by Nick Grace in *Clandestine Radio Watch*, the London-based Party for Islamic Renewal terminated their satellite radio feed of Radio al-Tajdeed (Radio Islamic Renewal) in early July. However, Nick also discovered that Osama is still visible via streaming television on the internet. If you want to see some clandestine transmissions from the Saudi Arabia branch of al Qaeda, you'll have to find one of their web sites. One of them, which was working during the summer, is found at <http://www.alaflam.net/Wdki/index.htm> on the internet. Curiously, al Qaeda has failed to operate a regular shortwave service in recent years, despite some satellite clandestine programming at times.

❖ Pancho Villa in mp3

Regular attendees of the March Winter SWL Festival in Kulpville, PA, are of course familiar with the long-running pirate station, **Voice of Pancho Villa**. Pancho's midnight rides are carried by a low power transmitter that rarely gets out farther than the hotel parking lot. So, many of us have never heard this legendary pirate station. But, Steve Colletti notes that many of the prior programs from Pancho can now be heard up on the internet. Point your browser toward <http://pix.dkosmedia.com> on your internet dial, and then any computer with software that will play .mp3 files can hear Pancho's antics from prior years.

❖ Radio Alpha Lima Links

Europirate **Radio Alpha Lima** not only produces and transmits shortwave radio programming, but it also operates a very useful web site. On that web site is a comprehensive list of other pirate radio web sites on the internet, along with links to the other sites. If you are looking for an index to pirate radio information on the internet, the Alpha Lima site at <http://www.alfalima.net/links-links.htm> is a good one to stick in your browser bookmarks.

❖ BPL

Some have speculated that the new internet technology of Broadband by Power Lines may have difficulty competing with other means for distributing internet connections. But, many in the ARRL and the DX community remain alarmed, since the internet signals on the power lines are actually unlicensed pirate interference generators. Some tests continue in various locations across the country, with unfortunate interference results. The technology is being kept alive in theory by a recent investment in some utilities by Google, of

internet fame. One recent investment took place in Cincinnati, OH, in collaboration with the Cynergy electric utility company. But, neither Google or Cynergy has announced a maildrop for pirate radio reception reports.

❖ More FM Busts

A wave of Federal Communications Commission busts of FM pirate stations continued during the last month. Among the stations closed down was a North Miami Beach pirate using 97.1 MHz FM for a Caribbean music format. A different bust took place in Jacksonville, FL, where a station was using 94.7 MHz FM for music and voice programming. The bust took place in an empty studio, since the equipment feeding the station was an automatic device, with no humans present.

Meanwhile, on the West Coast, the FCC shut down Free Radio 96.9 in San Diego. The station's web site remained up at <http://www.pirate969.org> at press time for *MT*, but its over the air signal has vanished following the bust. Station staff complained in various San Diego media outlets that this was a violation of their free speech rights, but the FCC obviously felt otherwise.

❖ What We Are Hearing

Despite a bit of a slump on the pirate bands lately, *Monitoring Times* readers heard fifteen different North American pirates this month. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regular announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. You sometimes have to tune your dial up and down through the pirate radio band to find the stations, but the primary North American pirate frequency of 6925 kHz, plus or minus 30 or 40 kHz, contains more than 90% of all North American shortwave pirate broadcasts.

Ground Zero Radio- Dave Gunn broadcasts from an abandoned ICBM missile silo. Nuclear war issues are mixed in with rock music on his shows. (Elkhorn)

Grasscutter Radio- Rock music and pirate radio advocacy are their fare, but sometimes they initiate ham radio style two way QSO conversations with other pirates. (Uses grasscutterrado@yahoo.com e-mail)

KCBM- Their Ken and Barry show has a west coast emphasis, using the unusual frequency of 6990 kHz. Their slogan is the "Jolly Roger of Southern California." Some of their IDs are in Morse Code. (Not known yet)

KC3- Here's another new one. They feature political commentary about the alleged decline in privacy and an increase in fascism in the United States (None)

Pirate Radio Boston- They are a rock music station, but they emphasize groups from Boston and New England during their shows. (Uses pirateradioboston@yahoo.com e-mail)

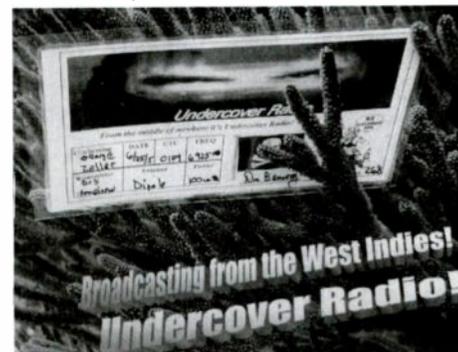
Robot Radio- Another new one. They feature guitars and rock music with commentary by the announcer over the music. During one of their shows they gave dozens of identifications in about a minute. (None announced)

Sunshine Radio- Rock music with a female announcer is somewhat unusual on the pirate bands, but that is the format here. (Uses the address from Grasscutter Radio; grasscutterrado@yahoo.com e-mail)

The Crystal Ship- The Poet is one pirate who uses almost random frequencies for his shows, including 6854, 6875, 6925, 7545, 7825, 8000, and 9057 kHz in recent weeks. He features rock music and political commentary. (Belfast and uses tcshortwave@yahoo.com e-mail)

The Mule- The name of this one puzzles some people, but its format primarily features selections from the rock group Government Mule. (Uses mule6925@yahoo.com e-mail)

Undercover Radio- Dr. Benway usually says that his rock music shows come "from the middle of nowhere." But, their new QSL defines where the middle of nowhere is, as we see here this month in the West Indies. (Merlin and uses undercoverradio@mail.com e-mail)



Voice of Captain Ron Shortwave- Captain Ron usually features rock music. Recent broadcasts were labeled as tests of some new equipment at his studio. (Uses captainronswr@yahoo.com e-mail)

VUDU- Voodoo Radio still occasionally appears on the pirate bands with rock music and drama shows, but remarkably little voodoo. (Elkhorn)

WHGW- They mix rock music, old time radio shows, and digital mode broadcasts. The eclectic mix is obviously something heard only on pirate radio, since commercial radio does not do this sort of thing. (Uses whgw6925@myway.com e-mail)

WHYP- James Brownard's weather reports for Lake Erie cities from North East, PA, remain out of date, but his pirate comedy is regarded as highly entertaining by most DXers. (Providence and uses whypradio@gmail.com e-mail)

WMPR- Their "Dance Party" rock instrumental format is easy to recognize. (None, has QSLed only at the Winter SWL Festival)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations, especially in Europe

continued on page 61

Low Bands and Loose Ends

In the course of planning this month's column I realized that I had a few loose ends to wrap up around here. I had another new book from the American Radio Relay League that came in too late for last month's column. I also had a couple of things I had been holding back to add when a column came up short. Well as you all know by this point, I am usually never at a loss for words, so I guess it wouldn't be a bad idea to get these matters out to you folks before any dust gathers on them.

❖ Low Band DX

In the neck of the amateur radio world where I live, October is the time of the season when the bands really do start to quiet down from all those heavy summer atmospherics. For many hams, it signals the time to move down below 14 MHz in search of serious low band DX. As we enter the low band season, we once again can benefit from the sage advice of John ON4UN.

ON4UN's Low-Band DXing 4th Edition

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I had the privilege of reviewing ON4UN's previous edition of *Low-Band DXing* about five years ago. John really did things right. Instead of simply rehashing old material and updating the cover and reference lists, he sent out surveys to over 500 dedicated low band operators. He took that information, along with five more years of his own ongoing engineering and contesting efforts, and built a book that will be considered the state of the art standard in the low band world for years to come. (Or at least until John writes his next edition.)

A lot can happen in five years in any field. As you know, digital technology has taken our transceivers to places we never thought they could go. But a lot of what makes for success in the low band world doesn't reside in the radios. Three words rule the low band scene: antennas, antennas and antennas.

Since his previous edition, a great deal of

new thinking has occurred in the area of receiving antennas. Finding ways to reduce noise (and reduce size) while maintaining or improving received signal sensitivity is always a topic of design and development. John covers the latest thinking on both receiving and high gain transmitting antennas in two completely rewritten chapters. I have always been fascinated with the concept of Phased Vertical Arrays. Vertical arrays are the hot setup for low band DXing as they can be the best answer to setting up gain or directional antennas on limited real estate. John's book covers the latest thinking on phasing network design as developed by another great low band DXer Robye Lahlum W1MK.

John's chapter on Propagation should be standard reading for not just any ham, but any shortwave listener who wants to maximize his or her enjoyment of the lower frequencies.

DXing is also a bit different from higher bands. You have to pick your times and places. I can recall finally making sense out of split-frequency operation many years ago when I first read John's explanation of how this technique is used for chasing DX, not just on the low bands, but on higher bands as well.

As with any aspect of amateur radio, not everybody is in a position to be a Big Gun. But, as with previous editions, John never forgets all the moderate and low power operators. Regardless of your entry point in terms of skill, experience and equipment, the information in *Low-Band DXing* is well worth reading.

The book ships with a CD-ROM that contains a complete, searchable, electronic version of the book as well as ON4UN's Low-Band Yagi design software.

❖ Parts is Parts

If you are involved in the construction, repair or restoration aspects of the amateur radio hobby, you know that two things are becoming rarities. The first is suppliers of "through hole" parts. The second is suppliers who are willing to deal in hobbyist level quantities without minimum order size.

One of the companies that continues to respect the needs (and the wallet) of the hobbyist is Mouser Electronics (<http://www.mouser.com>). Their catalog is updated quarterly. The hard copy version of the catalog is over 1500 pages, covering in excess of 300,000 part numbers. Of course, everything Mouser sells can be found on line, but I am "Old School" when it comes to parts catalogs. For me, it's always been hard to compare, design and even dream using

an on-line catalog. Maybe it goes back to those days when I was in high school pouring over the Allied, Lafayette and Burnstein-Applebee catalogs.

(Side Note: Have you seen the prices these old catalogs are going for on e-Bay? I wish I had kept them. I could buy a lot of parts out of the Mouser catalog with the money I would have made.)

You can order the hard copy Mouser catalog right off on their Web site or by calling (800) 346-6873. Don't forget to tip your mail carrier, though. It's a big book and he or she has to carry it four times a year. *IF* you want to go a bit easier on your Mail person, consider the CD-ROM version of the catalog, also available from their Website.

By the way, if you are an educator, Mouser offers special sales assistance and service for you (special_sales@mouser.com or at (800) 633-2246). This is yet another reason I like to do business with the Mouser folks. Anybody who supports bringing young folks into the electronics hobby and profession is okay in my book.

