

Scanning - Shortwave - Ham Radio - Equipment
Internet Streaming - Computers - Antique Radio



Monitoring Times

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United States

A VOICE IN THE NIGHT:



ART BELL

In this issue:
NEW! Global Net -
MT's Monthly Guide to Internet
Radio and Television plus two
WiFi receiver reviews



AR5000A+3 Wide Coverage Desktop Communications Receiver

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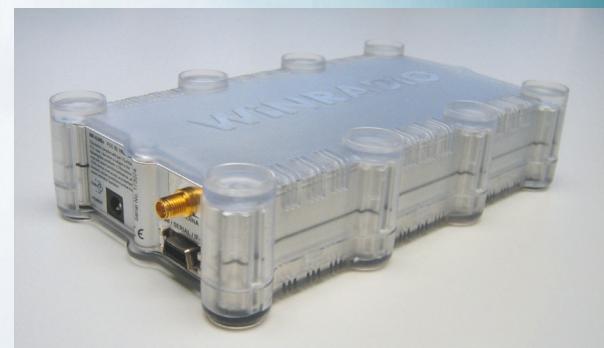
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DRM Decoder Option



**APCO P25
Decoder Option**

For more details about WR-G315 receivers, visit www.winradio.com



Vol. 27 No. 4

April 2008



Lead Story

A Voice in the Night

Interview with Art Bell

By Deborah Howe

Art Bell's *Coast to Coast AM* inaugurated a whole new genre of late-night radio programming, but it was only the culmination of his long love affair with the air waves. The author interviewed Art Bell just as he announced his second retirement from the popular broadcast, now hosted by George Noory.

Bell was attracted by radio almost from infancy and he earned his amateur radio license at age 13. (Bell now holds license W6OBB.) Though he has retired to enjoy life with his new wife and child, no one expects him to stay retired for long. Meanwhile, you'll likely hear Bell's distinctive voice as a guest host on *Coast to Coast* and on the ham bands.

On our Cover: Art Bell in his radio shack where he stays up with late-night listeners and ham operators. (Background photo courtesy Goddard Space Flight Center).

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By Ron Bailey AA4S

There are some similarities between Art Bell's and Ron Bailey's growing up years – at least in their fascination with radio. No doubt many of our readers were equally precocious. Circumstances conspired to encourage a lifelong love of medium wave DXing in Ron's hobby career. In this article, Ron shares his early experiences and logs from the 1950s.

Summer Propagation Outlook 16

By Tomas Hood NW7US

The good news is, Solar Cycle 24 is confirmed to have officially begun. The bad news is, the full benefit won't be felt for another year or two in terms of improved propagation. At least, conditions can no longer get worse! That said, there are still lots of opportunities for interesting DX challenges if you know where to look for them. And that's what this spring/summer propagation forecast is all about.

NEW COLUMN: Global Net

The world's newest and fastest-growing media knows no spectrum limitations and no geographical boundaries: the delivery method is the Internet and the World Wide Web. Because this new media is intrinsically entwined with radio and television, Monitoring Times proudly inaugurates Global Net to help our readers tune in to this exciting new way of monitoring the world. Global Net will clue you in to interesting programming and help you make sense of the thousands of listening opportunities that already exist in this exploding media. Just turn to page 22.

Reviews

In honor of our new column on internet audio and video, MT reviews two new "internet radio devices" (IRDs). These units unchain internet audio from the computer to restore the radio experience. The difference is, these radios can tune in literally thousands of broadcast stations and scanner feeds from around the world!

Larry Van Horn reviews the TANGENT QUATTRO, a stylish table-top model with outstanding audio quality. Not only does

it play streaming audio from the internet or auxiliary inputs, but it also houses an FM receiver with RDS capability. (See page 66.)

John Figliozzi reviews the COM ONE PHOENIX portable internet radio. This compact unit can run on batteries, connects to the Internet using your wireless modem, and plays streaming audio through stereo speakers housed in the unit. (See page 68.)



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Address: 7540 Highway 64 West,
Brasstown, NC 28902-0098
Telephone: (828) 837-9200
Fax: (828) 837-2216 (24 hours)
Internet Address: www.grove-ent.com or
www.monitoringtimes.com
Editorial e-mail: editor@monitoringtimes.com
Subscriptions: order@grove-ent.com

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Owners
Bob and Judy Grove
judy@grove-ent.com

Publisher
Bob Grove, W8JHD
bobgrove@monitoringtimes.com

Managing Editor
Rachel Baughn, KE4OPD
editor@monitoringtimes.com

Assistant Editor
Larry Van Horn, N5FPW
larryvanhorn@monitoringtimes.com

Art Director
Bill Grove

Advertising Svcs.
Beth Leinbach
(828) 389-4007
bethleinbach@monitoringtimes.com

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EDITORIAL STAFF Email firstlast@monitoringtimes.com

TJ "Skip" Arey..... On the Ham Bands
Rachel Baughn Letters to the Editor
Kevin Carey Below 500 kHz
John Catalano Computers & Radio
Mike Chace..... Digital Digest
Marc Ellis Radio Restorations
Bob Grove..... Ask Bob
Glenn Hauser Global Forum
Chris Parris Fed Files
Ken Reitz..... Beginners Corner
..... Communications
Iden Rogers..... Planes
Clem Small Antenna Topics
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Hugh Stegman..... Utility World
Ernest Robl..... Trains
Gayle Van Horn Frequency Manager
..... Broadcast Logs
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Larry Van Horn..... Milcom
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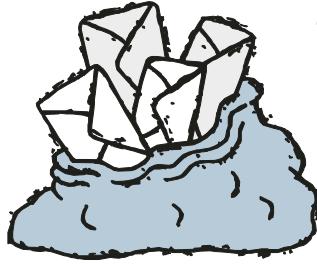
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LETTERS TO THE EDITOR

This column is open to your considered comments. Opinions expressed here are not necessarily those of Monitoring Times. Your letters may be edited or shortened for clarity and length. Please mail to Letters to the Editor, 7540 Hwy 64 West, Brasstown, NC 28902 or email editor@monitoringtimes.com

Happy monitoring!
Rachel Baughn, Editor

April and Art Bell

In the April edition of *Monitoring Times* we have a couple of treats in store for our readers. Art Bell is no one's fool, but he did make an art form out of late night radio covering the offbeat, oddball, or just slightly weird, so it seemed suitable to interview Art Bell himself as April's lead story.

Secondly, we announce with great pride the first column dedicated to discovering the amazing world of internet radio and video, entitled *Global Net*. In fact, check out *Global Net* to see how you can tune in via the Internet to Art Bell's *Coast to Coast AM* radio broadcast (though he is no longer the host).

We hope to introduce you to the incredible variety of sights and sounds to be found through the Net, either using your computer or using one of the new Internet Radio Devices – two

of which are reviewed this month in *MT*. *MT Express* subscribers will really get full benefit from the *Global Net* column as they will be able to tune to featured audio broadcasts with a simple click of the mouse.

Global Net isn't the only place you can find streaming audio, however. Whenever you see the icon anywhere in the pages of *Monitoring Times*, it will be followed by an audio or video broadcast link. The lure of exploring the "radio spectrum" for intriguing stations and content isn't dead: it's just shifting the delivery platform once again...

Use Less Power

Re January 2008 *Getting Started* column: "There's also a simple way to measure whole house power use at any instant, and it doesn't take any extra instruments! Go to your main electrical panel, and time one revolution of the disc within the electric meter. There is normally a black tick mark that can be used. Take this value, in seconds, and divide it by 3600. Then, take that result, and divide it into the Kh constant that should be somewhere on the front nameplate of the same meter (7.2 is a common value, but yours may vary). The resulting number will represent your electrical demand from the power grid, in Watts, at that instant.

"It is interesting to compare the total of what you derive from a device like the Kill-a-Watt, adding up various devices, to this whole-house value. You can even take your own meter reading, and compare consumption over a 24 hour period, if desired."

Mike Colburn, KV6Q

Guam LDOC

"I am reading the December Utility World and it so happens I'm in Guam for a couple days. I'm the Radio Electronics Officer aboard the Matson ship M/V *Maunawili*. We call on Guam every 35 days.

"I will listen for the Guam LDOC you wrote about. I have three radios onboard; Icom IC706



"Here's part of the CHAOS in my living room!" says Doug Chandler in Utah. Bob Grove suggests some organization and definitely more room ...

MKII-G, Icom R75 and Eton E1. I will have a listen to the freqs you have listed and report back.

"FYI Guam is located near 13° North and 145° East, over 2000 nautical miles west of the Date Line, not exactly 'fairly near the Date Line' as the article mentions. Just a little trivia for you."

Jon Van Allen, KF7YN

A Terrorist in His Own Mind

Lee Badman KC2IYK, wrote *MT* in January, regarding an interesting dilemma he encountered in Syracuse, New York. Lee began hearing some disturbing rants on Family Radio Service channels. As the "broadcasts" took on a regular work drive-time schedule, Lee recorded several of them.

"This guy claims to be working with Al Queda, says he had a hand in 9/11, says he will kill witches and homosexuals and plans on sabotaging oil pipelines, and on and on. He claims to represent a foreign government, and generally spews threats and claims of past violence as he renounces the US daily for all within range to hear (including stretches of two very busy interstate highways)."

As a concerned citizen, Lee contacted the Syracuse Police Department, then tried Homeland Security, and the FCC. "Finally, running out of ideas, I called the Mayor of Syracuse's Office, just to let them know of a potential embarrassment in the city (I am Deputy Mayor of my suburban Village of Jordan)."

In February, Lee wrote *MT* again to wrap up the saga.

"To end this thread... this gentleman was 'talked to' by some agency and his transmissions ceased..."

"Was sort of strange – I was invited to DF the source, provide all the potential evidence asked for (recordings/picture), and then was basically dropped like a hot potato after the FBI told the local boys in blue that they were not interested anymore (after strong initial interest)."

Here are some of Lee's final observations and thoughts on looking back over the events:

- Was interesting to initially hear the rant.
- Was a bit disturbing to hear it evolve into a "regularly scheduled program."
- The Syracuse Police were great – up to a point. When they lose interest, you go from being an asset to being completely disregarded.
- DHS is confounding: after over an hour and a half on hold I got disgusted and hung up. There is no way to report any real imminent threat that I can tell.
- FCC was mildly responsive, including Mr. Hollingsworth who I rudely copied knowing this isn't exactly within his scope.
- A call to the Mayor's office seemed to be

the fix.

- Was great fun using the Icom R3 for foxhunting (radio direction-finding). This receiver and simple body fade techniques made short work of the task.
- Simple FRS radios do have impressive range – and seemed to be very dependant on conditions (weather, subject's battery strength, etc.). He was easily getting out 1/2 to 1-1/2 miles in some directions, even in an urban/suburban setting, but some of that could have been multipath.
- Despite freedom of speech, etc., this guy's rants are disturbing, and it violates common sense that these activities draw less scrutiny, given all of the other personal freedoms that are eroding in the name of security."

Lee Badman, KC2IYK

Lee's experience with government agencies, especially Homeland Security and the FCC, sound just like Greg Smith's encounters, reported in his October 2006 *MT* article "To Catch a Spy."

On the other hand, Bob Grove wasn't too encouraging in this case: "So far as your ranting neighbor, I'm afraid there's nothing that anyone can do under the Constitutional protection of free speech. He has not made any specific threats that he is going to do anything, only that something is going to happen. It's vague, and much of his dialog seems to be delusional ... He doesn't present a danger to himself or to anyone else so long as all he does is press that mike button and deliver his message. If he begins to show signs, however, of actually taking action, then the law steps in."

One thing's for sure: you can't say there's nothing interesting on radio! One can find weirdness and oddities on any radio band – so tune in and join the April fools!

Cycle 22 - How Good was it?

By Stanley Roberts, a writer at Helium.com

Tales of Cycle 22 talk of legendary propagation conditions, and some have speculated that Cycle 24 could repeat some of those conditions. But just how good was it, anyway? One fairly new hobbyist is hoping he'll learn firsthand...

Shortwave and medium-wave radio was the extent of my radio listening in the late 1980s and early 1990s. But, I remember them well, just as if it were yesterday. My only regret is that I didn't have my ticket to operate ham (amateur) radio back then. Think of the contacts!

In about 1988 the bands really began to heat up and you could hear a lot of chatter, be it single side band (SSB) or continuous wave (Morse code) from ham operators around the world. The first conversation (QSO) I heard between two distant amateur radio stations was in January 1989. It was a station in Hawaii working a station in Australia. It was amazing to imagine what these people were like and how I would feel if I were able to tell everyone I had talked to Australia, or even Hawaii for that matter, via amateur radio. I would have been the talk of my school, that is for sure!

From 1989 until about 1994 my bands were hopping with more chatter than an AM radio in a car in the mid western United States. There were languages I could not understand. I could hear the Netherlands, Germany, Japan, Guam, Puerto Rico, and one time I even picked up a

station from Switzerland on the shortwave.

Why was this activity happening? Well, it was because of the Sun and the disruptions on it referred to as sunspots ... (*For a discussion of propagation theory, see this month's Propagation Forecast or the article "Propagation, Space Weather, and You" found online in the Reference Library at www.monitoringtimes.com - ed.*)

The region of the atmosphere known as the ionosphere is what radio signals use to travel around the planet. Sunspots increase the radiation to the ionosphere and cause the ions to do what scientists understand. Anyway, when this area is charged it is much easier for your radio signals to travel. The F-layer being the highest layer, and less dense, holds this ability long after the sun has moved to the other side of the planet. This makes higher frequencies more available than at any other time.

During Cycle 22 there were stations using the F2 layer to communicate and send out their signals. It was even possible to work across the water with voice on 6 meters. Using the old favorite 10 meter band, it was even possible for operators with low power radios or poor antennas to communicate great distances. I wish I had my ticket then. Do you know how many people who have their license would like to make some of the contacts that were made in Cycle 22??

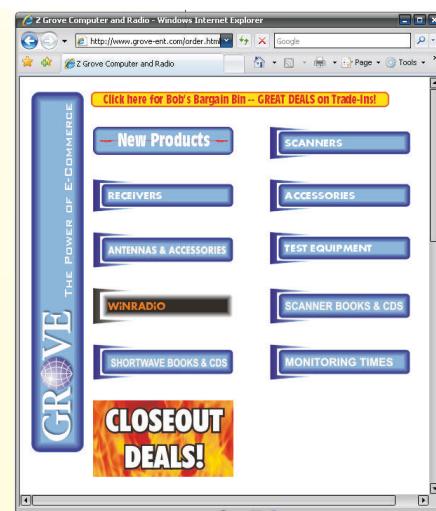
I have my license now to operate ham radio and don't think I am not getting ready for Cycle 24! The scientists all say it is going to be as hot or hotter than Cycle 22. I can only say look out, 'cause here I come. I may not be in high school anymore, but the thought of keeping a log with my contacts is a dream come true.

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COMMUNICATIONS

by Ken Reitz

SHORTWAVE

WWVH Makeover

A press release from the National Institute of Standards and Technology (NIST) details improvements made on the venerable shortwave time-signal station WWVH, in operation on the island of Kauai since 1948. The seven year project included installation of new antennas encased in fiberglass to reduce maintenance and repair costs. The new design allows the wire installation to be lowered instead of having NIST personnel climb the 98-foot towers (Photo below).