❖ Crystal Kit

And speaking of getting young people (or even older people, for that matter) interested in the radio hobby (and eventually amateur radio), the folks at the X-tal Set Society may just have the project to get somebody excited.

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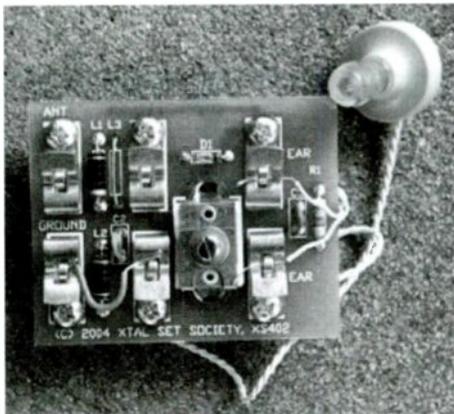
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Most middle-aged radio enthusiasts have probably had the experience of constructing a crystal radio set. I'd be hard pressed to think of a ham from that era who didn't cut his teeth on this basic technology. In the 1950s and 1960s, it was many a young person's joy to pull radio signals out of the ether using either a piece of galena crystal or a germanium diode and no power source other than the radio signal itself.

Designed by Phillip Anderson, W0XI, the XSS tunes the entire AM Broadcast Band. The kit has extra large solder pads, great for learning (or teaching) soldering technique. Unlike traditional crystal sets, the XSS uses a molded high frequency choke. This eliminates the coil winding process that can frustrate many first time builders. The XSS is perfect for parents and grandparents to build with kids. It is also priced right for classroom use, and can be used to teach basic radio





theory, soldering, and handling of electronic parts and printed circuit boards. The kit also includes a high impedance crystal earplug that can be used with further crystal set experiments.

For less than the cost of a good dinner or two movie tickets, you can expose someone to the radio hobby in a fun and non-threatening manner. And once they are hooked, it is just a quick read of a license manual to get them into ham radio.

❖ Drop the Code to Save the Code

Lots of folks have e-mailed me to ask my latest thinking of the FCC Notice of Proposed Rule Making (WT Docket 05-235) that, among other things, modifies Part 97 to eliminate the Morse Code test for amateur radio licensing. Those of you who have followed my writing over the years may have noticed my thinking has evolved on this subject. Yes, I am a dyed in the wool CW fanatic who has to read the manual in order to use a microphone. Yes, I am a card carrying member of FISTS (#6214 to be exact.) Yes, I got my Extra Class license the *Old Fashioned Way* sitting across from a steely eyed examiner while I struggled to copy 20 wpm. Yes, if you want a casual QSO with N2EI you had better sharpen your skills and go hunting around the lower end of 40 meters. You would think that I would be blowing a gasket over a move away from mandatory code testing.

Well, in a very few words, I say to the folks at the FCC: *Go For It!* As a matter of fact, that is the extent of my formal comments to them on the subject.

I know I haven't always been in favor of letting the code test rule pass gently into ham radio history, but I've spent a lot of time looking at the subject and talking it over with folks I respect in the amateur radio hobby. I've even talked the matter over with more than a few commercial code veterans from both the maritime and news services.

My current reasoning is based solely on my own experiences with CW. In my fledgling years as a ham radio operator, I really believed I hated the International Morse Code. I rarely hooked a key up to a transmitter throughout most of my early ham career. And after years of anguish, I finally figured out what was wrong, and, in so doing, came to fall deeply in love with the most ancient and revered mode of radio communication.

It turns out I discovered I didn't hate the code, I hated the *Code Test*. I hated the mind-numbing practice. I hated the code records and tapes that were easily memorized after one or two passes. I hated trying to work *anybody* on the old 40 meter novice band with all its QRM and QRN. I hated what a person had to do in order to get permission to get on the air and actually use CW in the way it was designed to be used. (I suppose any ham who knows me personally will also chime in here with comments about my general contrarian attitude and less than zealous respect for most authorities. I respect Ohm's Law and the Law of Gravity; everything else is pretty much up for grabs.)

So, once I put all that learning and testing stuff behind me, upon achieving my Extra Class ticket, much to my surprise, I relaxed and, over a relatively short period of time, lost track of my microphones. I began to see the beauty in the simplicity of the CW mode. It became my primary reason for participating in the hobby and, supplemented with operating at QRP power levels, gave me some real challenges and rewards along the way.

So, I guess what I am saying is that what makes CW worthwhile, at least for me, has nothing to do with passing any test or proving anything about my skill to anyone except that ham on the other side of my latest QSO. Maybe with the requirement removed, in keeping with the current trend in international amateur radio practice, other people will find their way down to my end of the ham radio world and join me

in enjoying CW.

I am somewhat disappointed that the new rules proposed did not make for better closure for our Novice ham brothers and sisters. People who still hold the Novice Class ticket remain limited to the old rules covering their license while the very frequencies they held access to go up for proposed "refarming" within the rest of the ham radio world. To me, a more evolved way of giving these stalwarts a reason to soldier on would be to allow them to pass a brief open book exam on current rules and frequencies (similar to how the VE Examiner's credentialing test is given). Upon passing this exam, they should be granted current Technician Class privileges. Maybe a future look at rewriting the rules will address this issue.

For now, have fun, wherever you are on the bands. I'll see you on the bottom end of 40 meters.

Outer Limits continued from Page 59

where the value of the US dollar is plunging rapidly. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14895; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 69, Elkhorn, NE 68022; and PO Box 293, Merlin, Ontario N0P 1W0. Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for submitting pirate loggings with a hope that pirates might QSL the logs remain The ACE (\$2 US for sample copies via the Belfast address above) and the e-mailed Free Radio Weekly newsletter, still free to contributors via niel@ican.net. The Free Radio Network web site, another outstanding source of content about pirate radio, is found at <http://www.frn.net> on the internet, and a few pirates will occasionally QSL a web site report left on the FRN.

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Skip Aray, Beverly, NJ; John T. Arthur, Belfast, NY; Artie Bigley, Columbus, OH; Ross Comeau, Andover, MA; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Rudy Elsen, Castro Valley, CA; Harold Frodge, Midland, MI; William T. Hassig, Mt. Prospect, IL; Harry Helms, Wimberly, TX; Alan Johnson, Reno, NV; Chris Lobdell Stoneham, MA; Leonard Longwire, Chicago IL; Greg Majewski, Oakdale, CT; Larry Magne, Penn's Park, PA; A. J. Michaels, QTH unknown; Mark Morgan, Cincinnati, OH; Mike Ostrowski, Saline, MI; Anker Peterson, Denmark; John Poet, QTH Unknown; Lee Reynolds, Lempster, NH; Martin Schoech, Eisenach, Germany; John Sedlacek, Omaha, NE; David Towers, UK; Peter Vieth, San Diego, CA; Bob Wilkner, FL; Niel Wolfish, Toronto, Ontario; Joe Wood, Greenback, TN; and two anonymous contributors who failed to identify themselves.

UNCLE SKIP'S CONTEST CALENDAR

California QSO Party
Oct 1, 1600 UTC - Oct 2, 2200 UTC

RSGB 21/28 MHz Contest (SSB)
Oct 2, 0700 - 1900 UTC

YLRL Anniversary Party (CW)
Oct 5, 1400 UTC - Oct 7, 0200 UTC

FISTS Fall Sprint
Oct 8, 1700 - 2100 UTC

Pennsylvania QSO Party
Oct 8, 1600 UTC - Oct 9, 0500 UTC
Oct 9, 1300 - 2200 UTC

North American Sprint (RTTY)
Oct 9, 0000 - 0400 UTC

10-10 International 10-10 Day Sprint
Oct 10, 0001 - 2359 UTC

YLRL Anniversary Party (SSB)
Oct 14, 1400 UTC - Oct 16, 0200 UTC

RSGB 21/28 MHz Contest (CW)
Oct 16, 0700 - 1900 UTC

ARCI Fall QSO Party
Oct 22, 1200 UTC - Oct 23, 2400 UTC

CQ Worldwide DX Contest SSB
Oct 29, 0000 UTC - Oct 30, 2400 UTC

10-10 Int. Fall Contest CW
Oct 29, 0001 UTC - Oct 30, 2359 UTC

FISTS Coast - Coast Contest
Oct 30, 0000 - 2400 UTC

Liquid Antennas and Other Oddities

Ever heard of a wet-string antenna (WSA)? Usually references to WSAs are made in jest to indicate that the antenna in question is extremely ineffective.

On the other hand, impure water will conduct electricity, and salt water is even more conductive. Ben Franklin discovered that lightning was an electrical-current flow by flying a kite with a wet ribbon as a conductive tether. I've even read of successful radio communication using an antenna that was a stream of water pumped high into the air. So, I decided to check out WSAs to see if maybe they could support radio communications.

❖ The Proof of the Pudding

To begin, I determined that transmitting using a rubber-duck antenna with my handheld transceiver caused a full-scale reading on my field-strength meter (FSM) when the transceiver was about 8 ft away from the FSM. This gave me a basis against which to judge the performance of my WSAs.

My first WSA (fig. 1A) was a cotton string cut to 19-1/4 in. – a quarter wavelength on 146 MHz, the test frequency. A short (3/8 in.) copper wire was attached to one end of the WSA and served to connect the antenna to the transceiver. First the string was soaked in filtered tap water. Transmitting to the FSM from a few inches away produced no response on the FSM. Then I even touched the WSA to the FSM antenna. There was no response.

Next, I added so much salt to the tap water it wouldn't all dissolve and rewet the

WSA. When the antenna was held about 2 ft from the FSM's antenna, I got a weak but easily noticeable reading on the FSM. As I moved the antenna up to about 8 in from the FSM's antenna I got a full-scale reading. Not exactly a DX sky wire, but it did work.

A thicker string (about 1/8 diameter) wet with the salt water gave somewhat better performance. About 4 ft away from the FSM there were noticeable readings on the FSM. At about a foot from the FSM antenna the reading was full scale.

Encouraged by my limited success with the larger-diameter conductor, I tried one of my cotton summer undershirts saturated with the salted water (fig. 1B). The shirt was about 26 inches long and averaged perhaps 2 inches in diameter. It hung loosely below the transceiver, supported by a dry, synthetic-fiber string. To my surprise this "undershirt antenna" yielded a full-scale FSM reading at 10 ft: a stronger signal than produced by my rubber duck! With it I was also able to key and receive a local repeater. This cotton rag was a useful, if inconvenient, antenna!

Next I tried reception on HF with a wet, salted, cotton rope about 46 ft in length (fig. 1C). The rope's diameter was about 1/4 in. It was strung about 7 ft high inside the first floor of my house. It did support reception, but signal strength was something like 12 dB (2 S-units) less than that obtained with a copper wire of comparable length put in the same position.

I'd like to do more experimenting with WSAs on HF using larger-diameter conductors. But that will have to wait, because I don't have

enough undershirts to tie together to make a proper length HF antenna!

And So:

With proper design, WSAs can support communications. But they lose moisture rapidly, and thus lose efficiency. If you try WSAs, use cotton for the conductor. Some string and rope marked as cotton is actually a blend of cotton and synthetic fiber that doesn't absorb water like cotton does. Check the small print on the label. Also be careful not to let salt water get into your antenna connectors or other metal gear: it will corrode them.

❖ Under Water

As surprising as it seems, wire antennas are occasionally placed underwater or underground. Of course, both water and earth attenuate the strength of signals passing through them. So, the deeper the antenna is placed, the less the strength of signals which reach it. But when the strength of incoming signals is sufficient, these antennas provide satisfactory service.

Such antennas are reported to have a better signal-to-noise ratio for reception than above-ground antennas and lightning-induced damage is less likely when using these antennas. Underground antennas have performed well for me for local, two-way ham radio communications. Both underground and underwater antennas are more effective at lower frequencies.

❖ Earth and Growing Things

One of the most unusual antenna ideas I've heard of was a plan to use an entire island as an antenna! However, I've read only one report of that sort. On the other hand, a number of reports of trees being used as antennas have come to my attention over the years. A live tree has moisture and can conduct electrical current to some degree. When I lived in Vermont I connected a matching circuit and feed line to a tall maple tree in my backyard. It gave good performance as a receiving antenna on the LF, MF and HF bands. I didn't try it on VHF or higher frequencies or for transmitting. Lee DeForest, the self-styled "American Father of Radio," reported that he successfully used a weed as a ground connection for one of his antennas.

❖ Out of Thin Air?

When rockets and space vehicles re-enter the earth's atmosphere, they create a trail of

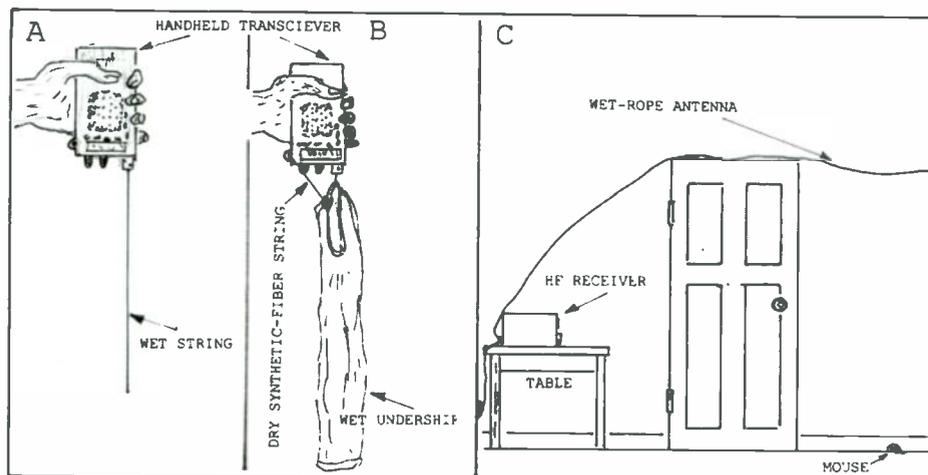


Fig. 1. A quarterwave wet-string VHF antenna (A), a cotton-undershirt VHF antenna (B), a wet-cotton rope, random-length, HF antenna (C).

This Month's Interesting Antenna-Related Web site:

Here are a couple of web sites that report success with WSAs:

<http://www.alangm6.plus.com/Pages/wetString.htm>

<http://www.bitshack.fsnet.co.uk/radio.htm>

If you enter "'wet string' antenna" in Google, you will find numerous references to the proverbial, ineffective wet string antenna!

For some unusual antennas inspired by the work of the legendary Kurt N. Sturba check out:

<http://www.n0ew.radiomonkey.org/StrangeAntennas/10m.html>

<http://n0ew.radiomonkey.org/Strange-Antennas/k0s.specialevent.html>

ionized gasses. One report I read proposed to use these ionized trails as antennas in a fashion similar to the streams of water mentioned earlier.

Interesting world, isn't it?

❖ Interesting Radio Reading

Do you enjoy reading about secret, military, radio operation, breaking secret wireless codes, or operating radio in dangerous situations? The following two books cover some interesting radio spy work during the First and particularly the Second World Wars. They show the importance of radio monitoring and code breaking in both world wars. The books are: *The SIGINT secrets : the signals intelligence war, 1900 to today* : Nigel West, Publisher:

W. Morrow, Pub Date: c1988, and *The Secret Wireless War*. Geoffrey Pidgeon, published by USPO, London, 2003. If your library doesn't have them, they can probably get them for you on inter-library loan.

RADIO RIDDLES

Last month:

I wrote: "The antennas discussed this month are described as antennas for shortwave (HF). Will these antenna designs work on other bands such as LF, MF, VHF, UHF, and microwave bands?" Well, theoretically any antenna design can be constructed for operation at any frequency. But practical considerations make certain designs better choices for certain bands. This is primarily because the longer the wavelength, the larger the elements of the antenna must be. For example, the reflector dish for a home, satellite-TV antenna is a reasonable size at the really short wavelengths of microwave frequencies. On the other hand, that same design would produce a dish on the order of a thousand times larger if designed for the much longer wavelengths of the AM broadcast band!

This Month:

Dielectric materials, such as mica, cloth, paper or glass, offer so much resistance to cur-

rent flow that they are used as insulators. In practical terms they do not conduct electricity to any useful degree. However, you now know that a piece of cloth, when wet, can actually work as an antenna. But how about using dry dielectric material to make an antenna? No? Hmmm.

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

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How Many Volts to Light a Tube?

I had hoped to have the HQ-120 completely recapped in time for this column so that I could report on an initial "smoke test." But I'm really not ready. The HQ-120 has more than 30 paper and electrolytic capacitors, some of them buried in difficult-to-get at locations. I've replaced a lot of them, but I have many more to go.

That being the case, I thought I'd devote this column to a general topic – something that several respondents to my recent survey wanted to see more of. I'll be building on a column that appeared in the April 2003 issue called "A Short History of Vacuum tubes." It traced the evolution of vacuum tubes from a physical point of view, such as the design of bases, internal elements and envelopes.

What we didn't cover then was the development of the electrical specifications for the filaments used to light the tubes. As you'll see, it's a very interesting subject.

❖ The AK Model 37: A Good Case History

Perhaps the best way to get into this subject would be to take a look at the tube complement of the Atwater Kent Model 37, a typical late-1920s a.c. operated radio. This set uses three type 26s as r.f. amplifiers, a type 27 as the detector, another 26 as the first audio amplifier, and a type

71-A as the second audio amplifier. The rectifier tube was the usual type 80.

I'm including a portion of the manufacturer's schematic of the power unit for this radio so that you can study the transformer. Notice that, in addition to the high-voltage winding, it has no less than four filament windings.

Looking at these from top to bottom, we find one marked "2nd A.F. FIL. WINDING," which provides 5 volts for the 71-A filament. The next one, marked "R.F.-1ST A.F. FIL.," supplies 1.5 volts for the type 26 filaments. Below that is the "DET. FIL. WINDING." It puts out 2.5 volts to light up the type 27. Skipping over the high voltage winding, we come to the "RECTIFIER FIL WINDING," another 5-volt winding, that powers the type 80 filament.

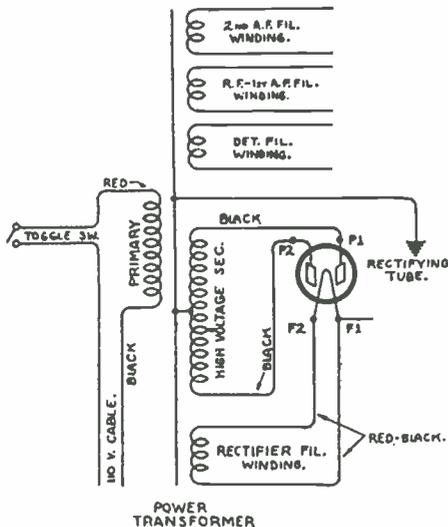
It's obvious why we need separate 5-volt windings for the rectifier and second audio filaments. The rectifier filament carries the high voltage for the radio, and so its supply winding has to be isolated from all the other filament windings in the set. But why do we need windings providing separate voltages for the type 26s and 27? If they could have been designed with 5-volt filaments, we would be able to operate all of the tubes in the set (except the rectifier) from a single transformer winding.

❖ Early Battery Tubes

To look for the answer that question, let's begin in the year 1920. In that year, the fledgling RCA company placed its first two consumer receiving tubes on the market: the types '00 (a detector) and '01 (an amplifier). Their filaments were made of tungsten, like the filaments of the light bulbs of the era.

The filaments of these tubes were designed to be operated from a six-volt auto-style battery. But they were rated at five volts so that the battery would last longer between recharges. A rheostat provided on the front panel of the radio was used to reduce to 5 volts the 6 volts provided by a freshly-charged battery. As the battery discharged and its output voltage slowly dropped, the setting of the rheostat was adjusted to keep the filament voltage at 5 (or, more accurately, at the minimum voltage required for satisfactory operation of the radio).

The '00 and '01 tube filaments drew one ampere at their rated voltage – a hefty amount, especially if the radio used several tubes. So, a few years later, in 1923, RCA doctored up the '01 tube filament by alloying it with thorium, which reduced its current draw to 0.25 amperes at 5 volts. This revised tube was the ubiquitous



Power transformer for Atwater Kent Model 37 has four separate filament windings supplying three different voltages.

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ARCTURUS RADIO COMPANY
220 Elizabeth Ave., Newark, N. J.

Early advertisement for type 27 detector tube. The "7 Second" statement probably refers to claimed warm-up time.