Broadcasting on four different frequencies, the press release noted, requires four different antennas and back-ups. The station has a total of eight antennas, seven of which are fiberglass. Tune in WWVH on 2, 500 kHz, 5.000 MHz, 10.000 MHz and 15 MHz.

BROADCASTING

Retailers Cash-in on Converter Rebates

Retail stores across the country are cashing in on the digital TV converter subsidy program initiated by Congress earlier this year. The plan was to provide hundreds of millions of dollars in the form of \$40 coupons issued by the federal government to anyone who applied at www.dtv2009.gov. The government allows up to two such coupons per household and is intended to let those who have analog TV sets up-grade those sets to be able to receive off-air digital TV signals.



Retailers are eager for the \$40 federal hand-out on their set-top digital TV converters. But, not all converters qualify for the rebate. This Insignia model sells for \$59 at Best Buy or \$19 with your coupon. Converters with more features (digital audio output) will cost more. (Courtesy: Best Buy)

Analog TV signals will be shut down in February 2009.

On-line stores are competing with traditional stores in the sale of these converters, but not all converters qualify for the coupon subsidy. Some stores are selling converters for \$49, making the final price to the consumer \$9 (plus tax). Consumers buying through on-line stores will, in most cases, also have to pay shipping. According to industry sources, 3.7 million consumers have requested coupons as of the middle of February 2008.

Consumers should look closely at the unit they want to buy. Many cheaper sets do not have fiber optic audio output for 5.1 Dolby Surround-Sound. Other features may be lacking, too. Since Uncle Sam is helping you buy your converter you should look for the one with the most features and pay a little more out of your own pocket.

This is also a good opportunity to buy an older 16:9 aspect ratio HDTV set that doesn't have a built-in digital converter. The prices on



WWVH, Kauai, Hawaii antenna field. Left to right: 20.0 MHz array (abandoned), 15.0 MHz array, 10.0 MHz array, 2.5 MHz dipole, Standby 1 (SB1) broadband, and Standby 2 (SB2) broadband (Courtesy: NIST)

those sets will be very reasonable. Many retailers have such demo units for sale in the "scratch and dent" department at deep discounts.

Public Broadcasting Cut 56%

The Bush administration's proposed 2009 budget would whack 56% of federal funding for public broadcasting. But it looks like it's more of a political gesture, sort of a last slap in the face to public broadcasting from an administration that has cut the budget every year for the last eight years. According to an industry report, throughout those same years Congress has stepped in to restore many of the cuts. Still, the uncertainty of where the cuts are to be made and when, coupled with what gets restored and what doesn't, keeps public TV and radio managers awake at night.

Some Japanese Queasy over HD Broadcasts

An industry report says that viewers watching experimental Super High Definition TV in Japan weren't prepared for the intensity of the images. It said that in close quarters the super realism could make individuals overcome with nausea. The SHD images are said to have a resolution of 4,320 horizontal lines and 7,680 vertical lines. (Some Americans get the same feeling watching network TV with just 1,080 line resolution in current U.S. HD standards, but then, maybe it's the programming.)

PUBLIC SAFETY

Copper Theft Global Problem

An Associated Press report that appeared in the San Francisco *Chronicle* detailed the phenomenon of the theft of anything made of copper by thieves who resell the metal to scrap dealers. The report credits China's ever-increasing demand for copper with fueling the copper thefts. The price of copper and many other metals has been at an all-time high for several years.

The report details disruption of various public services ranging from transportation to communications across the U.S. and Europe. Metal thieves have no regard for history or art, as items as diverse as lamp posts and statues, plaques commemorating war dead and literally miles of phone line are pulled down, pried off, cut up and hauled away.

More Fallout from NY M/A-Com Flop

A report in the February 10th issue of the Albany, New York *Times-Union* details more fallout following the less than successful tests of the \$2.1 billion statewide New York emergency radio service. The article indicated that the system works best in rural areas and is "at best haphazard" in more populous areas of the state. One county, Erie, is said to have pulled out of the system, opting to upgrade its own existing communications system. The system will undergo final tests this month. Stay tuned.

Sheriff's Radio Now On-line

Meanwhile, the Clark County (Ohio) Sheriff's office has made its communications available on-line. According to an article in the Springfield *News-Sun*, the department has added its link to ScanMiamiValley.com, a site that has many

such departments available from across Ohio. The article quotes Chief Deputy David Rapp as saying, "This is another alternative to buying a scanner."

SATELLITE

HITS Switches from Ku to C-band

The Comcast satellite delivered cable service known as Headend-in-the-Sky (HITS) is switching its delivery platform from Ku-band (X4 99°W) to C-band (AMC18 105°W). The programming will be dual illuminated until June 1 of this year. This means that homes using the Skyvision 410 receiver (*MT* February 2008 *Beginner's Corner*) and getting their programming from Satellite Receivers Limited will need to switch their dish from Ku to C-band in order to continue receiving satellite programming from SRL. This won't affect subscribers who are using the 410 receiver with a big dish equipped with both Ku and C-band LNBs. For updated information on the programming go to www.programming-center.net and for C-band dishes and LNBs go to www.skyvision.com.



Back to C-band for Skyvision/Satellite Receivers LTD programming. The switch-over will occur June 1st and require subscribers to switch from Ku-band to C-band. (Courtesy: Skyvision)

Spy Satellite Monitors Fill Info Gaps

The U.S. government's obsession with shadowy "alphabet-agencies" and their off-the-books, deep pocket budgets sometimes makes our outward display of freedom and democracy look a little shallow. But, tight-lipped agency spokesmen inadvertently fuel amateur hobbyists who just want to know a little more than "no comment" reveals.

Take the case of former *Satellite Times* writer John Locker from Merseyside, England, who is one of many amateur satellite spotters around the world who spend their spare time tracking satellites of various origins and capabilities for their own interest. When the U.S. government announced in January that a spy satellite would fall out of orbit and end its life in a fiery display, no more details were given.

But, the satellite spotters were prepared to give their own details, including a photograph of the doomed satellite taken by Locker from his backyard using an 8-inch Meade telescope with a webcam attached to the eyepiece for easy viewing inside his home and easy linking to the Web. For more information about visual satellite observing go to www.satobs.org/satintro.html. To see an image of what the amateurs called USA-193, go to Locker's web site www.galaxypix.com. You can also read the complete story about his work at *Skymania* news. There's a link to the article on Locker's web site.

Not content to let gravity do its thing, as of the middle of February the Bush administration

announced plans to shoot the satellite down with one of our own missiles. The resulting cloud of debris could pose a hazard to all other space objects including the International Space Station, Space Shuttle and Russian, Chinese, and Japanese planned missions. The dilemma is that, if left to fall on its own, it might fall on populated areas, spraying all affected for hundreds of miles with deadly hydrazine fuel. Similar fallen spacecraft that have made landfall have caused serious illness to those who come into contact with the crater and the satellite's remains. This is usually not an issue with satellites that have reached their end-of-mission lifespan. Such satellites have usually depleted their fuel supplies and the risk is from falling debris, not hazardous fuel.

GPS

Bear Tracking Arm Chair Pursuit

According to an Associated Press report, some West Virginia bears are being outfitted with special GPS-equipped tracking collars that allow scientists to track the movements of bears using GPS data technology. The program is financed by the West Virginia Division of Natural Resources using funds paid by the purchase of bear hunting licenses.

Using more primitive analog technology required extensive in-field monitoring by scientists and was financially prohibitive. Now, when the collars are retrieved during hibernation, computers download the data and display it on a map to show exact movements of the bears throughout the days and seasons.

The collar is designed to fall off the bear if it hasn't been recovered after 100 months. And, there's a "mortality" signal that is transmitted if the animal dies while wearing the collar. Hunters who kill the bears send the collars back to the Division of Natural Resources.

Electronics Mystery Surrounds Empire State Building

An eerie article in the January 27 issue of the New York *Daily News* and picked up by many other news outlets details the bizarre mystery surrounding effects on many cars near New York City's iconic Empire State Building. According to the article written by Richard Weir, there is a five block area around the building where some cars simply won't run. If towed several blocks west or east, the report says, the disabled vehicles start right up. The report hints that the cluster of antennas at the top of the building that include 13 TV and 19 FM stations may be the cause. The popularity of the building's position increased after the 9/11 attacks destroyed the twin towers of the World Trade Center which previously housed many of those antennas.

"Communications" is compiled by Ken Reitz KS4ZR (kenreitz@monitoringtimes.com) from news clippings and links supplied by our readers: Many thanks to this month's fine reporters: Anonymous, Rachel Baughn, Bob Grove, Alokesha Gupta, Norman Hill, Rick Kissel, Doug Robertson, Larry Van Horn.

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A Voice in the Night

An Interview with Art Bell

By Deborah Howe

Art Bell and his impressive array of W6OBB station equipment including both an Icom IC-7800 and a Yaesu FTDX-9000 (left). Of course, all that equipment would be relatively useless without good antennas and Art has an equally impressive antenna farm with thirteen towers spread over five acres of land that give him one of the strongest signals on the amateur bands. (See below)

Last July 2007, when Art Bell, the weekend host of the syndicated talk radio show *Coast to Coast AM*, unexpectedly announced that he was once again retiring and that the following night would be his last regularly scheduled broadcast, groans of disappointment could be heard around the world.

After spending most of the last two decades entertaining insomniacs and inquiring minds throughout the wee hours of the night, talking with a wide array of paranormal explorers, conspiracy theorists, healers, and more, and taking calls from his audience, Bell had, to say the least, developed a large, loyal following. When Ramona, his wife of 15 years, passed away from emphysema at age 47, his fans cried with him. When a very short time later he met his new love Airyn over the internet, they were happy for him. When he left for the Philippines to not only get married but to stay there and live, they felt an amazing sense of loss, even though he contin-

ued broadcasting after a brief hiatus. And eight months later when he moved back to the United States with his pregnant bride, they jumped for joy.

Now Bell was ready to make another radical change. He was reprioritizing his life. His new wife and baby had moved into the number-one spot in his heart – a spot that had previously belonged to radio – and he wanted to devote his time to them. But, I'll be back on occasion, Bell reassured his heartbroken audience.

Born Arthur William Bell III on June 17, 1945, Bell has a mischievous *Our Gang* face, much of it covered by his trademark over-sized glasses. By his own admission, he was a hell-raiser when he was a child, and as an adult he is extremely driven and competitive. On the radio, his voice bursts with energy. It's smooth and silky but has a rough edge to it, kind of like those candies that are hard on the outside and soft in the center. He loves cats, is a neat freak, has



traveled the world, and likes fast cars. He has a 1998 Firebird Trans Am and a 1999 Camaro, the last year for each. They sit in the garage most of the time. For gas mileage, he drives a Chevrolet Aveo. Bell has no other hobby besides amateur radio. "That's it," he says. "It's an all consuming hobby."

On the Air Coast to Coast

When he broadcasts, Bell is pretty much a one-man show, sitting alone in his studio taking unscreened calls. "There's nobody between me and the caller," he explains. As a result, he never knows ahead of time what a person is going to say. "Whatever they come up with, as long as it legally can go on the air, it's fair game." According to Bell, the element of surprise is part of the *Coast to Coast*'s success. "My philosophy is that radio should be open. I like surprises," states Bell. It keeps things spontaneous. He told me his favorite subjects are the ones that are really unusual, anything different. "Anything away from the norm is of great interest to me and always has been."

Because of the often unusual subjects that Bell deals with and because he has no call screener, he gets more than his share of wacky callers. But Bell is always the gracious host. He likes his audience and almost always finds something in what a caller has to say to validate and can usually take any call and make it funny or entertaining. Frequent guest Sean David Morton tells the story about the time a man called in and said, "Well, you know, I wear tin foil on my head with paper clips in the back to keep the govern-



Art and Airyn's wedding ceremony in the Philippines

ment from reading my mind with their satellite from space." Instead of simply dismissing the guy as a nut, Bell asked him what it was he was thinking that government wanted to know. "If you're a good talk-show host, you can find value in it somewhere," says Bell.

But Bell's callers aren't all mad as hatters. Morton calls them a cosmic circus of scientists, researchers, experiencers, investigators, prophets, psychics, and madmen. A good number of his guests, in fact, are distinguished, respected professionals who just happen to dabble in the different or question what most of us take for granted. And many of whom the mainstream media ignore. "Art Bell gave a voice to those that had their voices taken from them," explains Morton.

Bell speaks simply on complex subjects. When interviewing a NASA scientist or a physicist, he distills information so that listeners can easily comprehend what might otherwise be difficult to understand. But that doesn't mean he skips the hard questions. "I have been interviewed by many top radio hosts, including Larry King, but no one ever pushed the envelope and asked the controversial questions this man did," says psychic Evelyn Paglini. "And you couldn't gloss over the answers. He wanted details. He wanted an explanation."

Amazingly, after all these years, Bell suffers from stage fright. Before he goes on the air his heart pounds, he shakes and he sweats, and he has difficulty breathing. To cope, he drinks numerous cups of coffee and, until recently, smoked cigarettes. The birth of his baby, however, motivated him to give up his three-pack-a-day habit.

While *Coast to Coast AM* is big, the studio Bell broadcasts from is tiny. It's a converted bedroom in his solar-powered double-wide manufactured home. His studio doubles as his ham shack. He lives on five acres in Pahrump, Nevada, about 45 miles from Las Vegas and not too far from Area 51. "Living in the middle of nowhere massages my soul; that is the best way I know how to describe the feeling I get," states Bell. "I relish the privacy."

A Love Affair

To say that Bell loves radio would be an understatement. "I'm a nut when it comes to radio," he exclaims. The first word he ever said sounded like *radio*, which, according to his mother, was an attempt to say *radio*. He was introduced to ham radio by a Polish physicist neighbor when he was 12, and by 13 he had earned his ham license. "My enthusiasm for ham radio was at such a fever pitch that I remember insisting that my mother stop at every house in the neighborhood with a tall ham antenna," states Bell who still finds radio as fascinating now as he did then. "To me signals going through the air were always magic and that part has never changed for me," he says. "I suppose that I've broadened out. I've got gigantic antennas and I've got thirteen towers up."

Bell holds an advanced license and goes by the call sign W6OBB. He hasn't upgraded intentionally. "If you have an advanced-class license that means you had to take a code test at one point. It's a challenge that one day was part of the hobby. It isn't now," says Bell. "I'm not bemoaning the fact that we have the no-code

extra or the no-code license now. I think it's time in the hobby. I'm not one of those people who goes around moaning and complaining about the no coders out there."

Bell talks on the ham radio nearly every day, usually on 75 or 160 meters, discussing radios, politics, and whatever happens to be going on in the news that day. "The conversations are like conversations you'd have over the fence," says Bell. Bell's motor home is decked out with some serious communication equipment: a Yaesu 7000, 500 watt amp and a loop antenna on the roof. On occasion he does Morse code, but not a lot. "I'm more of a vocal person," he says, though he also likes AM DXing. Bell also owns a radio station that broadcasts oldies but goodies, KNYE 95.1 FM. He has an S-meter receiver at the station and in the biography info portion of QRZ.com he writes, "Can be found on 3.678 L.S.B. Feel free 2 drop in!"

Had it not been for amateur radio, Bell is convinced he wouldn't have found a career in radio. "It has gotten me every job I've ever had," he says.