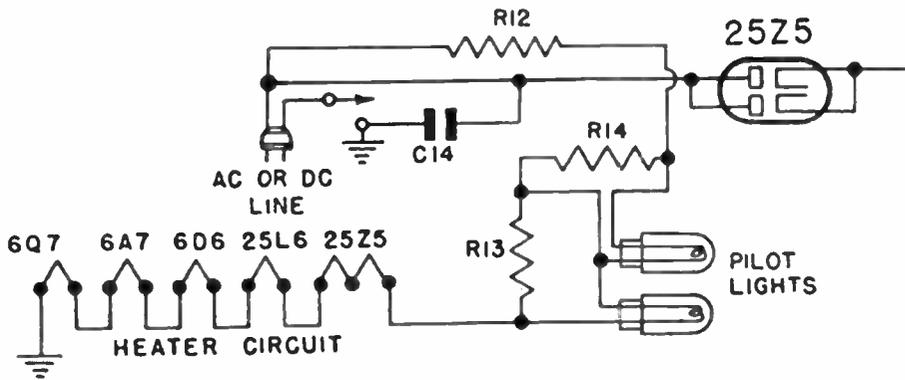
'01-A. The '00-A, a 0.25 ampere version of the '00, was released a few years later but never saw wide distribution.

Incidentally, the apostrophes I'm using ahead of the type numbers represent letter and number prefixes that were originally used to designate base styles and the manufacturers. The use of these prefixes had pretty much died out by the mid 1930s.

A few other tube types that are a little out of the mainstream of our discussion, but which need to be mentioned in any discussion of tube filament electrical specifications, are the '99, '20, and '11/'12. The '99 was a general purpose amplifier/detector; the '20 was intended for use as an audio output tube. Both types have 3.3-volt filaments and were intended to be operated from three 1.5-volt dry cells in series with a rheostat. The '11 and '12 (identical tubes with different basing) had a 1.1-volt filament to be operated from a single 1.5-volt dry cell in series with a rheostat.

❖ Tubes for Plug-In Radios

Now we come to the late 1920s, when battery-operated radios were being replaced with



Filament string of early a.c.-d.c. radio doesn't add up to standard line voltage – hence the addition of series-connected ballast resistor (R12).

sets that were powered from a wall socket. The tubes for these sets now had to be lit by alternating current rather than battery power.

The filaments of the '01-As normally used in battery sets as r.f. amplifiers and as the detector were not suitable for alternating current operation. In that application, they introduced significant hum into the received signal.

However, the type '71-A, originally developed to replace the '01-A in the audio output stage of battery sets, turned out to be usable for the same purpose in a.c.-operated sets. Since this tube was intended to be lit by a 6-volt storage battery, it had a 5-volt filament.

New tubes had to be developed for r.f. amplifier, first audio amplifier and detector use in a.c. sets. The first of these was the type 26, which was equipped with a very heavy filament having enough "heat inertia" to resist the cycles of heating and cooling superimposed on it by the a.c. supply. With the ripples smoothed out in this way, very little hum was introduced into the signal passing through the tube.

The filament of this tube drew over an ampere at its rated voltage of 1.5. By keeping the supply voltage low, the power drawn by the heavy filament could be limited to the value required for proper emission. The type 26 worked very well as an r.f. and a.f. amplifier in a.c. sets, but introduced too much hum when used as a detector. Enter, the type 27.

This new type introduced a brand new concept in vacuum tube design. Rather than directly emitting the electrons required for the functioning of the tube, the filament heated an element called the *cathode*, which was housed in a sleeve surrounding the filament. The cathode contained chemical compounds that released the necessary electrons when heat was applied.

The cathode assembly of the type 27 had greater "heat inertia" than even the heavy-duty filament of the type 26. With this tube in the detector position, hum was reduced to a very acceptable level. However, the filament of the new tube could not operate on either the 5-volt or 1.5-volt standards previously established.

Heating up the 27's cathode required perhaps three times the wattage drawn by the 26's filament. To supply that power at 1.5 volts would have required such a high current drain that the filament (or "heater," as the filament of a tube with a cathode is called) would have had to be constructed of unwieldy and expensive heavy-gauge wire.

Conversely, returning to the 5-volt standard established for battery sets would have required the heater wire to be too thin and fragile than was practical given the technology of the day. Accordingly, a compromise value of 2.5 volts was decided upon. And that value became standard for the expanding family of tubes with cathodes.

❖ Auto Radios and A.C.-D.C. Sets

The 2.5-volt heater would have remained standard for many years were it not for the growing interest in automobile radios. Once more, tubes had to be designed for operation from an automobile battery. However, the battery in an auto is not slowly drained with use but, instead, is kept always near full charge by the auto's generator.

Under these conditions, the output voltage of the 6-volt automobile battery standard for the era was about 6.3. And that was the value of the heater for the myriad tube types developed from that point on. Apparently, by then the tube engineers had solved the problem of making the requisite fine-wire heaters sturdy enough for reliable operation.

Most of these tubes were equipped with cathodes so that they could be used in a.c. operated home radios as well as in automotive sets. A little later on, families of 12.6 volt tubes were developed for use with military mobile equipment.

During the depression era, demand for inexpensive home radios was very high. Families with slim budgets gathered around the living room set to enjoy the free entertainment. And one method radio manufacturers used to cut costs to the bone was to eliminate the power transformer.

Tube heaters in such radios were no longer operated from special power transformer windings. Rather, they were placed in series and connected directly across the line like old-fashioned Christmas tree lights. This required that all the tubes in a set draw the same current when operated at their rated voltages.

Some of the first "a.c.-d.c." sets, so called because (thanks to the elimination of the power transformer) they could operate from a.c. or d.c. mains, were designed around the early 6.3-volt tubes. The example I'm showing here uses a 6A7 pentagrid converter, a 6D6 i.f. amplifier,

and a 6Q7 detector/first audio tube. All heaters are rated at 300 mA. For proper operation, the heater voltages of the entire series string had to add up to the approximately 115-volt line voltage.

Tubes with special high-voltage heaters were developed to help boost the total to the correct value. Note, in the example shown, the use of a 25Z5 rectifier and 25L6 audio output tube – which both have 25-volt heaters drawing 300 mA. Since adding up all of the tube heaters gives only 68 volts, a ballast resistor (R12) and a pair of pilot lamps make up the difference.

By about the late 1930s, a family of tubes for a.c.-d.c. radios was developed with heater voltages high enough to eliminate the need for a ballast resistor. This family consisted of the 12SA7 pentagrid converter, 12SK7 i.f. amplifier, 12SQ7 detector/first audio, 50L6 audio output and 35Z5 rectifier. All had a current draw of 150 mA. The first two numbers of the tube type represent the heater voltage; note that the total is 121. This series of tubes was in such widespread use that it became known as "The All American Five."

Before closing, I'd like to at least mention the family of 1.4-volt filament (no cathode) tubes developed for battery portables. There were about a half dozen of them, including the 1A7, 1N5, 1H5 and 1G5.

This brings our review of tube filament and heater voltages up to the ending of civilian radio production with the onset of World War II. This seems like a good place to stop – especially since we've run out of room. See you next month!

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A Better AM Antenna for Your Handheld

By Bob Lombardi

Over the last several years, the major receiver manufacturers have produced a line of wideband coverage ("DC to Daylight") handhelds. Icom produces the R2, R3, R5, R10 and R20; AOR produces the AR8200, Alinco has the DJ-X10T, DJ-X2T, DJ-X2000, and DJ-X3; Yaesu offers the VR-120D and VR-500; and there are more. Most of these radios share a common weakness: they have a poor antenna for AM broadcast band (BCB) and lower frequencies. This tends to leave a bad impression with first-time users.

If you've ever wanted to improve the AM reception of your handheld, or wanted to take it out to a quiet radio location for DXing, then read on for details on how to build a better antenna than the ones that are provided on all of these radios.

❖ The Problem

First off, let's ask the question: why are handheld wideband radios relatively poor on the AM BCB? The answer is that since these are broadband, continuous coverage receivers, they don't have much choice in designing the input stage. They have a choice of a broadband input that will work well with most external antennas, or one that can be tuned to work well with a supplied whip antenna. The drawback to the second type is that the radio will likely overload badly when connected to an external antenna.

If your radio has a BNC (or SMA) antenna connector, it's most likely the first type, most likely having a 50 ohm antenna input which matches the majority of small amplifier integrated circuits on the market. Therefore, the radio will work best if we can provide it with an antenna that matches its 50 ohms impedance.

I have the most experience with Icom's R10, which is typical of this type of receiver. It's actually a very impressive receiver, but many users don't get that feeling when they first turn it on. There are frequent reports of it being deaf, coupled with a widely-held (and very unrealistic) belief that any receiver should be able to hear anything indoors with any antenna. However, if you measure the sensitivity on an R10 with a 50 ohm signal generator, the performance is great. Simply stated, the rubber ducky provided by Icom is a rotten antenna, good for only a few narrow bands. If you want better results, you need better

antennas.

Here's where I have a couple of advantages over some scanner/radio hobbyists. I'm a professional receiver designer and a ham. I have access to test equipment and outdoor antennas. I've done side-by-side tests between my R10, my Icom 746 Pro ham station, and my Collins R-390A boat-anchor shortwave receiver, using my outside antennas for comparison: an HF log periodic array, a VHF/UHF log periodic, and a random length wire antenna. In all cases, the R10 hears everything that the big station rigs hear.

I do need to use the attenuator on the R10's front end more often than with the big rigs, but that simply means the R10 doesn't have their dynamic range. I expect that. Dynamic range depends on a few design factors, but the primary ones are filters and the current flowing in the circuitry. It's an old axiom among filter designers that "Q comes by the cubic yard" – meaning that high selectivity filters are big. And, of course, high current consumption circuits are incompatible with the long battery life you want in a portable.

The R10 is my constant companion at work. Some time ago, I built a dipole for the aviation band so that I could monitor air traffic at work. This dipole also makes a good FM band antenna and provides listenable signals on the AM BCB, at least for the stronger local stations. Unfortunately, our company is a typical engineering building

with a couple of computers in every office and hundreds of pieces of test equipment. The electro-magnetic interference (EMI) environment is awful. I've tried a variety of indoor antennas and still have not been able to hear some of the local AM stations. At some times, the noise is too high to hear much of anything.

It's commonly stated that this sort of interference seems to be primarily electric field, and that a magnetic antenna will reduce or remove it and this started my research into this sort of antenna.