First Efforts at Broadcasting

Bell began his career in broadcasting on a pirate station. He and three of his buddies set up an AM station in the MARS (Military Amateur Radio Service) building on the Amarillo Air Force Base, amazingly with the approval of his commanding officer who was clueless as to what was legal and what wasn't. "In hindsight, this was obviously meant to be for me, for this began my radio career, although it began outside the law with an illegal radio station," states Bell. "We became an instant hit. Everyone loved our radio station, which we called Amarillo, KMED. These were call letters that were not assigned to us; we just made them up, based on the fact that the Air Force base was part of a medical squadron."

Everyone, that is, except the commercial radio stations in town. The illegal radio broadcasts could not only be heard on the base, they reached 30 miles away to Amarillo. Once the commercial stations got wind of the broadcasts, KMED was history.

After returning to civilian life, Bell spent nearly two decades spinning rock music, moving from station to station. "I have done regular old rock and roll, to 40 rock, and on and on. If it was done in rock music during the 1960s and 1970s, I probably did it," states Bell.

During a six-year stint in Okinawa, Japan, he set two world records: one for the longest continuous broadcast (115 hours on the air) and another for continuously seesawing while broadcasting (57 hours.) Luckily, for the listeners of *Coast to Coast AM*, Bell grew bored with intellectually non-challenging rock radio and its inherently gypsy-like existence. After a brief break from broadcasting, Bell made the move to talk radio, eventually filling the night air with his lively banter at KDWN. He began as a political talk show host but then transitioned into the paranormal. "He transcended from a sort of right-of-center political talk-show host in the late '80s and '90s to someone that invented a genre," says Morton.

"Before Art came along and decided that political radio was boring...boring, boring, boring.. and that there was a lot more to life than, you know, who was going to one-up each other in Washington, there was nothing really to listen to for people that had a brain," says conspiracy theorist Richard C. Hoagland. "And Art pioneered this incredible art form where, you know, you and I can now talk to the Coast family on almost an intimate one-to-one basis; millions of people who have been led through extraordinary flights of imagination, science, creativity, projection, ancient history, who are we really, are we alone in the universe? Art was there as a pioneer."

Bell has been on the air long enough to



Halloween 2007



Art Bell's new obsession, Asia Rayne Bell!

have had virtually everything possible go wrong, plus more. One of his funniest on-air errors of comedy was when he accidentally superglued his lips together when, while on a commercial break, he attempted to repair a cart rack. "I got glue on my hand and like an idiot put it up to my lips and while I'm on the air I glued my lips together," he told me. He went back on the air talking with his lips stuck together, finally yanking his lips apart and depositing a piece of his lip in the ashtray.

There was also the time when brown liquid mysteriously dripped from the ceiling onto his head, the board and electronics in the studio, threatening him with electrocution. The murky wet stuff turned out to be water that had overflowed from a clogged toilet on the floor above him.

Changes

Radio has changed a lot since Bell first picked up a microphone. "Large companies, like the one that now owns me, buying up all the radio stations: that would be the biggest change," he told me shortly before he retired. "Of course, it's gone from the little mom and pop radio station to the primarily automated syndicated station." And new markets have entered the playing field that threaten *old-fashioned* radio: podcasts, streaming audio, HD radio, and satellite.

"In our lifetime there'll continue to be a place for terrestrial radio. I own a radio station, so I have to believe that, I guess. I do believe it," he told me. "It's my own personal opinion that HD radio is a big flop. HD radio seems to work fine for FM, but it doesn't work worth a damn for AM."

Bell has strong opinions on satellite radio. "I think satellite radio could have owned the world if their business model had been different," he says. "If I'd owned the satellite-radio companies, I would have put the satellites up, made it absolutely free, kicked the radios out fairly cheaply, made it commercial instead of non-commercial and tried to take over the world. Whereas, what we have right now is subscription service and people have a deep profound angst about the idea of paying for

radio. I guess we grew up in a generation where you don't pay for radio. It's free over the air," says Bell. "If it's going to remain subscription radio, then I don't think it's ever going to be a threat to terrestrial radio. And of course terrestrial radio has this local angle that will always protect it to a degree."

And, regarding the government trying to prevent the merger of XM and Sirius, "I don't know why they should be afraid of the merger if the business plan remains the same."

He has also seen the ebb and flow of the popularity of AM radio. "Talk radio is credited for saving AM radio and I think that's probably a fair assessment," he says.

Though Bell's career began with a pirated radio station, in most cases he doesn't approve of

pirates. "When I was young, pirates were technical people. And those are the people I'm supportive of. The 'oh-my-god-wow' people; 'we can put a signal on the air'; those kind of people, I'm supportive of. People who don't know a thing about the technical aspect and just want to make a political statement, I'm not as supportive of. If I was an FCC guy I would probably be a little softer and less likely to slap a giant fine on a little 12 year old who just figured out how to put together a transmitter and get on the air and was just doing it for the love of the technical discovery that he was going through. That kind of pirate I'd tend to go easier on. The guys who put a big powerful transmitter on and are just trying to make a political statement, I'd have less mercy on them."

For all the little kids who are interested in radio and want to get into broadcasting one day, Bell advises, "Do something different. Don't copy. Don't do the same damn thing that everybody else does. What I attribute my success to on the air is I did something different. I said, 'Enough of this political baloney. I'm sick of it. Let's see if people want to talk about something different.' And I did that."

Retirement

Bell has always led an interesting life. Right now he is fascinated with his new baby, happily in love with his wife, and content to fill in from time to time on *Coast to Coast AM*. Since he retired, he has cruised to Alaska, driven his motor home to Reno, is going to visit family in the Philippines and is planning a trip to Europe. Everybody asks him if he misses radio. "Yes, I miss radio. Of course, I miss radio. How could I not miss radio? It's in my blood," says Bell. But at the moment Bell is living the life he prefers.

But can he stay away forever? "Knowing how much Art loves radio, I cannot imagine that he will stay retired," says Hoagland. "I think he will be back. He may be back in forms that you and I can't imagine, because he is definitely a pioneer."



Medium Wave DXing Retrospective

By Ron Bailey, AA4S



My life changed in 1950 when my mother remarried and we moved from a row house in Philadelphia's Mayfair section to a brand new two-bedroom home in a development in Haddon Heights, New Jersey. It was a nice town with neither bars nor liquor stores and had a "hometown" kind of feel to it. Neighbors became friendly pretty much overnight. (I correspond with several of them to this day.)

The house sat on a tenth of an acre lot with a vacant lot on one side. Even though it was only a stone's throw over the Ben Franklin Bridge from Philly, it was, as I was to find out, a relatively noise-free location. My guess is that this was because all of the utility poles and electrical wiring were brand new. (I wonder if it is still as noise free there today??!)

I was 11 years old then and was athletic enough to make one of the baseball teams in the newly-formed Little League. At year's end I was even voted to the All Star Team which went on to win the New Jersey State Championship. In those days I was really into sports because of the encouragement of my grandfather and new stepfather. The interest was heightened even more by the fact that the Phillies actually won the pennant that year and the Athletics had not yet left town.

But it is well-documented that winters in New Jersey are not for playing baseball. I was a fairly good student, so homework didn't consume that much time. So, with both mom and "pop" working and the fact that we were not yet affluent enough to own a TV set, I became restless. My once a week visit to the neighbor next door to watch "Uncle Milty" on his TV set did nothing to ease the feeling!

Mom had refinished an old Stromberg-Carlson floor model radio to serve as a piece of furniture in our new home. At my request it was moved into my bedroom to provide whatever entertainment I could get from it. It had excellent sensitivity and outstanding audio quality, but greatly lacked selectivity. Nevertheless, I began tuning around to see what there was to hear.

I already enjoyed classical and popular

music, because we did have a piano in our living room (although it was later sold so we could buy a TV set) and mom would often sit down and play something by Tchaikovsky, Beethoven, Rachmaninoff, or Chopin. She also knew the words and melodies of all the contemporary tunes from her day. (I found out later that she played piano and sang on a small AM station in Huntington, West Virginia, while my father was working there for an oil company from about 1936 to 1941. Unfortunately, she never could remember which station.)

An Accidental Hobbyist

Naturally, there were some programs I began to listen to regularly and I enjoyed listening to the R&B/R&R music of the time. It wasn't long before I was writing down call letters, station locations, time of day heard, and frequencies (whenever they were given).

By now I'm sure my story is beginning to sound familiar to many of you who remember having similar experiences back then. I became fascinated with being able to hear stations from as far away as St. Louis where I could listen to the Cardinals baseball games and from CKLW in Windsor, Ontario, which aired music I enjoyed every night on a program called "The Make-Believe Ballroom" hosted by Eddie Chase. I even wrote to him and received his autographed picture which

I still have today.

One of the first things I did was to acquire a set of headphones which I connected to the speaker leads in such a way that I could listen late at night without disturbing anyone. (Impedance matching, what's that?)

But most of my listening (by serendipity) was either before breakfast or before/after suppertime, when I began to hear stations signing off the air for the night and hear other more distant stations become audible. (Can you say "grayline"?) At times I would even be able to copy more than one station on a frequency at the same time. What was going on here?

Then I found a copy of *White's Radio Log* at a news stand and actually began to keep a

WABC	WABC
New York City, New York	770 - Kilocycles
50,000 - watts	
Network - American Broadcasting Company	
Heard - 24 hours a day	
Signal - Excellent!	
Motto - "New York's First Station"	
Remarks - once was WJZ	

CFAC	CFAC
Calgary, Alberta	960 - Kilocycles
5000 - watts	Canadian B. C.
Network - Independent	Language - English
Heard - Late night - after 2:00 a.m.	
Signal - Good though difficult to find	



Hallicrafters S38C, photo from <http://www.rigpix.com/hallicrafter/s38c.htm>

formal written log of stations with their calls, location, date and time heard, network affiliation, power, signal quality, etc. I got fairly good at this and was proud of the number of stations I was able to hear. Next, I wrote all of the information for each station on a 3" x 5" card which I filed alphabetically by call letters in a metal file box. Yes, I still have it!

I guess the most amazing part is that at one time I had memorized virtually every piece of information for each of the nearly 400 stations which were logged up until I went off to college in 1957. Typical file cards look like the samples below..

Regarding the radio itself, I don't even remember if it had an internal antenna of some sort or if there was just a piece of wire connected to a terminal on the back of the set. All I knew was that it worked very well.

One thing of which I wasn't aware was that an organization known as the "National Radio Club" had existed since 1933 and that their members were deeply involved in doing essentially the same thing I was doing: namely, DXing the medium wave band.

Back in the early fifties it was relatively easy to log stations as far away as the West Coast. The clear channels were actually "clear," and I was amazed and excited to hear KFI in Los Angeles, KNBC (now KNBR) in San Francisco, and others such as KSL in Salt Lake City, KOA in Denver, and several Canadian stations such as CBK in Watrous, SK, and CBW in Winnipeg, MB. I am still able to log most of these today from my North Carolina location, but a lot more patience and greatly improved technology are required.

Amateur Radio

In about 1952 or 1953 I became friends with one of my classmates who, I discovered, shared my interest in radio. He began talking about people known as amateur radio operators and said he actually knew of one or two. Also about that time, I found that my radio had a band which covered frequencies a little above the medium wave band. I began to listen there and would occasionally hear someone talking. They were normally using amplitude modulation. I remember hearing some Morse code

as well.

One of the things Jerry (my classmate) and I started to do was to ride through neighborhoods on our bikes trying to find unusual-looking towers or antennas. Whenever we found one we would knock on the door and ask whomever answered, "Is there a ham operator living here?" Imagine doing that in this day and age! But back then we were invited in on several occasions to see the equipment and sometimes were even given QSL cards, much to our delight.

One elderly gentleman, who was handicapped (with polio, I believe) and unable to leave his house, had his ham station in an upstairs bedroom in a row house. I visited him quite a few times and he would try to explain things. He was always glad to see me and I appreciated his taking time with me.

Another man who was a doctor invited me in one Saturday afternoon and actually let me speak to another station who was mobile

in Red Bank, NJ. As you can imagine, I didn't know what to say! I don't know on what band it was but I remember he had a fairly elaborate setup for that time period.

After that, I began to do more listening in the amateur bands in addition to the medium wave frequencies. I started to realize there was a lot more of interest going on out there in the ether and that I was missing it because of the limited frequency range of my radio. I began to ask around to see what other receivers were available and how much they cost.

Branching Out

Somehow I found out there was a brand new Hallicrafters S38C sitting on a shelf in a store in Haddonfield, NJ. Well, I had no money but hopped on my bike and made the 8 or 10 mile ride there anyway to investigate. There it was. Bright metallic gray and totally beautiful to my eyes! A man asked if he could help me. I said, "How much is that receiver?" I believe he said something like \$49.95. Well, now I knew one thing – I couldn't afford it!

I told him I really would like to buy it and asked if he could hold it for me until I earned, or otherwise raised, enough money to buy it. (I obviously must have thought it was the only one in the whole world at that time.) He gave me a look which said, "I don't believe you're going to be able to do that!" I can't remember what he actually said in response; and, I don't remember the details of how I did it, but I was back in about two weeks with the money. He may have even given me a slight break on the price.

Now that the receiver was mine, I needed a place to set it down. This led mom to negotiating a trade with the new neighbors who had just built a house on the vacant lot next to us. They were young newlyweds and were planning to have children in short order. As a

TABLE 1: LOG APRIL 1954

Date	Call	City	St./Prov.	kHz	Time	Notes
4/3	WBIR	Knoxville	TN	1240	5:00 a.m.	** now WIFA
	WLAK	Lakeland	FL	1430	5:30 a.m.	* now WLKF
	WTAR	Norfolk	VA	790	5:45 a.m.	* now WNIS
	WEAN	Providence	RI	790	5:55 a.m.	* now WSKO
	WFNS	Burlington	NC	1150	6:00 a.m.	* now WBAG
	WHUN	Huntingdon	PA	1150	6:00 a.m.	**
4/5	WHBC	Canton	OH	480	7:00 a.m.	*
4/6	WKLV	Blackstone	VA	1490	7:00 a.m.	** now on 1440
4/12	WSAR	Fall River	MA	1480	6:30 a.m.	**
4/13	WCMC	Wildwood	NJ	1230	7:00 a.m.	*
4/16	WBNS	Columbus	OH	1460	5:15 a.m.	*
	WPGC	Morningside	MD	1580	5:30 a.m.	*
	WHIS	Bluefield	WV	1440	5:00 a.m.	*
4/19	CKBB	Barrie	ON	1230	4:00 a.m.	Gone
	WALE	Fall River	MA	1400	4:06 a.m.	** now WHTB
	WATA	Boone	NC	1450	4:12 a.m.	*
	WPAM	Pottsville	PA	1450	4:12 a.m.	**
	WMON	Montgomery	WV	1340	4:35 a.m.	**
	WDBF	Denton Beach	FL	1440	4:40 a.m.	Gone
	WTIX	New Orleans	LA	1450	4:57 a.m.	** now WBZY
	WING	Dayton	OH	1410	5:00 a.m.	*
4/21	WMTR	Morristown	NJ	1250	7:00 a.m.	**
4/22	WJWS	South Hill	VA	1370	7:00 a.m.	** now WSHV
4/30	WRIS	Roanoke	VA	1410	7:00 a.m.	*
	WHEC	Rochester	NY	1460	7:00 a.m.	** now WHIC
	WADC	Akron	OH	1350	11:30 p.m.	* now WARF

Totals for April = 26 stations, 2 countries, 13 states, 1 province

Notes: * Still there and logged in NC; ** Still there but not yet logged in NC.

CONFIRMING YOUR RECEPTION
REPORT DATED Dec. 13, 1954

FREQ. 1360 Kc, 3 tower directional
XMTR: Gates, 1000 Watts.

KREL AM/FM SERVING THE
GREATER GROWING GOLDEN
GULF COAST AREA.

Station K REL
Box 419
Baytown, Texas

Tnx, 73's: *[Signature]*
Chief Engineer....



result, mom traded my small roll-top, child's desk to them for a very large, beautiful desk for operating, which in today's market would probably bring \$700-\$800! Mom always could swing a deal.

Next problem. "Pop, I need an antenna." (Will it never end?) Fortunately, he had an easy answer. He simply ran an insulated wire under the eaves around three sides of the house using insulators at the ends and the corners to keep it from touching anything. He then ran the wire down into the basement and up through the floor in my bedroom to the receiver.

Now both the S38C and the antenna

worked great! I was able to listen to not only medium wave frequencies but also amateur bands and short wave. An added benefit was being able to fall asleep at night listening to classical music from European shortwave stations on the 40 meter band, such as Radio Bucharest.

My medium wave totals continued to grow on nearly a daily basis with this new setup. My log for April 1954 looks like Table 1.

The most amazing thing about these loggings is that the vast majority are still on the

air after 53 years and many (13) have been logged in North Carolina!

This pretty much sums up those golden years of medium wave DXing. Obviously, those times are gone forever; but don't despair: with the proper equipment and lots of patience there is plenty of DX out there to be logged.

When DX season rolls around again, I will explain how I've successfully logged over 1650 medium wave stations, including 1573 domestics and 217 graveyarders in 37 states and 14 countries from my location in North Carolina from 1992 to date. Watch *MT* for the next installment!

About the Author:

Ron Bailey was born in 1939 in Huntington, WV, during a flood of the Ohio River which nearly prevented his mom from reaching the hospital. He was active as a medium wave listener in New Jersey during the 1950s. In 1961 he earned a B.S degree in Chemical Engineering from Lafayette College in Easton, PA, where he was a pitcher on the baseball team. He worked as a chemical engineer in the lithium industry for 34 years until he retired in 1996.

Ron became a licensed amateur radio operator in 1963 and progressed to Amateur Extra Class by 1970. He now keeps busy coaching baseball, MWLing, and participating in ham radio contests, having operated from Nassau, Curacao, and Puerto Rico. He is also a member of a team which operates VHF contests from a mountaintop two or three times a year.

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Propagation Outlook for April-September Summer SW Broadcast Season 2008

By Tomas Hood NW7US

If you are not typically a shortwave listener or "HF operator," this is the perfect time for you to begin exploring the excitement of world-wide communications. In the next few years, the amount of activity on the Sun will increase dramatically. With this increase, the high frequency spectrum known as "shortwave" will come alive with world-wide signals.

Now is the time to begin putting together your high-frequency (HF) station. Amateur radio operators and shortwave radio listeners will have an exciting, open hunting season starting this year.

Solar Cycle 24 News

There was a lot of buzz around the world on December 11, 2007, because of a patch of magnetism appearing on the eastern limb of the Sun. Scientists hoped that this patch would develop into a full sunspot group, giving the first sign that Solar Cycle 24 had finally arrived.

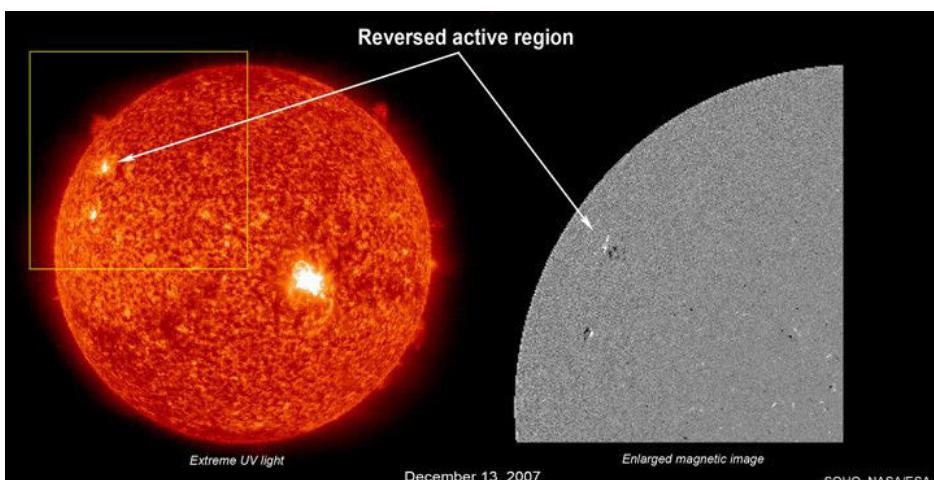
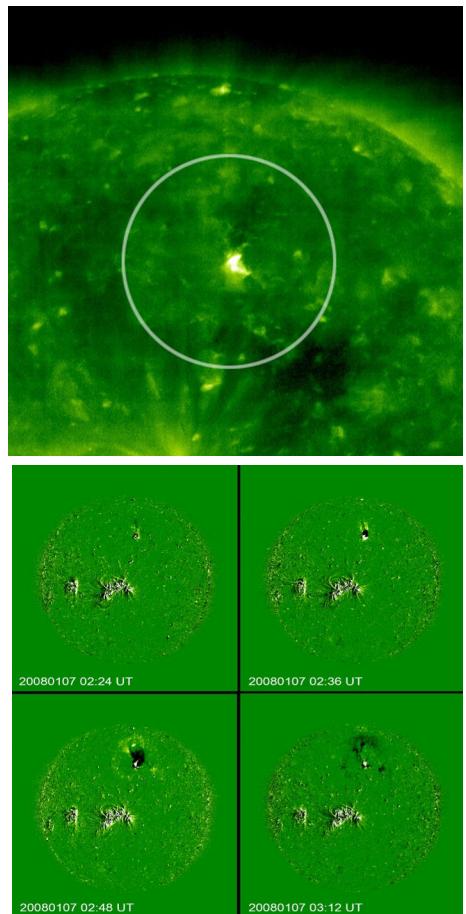
Sunspots have a complex magnetic structure. Typically, though, a sunspot will have at least one very clearly defined set of magnetic poles, north and south. Solar scientists look for a reversal of the magnetic structure of a

sunspot as a sign of a new solar cycle. The reversal is in comparison to the polarity of the magnetic structure typical in the sunspots of a current solar cycle. When the polarity reverses, it is a sign that the solar cycle has finally reached a point where it will once again grow more and more active.

This high-latitude event that created the exciting buzz featured a reversed-polarity magnetic orientation. Solar physicist David Hathaway of the Marshall Space Flight Center said this about the event: "New solar cycles always begin with a high-latitude, reversed polarity sunspot."

"High-latitude" refers to the sun's grid of latitude and longitude. Old cycle spots appear near the sun's equator. New cycle spots develop higher, around 25 or 30 degrees latitude.

This patch, however, did not develop into a sunspot. It was not until January that such a sunspot was observed. When solar scientists observed the solar disc on January 4, 2008, they noticed that a small sunspot had developed with such a much-anticipated feature. Since then, not all sunspots were reversed from the orientation prevalent during cycle 23. However, more and more are showing this

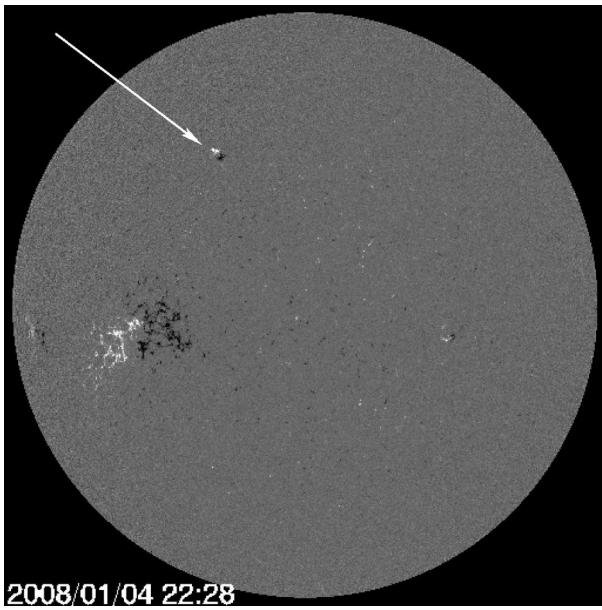


This is a UV-wavelength image of the sun taken by the Solar and Heliospheric Observatory (SOHO) and a map showing positive (white) and negative (black) magnetic polarities. This high-latitude active region is magnetically reversed, causing quite a buzz among solar scientists and radio amateurs alike. Source: SOHO/NASA

Solar Cycle 24 began when it was officially confirmed on January 4, 2008, that SOHO observed the first "reversed" sunspot of the new solar cycle. The fairly petite active region was officially classified as an active region by NOAA (AR 10981). Since it appeared at a high solar latitude and its magnetic orientation is opposite of the last solar cycle, scientists were convinced that Solar Cycle 24 has begun. Source: SOHO/NASA

reversal, making a strong case that cycle 24 is indeed beginning.

What is in store for 2008, then? Solar cycles take anywhere from two to five years to reach the point of maximum solar activity. The current consensus among most solar sci-



2008/01/04 22:28

Another view of the first sunspot of Solar Cycle 24, showing the reversed polarity of the magnetic structure (see text).

Source: SOHO/NASA

entists place Cycle 24's maximum sometime between 2011 and 2013. That means we have at least a year or two before we see major solar activity of the kind useful to VHF propagation. At the same time, the next year will see some increase in solar activity, waking up the slumbering higher shortwave frequencies.

The Spring/Summer Season

It is that season, again, when the Northern Hemisphere transitions from days of more dark hours than sunlit, to a season of days with more hours of sunlight than of darkness. The moment (not the day) when the Sun is observed to be directly above the equator is known as the Vernal Equinox. At that moment, the center of the Sun will spend a nearly equal amount of time above and below the horizon at every location on Earth and night and day will be of nearly the same length. These equinoctial transitions occur twice a year, in the autumn and in the spring. This year, the Vernal Equinox occurs in 2007 on March 20 at 0548 UTC.

Every minute after the Vernal Equinox until the date when the Sun reaches the highest latitude in the summer season (known as the Summer Solstice), the length of daylight in a 24-hour day grows longer. The ionosphere is affected by the length of exposure to the Sun. When the ionosphere is energized longer during the spring and summer season, it stays energized longer than it would be during the autumn and winter seasons.

This is why most of the lower shortwave spectrum and the medium wave spectrum become unusable for most of the day. Signal absorption in the lowest of the ionospheric layers, the *D region*, occurs most prominently at the low end of the radio spectrum, at medium frequencies (MF) and at the lower portion of high frequencies (HF). The amount of absorption is directly tied to the amount of sunlight energizing the D region. At night when the D

region is in darkness, it quickly loses energy and absorbs very little of the signals it did during daylight hours (some nighttime absorption still occurs, however).

Since the period of darkness is short in the summer season, the window for hearing a DX medium wave (MW) broadcast station or a tropical shortwave DX station on the lower HF spectrum is very short. At the same time, the radio noise-level caused by weather is higher, masking those weak MF and low HF signals that might still make it through the D region.

The higher shortwave frequencies come alive, though. The more energized the ionosphere, the higher the radio frequencies that it can refract. Even during this period of low sunspot activity, a great

amount of radio propagation in the shortwave spectrum is occurring. And the good news is, Solar Cycle 24 is just beginning, meaning that there might be a slight increase in solar activity during 2008.

To take advantage of the summer ionospheric conditions, international shortwave broadcasters typically change their transmission schedules and the frequencies they use so they can better reach their audience. This change is made by most broadcasters at the end of March, each year. Because they typically use hefty amounts of power (millions of watts) to overcome the signal loss the radio signals experience between the transmitter and your receiver, many windows of DX opportunity for the shortwave radio listener open up even during the years of solar cycle minima.

The VHF / UHF hobbyist also benefits from the changes in season. The summer season holds a lot of unique opportunities for exotic radio activity. DXing distant FM radio stations and TV broadcasts via tropospheric ducting becomes an exciting summertime activity. Trans-equatorial propagation between stations on either hemisphere is common during the spring and early summer. Some hobbyists enjoy catching pings of FM stations off of meteors blazing through the ionosphere that leave behind a thin but dense ion cloud that reflects VHF and sometimes UHF signals. Don't forget the interesting pursuit of exotic VHF propagation via the Aurora, too. The aurora-mode propagation opportunities might increase this year, as Solar Cycle 24 slowly gains intensity.

Summertime Shortwave Propagation

While the lower HF and MF bands become less usable as we move through the spring and into summer in the Northern Hemisphere, the characteristics of higher shortwave

propagation changes. Paths between many areas of the Earth begin opening up on higher shortwave frequencies. Openings between the northern and southern hemispheres become more reliable. Because the Sun is mostly overhead over the equator during the last part of March and early part of April, we have optimal DX conditions on paths crossing the equator, especially on paths that follow the grey line terminator.

The terminator is the line on the earth between the sunlit side and the side in darkness. This is also known simply as the "grey line." It is also called the "twilight zone." Because of the tilt of the earth as it rotates, in relation to the Sun, the location of the terminator line changes dramatically. During the two yearly equinoxes, the terminator runs straight from pole to pole. This transitional period is significant in terms of radio wave propagation because of how the ionosphere changes during this transitional period. In the most general terms, unique and enhanced modes of HF radio wave propagation exist along this terminator.

As high summer arrives, conditions on shortwave frequencies become quite different from those of winter. Radio paths running east and west are not as strong as the signal paths that run between points north and south. On June 20, 2008, at 2359 UTC, the period of sunlight is the longest of the year in the Northern Hemisphere.

At the end of the summer season, we move again through the equinoctial period, and those east/west paths open back up, and we enter the prime "winter" DX season.

From April to June, fair to good propagation occurs on both daytime and nighttime paths on the middle shortwave bands. The strongest propagation occurs on paths that span areas of both day and night. During April, peaking in May, and still during June, the frequencies between 9 and 16 MHz may offer occasional 24-hour DX to all parts of the world. Thirty-one meters will be the most stable as a nighttime band, with propagation following grayline and nighttime paths.

During the early part of the summer season (April through May) propagation is still hot on lower SW frequencies, like 41 meters, with Europe in the evening and Asia in the mornings. Occasional DX openings will occur on the tropical bands around sunrise. However, these bands are quickly being degraded by the seasonal increase in noise.

June marks the changeover from equinoctial to summertime propagation conditions on the shortwave bands. Solar absorption is

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expected to be at seasonally high levels, resulting in generally weaker signals during the hours of daylight when compared to reception during the winter and spring months.

As we move into July, solar absorption is expected to increase. This causes generally weaker signals on the lower to middle short-wave frequencies during the hours of daylight when compared to reception during the winter and spring months. This higher absorption will continue to play a role in weaker signals on shortwave until the autumn.