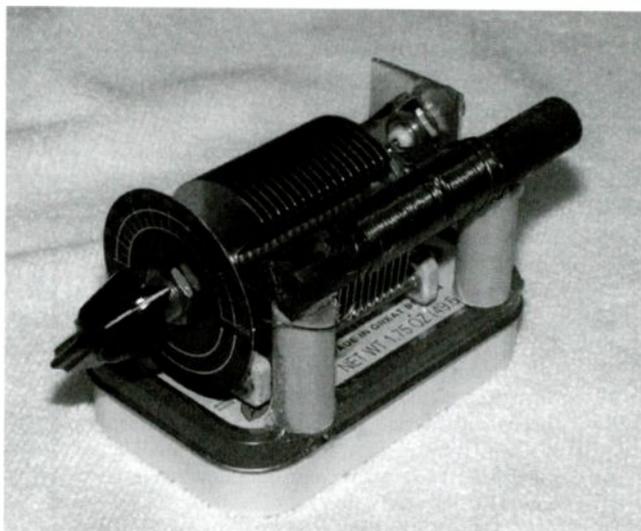
❖ The ferrite loop

Loop antennas are not new; I've used one at home for ages with my R-390A. That sort of loop is made by putting a large number of turns of wire on a large frame, tuning it to resonance with a variable capacitor, and coupling that signal into the receiver. There are dozens of web pages that detail how to make this sort of loop antenna. There are far fewer that detail how to make a ferrite rod loop antenna.

Ferrite rods increase the magnetic flux pickup of the coil wound on them. This leads to the interesting property that the physical size of the magnetic rod determines how much signal is picked up, not the inductance or physical dimensions of the coil. The ferrite core acts to concentrate the magnetic fields into the antenna, increasing its aperture or capture area. The inductance is determined by the permeability of the core, the frequency you want to tune, and the capacitor you want to use to resonate the coil. Now, to be fair, the physical size of the ferrite does affect the permeability somewhat, and therefore the inductance, but the thing that affects the permeability the most is the "recipe" the ferrite maker uses. This means that you can wind a coil to a convenient physical size, say on a piece of 3" long, 3" diameter PVC, and slide that over a ferrite rod that is as physically large as your desires and budget allow.

Furthermore, the rod doesn't have to be one piece because the magnetic field, unlike electric current, jumps non-conductive gaps. (In fact, the ferrite rod is non-conductive). What does this mean? It means you can glue together a bunch of rods to make a big one that digs out weak DX signals better.

But weak signals aren't my problem. My problem is interference rejection. In light of this, I decided to build a fairly



This view of the antenna shows the connections. One end of the pickup loop goes to the center of the connector, the other goes to ground along with one end of the main winding. Ground on the cap is the rotor (frame). The other end of the main winding goes to the stator terminal at the front of the variable.

small ferrite-loaded antenna, and this article will present details on how to design and build both small and large ferrite rod antennas.

First, pick the right ferrite mix

Ferrite rods are available in different mixes, which work better in different frequency ranges. Amidon Corp. shows their mix 33 material as the choice for 10 kHz to 7 MHz. This material has an initial permeability of 800.

Next, pick the size inductor you want to wind

Here you need a reference or some starting knowledge. The range required for the AM BCB is pretty large. Long ago, radio designers started making variable capacitors that tune from about 9.5 or 10 picofarad (pF) up to 365 pF. The smaller capacitor gets the top end of the band while the larger value tunes the bottom end. You can calculate the coil (the inductor) by finding the inductance that resonates with 365 pF at 540 kHz. This value is about 240 microhenries (uH). At 9.5 pF, this will resonate at 3.35 MHz, so you can make the coil a little bigger, or use a capacitor that doesn't go to that small a value.

Remember, the resonant frequency of an LC (inductance/capacitance) pair is

$$F = 1/(2\pi\sqrt{LC})$$

where SQRT means square root, as it does in many programming languages. That means if you have one value, like the capacitor, the inductor is

$$L = 1/((2\pi f)^2 C)$$

If you have the L and want to find the C, just substitute L for C in that equation.

Calculate how many turns of wire are required

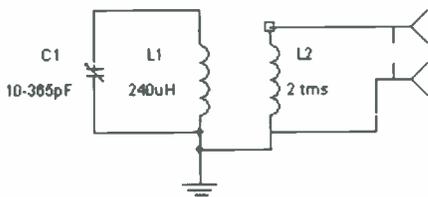
The formula you need is on the Amidon page shown at the end of this article. The number of turns is calculated from a constant called "A sub L" - A_L - which is based on the physical size of the ferrite rod or core and the initial permeability. I recommend Amidon's part number R33-050-750, which is a solid rod, a half inch in diameter, 7.5 inches long.

For this rod, $A_L = 70$, so the number of turns is $(1000 \times \sqrt{0.240/70})$ or 58.55. You can wind a half turn on a rod, but there is some variation in the A_L value, which affects the number of turns you get, and 59 turns is "close enough." I used 24 gauge enameled wire, but that's what I had on hand. The wire choice isn't critical.

❖ The schematic

❖ Where do you get the parts?

Amidon sells online, but other companies also carry these rods. Universal Radio carries the Amidon parts, and you'll find other companies



selling them at hamfests and other places. The capacitors are becoming harder to find, but the size is common in AM transistor radios. A flea market or garage sale AM radio can be raided for the parts.

Companies such as Midnight Science carry larger, all metal capacitors that should be great for this application. Most of the small AM radios on the market will have a capacitor that uses plastic insulation between the tuning plates, and the whole thing is in a small package. My prototype used a capacitor from a surplus transmitter that is much bigger than it needs to be.

❖ Putting it all together

I wound the coil on a piece of rod I had that was broken off from a longer one. I approximated the coil A_L as halfway between the 4" and 7.5" values, and wound that number of turns. I wound two turns of wire over the base end of the coil and connected that to a BNC connector. The large coil was connected to the tuning capacitor. The capacitor's frame ground was on the bottom end of the coil at the same point the output coil was wound over.

The whole thing fits comfortably on the top of an Altoids tin, but don't put the coil down on the steel can - you'll de-tune it. I put the coil on some wooden dowel pieces, held on with hot-melt glue.

How much did it cost? Well, mine used a broken off piece of ferrite rod, wire, and a surplus capacitor I had around the house, so mine was free. The 4" rod from Amidon is \$6, and a capacitor will cost \$12 for a new metal one, or it could be free if you get a junker AM radio to take apart.

❖ Testing the new antenna

I warmed up the R-390A which was attached to the conventional wire loop - a wooden square 15" on a side. I connected the ferrite loop to the R10 and started at the top of the AM band, tuning for stations I can usually hear on the R-390A from my central Florida location. First stop was WTOP at 1500 in Washington DC. As I progressed down the band, I found that every station I could hear on the R-390A and its loop, I could hear on the R10 with the ferrite rod. WBT in Charlotte, WCBS, and WABC in New York, and all the other stations I usually hear were perfect copy on both receivers.

The following Monday I took it to work. I was able to listen to AM stations that I couldn't hear on my dipole, and able to null out noise on all of them. I got better AM reception than on any of the other antennas I've tried, including some that are fairly expensive. This is the first loop I've tried at work, so I don't know if any other loop design would work as well, or even better. I was surprised to find that some FM broadcasters, even those in Orlando (roughly 70 miles away), are good copy on the ferrite loop. I expected to have to change antennas to hear any of the FM stations, except perhaps for the college station a few miles away.

❖ "Extending" the concept

So, how do you make the antenna better?

Earlier, I mentioned gluing the rods together. You can make up a bundle of them, glue them together with epoxy, and make a longer, larger diameter loop. Remember, the area of the ferrite rod is the area of the antenna, so making it thicker in diameter works. Make an assembly that's longer and thicker in the middle by putting rods in the grooves formed by placing rods together.

You will no longer be able to use the A_L formulas on the Amidon website, because it's no longer one of their standard rods. There have been attempts to come up with equations that will work for any combination of rods, but my best advice here is to measure the inductance of what you wind and experiment.

Many loop designs include low-noise pre-amps. I found the signal levels out of my loop more than adequate for my purpose, both at home and at work. I wouldn't hesitate to try a low-noise amp if I was trying to DX BCB or low frequency stations using a loop like I just described. The local stations I'm trying to receive at work have strong fields; they're just masked by interference that is equally strong (or stronger). I don't think an amplifier would help in this case.

So there you have it; a way to improve the AM BCB performance for a wideband receiver. I've also presented advice on making other ferrite loops for more demanding DXing. Why wait? Go try a ferrite rod loop antenna.

Sources:

Amidon Inc.
240 Briggs Ave
Costa Mesa, CA 92626
800-898-1883
http://www.amidoncorp.com/aai_ferriterods.htm

Universal Radio
6830 Americana Pkwy.
Reynoldsburg, OH 43068
<http://www.universal-radio.com>

The Crystal Set Society
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Norman, OK 73070
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ETON FR-300: It's Not Just For Emergencies!

By Ken Reitz

Several years ago the Grundig Corporation found themselves with a great hit on their hands in the FR-200 (*MT* October 2002). It featured AM, FM and two shortwave bands. Now the Eton Corporation, the American distributor of Grundig radio products and maker of its own line of radios, has released the FR-300 just in time for the big finale to the hurricane season.

❖ Feature Packed Portable

Similarities between the two radios abound. Both use a similar housing and knob arrangement; the case is 6.5" high, 6.5" wide and just 2" deep. With only its internal batteries the radio weighs just 1-1/4 pounds. Like the FR-200, the FR-300 covers the AM and FM bands, but instead of shortwave the FR-300 covers the VHF-TV and Weather bands.

The greatest thing about this radio is, of course, the hand cranked dynamo power source, called "recycle power," which allows cranking by either lefties or righties and features a bright red LED to indicate it's charging via the dynamo.

Among the usual features are conventional battery power (three AA batteries, not included), an external 5 volt power input (power supply optional), earphone jack and a 26" telescoping, fold-away antenna. Analog tuning is done using a two-speed thumb wheel. Band switching is via a five-position slide switch, and the weather band is tuned using a seven-channel rotating selector switch to click into all seven WX radio frequencies used in the U.S. and Canada.

The FR-300 features a number of very useful changes, including much more powerful LEDs in the emergency light, a red emergency strobe, a cell phone charger and a piercing, warbling siren.

❖ Tuning in on the Details

Even if you don't anticipate being in an emergency, this multi-purpose radio will find its way into your hands. Take it with you on outings, fishing, hiking, picnics, and keep a radio eye on the weather; never miss a pitch of your favorite Major League Baseball team or a down of your local college football team.

Out in the middle of nowhere and your cell phone batteries are dead? Don't

worry, charge 'em up and keep yakking! There are enough adaptors to allow charging all Nokia models, all Siemens models and most Sony, Motorola and Samsung models.