Solar activity is at the very lowest during this period of solar cycle minima. Cycle 24 may have started, most scientists do agree. Yet, it will take several years before we see high solar activity. It typically takes three to five years for a new solar cycle to reach its peak.

The low sunspot activity during 2008 will result in lower maximum usable frequencies than most of the last eleven years. At the highest end of the HF spectrum, propagation from DX locations east and west is a rare event. North and south paths may still open up for short periods on some of the higher bands, especially around sunrise and sunset. During this summer, 19 and 16 meters will be the most reliable daytime DX band, though signals will be weaker and more unstable. Sporadic-E propagation will make reception of signals possible for less distant stations, though.

Twenty-five through 31 meters will be fairly good in the evenings and mornings. At night, those paths that remain open may be marginal. During periods of low geomagnetic activity that I expect this summer (we get less solar storm activity during the years closer to cycle minima), this band may offer long distance DX all through the night. The most reliable band for both daytime and nighttime should be a toss-up between these two bands.

Forty-one and 49 meters offer domestic propagation during daylight hours and somewhat during the night. The tropical bands (60, 75, 90, and 120 meters) are not noticeably affected by the solar flux, but are degraded during geomagnetic storminess. Through the summer, expect these bands to be more challenging, though less this year than last year, due to the somewhere lower geomagnetic activity levels expected. Look for Europe and Africa as early as sunset. After midnight, start looking south and west for Pacific, South America, and Asia. Short-skip should be possible out to about 750 miles during the daytime.

Expect some openings on 75 and 90, similar to how 40 meters will be acting. Fairly frequent short-skip openings up to 1000 miles are possible during darkness, but expect very few daytime openings with all the static and absorption. MW and 120 meter propagation is rough in the summer, due to the high static and higher overall absorption caused by the short nights and higher D-Layer ionization.

Overall, daytime bands will open just before sunlight and last a few hours after dark. Look higher in frequency during the day, as these frequencies will be less affected by any solar storms occurring and more broadcasters have transmissions in these upper bands.

VHF Propagation

Sporadic-E

On VHF we are expecting Sporadic-E (Es) propagation as we move into June, possibly producing some great long-range VHF and even potential UHF DX. Statistical studies show that a sharp increase in sporadic-E propagation takes place at mid-latitudes during the late spring and summer months.

During July and August, short-skip propagation over distances as great as 1400 miles should be possible for about ten percent of the time on 6 Meters. Higher VHF (2m) openings may also be possible during periods of intense sporadic-E ionization.

At the same time, there is a seasonal decline in Trans-equatorial Propagation (TE) during the summer months, but some VHF openings may still be possible during June. The best time to catch a TE opening across the geomagnetic equator is between 8 and 11p.m. local daylight time. These TE openings will be north-south paths that cross the geomagnetic equator at an approximate right angle.

Tropo

Tropospheric ducting begins to form over wide areas of North America and over the Atlantic and Pacific Oceans during the middle to late summer. Watch for stalled high-pressure weather cells between your location and the distant (DX) station. Stalled high-pressure weather cells, with pressures reaching above 1025 millibars, are known to cause the ducting of VHF radio signals. Ducting allows VHF radio signals to bounce through these natural waveguides far beyond the normal line of sight distances.

Tropospheric ducting forms each year between Hawaii and the U.S. West Coast, and from San Francisco to Los Angeles, Denver to Dallas, Texas to Florida, the Great Lakes to the eastern seaboard, from the Great Lakes to Texas, Nova Scotia to Miami, and from the Midwest to the Southeast.

Advanced visual and infrared weather maps can be a real aid in detecting the undisturbed low clouds between the West Coast and Hawaii or farther during periods of intense subsidence-inversion band openings. This condition occurs also over the Atlantic. There is a great resource on the Internet that provides a look into current conditions. Bill Hepburn has created forecast maps for North America and presents them at www.dxinfocentre.com/tropo.html. He also presents maps for the Pacific, Atlantic, and other regions.

Aurora

Widespread auroral displays can occur during April, bringing with them unusual ionospheric short-skip openings on the VHF bands. Best times for these to occur are during periods of radio storminess on the SW bands. Look for days with high planetary K (K_p) and A (A_p) figures (typically, the K_p should be over 5).

Will that occur often, this year? Probably not, since we are at the lowest point of the sun's activity. However, because there are recurring

coronal holes that spew out massive amounts of solar plasma toward the Earth, we expect occasional periods of moderate geomagnetic storminess. These occasional moments of minor geomagnetic storminess caused by fast solar winds and the passage of plasma released from the Sun's corona may trigger aurora, providing possible E region ionospheric propagation (Au).

Meteor Scatter

There are a number of meteor showers during this period between April and September that might provide opportunity for observing VHF/UHF Meteor Scatter propagation DX.

Most meteor showers are at their best after midnight. After midnight, you're on the leading edge of the Earth and you're meeting the meteors head-on. Before midnight, you're on the trailing edge of the Earth and the meteors have to catch up to you. As a result not only are more meteors seen in the pre-dawn hours, but their impact speeds encountering the Earth's atmosphere are much higher and the meteors are generally faster and brighter. This causes greater ionization, which is what you use to refract a radio signal. Look for TV and FM broadcast "pings" (short bursts of reception) during these events. If you are an amateur radio operator, look for six and two meter openings off of the ionized meteor trails.

Lyrids, a major meteor shower, should take place from mid to late April. The unpredictability of the shower in any given year always makes the Lyrids worth watching, since we cannot say when the next unusual return may occur. If this year's event is average or better (30 to 60 good-sized meteors entering the atmosphere every hour), meteor-scatter openings could occur on the VHF bands.

Another major meteor shower, the Eta Aquarids, will occur in May. This shower has a peak rate of up to 20 to 50 per hour.

Minor showers include the Alpha Aurigids (continuing from August), the Beta Cassiopeids (peaking September), the Epsilon Perseids (peaking September), the Delta Aurigids (peaking September) and the Piscids.

Write Me

Do you have questions about space weather and radio propagation? Do you have observations about Aurora, Sporadic-E, 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 cell phone 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
NW7US@hfradio.org

ASK BOB

GENERAL QUESTIONS RELATED TO RADIO

Bob Grove, W8JHD

bobgrove@monitoringtimes.com

Q. I was told that my Realistic/Radio Shack scanner had been modified to pick up cell phones, but it doesn't pick up mine. How come? (Name withheld)

A. Chances are that your cell phone is digital, and no scanner made has cellular digital decoding. Regardless, modifying a scanner so that it picks up cell phone frequencies is unlawful. A scanner with cell-phone frequency coverage cannot be imported, sold, manufactured, or even possessed by an ordinary citizen according to law.

Q. What is the antenna impedance of a long wire? Can I trust HAMCALC 75 to calculate it? Is there a mathematical model as well? (Thadde Loepfe HB9DNB, Switzerland)

A. A longwire is a general reference to any wire antenna more than one-half wavelength long at a specific design frequency. Wires longer than a half-wave have high impedance (generally several thousand ohms), and are inductive; wire antennas shorter than a half wave are low impedance and capacitive.

Thus, a half-wave dipole for the 40 meter band (7 MHz) is a longwire on 20 meters (14 MHz) and a short, low-impedance antenna on 80 meters (3.5 MHz).

Antenna impedance is a complex value consisting of radiation resistance plus capacitive and inductive reactance. The desire is to cancel the two reactances, leaving just the radiation resistance.

You cancel a capacitive reactance with an inductance (coil), and an inductive reactance with a capacitance (capacitor). In the transmatch ("tuner"), the capacitor is an air variable, and the inductance is either tapped or a rolling-contact coil.

Software and mathematical models are both found in the *ARRL Antenna Book*, \$44.95 plus shipping from the ARRL Book Store, 225 Main St., Newington, CT 06111-1494. Their software can be trusted.

Q. Whatever became of the shortwave publishing and equipment company Gilfer Associates? (Mark Burns, Terre Haute, IN)

A. I remember them well; they published several volumes of my *Confidential Frequency List*. The name Gilfer was an acronym composed of the

last names of the owner, Oliver P(erry) Ferrell, and his wife, Jeannie Gillespie (Gil + Fer). After Perry's death, several successive editors put out the *CFL* series before it was finally turned over to a British publisher. The last volume I'm aware of was 2003.

Q. I currently have a PAR EF-SWL shortwave wire antenna mounted in my attic. Would I be better off with an outdoor antenna such as the PAR or the Grove Skywire? I'm concerned about tree limbs, and wonder about angling the wire antenna. (Rich Mitchell, NC)

A. Outdoor antenna locations are ALWAYS better than indoor. At shortwave, the indoor antenna is subjected to electrical wiring noise, reflective/absorptive effects of wiring and ducting; shielding from metal roofing or metallized Mylar insulation in the walls; microprocessor radiation from electronic accessories; and probably a few other things I can't think of at the moment!

A great outdoor combination consists of two horizontal dipoles at right angles with two coax lead-ins; you can switch between them for either reduction of interference or enhancement of desired signal, depending upon the compass direction.

If you mount a dipole at an angle (known as a sloper), it becomes directional toward the horizon favoring the lower end.

Tree limbs don't really have much effect on shortwave reception, so erect whatever's convenient. The Skywire is an inexpensive choice, and the PAR antennas are great, too.

For all-direction response, a vertical is good possibility. Mount it away from the house and power pole wiring 50 feet or so to minimize electrical noise pickup.

The least expensive, best performing shortwave antenna I've ever used is our Grove Flex-Tenna; that's what I have hanging from a tree limb as my primary receiving antenna.

Q. When analog TV finally goes "dark" in 2009 with the switch-over to digital, can I still use my old analog set with a digital converter? (David Kruzek, Santa Monica, CA)

A. Yes. This was covered in detail in our November, 2007 issue of *MT*, page 6. (And again in this issue in the *AM Bandscan* column.)

Q. I would like to mount a scanner antenna in a tree and disguise its

elements with paint. Will that affect its performance? (Claus Giloi, email)

A. The short answer is no, just so long as you don't cover the insulators with paint. Darker colors like black often have conductive materials in them which could effectively short-circuit signals between the elements before they get to the transmission line.

Practically, however, it's doubtful that even with paint on them, the conductance of the paint when dry would be low enough to appreciably reduce signal strengths. Nevertheless, it's better to be safe than sorry.

Q. My daughter just bought a home and on the roof is a horizontal antenna that consists of a coil of heavy wire about 1-1/2"D x 36" L mounted inside what looks like half a tractor trailer muffler. I've been told that it's for a better TV picture on large screens, to hear the astronauts in space, a CB antenna, a ham radio antenna, and even for listening to NASCAR drivers! What the heck is it? (Jerry Rivet, email)

A. From the description and dimensions, I originally thought it was a high-gain, helical antenna for WiFi Internet access. However, seeing the picture nailed it. This is a TERK HDTV60, a receiving antenna for high-definition television. It's made by Audiovox and is often paired with a dish as your photo shows.



Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. Mail your questions along with a self-addressed stamped envelope in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.)

Getting Started with a New Language

How often have you heard a DX ham say, "Sorry, but my English is only for DX," in answer to a more complicated question from a stateside ham? He or she means that they know just enough English to complete the rudiments of a QSO and, if you ask them something else, they haven't got any idea what you're saying.

It's easy to criticize someone for only being able to speak enough of a language to log a DX contact, but, think about it: The bulk of all language used on the ham bands, voice, digital and even CW, is mostly derived from English. How easy we have it! The rest of the world has learned our language so we can work all the DX we want and never have to strain a brain cell.

❖ Where's All the Latin American DX?

Years ago, when I was a beginning ham, I was looking through my log and noticed something interesting. I had comparatively few

contacts with hams in Latin America. Partly this was due to having a wire antenna that was not favoring locations to my south; partly it was due to band conditions and relatively low power. I also noticed that I had even fewer QSLs from the dozens of countries covering the vast area of the globe south of our southernmost border. Why was that? I set out to find the answer.

The first thing that I learned was that band conditions have to be pretty good in order to make any contacts possible to South America. The second thing I learned was that while we're enjoying winter DX conditions, Latin American hams are struggling with summer conditions and their attendant static crashes. Only a few times in the spring and fall do we actually share similar conditions. And, once I finally looked at a map, I discovered that the tip of Argentina is as far to the south of my location as Sudan, in east Africa, is to the east of my location.

Listening on the bands I could hear plenty of QSOs in Spanish, but, where were these

hams located? I had no idea. Occasionally I would hear a Spanish accent calling "Say Coo, Say Coo, Ola Say Coo..." I was smart enough to know the operator was calling CQ in Spanish, but I never bothered to call back, assuming he was looking only for Spanish speaking stations.

❖ The ARRL to the Rescue

About that time, while browsing the ARRL HQ pages in *QST*, I noticed they were offering a cassette tape called "Hola CQ." The blurb in the catalog suggested one could learn the basics of a QSO in Spanish using this tape. The tape did not disappoint. Produced by a ham from Puerto Rico, it patiently provided the correct pronunciation for letters of the alphabet, numbers and key sentences and phrases in Spanish that are typically used in a QSO. Unfortunately, the tape was long ago discontinued. I asked the League to consider re-issuing the tape, but got no response.

I listened to the tape over and over until I could finally pick out the call signs, names and locations from among the many Spanish speaking hams I could hear on the air. What's more, I could also ID many shortwave and AM band stations that I wasn't able to ID before. Still, I found that the tape didn't give me the courage to go out on the bands alone and attempt to chat with native Spanish speakers.

❖ Back to School (sort of)

I felt that a better understanding of Spanish would really help, but working full time and having a lot of family activities to go to made formal education in the language impractical. So, I enlisted the help of my daughter, who is fluent in Spanish from having spent better than two years in Central America in the Peace Corps. I asked her if there was a language learning course that might work. We went to the local Barnes & Noble bookstore, and after looking over the offerings she chose "Learn in Your Car Spanish" from Penton Overseas publications.

The course included six cassettes (my car only had a cassette player) and a small booklet. She pointed out that the best way to learn a language for conversation is by hearing and repeating. She said that I was unlikely to read a thick text (how right she was!) and that the booklet would give me additional information.



A few of the dozens of QSL cards I've received from Cuba. They're difficult to get direct but very easy through a manager. (Courtesy: Author)



A few of the dozens of QSL cards from hams across Argentina, including one from Grupo Argentino de CW during a CW-only DXpedition to the rare provinces of Catamarca and La Riojas. (Courtesy: Author)

I spent the next two years listening for one hour a day during the daily commute (I'm a slow learner) until I was more comfortable, though by no means fluent in the language. I also supplemented the original course with additional CDs (I'd finally gotten a CD player) of additional vocabulary and grammar from Vocabu-Learn, also a Penton publication.

❖ Graduation Day

One day in the spring of 2002, after answering a few South American DX stations for the typical "cinco-nueve" contact, I felt I could strike out on my own. By now I had put up a 3 element tri-band beam which was pointed due south and decided to solo. It happened that there was a good band opening on ten meters in May of that year, so I set up on 28.460 MHz and started my Spanish speaking amateur radio career. I asked if the frequency was in use and called CQ all in Spanish. I did this over and over and was about to give up on the band when the craziest thing happened. A ham from New Zealand answered my call. "Do you speak English?" he asked. I almost fell off my chair.