How well does this radio play? The AM and FM bands were no better (and no worse) than you'd expect from a small, cheap, analog tuned portable. I found the WX radio band was as sensitive as my Radio Shack scanner. The FM radio was able to pick up my tiny FM transmitter from over 100 feet away (better than most portables I tested). The TV band tuning was adequate for receiving my local VHF-TV stations, the nearest of which is 50 miles away. There was considerable ingress of nearby FM radio signals in the VHF-TV band. The audio from the tiny 2" speaker was crisp and capable of being clearly heard throughout a sizable room. Even at full volume it was distortion free.

With the coming of digital TV and FM radio, won't this radio be obsolete shortly? No. There will continue to be analog TV and FM signals for the next 5 to 10 years. And, there is virtually no chance that the NOAA WX radio system will be replaced by a digital service within that same period.

Can this radio receive SAME WX warnings? No. But, in the "alarm" mode, it can receive the general alerts sent out by any WX radio transmitter. Set the volume to an audible level and the "alarm" switch to alarm. But, before you do so, make sure it has enough power to stay on during the emergency. I found I could get roughly an hour and a quarter

listening with five minutes on the crank. To test emergency reception, many WX radio transmitters send the emergency signal between 11 a.m. and noon on Wednesdays.

For the money (typically \$49.95 retail) and the features, this is one radio which could actually pay for itself in cost of batteries (roughly two eight packs of AA's). The FR-300 comes with a sturdy, nylon lined, black canvas carrying case, attached shoulder strap, three exterior pockets and magnetic closers on the pouch flap.

❖ Emergency Prepared

Anyone who has ever been in a weather related emergency, or even thinks they will, needs this radio. Before, during and after a storm this little radio will continue to earn its keep. Long after the last of your batteries have gone dead you can continue to monitor the local news and weather conditions on the radio that just doesn't quit.

If you've ever spent several days (and nights) without power, you'll also appreciate the built-in reading light/flashlight. You can find the latest news (which roads are closed, which gas stations are open, where the power's being restored) and enjoy listening to your favorite AM and FM stations. You won't have to hoard the power with the FR-300. As long as you can crank, you can use this radio. The FR-300 is sold through most consumer electronics stores and many *MT* advertisers.

Eton FR-300 Specifications

Size: 6.5"W x 6.5"H x 2"D

Weight: 1.25 pounds

Tunes:

AM (525-1710 kHz)

FM (88-108 MHz)

VHF-TV channels 2-13

WX Radio (seven channels)

Power:

Built-in hand-cranked Ni-MH replaceable battery pack

5 volt DC jack for external power adaptor (not included)

3 AA batteries (not included)

Antenna:

26" telescoping whip for FM, WX and TV bands

Built-in ferrite rod for AM

This product is made in China.

Note: Need some help with your Grundig/Eton radio?

<http://www.grundigradio.com/US/support>



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R20	SCN 20	\$519.95

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PAR VHF Intermod Filter 152MHz	FTR 152DS	\$69.95
PAR VHF Intermod Filter 158MHz	FTR 158DS	\$69.95
PAR VHF Intermod Filter 462MHz	FTR 462DS	\$69.95
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PAR NOAA Weather Filter 162 MHz	FTR 162DS	\$69.95
Yaesu SP-8 Speaker	SPK 4	\$159.95
GRE Superamplifier	PRE 1	\$59.95
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The SI-TEX NAV-FAX 200 Communications Receiver

By Jim Clarke, NR2G
jimclarke@monitoringtimes.com

The SI-TEX NAV-FAX 200 is a small tabletop shortwave receiver covering 30 kHz to 30 MHz, operating AM, USB, or LSB modes. It runs on externally supplied 12 Vdc, with a black plastic case that measures about 2"H X 10"W X 10"D.

❖ First Impressions

Initially, I was quite surprised when the 200 to be used for this review arrived in a relatively small carton. The first word that came to my mind after unpacking it from its box was, "Spartan!" Wow, this radio is simple – three knobs and four buttons on the front-panel, and three jacks with one switch on the rear.

Looking at the SI-TEX website, the 200 seems to be marketed mainly toward the mariner, and in that application it's sure to please those who are trying to keep things simple when on the water. But I wouldn't be too quick to relegate it to just maritime use; I could see it finding its way into an SWL or Ham shack for use as a simple emergency receiver.

❖ Ergonomics

Although this is a rather small tabletop, having so few front-panel controls leaves plenty of "real estate" to keep things from being cramped. There is nothing worse, for me at least, than having a small radio with so many knobs and buttons on the front panel that you need a 10-year-old's fingers to operate it.

The tuning knob is about 1.5", is substantially weighted, and has a finger-dimple, which, all together, provide for a good feel. It works nicely when tuning slowly, but gives you the inertia required to get from one frequency to another quickly, with one or more flicks of the knob.

There is an internal 3", 2-Watt speaker whose audio is projected forward through a vented opening on the top-cover.

A small wire front-stand can be unfolded down from the bottom-panel to elevate the front by about 1".

❖ Tuning

Aside from the tuning knob, the only other way to change frequency is by selecting a memory channel, of which the 200 has ten. The frequency readout is in whole kHz – that's right, no fractional kHz – with fixed tuning steps of 1 kHz.

However, it does have a four-level, automatically adjusting tuning rate – the faster you spin, the larger the step. When using USB or LSB, the clarifier covers most of the 1 kHz in-between steps. With the majority of the maritime channels being predefined frequencies, the clarifier arrangement is quite adequate. However, this can be a very frustrating feature if attempting to casually tune through an amateur radio band.

❖ Memory Channels

Programming one of the ten memory channels with the currently tuned frequency is as simple as pressing the MEM button, scrolling to the channel number using the tuning knob, then pressing MEM again. As you scroll through the memory channels, the content of each is displayed to help prevent accidental over-write. Recalling a memory requires pressing the RCL button, scrolling to the desired channel, and then pressing RCL again.

❖ Front Panel Reset

In case of any operational problem, such as might be caused by an electrical transient, there is an RST button to reset the radio and return it to the frequency and mode of the first memory-channel. This could be used to your advantage if you have a frequency that you return to frequently, say, a "Home" frequency. Program the first memory-channel to your "Home" frequency, then whenever you want to return there, just press RST. And, because you've stored the frequency in the first memory-channel, no matter where you were listening when you turned

off the receiver, it will always turn on to your "Home" frequency.

❖ The Display

The 200's display is about 1"H X 3"W, has frequency numerals that are about one half inch tall, and has no backlighting. This was surprising to me, even considering the target audience; I would have expected some minimal readout lighting.

The S-meter, which doubles as a memory channel indicator, is a multi-segment LCD bar located at the bottom of the display. Mode is displayed to the left of the operating frequency, with each mode having its own discrete indicator.

❖ Other Front-panel Controls

The volume knob not only controls audio level, but is also the on/off switch; turning the knob fully counter-clockwise shuts the radio off. The clarifier has a +/- 800 Hz range to compensate for the 1 kHz tuning and has a small indicator-dot to show the current position.

❖ The Rear Panel

As I said earlier, this radio is simple. You won't find a plethora of jacks and switches on the rear panel, just power, antenna, attenuator, and WEFAX Data Output. The Antenna jack is an RCA Phono jack and comes with a lug for soldering a ground connection.

The 200 even comes with a pre-built long-wire antenna – plug it in and you're ready to go. I didn't measure the attenuation, but it seems to be somewhere between 10 and 20 dB. The WEFAX Data Output is a monaural 1/8" jack that carries audio, not digital data.

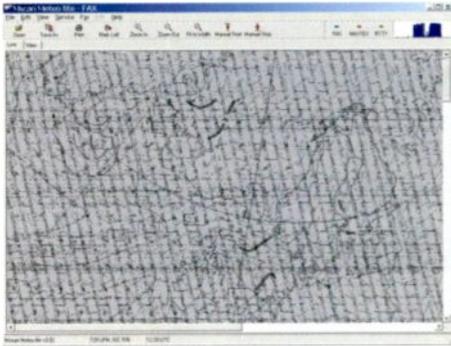
❖ Power-up Default

Each time you turn the radio on, it automatically sets the frequency to whatever has been stored in first memory-channel.

❖ Special features

One of the 200's advertised features is its ability to receive shortwave data transmissions, specifically: FAX, NAV-TEX, and RTTY. I know, there are those of you saying, "Yeah, it and every other radio that tunes SSB." But, the combination of the WEFAX Data Output jack, supplied decoding software and





interconnect cable set it apart from other radios in its price range. It ships with a CD containing a decoding program called Mscan Meteo Lite. Plug the radio's WEFAX jack to your computer's sound-card line-in jack, run the software, tune in a WEFAX signal, and you're in business, weather charts galore. And if that's not good enough, you can also decode NAVTEX and RTTY.

❖ The Manual

I don't usually comment on manuals unless there is something remarkable. The manual for the 200 is, like the radio, small and simple. It's not laid out the way most of us "radio enthusiasts" are used to; it has more of a tutorial flavor. The manual does a good job of providing easy to understand conceptual information about radio, and weaves the operation of the radio into the tutorial. Once again, given the target audience, it is probably just what is needed to help the beginner get started.

❖ How Does It Play?

The advertised bandwidth in AM is 6 kHz, and while I did not specifically measure it, the filter performance seems very good. Tuning through the shortwave bands at night is usually a good test for a receiver's selectivity, and I am happy to report that there was very minimal heterodyning heard. Audio fidelity was good, and in fact was quite impressive for a 3" internal speaker.

Single-sideband has a specified bandwidth of 3.8 kHz, and once again, I didn't measure it, but this time I was a little less impressed. The recovered audio from the signal was fine, but it seemed like the high-end of the audio pass band was a little too high. There was a fair amount of static crashing one evening and it kept an almost constant high-frequency noise in the background. A switchable low-pass audio filter would work wonders to improve the audio.

Published specs give sensitivity as 1uV, apparently across the board. Table 1 reports sensitivity as I measured it, using the audio output at the WEFAX Data Output jack, in AM and USB.

Since I don't do much with WEFAX, I figured I'd give it a try. The software documentation makes the proposition sound as easy as falling down – well, almost. So I installed and ran the software, plugged the radio into the computer, tuned in one of the WEFAX signals, and voila, nothing.

After some consulting with the program's help system, I was finally able to view weather maps, not very clearly, but definitely weather maps. Unfortunately, I was never able to get the full-automatic capabilities of the software

to work, but I'm sure it's something I'm doing wrong. You're supposed to be able to just tune in a WEFAX frequency and sit back and wait: the software detects the start of an image and sets itself up to receive without you touching a thing. Pity I couldn't see it in action. I've included a screen snapshot of one of my more successful map intercepts.