After working the ZL, I called again in Spanish. This time I hit pay dirt. CX8FM came back from Uruguay, HR1FJC from Honduras, ZP6SVA from Paraguay, followed by two more from Uruguay. In the following days I worked stations in Venezuela, Puerto Rico, Chile, Argentina, Cuba and Mexico, all in Spanish.

Since that time I've worked hundreds of native Spanish speakers from all over Mexico, the Caribbean, and South America, many of whom didn't speak a word of English. And, even though I'm still not fluent, these hams appreciated that I took the time to learn enough of their language to chat about the kind of common things that

most hams talk about the world over: transmitters, antennas, microphones, band conditions, weather, the family, the QTH and careers.

❖ IDing, QSLing and Paper Chasing

It's very important to remember that no matter what language you're trying to learn, when operating phone (SSB, AM or FM), FCC rules require you to identify every 10 minutes in the English language. This is easily forgotten when you're caught up in another language, but you have to stick to the rule [FCC 97.119(b)(2)]. Even when just calling CQ, don't forget to slip in the English version of your call once every ten minutes.

Getting QSL cards from Latin American hams can be a little tricky. Some countries do not participate in the international QSL bureau, and many that do are sporadic in their activity. In addition, many Latin American hams are not members of their national amateur radio societies and are not eligible to use the bureau. To add to these woes, many national postal systems are less reliable than our own and notoriously slow. Expect to wait a year or more for a direct QSL exchange through the mail. In the case of Cuba, mail has to go through an intermediary, which only compounds the difficulty further.

Many South American hams use QSL managers to handle their QSLs. Often these managers are hams in Spain or Italy. Many Cuban hams use stateside managers as well as European managers. This is the easiest way to QSL the Latin American amateurs, but it may take years for the QSLs to wander from bureau to bureau before it finally gets back to you. You can short circuit the wait by sending the card direct to the manager with two IRCs or

\$2 (U.S.) and a self-addressed envelope (SAE). I've had QSLs from Cuba within two weeks by sending to Spanish QSL managers and in only one week when using a stateside manager. For stateside managers you need only send an SASE (self-addressed, stamped envelope) with your card.

Latin American amateur radio clubs offer dozens of awards. Working the stations to our south can result in enough wallpaper to cover your entire shack. Each country offers its own version of Worked All States and DXCC. I've been working for years on my Toda La Republica de Argentina (worked all Argentine provinces). There are 25 provinces, and so far, I've worked 21, with 13 confirmed. Call assignments in Argentina are different from the U.S. in that the number in the call is meaningless. The district is indicated by the first letter following the number. For instance, LU4AA indicates the Capital Federal (Buenos Aires). That call belongs to Radio Club Argentina; X following the number indicates Tierra Del Fuego, etc.

❖ Final Word

In all the contacts I've made completely in Spanish, I've heard only the kindest words of encouragement. A few times I've run into Spanish speaking hams eager to try their English and it's easy to reciprocate. For many of these hams I was like a rare DX station and I could quickly get a pile-up going, particularly on 10 meters which lets very low powered stations with modest antennas be heard.

One of the most rewarding contacts was with a ham who lived in a high-rise apartment in Buenos Aires operating low power with only a window mount antenna. He shouted, "Es un milagro (It's a miracle)!"

The last several years have been bad news for DX. But, with Cycle 24 underway, you've got a couple of years to get up to speed on the language of your choice. Start at the beginning and learn the way children do: by hearing and repeating. In fact, watching children's shows in another language on TV is a really good way to build vocabulary and learn sentence structure. I like to watch the news programs on satellite from South America. Not only do I sharpen my language skills, but I learn a lot about the current events of the rest of the hemisphere.

RESOURCES:

Here are some Latin American amateur radio resources:

Mexican Awards

www.fmre.org.mx (click on "Diplomas")

Argentine Radio Awards

www.lu4aa.org (click on "Operativas" then "Diplomas")

Cuban Radio Awards

www.frc.co.cu (move the cursor to "En las bandas" and click on "Diplomas")

Radio Club of Chile Awards

www.ce3aa.cl (click on "Diplomas")

Radio Club de Costa Rica

www.ti0rc.org

Guayaquil (Ecuador) Radio Club Diplomas

www.hc2grc.org (click on "Diplomas")

Welcome to the Exciting World of Internet Audio and Video

Can you imagine what your life would be like today without the Internet (Net) and the World Wide Web (Web)? No email, no access to late breaking news, no up to the minute weather reports, no maps and trip planners ...

If you're like most of us with Internet access, you may not realize how much we've grown to be dependent on computers and related Internet technologies. It has transformed the way we conduct our lives. Try and go one day without using the Internet and I think it will illustrate my point. The Internet and the Web have revolutionized the way we communicate – not only with individuals, but with the world as a whole.

The Internet is also changing dramatically the way we are conducting our hobby of radio listening. Thanks to the Internet, radio hobbyists can now share information, software, frequencies, tips and much more in real time.

But it doesn't stop there. New Internet technologies are making even more radical changes to the hobby. It is changing the delivery method that some of us use to receive radio transmissions from our favorite radio services. We are now using the Net to replace even the radio waves themselves.

Imagine sitting in your easy chair and within a few minutes being able to travel the four corners of the Earth via Internet radio. Yes, I know that shortwave radio listeners and amateur radio operators have been doing that for decades via the airwaves, but how about making this trip with no interference, no fading, and with static free reception?

What makes it possible is the fact that no one has been more embracing of Internet radio technology than the broadcasters who transmit in the AM, FM and shortwave radio bands.

❖ Worldwide broadcasting at your fingertips

One of the largest audio services delivered via the Internet is broadcast radio. AM-FM-Shortwave broadcasters from more than 206 countries are currently streaming their RF broadcast on the Internet. Just about any major programming genre is being broadcast across the Net – subscription free.

So how do you get started with listening to radio broadcasters via the Internet? The simplest way to start is with a computer, Internet access, and some free software.

One of the first things you will have to do – if you don't have an Internet Radio Device (IRD) such as the Tangent Quattro or the Com One Phoenix (see our *First Look/MT Review* columns on pages 66 and 68) – is to download a few media players to handle the various audio



streaming formats that broadcasters and others use to deliver their program content. These are free, and you may even have some of them installed on your computer already.

If you use the Windows operating system, you probably have one of these media players already installed on your computer as part of this software package – the **Windows Media Player**. This is one of the more popular methods of streaming audio and video across the net. You can download the latest edition of this popular media package from the link we have provided in our *GlobalNet Internet Resource* section of this column.

Another popular streaming format used on the Net is **Real Audio**. The RA media player is also a free download from the Internet. If you want to listen to audio streams that have a ".pls" or ".m3u" file extension, you can use Apple's **iTunes** software that is popular with the IPod community for converting, organizing, and transferring music to Apple's IPod and IPPhone devices. This is also a free download from the Internet.

Finally, if you want a bit of simplicity and you don't want or have the time to learn how to

use several different media players, the **Winamp** media player might be a simple alternative to using the various media players above. Again, this is a free download.

The nice part about all of this is that these media players know what stream is being selected and will automatically start the right media player for the audio stream being monitored.

If you are using an Internet Radio Device, these stand-alone units have the software built into the unit's firmware, so no user interface is required. Just select the station you want to monitor and the IRD does the rest. You don't even have to have a computer turned on. All that is required for these devices to operate is a connection to the Internet (wireless or wired depending on the unit).

Now that you have your media player(s) installed, you are ready to start monitoring the world of Internet broadcasters.

❖ Web portals make it easy

Of course, you can surf the Net yourself, use your favorite search engine to locate your favorite station's website, and hope they have an audio stream you can tap into. But an easier way to access the myriad of Internet stations is to use one of the many Internet portals that have links to known Internet broadcaster audio streams.

A web portal is a site that functions as a point of access to information on the World Wide Web. Portals present information from diverse sources in a unified way. Aside from the search engine standard, web radio portals offer a large collection of broadcast station links from around the Internet world of broadcasting. Portals provide a way for enterprises to provide a consistent look and feel with access control and procedures for multiple

applications, which otherwise would have been different entities altogether.

Reciva is the premiere Internet radio portal on the net. Not only can you use the site's search engine to see if a particular station has an audio stream you can monitor, but you can also browse their entire list of known stations using their location or genre list. Table 1 is an impressive list of countries that Reciva has catalogued with Internet audio streams.

❖ More than just broadcasters

But, before you think that the Internet only offers radio broadcasts, there is a lot more to this story for the radio hobbyist. In future *GlobalNet* columns we will cover some other areas of the radio hobby that you can monitor via the net.

Amateur radio (including two-way communications for licensed hams), public safety scanner communications, civilian and military aviation communications, and other portions of the radio hobby all have a major audio streaming presence on the Internet. You can even monitor some out-of-this world communications from NASA in real time or tune up a shortwave receiver in a remote location of the world directly from your home computer.

It is an exciting world of communications that you can monitor, and all you need is a computer and an Internet connection. *Global Net* is here in the pages of *MT* to cover it all for you in future columns.

Finally, if you are a fan of the most popular overnight broadcast program here in the United States, George Noory's *Coast-to-Coast AM* (see page 10 in this issue on Art Bell, the show's creator), but you do not have a local affiliate, Internet Radio can come to the rescue.

We have included a sample list of Internet radio stations that carry the program in Table 2. All of these stations are available from the Reciva website for both computer and IRD users.

Last but not least, if you are interested in listening to late breaking and special event audio broadcasts via the Net, keep an eye on the *Btown Monitoring Post* and *Shortwave Central* blogs. We will post material in these two blogs that can't be published in *MT* due to short turn around times and magazine deadlines.

So, till next month, 73 and good hunting.

GLOBALNET INTERNET RESOURCES

Apple's iTunes Software: www.apple.com/itunes/

Btown Monitoring Post: <http://monitor-post.blogspot.com/>

Easy Stream Client/Server: <http://eazystream.us/>

Real Audio Player: www.real.com/

Reciva.com: www.reciva.com

Reciva - Locations: <https://www.reciva.com/listen/locations>

Reciva - Genre: <https://www.reciva.com/listen/genres>

Shortwave Central: <http://mt-shortwave.blogspot.com/>

TeamSpeak 2 software: www.goteamspeak.com/

Winamp: www.winamp.com/

Windows Media Player: www.microsoft.com/windows/windowsmedia/default.mspx

Table 1 – Countries with Radio Stations Broadcasting on the Internet

Afghanistan	El Salvador	Lebanon	Saint Lucia
Albania	Eritrea	Liechtenstein	Saint Pierre and Miquelon
Algeria	Estonia	Lithuania	Saint Vincent and the Grenadines
American Samoa	Falkland Islands	Luxembourg	Samoa
Americas	Faroe Islands	Macau	San Marino
Andorra	Federated States of Micronesia	Macedonia	Saudi Arabia
Angola	Fiji	Madagascar	Senegal
Anguilla	Finland	Malawi	Serbia and Montenegro
Antigua and Barbuda	France	Malaysia	Seychelles
Argentina	French Guiana	Maldives	Sierra Leone
Armenia	French Polynesia	Mali	Singapore
Aruba	Gabon	Malta	Slovakia
Australia	Gaza Strip	Martinique	Slovenia
Austria	Georgia	Mauritania	South Africa
Azerbaijan	Germany	Mauritius	South Georgia and the South Sandwich Islands
Bahamas	Ghana	Mayotte	Spain
Bahrain	Gibraltar	Mexico	Sri Lanka
Bangladesh	Greece	Moldova	Sudan
Barbados	Grenada	Monaco	Suriname
Belarus	Guadeloupe	Mongolia	Sweden
Belgium	Guam	Montserrat	Switzerland
Belize	Guatemala	Morocco	Syria
Benin	Guernsey	Mozambique	Taiwan
Bermuda	Guinea	Namibia	Tajikistan
Bolivia	Guinea-Bissau	Nepal	Tanzania
Bosnia and Herzegovina	Guyana	Netherlands	Thailand
Brazil	Haiti	Netherlands Antilles	Togo
British Virgin Islands	Holy See (Vatican City)	New Caledonia	Trinidad and Tobago
Brunei	Honduras	New Zealand	Tunisia
Bulgaria	Hong Kong	Nicaragua	Turkey
Burma	Hungary	Nigeria	Uganda
Cambodia	Iceland	Norfolk Island	United Kingdom
Cameroon	India	Northern Mariana Islands	Ukraine
Canada	Indonesia	Norway	United Arab Emirates
Cape Verde	Iran	Oman	Uruguay
Cayman Islands	Iraq	Pakistan	United States
Chad	Ireland	Palau	Uzbekistan
Chile	Isle of Man	Panama	Vanuatu
China	Israel	Paraguay	Venezuela
Colombia	Italy	Peru	Vietnam
Cook Islands	Jamaica	Philippines	Virgin Islands
Costa Rica	Japan	Poland	Wake Island
Cote d'Ivoire	Jersey	Portugal	Wallis and Futuna
Croatia	Jordan	Puerto Rico	West Bank
Cuba	Kazakhstan	Qatar	Yemen
Cyprus	Kenya	Republic of Korea	Zambia
Czech Republic	Kiribati	Republic of the Congo	Zimbabwe
Democratic Republic of the Congo	Korea	Reunion	
Denmark	Kuwait	Romania	
Dominica	Kyrgyzstan	Russia	
Dominican Republic	Laos	Rwanda	
Ecuador	Latvia	Saint Helena	
Egypt		Saint Kitts and Nevis	

Table 2 – Sample Internet Broadcasting:

Where can I hear "Coast to Coast AM" on the Internet?

Station/Frequency	Location	Run Times (Weekdays)
KSCO-AM 1080	Santa Cruz, CA	10:00 PM - 5:00 AM (PST)
KSFO-AM 560	San Francisco, CA	10:00 PM - 3:00 AM (PST)
KFI-AM 640	Los Angeles, CA	10:00 PM - 5:00 AM (PST)
KIDO-AM 580	Boise, ID	9:00 PM - 4:00 AM (MST)
KOTA-AM 1380	Rapid City, SD	11:00 PM - 3:00 AM (MST)
WWL-AM/FM 870/105.3	New Orleans, LA	12:00 AM - 4:00 AM (CST)
KSTP-AM 1500	Minneapolis-St. Paul, MN	12:00 AM - 4:00 AM (CST)
WHAM-AM 1180	Rochester, NY	2:00 AM - 5:00 AM (EST)
WIBC-FM 93.1	Indianapolis, IN	11:00 PM - 5:00 AM (EST)
WOWO-AM 1190	Fort Wayne, IN	12:00 AM - 5:00 AM (EST)

How to Be a Frequency Sleuth

Oftentimes when you're scanning new bands and new frequencies for activity, you come across something that you can't immediately identify. It may be voice traffic you can't make out or unusual signals that you don't recognize. Rather than give up and move on, a little detective work and an Internet connection can help you put the pieces together.

❖ Clovis, California

I live in Clovis, California. While searching the UHF business band, I came upon a frequency that is using speech inversion for privacy. I've never heard this before in this band. The frequency is 463.3125. The FCC database brings up two licensed users: Aramark and Fresno Unified School district. The frequency is quite active, day and night. Would you know why this is so? Any information would be appreciated.

Bill in California



of Fresno.

The frequency of 463.3125 MHz falls within what is known as the "Industrial/Business Pool." Radio frequencies within this pool are generally licensed to businesses for day-to-day operations. Some license holders are direct users, meaning they actually use the frequencies themselves. Other license holders sell or rent equipment programmed to operate on their frequencies to end-users.

Speech Inversion

Speech inversion is a technique used on some analog systems to provide a measure of privacy for users. In order to understand how speech inversion works, you need a bit of background about how human speech is represented in an analog radio system. As telephone engineers at Bell Labs learned many decades ago, most of the information-carrying energy in human speech occurs between the

audio frequencies of about 300 Hertz up to about 3,000 Hertz. A basic analog system is designed to pass this band of audio energy from the transmitter to the receiver.

A speech inversion circuit is designed to mix up the audio frequencies at the transmitter and reassemble them at the receiver. For instance, a simple inversion technique is to split up the audio band into two blocks, one from 300 to 1,500 Hertz and another from 1,500 Hertz to 3,000 Hertz, and swap them during transmission. The receiver then swaps the two blocks again, so that the audio comes out organized in the same way it started.

For a scanner hearing the transmission, the swapped speech energy comes out sounding very distorted, somewhat like listening to the cartoon character Donald Duck underwater.

Some speech inversion systems split the audio into multiple blocks and others vary the size of the blocks. However, none of these systems are terribly effective, and most scanner listeners are able to make sense of the scrambled voice after some practice. There are also scanner add-ons that can help reverse the effects of many speech inversion mechanisms. However, although you will find them on the market, these accessories are not legal for sale to consumers in the United States.

FCC Database

The first stop in tracking this frequency down is the database maintained by the Federal Communications Commission (FCC), the government agency responsible for licensing non-military users in the United States. Access to the Universal Licensing System (ULS) can be made through the FCC web site via the Database link at wireless.fcc.gov. One option at the web site is a "GeoSearch" where it is possible to locate the use of a licensed frequency within a specified geographic area. Going to wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp and selecting "Advanced License Search" will get you to the main entry form.

A basic GeoSearch returns three possibilities within 100 miles of Clovis:

The first license holder is the Fresno Unified School District, which has one fixed (non-mobile) transmitter operating on 461.7250 MHz located at Tulare and M Street in Fresno. This is about ten miles from Clovis. One of several frequencies associated with this fixed transmitter is 463.3125 MHz, which is indicated as a mobile license with a maximum limit of two watts of transmitter output power.

Two watts isn't much power, especially ten miles away, so it's unlikely Bob would be able to hear this traffic very well. It's also a poor fit since you wouldn't expect that much activity during the night.

463.3125 is also licensed to Mi-Wuk Village, located about 100 miles north of Clovis. It is a fixed transmitter with a two-watt limit, although the license allows a directional antenna that could provide additional signal strength in a particular direction. Unless there are unusual atmospheric conditions, it is unlikely that Bob would be receiving this signal from that far away.

About 100 miles to the southwest of Clovis is Paso Robles, which is home to a license that includes 463.3125 MHz. 45 mobiles are licensed on this frequency with a maximum output power of two watts. Again, it is unlikely that Bob is hearing activity from Paso Robles.

Deeper Search

The ULS database search has some additional options for a geographic search. By selecting additional "includes" for Nationwide, Continental, and Mobile Areas of Operation, two dozen records are returned for a search area of 25 miles around Clovis. These results include companies that are licensed for "itinerant" operations, meaning they need not remain within a specific area. The results for this search include organizations like the National Football League (90 mobile units licensed) and Nintendo of America (250 mobile units licensed). These might make for interesting listening in their own right, but at the moment we're on a hunt for Bob's mystery signal.

Some of these results have expired or terminated licenses. Others, despite having some itinerant frequencies, have their license for 463.3125 MHz in particular tied to a particular geographic area. Occidental Petroleum fits this pattern – They hold an itinerant license for the state of California; however, only 464.5000 MHz may be used further than two kilometers away from West Los Angeles.

Some of the others just might not make sense. For instance, Viacom is licensed nationwide to use 463.3125 for up to 22 mobile units, each with a maximum power of two watts. This appears to be associated with the Grand Ole Opry in Nashville, so unless there's a traveling road show in Fresno, I doubt this is it.

Perini Building Company holds a license

for 1200 units, each up to 4 watts. However, their license for 463.3125 is tied to an eight-kilometer circle in and around Las Vegas. Tutor Saliba is licensed to use 463.3125 in 300 mobiles at up to 4 watts. Tutor-Saliba Corporation is an engineering and construction company involved in public works projects. Perhaps there is a large construction project nearby that might be using portable radios?

Harvest Crusades, a Christian Fellowship based in Riverside, is licensed for up to 300 mobiles, each with a maximum transmit power of two watts. Although they hold a nationwide itinerant license, it's not clear that they would need to use speech inversion or that they would be busy both day and night.

There are two results for Aramark. One can be dismissed, since the frequency is limited to use around Winfield, Illinois, a city in the western suburbs of Chicago.

The second Aramark license is for what the FCC records as a health care facility on East Herndon Avenue in Fresno. A quick Google Maps (maps.google.com) search identifies this address as the Occupational Health Center at the Saint Agnes Medical Center. The license covers two fixed transmitter sites (one at Saint Agnes in Fresno, the other in Meadow Lakes) and a total of 100 mobile radios split equally between the two transmitter sites. The fixed sites are licensed to transmit at 25 watts, which should be sufficient to reach Clovis with adequate signal strength – much better than the two or four watts of most of these UHF mobile radios.

Given the patient confidentiality requirements of the Health Insurance Portability and Accountability Act (HIPAA), I would guess the use of speech inversion would make sense for the type of medical information expected from such a facility.

So, my guess is the following three frequencies licensed to Aramark for the Occupational Health Center are the best fit for what you're hearing.

Frequency	Use
463.3125	Fixed and mobile
463.8125	Fixed and mobile
468.8125	Mobile only

❖ Jasper, Indiana

Thanks for the information on trunking. I'm still a little confused but it will come to me. Do you know the frequencies for Jasper, Indiana, zip code 47546 for police, fire, and so on?

Doug in Indiana

Jasper is the county seat of Dubois County, located in the southern part of the state. Jasper has a population of just over 12,000, although that number may grow as the town was ranked in the top ten best places to live in the United States by a national relocation firm. Dubois County is home to about 40,000 residents and has recently had



some difficulty in deciding which time zone to follow, having switched to Central Time in 2006 and back to Eastern Time in 2007. Currently six counties in the northwest part of the state and six in the southwest observe Central Time, while the rest of Indiana (including Dubois County) follows Eastern Time.

Regardless of the time, there are a number of conventional frequencies that can be monitored by nearly any scanner you might have. These are analog, conventional transmissions in the VHF and UHF bands. The first is a list of frequencies for the town of Jasper:

Frequency	Description
151.1000	Jasper Public Works
152.3900	Jasper Parks and Recreation
153.5900	Jasper Gas and Water Departments
153.7100	Jasper Electric Department
154.0550	Jasper Waste Water Department
154.7250	Jasper Police - Tactical Channel 3
155.5350	Jasper Police (Dispatch)
155.8650	Jasper Utilities
156.1050	Jasper Public Works
453.0250	Jasper Police - Tactical Channel 2

The second is a list of county frequencies:

Frequency	Description
154.1300	Dubois County Fire (Dispatch)
154.8900	Dubois County Sheriff (Car-to-Base)
154.9800	Dubois County Emergency Management (Tactical)
155.0250	Dubois County Emergency Management (State Net)
155.1300	Dubois County Sheriff (Base-to-Car)
155.2350	Dubois County EMS (Dispatch)
155.3700	Dubois County Sheriff
159.2100	Dubois County Sheriff (Dispatch)

Dubois County is also served by the SAFE-T system. Formerly known as Project Hoosier Safety Acting for Everyone - Together, SAFE-T is a statewide public safety radio system operating in the 800 MHz band. As with all statewide systems across the country, the goal is to have a common radio technology that allows local, state and federal users to easily communicate with each other. The Indiana system is basically complete, with 126 repeater sites across the state providing 95% mobile radio coverage to more than 900 agencies and 38,000 radios.

Voice transmissions on the SAFE-T system are a mix of analog and digital, depending on the talkgroup. In order to hear everything, you will need a scanner capable of monitoring APCO Project 25 digital transmissions.

The only SAFE-T repeater site actually located in Dubois County is in Birdseye and transmits on the following frequencies: 866.0625, 866.3875, 866.8875, 868.4000 and 868.7750 MHz.

Jasper is located within District 34 of the Indiana State Police. There is a report that the SAFE-T system is operating in conventional (non-trunked) mode in the south end of the state, and that the District 34 repeater is transmitting dispatches on 866.4250 MHz and a *simulcast* (simultaneous broadcast) can be heard on low band at 42.42 MHz.

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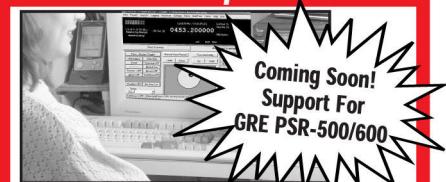
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Decimal	Hex	Description
1264	04F	Indiana Department of Homeland Security (Operations Center)
1280	050	Indiana Department of Homeland Security (Operations 1)
1296	051	Indiana Department of Homeland Security (Operations 2)
1312	052	Indiana Department of Homeland Security (Fire Operations)
1328	053	Indiana Department of Homeland Security (Hazmat Operations)
5040	13B	Statewide Air Medical
5168	143	State Police Statewide Investigations
5184	144	State Police Statewide Investigations
8064	1F8	Indiana Department of Homeland Security (Dispatch)
8080	1F9	Indiana Department of Homeland Security (Car-to-Car)
8096	1FA	Indiana Department of Homeland Security (Arson Investigations)
20464	4FF	State Police District 34 (Multi-group Dispatch)
20480	500	State Police District 34 (Dispatch)
20496	501	State Police District 34 (Operations 1)
20512	502	State Police District 34 (Operations 2)
20528	503	State Police District 34 (Operations 3)
20624	509	State Police South Zone Field Operations
20640	50A	State Police South Zone Field Operations
20656	50B	State Police South Zone Emergency Response Team
20672	50C	State Police South Zone Drug Enforcement Squad
23504	5BD	Dubois County Sheriff (Dispatch)
23520	5BE	Dubois County Sheriff (Tactical)
23536	5BF	Dubois County Sheriff (Car-to-Car)
23552	5C0	Dubois County Sheriff (Operations 1)
23568	5C1	Dubois County Sheriff (Operations 2)
23584	5C2	Jasper Police (Dispatch)
23600	5C3	Jasper Police (Tactical)
23616	5C4	Jasper Police (Car-to-Car)
23632	5C5	Jasper Police (Operations)
23648	5C6	Dubois County Fire (Dispatch)
23664	5C7	Dubois County (Fireground 1)
23680	5C8	Dubois County (Fireground 2)
23696	5C9	Dubois County (Fireground 3)
23712	5CA	Dubois County (Fireground 4)
23728	5CB	Dubois County Emergency Medical Service (Dispatch)
23744	5CC	Dubois County Emergency Medical Service (Operations 1)
23760	5CD	Dubois County Emergency Medical Service (Operations 2)
23776	5CE	Dubois County Emergency Management Agency
24384	5F4	State Police South Zone Train-

39296	998	ing
46368	B52	Indiana Department of Homeland Security (Central)
53360	D07	Indiana Department of Homeland Security (North)
		Indiana Department of Homeland Security (South)

❖ Dakota County, Minnesota

A person wants me to program a PRO-2055 radio shack scanner for our digital simulcast system. The person is the Police Chief – Is it possible? What do you think? Thank you for your time and keep up the good work.

Jim in Minnesota

Dakota County is just south of Saint Paul, Minnesota, and is home to about 350,000 residents. The metropolitan area around the twin cities of Minneapolis and Saint Paul covers seven counties (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington) and 2.3 million people.

Public safety radio in the metropolitan area is provided through what is essentially a two-layer network. A Minnesota Department of Transportation regional radio system serves as a backbone for public safety communication. Subsystems in various locations, including the City of Minneapolis and

Carver, Hennepin and Scott Counties, tie into the backbone and provide service for their local jurisdictions.

The overall Metro 800 MHz Radio System is built on a Motorola ASTRO digital simulcast system using APCO Project 25 standards.

The Dakota 800 MHz subsystem went live late last year with more than 1,600 mobile and portable radios on the county network. It transmits from four repeater sites, located in Apple Valley, Hastings, Randolph and Rosemont, on the following frequencies:

866.1625, 866.8375, 867.1875, 867.5875, 868.0625, 868.3125, 868.3375, 868.5625, 868.5875, 868.8625 MHz

Because the system has not been in operation for very long, the list of talkgroups below is rather short and is subject to updates as local monitors provide additions and corrections.

Decimal	Hex	Description
3436	OD6C	Dakota County 911 Center
4200	1068	Fire (East)

4202	106A	Fire (West)
4204	106C	County Fireground 4
4206	106E	County Fireground 5
4208	1070	County Fireground 6
4210	1072	County Fireground 7
4212	1074	County Fireground 8
4300	10D0	Police Main 1
4302	10D0	Police Main 2
4304	10D0	Police Main 3
4306	10D2	County Tactical 4
4308	10D4	County (Car to Car)
4310	10D6	County Tactical 10
4312	10D8	County Tactical 11
4314	10DA	County Tactical 12
4316	10DC	County Tactical 13
4318	10DE	County Tactical 14
4320	10EO	County Tactical 15

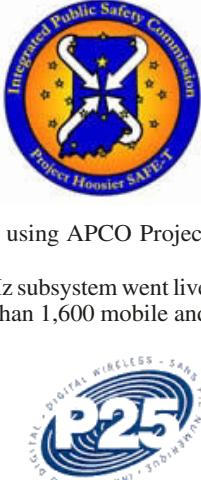
Below is a list of the old analog frequencies used in the county prior to the switchover to the digital subsystem. I wonder how many of these still carry traffic?

Frequency	Description
151.0400	County Public Works
151.1450	County Parks
151.2950	Sheriff (North Dispatch)
151.2950	Fire East (Dispatch)
153.9200	County Juvenile Center
154.0250	County Jail
154.1750	County Fire
154.4450	County Fire
154.7850	Fire West (Dispatch)
155.1150	County Jail
155.4900	Sheriff (Information)
155.5950	Sheriff (South Dispatch)
156.0150	County Juvenile Center
156.1950	County Juvenile Center
158.7900	Sheriff (Car-to-Car)
159.1200	Sheriff (North Simulcast)
458.4250	County Jail
860.7375	Sheriff Mobile Data Terminals

❖ PRO-2055 Scanner

The PRO-2055 is base/mobile scanner manufactured by GRE for Radio Shack, identical in functionality to the handheld PRO-97. It was introduced in 2005 and is capable of scanning Motorola, EDACS (Enhanced Digital Access Communication System) and Logic Trunked Radio (LTR) analog radio systems. Unfortunately, it lacks the necessary hardware to track and process digital transmissions from APCO Project 25 systems, making it unsuitable for the Metro 800 MHz System.