❖ Final Thoughts

I'll have to admit, I'm impressed. Sure, it's not a Watkins-Johnson, but I enjoyed it for its simplicity and good performance. I think that an external speaker jack would not only be a nice addition for the audio's sake, but it would provide for a remotely located speaker. However, if simplicity and good performance are what you are looking for, at sea or on land, this radio may be just for you.

The 200 has a list price of \$549, but can be found on the Internet for less than \$400. For more information about the NAV-TEX 200, go to <http://www.si-tex.com> or SI-TEX Marine Electronics Inc., 11001 Roosevelt Blvd., Suite 800 St. Petersburg, Florida 33716, (727) 576-5734, FAX (727) 570-8646.

Table 1: Measured Sensitivity

10 dB (S+N)/N Freq/Mode (MHz)	AM	USB
1.0	1.6 uV	0.9 uV
6.0	1.6 uV	0.9 uV
12.0	1.6 uV	0.9 uV
18.0	2.1 uV	1.4 uV
29.0	2.5 uV	1.8 uV



ICOM R75

By popular demand, ICOM has announced the reintroduction of one of the best, affordable, communications receivers they ever produced – the acclaimed R-75!

With extended 30 kHz-60 MHz frequency coverage in 1 Hz tuning increments, better than 104 dB dynamic range, twin passband tuning, multiple-mode detection (AM, AM synch, narrow FM, USB, LSB, CW, RTTY), and PC controllability, this is one potent radio!

The IC-R75 is capable of AF-DSP with a factory installed DSP plug-in module. It offers noise reduction, and auto notch filter capabilities. The large, backlit, alphanumeric display is easily readable in any lightning conditions, and at wide viewing angles. A direct-entry keypad makes frequency entry and memory-channel selection a snap. Choose between adjustable squelch or RF gain. AGC timing is selectable, and a two-level preamp boosts weak signals or use the attenuator to reduce strong-signal overload. There are three sleep/timer functions as well.

Multiple scanning modes increase the receiver's flexibility, while a noise blanker quiets interference. The single-function keys provide intuitive operation, while the receiver operates from any 12 VDC source for mobile/transportable applications; a 120 VAC power supply is included.



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Free PC Electronic Test Instruments

It seems there are some pieces of electronic test equipment I cannot live without. A voltmeter, audio signal generator, RF signal generator and oscilloscope are indispensable for maintaining and repairing radio, audio and computer equipment. But no matter how useful these instruments are, they are expensive and require a small SUV if you want to carry them with you. Now, suppose I told you, with one exception and some restrictions, that you could have all of these instruments in a laptop PC ... and for free?! Do I have your attention?

This month we will look at programs which transform a PC into a bench full of electronic test instruments. The good news is that nothing more than a PC is needed – no external components. The downside is that, since we are utilizing the PC's soundcard as the input, these instruments are limited to DC and audio frequencies. However, they are still very useful for analyzing the audio circuits of receivers, audio amplifiers, modulation circuits of transmitters and day-to-day DC circuit measurements. And remember, these "instruments" are free and, if you have a laptop, totally portable.

❖ A PC Instrument?

The programs we will look at this time perform their signal measurements by converting our analog signals to digital "ones" and "zeros." This analog to digital (A-to-D) digitizing conversion is the same method used by a soundcard to handle audio inputs to your PC.

CAUTION: The soundcard input is for low voltages only: **Make sure that your signal levels are well below 4 volts or you MAY DAMAGE YOUR PC.** Now that you have been

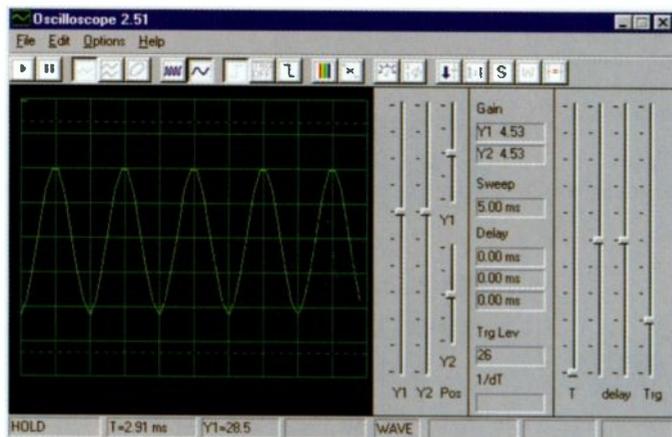


Figure 1 – One of the first PC Test Instrument program's Oscilloscope 2.51 displaying a 1 kHz Sine wave.

warned, let's see how useful these pseudo-instruments are.

❖ One of the First

I discovered an oscilloscope program on the Internet about seven years ago. It was primarily designed by its author, Dr. Konstantin Zeldovich, as a learning tool, and it ran under Windows 95. The latest version, Oscilloscope 2.51, is a dual trace oscilloscope that has a 20 kHz bandwidth, a number of triggering modes, point-and-click metering, spectrum analyzer function, signal storage capabilities and easy data exporting to Windows clipboard or disk files. Figure 1 shows Oscilloscope 2.51 displaying a 1 kHz sine wave.

If you go to <http://polly.phys.msu.edu/~zeld/> you will be able to download the oscilloscope freeware program, now at version 2.51. In the past I've used this program on the simplest of PCs. In fact, Version 2.51 still has modest PC requirements. An 80486 PC, running Windows 95 will do just fine. Make sure you have a reasonably new and good quality stereo soundcard in your old PC.

❖ Dave's the Man

Dave's Audio Sweep Generator, SweepGen, produces "... sine waves that are mathematically correct almost to CD quality ..." Dave rightfully warns that the quality and type of soundcard used may (will) limit the quality..." This is true for all PC instruments we will discuss. SweepGen is very easy to use and allows the user to select sweep range, sweep speed, sweep mode, output phase and output level. Sweep modes include fixed frequency (with no sweep), manual sweep, white and pink noise, a slow single sweep (45 seconds) and a fast sweep (0.75 seconds).

In Figure 2, we see SweepGen operating in manual mode and putting out a 1kHz signal as seen on the oscilloscope in Figure 1. SweepGen is one instrument that should be in every radio monitor or audiophile's PC. David's Audio Sweep Generator, SweepGen, along with other goodies can be found at Dave

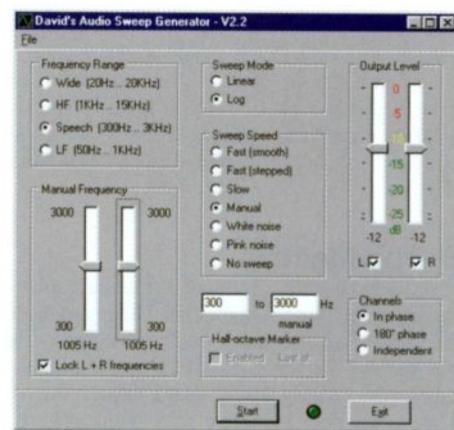


Figure 2 - SweepGen doing its stuff!

Taylor's site at <http://www.david-taylor.pwp.blueyonder.co.uk/software/audio.html#SweepGen>. Although the freeware, unregistered version does not come with support (what do you want for "nuthin"?), the program comes with a number of helpful text files.

❖ Marking Time

Rounding out our simple PC Instrument package is a freeware Frequency/Time/Interval Counter. This instrument reminds me of a 1980's Rascal product. With just two knobs it couldn't be simpler to use.

Remember that, due to the soundcard's input limitations, the Counter (and all the instruments we discuss this time) will be limited to audio frequencies. Considering its usefulness to radio monitors and audiophiles, its ease of operation and its "price," it's a great instrument to have in your PC.

You can download the Counter at <http://www.electronics-lab.com/downloads/pc/008/>. However, if you can read Czech, go right to its homepage at <http://chevees.hyperlink.cz/>.

❖ How Suite It Is

In the words of a classic TV comedian, this next suite of PC instruments is sweet. DazyWeb Laboratories, <http://www.dazyweblabs.com/index.html>, has provided the world with some slick PC Instruments. All are freeware and with one exception, require no external components.

DazyWeb Laboratories instrument suite includes: a two-channel oscilloscope, an audio frequency counter and AC voltmeter, a function

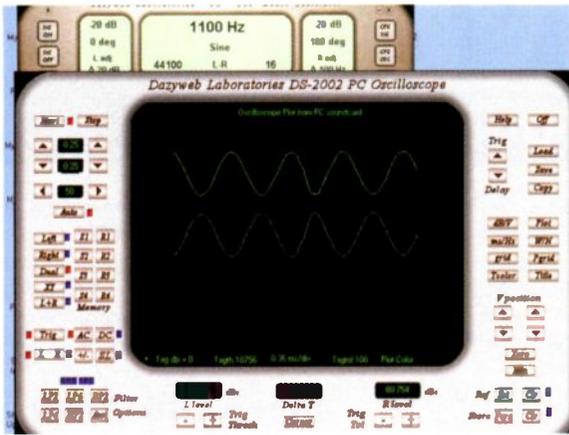


Figure 3 - DazyWeb Lab's Dual Trace Oscilloscope DS-2002 displaying the two out of phase 1100 Hz sine waves

generator and an AC wattmeter. All programs are freeware, and all but the AC wattmeter require no external components. Interested? You should be.

A Dual Trace Oscilloscope

The DazyWeb Laboratories DS-2002 PC Oscilloscope has a much more user-friendly interface than Oscilloscope 2.51. It also has a host of advanced features including auto scaling which selects the input sensitivity based on the input signal level. This is just one of the features that makes the DS-2002 a pleasure to operate.

The DS-2002 really has the operational feel of a real, high-end oscilloscope. If you've worked with a recent Tektronix oscilloscope you'll feel right at home with the DS-2002 and its digital readouts for voltage, frequency and relative dB. Its storage capabilities include the ability to measure levels over time and log them to disk. It can also capture, save and print displayed waveforms.

Once again, the quality of the soundcard will be the limiting factor in the DS-2002's performance. I ran it on an old HP system us-

ing a Pentium I running at 233 MHz and it did a fine job! If you have the need for trace audio signals in radios, or analyzing a sound system's performance, the DS-2002 will be indispensable. Figure 3 shows the DS-2002 displaying the two out-of-phase 1100 Hz sine waves, the output of our next freeware PC instrument.

SG One Audio Oscillator

Although this audio generator is partially hidden in Figure 3, it can be seen in all of its glory at the top of Figure 4. DazyWeb Labs' SG One Audio Oscillator is really a very versatile piece of test "equipment." It is a dual channel audio signal generator capable of many audio signal types.

It can produce sinewave, stereo (L/R L+R/L-R), burst sine square, triangle, white noise, sawtooth, pulse trains, sine plus noise, DTMF tones, and warble sweeps, to name a few. Modulation methods include frequency modulation (FM), amplitude modulation (AM) and double side band.

The SG One's frequency accuracy is 0.1 Hz over a range of 1 Hz to 96 kHz. Its dual channel outputs can be individually controlled for amplitude from 0 to -200 dB using a simple "click and enter" method.

As if that were not enough, the SG One has memories. These store the wave-shape, mode, output level(s), frequency, sample rate and phase of a number of test signals. Clicking the MEM button at the top right of the SG One's "panel" saves the current signal settings. Clicking on the Memory number around the knob recalls them.

A very useful Help file is always available by clicking the Help button located at the top left of the SG One's "panel."

A "Two-Fer"

The final piece of DazyWeb Lab's PC test equipment that we will look at is their CT-4004, shown at the bottom of Figure 4. The CT-4004 is both an Audio frequency counter and an AC voltmeter. In addition, it can also perform period measurements data logging.

At the bottom of Figure 4, we see it reading SG One's output of 1106.2 Hz at amplitude of 247.6 mv. Various methods of signal frequency and amplitude measurement can be chosen, depending on the type of signal being investigated. Here we have chosen a peak-to-peak voltage measurement. The CT-4004 fits right in with the flexibility, usefulness and stability of the other "equipment" at DazyWeb Laboratories.

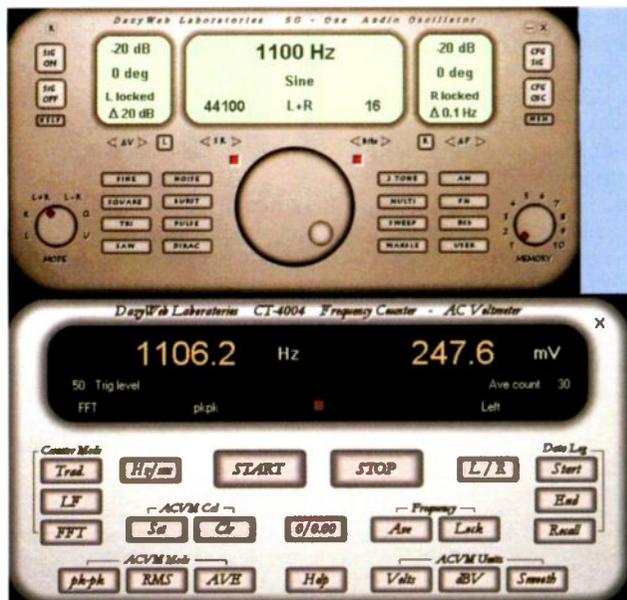


Figure 4 - (Top) The SG One Audio Oscillator is really a very versatile piece of test "equipment". (Bottom) The CT-4004 is an audio frequency counter and an AC voltmeter.

Summary

So why don't you have a bench full of electronic test equipment in your PC? You really should. All of the programs we looked at ran well on a Pentium I 233 MHz and a Pentium II 400 MHz, running Windows 98SE.

Vic Richardson of DazyWeb Laboratories said it the best: "The limitations are based mostly on the soundcard itself, so a \$500 soundcard will give stellar results compared to a \$20 stock soundcard. Even the \$20 variety will provide much usefulness with these free programs."

Give all of them a try. I think you will find them useful for the novice or experienced technician. And remember, surprisingly, all of these programs are freeware!

A Final Thought

After spending some time with these programs I had to reflect on the amount of time, effort and quality that went into them. I'm sure it was a major effort for the creators of these programs, and I felt a deep sense of gratitude. Their efforts provide access to thousands of dollars of electronic test equipment capability to anybody in the world that has access to a simple PC.

I wonder how many youngsters, after using these programs, will have these people to thank for getting them started in a career in electronics? We'll never know. But I'm sure it will be many, and perhaps, for years to come. Thank you, Dr. Zeldovich, Dave Taylor, Vic Richardson, and many other freeware writers for your unselfish efforts.

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What's NEW

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Everything Old is New Again - Icom R75

Earlier this year, Icom's news that they would be discontinuing their IC-R75 workhorse was met with consternation. With the demise of the Drake R8A shortly thereafter, it left very little else available in the U.S. in the mid-price, stand-alone, desktop receiver category. So, it is with great satisfaction indeed that we report Icom has reversed its decision and will be putting the IC-R75 back into production this fall.

This is one radio whose qual-



ity keeps going up as its price goes down! When it was first introduced in 1999, the R75 cost \$800 and the optional digital signal processor was an additional \$140. When the radio comes back, it is expected to cost slightly over \$600 with the DSP module already factory-installed. The DSP unit adds an automatic notch filter and digital processing to improve the signal-to-noise ratio and adds substantial value.

Coverage runs from 30 MHz or below to nearly 60 MHz in the following modes: AM, S-AM (Synchronous AM detection), FM, USB, LSB, CW, and RTTY. The R75 tunes in increments as fine as 1 Hz, and features a large, backlit, 8 character alphanumeric LCD display. There are 99 memory channels plus two scan edges and five different scan modes.

The Icom IC-R75 is an affordable receiver for the discriminating listener and the serious broadcast or utility DXer. For those who have steeper requirements, the R75 has slots for two optional filters – one each for 1st and 2nd IF stages. There is a jack for an external speaker to augment the audio quality. A voice synthesizer is also an optional accessory. Computer control of the R75 is available with optional software and connection cable.

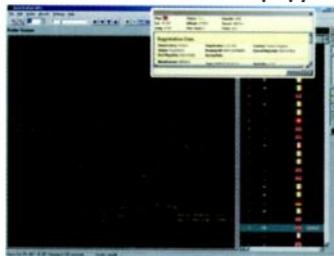
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Kinetic Avionics SBS-1

Thanks to the requirement that all aircraft must soon be equipped with a Mode-S/ADS-B transponder, for the first time, aircraft enthusiasts worldwide will be able to directly monitor the skies. Kinetic Avionic Products Limited has produced the innovative SBS-1 – a “virtual radar” on your computer screen!

Using the SBS-1 the user can track *Mode-S/ADS-B* equipped



aircraft in real time. The receiver apparatus connects to your PC via USB 1.1 or 2.0, Ethernet / 802.11b wireless. An external magnetic mount antenna and external low voltage power supply are provided. The SBS-1 is designed for portable use and can be powered directly from a suitable laptop PC via the USB port without the requirement for an external power supply.

Not only is the SBS-1 intended for hobby use, but it is a cost-effective tool to provide small and medium sized airfields with many of the safety and operational benefits previously only available to large international airports. The SBS-1 can even be an invaluable tool in flight training operations.

Mode-S signals are received from the aircraft on 1090 MHz at 250 miles or more using the supplied antenna.

SBS-1 Base Station is the software distributed with the receiving equipment, which generates the virtual radar display on your computer screen. This powerful application provides more than a map, but includes any other information transmitted, such as the identification of aircraft by callsign, altitude, speed and other parameters.

An additional feature available

by subscription is the MapModeS network, in which online members can view data from the whole community of connected users, such as viewing the virtual radar from another member's screen in another part of the world.

The SBS-1 is currently available only from the UK (at a cost of around £500), but Kinetics Avionics has an active dealer program. For more information and where to buy, visit <http://www.kineticavionics.co.uk>, email info@kinetic-avionics.co.uk or write Kinetic Avionic Products Limited, Elstree Aerodrome, Elstree, Borehamwood, Herts, WD6 3AR England.

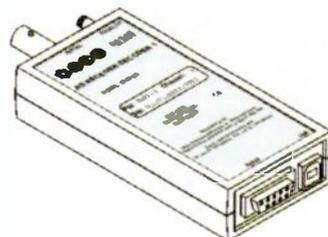
Marine Monitoring

What the SBS-1 does for “plane spotters,” the AIS Receiver does for boat enthusiasts. Also a product of the UK, the KATAS AIS Receiver 1 enables the listener to receive and decode Automatic Information System digital signals, which give location and other information about ships within reception range. (See this month's *Boats, Planes and Trains* column.)

AIS Receiver 1 is a single channel audio receiver (A or B) designed for use with ShipPlotter software (also mentioned in the *Boats* column). ShipPlotter will produce a chart on your computer screen denoting the location of all ships within range.

The AIS Receiver/Decoder 1 produces RS232 serial output instead of audio and may be used with or without ShipPlotter. Other products, such as two-channel receivers and base monitors will soon be available.

For product details and system requirements, go to the company website at <http://www.katas.co.uk>. Katesch marine electronic products are marketed and distributed by Ships Electronic Services Ltd



(<http://www.ses-marine.com>) of Waterside Court, Neptune Close, ROCHESTER ME2 4NZ United Kingdom; +44 1634 295500, (Fax) +44 1634 295537; sales@ses-marine.com

Alinco Wideband Pocket Receiver

Alinco has announced a new pocket-size wideband communications receiver measuring only 2.28 x 3.78 x 0.57 inches. One of the most-touted features of the new DJ-X7T is its excellent audio performance in a “credit card” size communications receiver, which Alinco says will redefine the standard in miniature electronics technology.

In response to customer preferences, the DJ-X7T receiver offers five operating modes, three different antenna modes, triple conversion AM/NFM plus double conversion WFM. The DJ-X7T receives 100 kHz to 1.3 GHz (with cellular frequencies blocked in the U.S.) and features 1,000 memory channels, which are easy to program using free software available for download from <http://www.alinco.com>.



The DJ-X7T weighs less than 4 ounces and operates using a long-lasting lithium ion battery, which is included. Also included is a standard adapter that charges the battery and operates with

AC power at the same time, so you can monitor frequencies even while charging. It also comes standard with a large, easy-to-read illuminated LCD screen, 39-tone Tone Squelch, Auto Power Off, Monitor/Mute, cable-cloning capabilities and priority receive.

Watch *Monitoring Times* for a review of this intriguing miniature!

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FR100

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Plug-In Radio with Blackout Alert

- Just unplug it for bright light and an AM/FM radio
- Plugs into the wall for continuous charging
- Illuminates automatically during a power failure
- Rechargeable Ni-MH battery (included) lasts up to 16 hours for LED light or up to 8 hours of radio use

Dimensions: 3"W x 5-1/4"H x 1-1/2"D / Weight: 1C.1 oz. / Power Source: AC outlet charges internal, rechargeable Ni-MH battery pack. 72 hour full-charge



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