The Metro System can be tracked and monitored by the following scanners:



Model	Manufacturer	Type
BC296D	Uniden	Portable
BCD396T	Uniden	Handheld
BC796D	Uniden	Base/mobile
BCD996T	Uniden	Base/mobile
PRO-96	GRE/Radio Shack	Handheld
PRO-2096	GRE/Radio Shack	Base/mobile
PSR-500	GRE	Handheld
PSR-600	GRE	Base/mobile

That's all I have for this month. More information and links can be found on my web site at www.signalharbor.com. I also welcome your questions, comments and activity reports via electronic mail to danveeneman@monitoringtimes.com. Until next time, happy scanning!

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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/I/I/I/I 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 from 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., 806.000-823.950 MHz., 849.0125-868.9950 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 makes 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® BC396T 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 2,000 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., 764.0000-775.9875 MHz., 794.0000-823.9875 MHz., 849.0125-868.8765 MHz., 894.0125-956.000 MHz., 1240.0000 MHz.-1300.0000 MHz.

The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as **Fire Tone Out Decoder**. This feature lets you set the BCD396T to alert if your selected two-tone

sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning.

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

More Radio Products

Save even more on radio scanners when purchased directly from CEI. Price includes delivery in the continental USA excluding Alaska. Bearcat 898T 500 channel Trunktracker III base/mobile.....\$209.95
Bearcat 796DGV 1,000 channel Trunktracker III base/mobile.....\$519.95
Bearcat BCD396T APCO 25 Digital scanner with Fire Tone Out.....\$519.95
Bearcat 246T up to 2,500 ch. Trunktracker III handheld scanner.....\$214.95
Bearcat Sportrac 230 alpha display handheld sports scanner.....\$184.95
Bearcat 278CLT 100 channel AM/FM/SAME WX alert scanner.....\$129.95
Bearcat 248CLT 50 channel base AM/FM/weather alert scanner.....\$104.95
Bearcat 92XLT 200 channel handheld scanner.....\$109.95
Bearcat 72XLT 100 channel handheld scanner.....\$99.95
Bearcat BR330T up to 2,500 ch. Trunktracker III with Tone out.....\$274.95
Bearcat BCT8 250 channel information mobile scanner.....\$169.95
Bearcat 350C 50 channel desktop/mobile scanner.....\$104.95
AOR AR16BQ Wide Band scanner with quick charger.....\$199.95
AOR AR3000AB Wide Band base/mobile receiver.....\$1,079.95
AOR AR5000A+3B Wide Band 10 KHz to 3 GHz receiver.....\$2,599.95
AOR AR8200 Mark II Wide Band receiver.....\$594.95
AOR AR8600 Mark II Wide Band receiver.....\$899.95
AOR AR-ONE Government/Export sales only 10 KHz-3 GHz. \$4,489.95
Scancat Gold For Windows Software.....\$99.95
Scancat Gold for Windows Surveillance Edition.....\$159.95

Bearcat® BC246T Trunk Tracker III

Suggested list price \$399.95/CEI price \$214.95
Compact professional handheld TrunkTracker III scanner featuring Close Call and Dynamically Allocated Channel Memory (up to 2,500 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.72" Wide x 1.26" Deep x 4.6" High

Frequency Coverage:

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

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include **Close Call Radio Frequency Capture** - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. **Dynamically Allocated Channel Memory** - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but **over 2,500 channels are possible** depending on the scanner features used. You can also easily determine how much memory is used. **Preprogrammed Service Search (10)**

- Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine, racing and weather frequencies.
- Quick Keys** - allow you to select systems and groups by pressing a single key. **Text Tagging** - Name each system, group, channel, talk group ID, custom search range, and S.A.M.E. group using 16 characters per name. **Memory Backup** - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. **Unique Data Skip** - Allows the BC246T to skip over unwanted data transmissions and birdies. **Attenuator** - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. **Duplicate Frequency Alert** - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. **22 Bands** - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAh nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part #HF24RS for \$29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.

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Acarsd: Tracking Aircraft with HFDL

Lately, activity has picked up on the High-Frequency Data Link (HFDL) system used by airlines contracting with Aeronautical Radio, Inc (ARINC). At a few peak times of the day, the data bursts fill nearly every available time slot.

We've talked a lot about the technical parameters of this mode, but not much about what can be done with inexpensive amateur shareware and freeware on ordinary Windows computers. Plane spotters continue to come up with some pretty amazing things that would have been science fiction even ten years ago.

❖ Acarsd

In the past few months, I've been having quite a bit of fun with a free program called Acarsd. It also has a Linux version, which I haven't tried.

Acarsd is a full-featured ACARS decoder and graphic user interface to the resulting data. You can get it at www.acarsd.org. ACARS stands for Aircraft Communication Addressing and Reporting System. It's a system that exchanges digital messages between aircraft and the ground. It is extensively used on VHF (Very High Frequency, above 30 megahertz).

This would be mostly of interest to scanner listeners, except that ACARS messages

can also be passed via satellite or HFDL. For us, it also means that the various programs developed for aviation enthusiasts to crunch ACARS data will work on HF too, with some light tweaking.

Users of AirNav (www.airnavsystems.com) and similar rather pricey packages, will recognize what Acarsd is doing. It contains its own sound-card ACARS decoder (intended for VHF), though we'll be turning this off on setup. The graphic interface has all the usual bells and whistles that real hard core aviation enthusiasts have come to expect.

Along with displaying and logging ACARS messages, Acarsd uses an Internet connection to automatically access public databases maintained mostly by the growing Acarsd user community. It busily finds aircraft types, routes, and even photos when available.

It's really remarkable what is out there for free, though donations are most certainly encouraged. About the only time "you get what you pay for" is with the documentation. It's the kind of terse explanations that we've



come to expect with amateur radio software. As always, it definitely helps to have had some experience with radio sound card software. At a minimum, learn to live with arcane error messages that sound like your computer is about to explode. It's not.

❖ Getting Data into Acarsd

Acarsd asks setup questions upon install. You want to configure it to connect to external Dynamic Data Exchange (DDE). For reasons we're about to go into, it's best to have it look for a program called Posfix, rather than PC-HFDL.

The basic idea of DDE is like any other computer network. It provides a path within Windows by which running programs can send data to one another via internal servers and clients. All the user has to do is supply the right names for things, which is harder to talk about than just to do. The documentation takes you right through it.

We'll be using DDE to get the data from your HFDL decoder, which is probably already PC-HFDL. Others work, too, but that's what I'm using.

❖ PC-HFDL

Well, we've certainly talked about PC-HFDL here. It's Charles Brain's classic HFDL program. If it likes your sound card and operating system, you're in business. Try the free version first, and if it works, spring a few bucks for the commercial one that has DDE. It's at www.chbrain.dircon.co.uk/pchfdl.html.

One problem has come up since my glowing review of PC-HFDL version 2.041 a few months back. Microsoft Vista, the operating

system that comes on new computers, has changed the way the sound card is handled. The great majority of radio sound card programs, including PC-HFDL, now need changes. While this is done, it's safer to stick with Windows XP. This is likely why 2.041 still hasn't come out of beta.

❖ Posfix

While it's possible to go straight into Acarsd with some tweaking, it's much better to send data to Posfix first. This is another free program, at www.posfix.co.uk. It was designed to plot aircraft positions, which it does nicely.

For us, though, its primary use is to reformat aircraft position messages coming from PC-HFDL. Technically, these are not true ACARS messages, and Acarsd ignores them. Posfix changes them into pseudo-ACARS messages from NO-REG (unknown aircraft registration), which Acarsd likes just fine.

Therefore, the first step is to get Posfix to connect as a client to PC-HFDL. Just click the PC-HFDL



choice under "DDE." If things start showing up in the small Posfix window, you're there.

❖ Acarsds

We're almost ready, but not quite. Acarsd does not directly connect to Posfix or any other DDE server. It uses an external server application called Acarsds. This came in my Acarsd distribution, but it's also available separately on the previously mentioned web site.

This is easy enough to set up, but the documentation (on the web site, at least) is rather dated. For example, it says that Acarsds doesn't work in XP. It works just fine in XP, not to mention Vista. What doesn't work is a very old decoder program called SkySpy. It was the only DDE choice several Acarsds versions ago.

Acarsds setup is just as easy as Posfix. Click the menu choice "Posfix client," and if messages appear, you're there. These will include the reformatted positions.

❖ The Good Part

At this point, with data showing in Acarsds, we can finally start Acarsd. If the right answers were given during installation, it should say "Successfully connected to ACARSDS socket server" as one of its startup messages. A little blue square saying "DDE" should appear at the lower right. Most important, the ACARS messages should now appear on the screen, all in pretty colors, showing a source called "Soundcard 'SkySpy Socket Server'."

If it isn't working, the first thing is to go to the menu under the "DDE" icon and click "Restart ACARSDS collector thread." This has always worked for me. If it doesn't work, it's possible to hack the acarsd.ini file, which lives in the program startup directory. Go to the "DDE" section at the end, and follow the instructions.

One last thing. Since DDE is one-way, always start things in this order: PC-HFDL, Posfix, Acarsds, Acarsd. Sounds like a lot to remember at once, but it becomes easy very quickly, and the slick Acarsd interface is worth it.

Remember that ACARS is very sensitive information in a "post-9/11 world." Don't blab it to anybody, and you'll be fine. See you next month.

ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
AWACS	Airborne Warning and Control System
CAMSLANT	Communication Area Master Station, Atlantic
CW	On-off keyed "Continuous Wave" Morse telegraphy
DEA	US Drug Enforcement Administration
EAM	Emergency Action Message
FAX	Radiofacsimile
FEMA	US Federal Emergency Management Agency
HFDL	High-Frequency Data Link
HF-GCS	High-Frequency Global Communication System
LDOC	Long-Distance Operational Control
M08a	Cuban 3-msg CW/MCW, ANDUWRIGMT = 1-0
MARS	Military Affiliate Radio System
MCW	Modulated CW or AM tone Morse telegraphy
MX	Russian single-letter CW markers/beacons
NTCN	US National Telecommunications Coordinating Network
PR	Puerto Rico
PSK220F	220-baud phase-shift keying mode
RDFT	Redundant Digital File Transfer, 8-tone mode
RTTY	Radio Teletype
S11a	"Strich" family, "Cherta" station, ends "Konyets"
Selcal	Selective Calling
SITOR-A	Simplex Telex Over Radio, Automatic Repeat Request
SITOR-B	Simplex Telex Over Radio, Forward Error Correction
SK01	Generic for Cuban numbers in ham digital modes
UK	United Kingdom
Unid	Unidentified
US	United States
USAF	United States Air Force
USCG	United States Coast Guard
V02a	"Atencion" Spanish numbers, 3-msg format
VOLMET	"Flying Weather," formatted airport observations

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 ().

1680.0	WD2XUM-Hatfield & Dawson Consulting Engineers, El Centro Naval Air Facility, CA, experimental 1000-watt AM psychological warfare transmitter, loop with identifier, test count, and tone, at 0045 and 2320. WD2XUM, AM count and tone, at 1630. (Steve Green-CA) [FCC license record: "Modernization and transformation of psychological operation equipment under government contract." -Hugh]
2872.0	Gander-North Atlantic air route control, Canada, selcalling AL-GP, possible registration D-AIHC (Lufthansa "Star Alliance" A340), at 0520. (Allan Stern-FL)
2899.0	Gander, taking position and fuel from United 932, at 0624. (Stern-FL)
2971.0	Shanwick-North Atlantic air route control, Shannon/Prestwick, Ireland, selcal and position checks with various airliners, at 0513. (Stern-FL)
3016.0	Shanwick, selcal and position checks with airliners, at 0558. (Stern-FL)
3413.0	Shannon Volmet-Shannon Radio, Ireland, aviation weather for European airports, at 0633. (Tom Severt-KS)
3450.0	OK-CW low-power hobby beacon, possibly Oklahoma, at 0541. (Severt-KS)
3455.0	New York-North Atlantic air route control, working Air Europa 440, gave 5550 kHz secondary, at 0525. (Stern-FL)
3593.7	"D"-Russian CW single-letter cluster beacon (MX), Odessa, also on 5153.7, at 0013. (Ary Boender-Netherlands)
3593.8	"P"-Russian CW beacon (MX), Kaliningrad, also on 4557.8, 7038.8, 10871.8, 13527.8, and 16331.8, at 0013. (Boender-Netherlands)
4020.9	AAM6RT-US Army MARS, net control station at 1339. (Severt-KS)
4021.5	R26611-US Army helicopter, calling B1Z171 (1-171 Aviation), ALE at 0032. (Mark Cleary-SC)
4028.0	Cuban Spanish AM numbers (V02a), in progress at 0329. (Severt-KS)
4035.0	V02a, at first only a carrier at 0713, then low AM audio at 0723. (Severt-KS)
4077.0	MO-CW low-power hobby beacon, OK, also on 4078 (drifts), at 0623. (Severt-KS)
4079.0	TMP-Low-power CW beacon, CA, "TMP" identifier and Fahrenheit temperature (45 degrees), at 0634. (Severt-KS)
4102.7	W-Low-power CW beacon, CA, "W" identifier and wind telemetry beeps, at 0609. (Severt-KS)
4146.0	WCY6640-Vessel Abdou Callais, needed a diver on arrival to fix a fouled line, at 1342. (Severt-KS)

4149.0	WBN 3011-Crowley Maritime seagoing tug Pilot, passing information to Vicky at WPE Jacksonville (FL), at 0610. WBN 7618-Tug Explorer, working WPE at 0615. WCX 9104-Tug Monitor, working WPE at 0618. (Patrice Privat-France)	8776.0	Ply Board-US military, EAM at 1835. (Cleary-SC)
4271.0	CFH-Canadian Forces, Halifax, NS, RTTY weather (75/850), at 0040. (MDMonitor-MD)	8891.0	Gander-North Atlantic air route control, Canada, working US Air National Guard tanker Copper 4, at 1312. (MDMonitor-MD)
4325.9	"R"-Russian Navy CW channel marker, Izhevsk, also on 5465.9, at 0018. (Boender-Netherlands)	8906.0	Santa Maria-North Atlantic air route control, Portugal, taking position from unknown aircraft Navy BD 200, who reports he doesn't have a selcal, at 1905. (MDMonitor-MD)
4372.0	"6-H-J"-US Navy, link-11 coordination with "0-2-H" at 0212. (Cleary-SC)	8912.0	VES-USCG Cutter Venturous, calling "0-7-M," ALE at 1411. Coast Guard 1719-USCG HC-130, position for CAMSLANT at 1606. (Cleary-SC)
4490.0	USDAEOC2-US Department of Agriculture emergency operations center, MD, ALE sounding, also on 9270, at 1506. 962WNRE-Ohio Bell WNRE 962, working 82KNY, NTCN KNY 82, KS, at 1632. (Jack Metcalfe-KY)	8971.0	Fighting Tiger 21-US Navy VP-8, a P3-C, working Goldenhawk, USN, ME, at 1547. (Cleary-MD)
4558.0	"C"-Russian CW beacon (MX), Moscow, also on 7039.0, 10872.0, 13528.0, and 16332.0, at 0013. (Boender-Netherlands)	8983.0	CAMSLANT Chesapeake-USCG, VA, diverting helicopter Coast Guard 2121 to a search for an overturned vessel, at 1533. CAMSLANT, giving search coordinates to helicopter Coast Guard 2114, at 1613. Coast Guard 2114, reporting search complete at 1735. (Cleary-SC)
4675.0	Gander, selcal check with Air France 009, at 0719. (Severt-KS)	8992.0	Drago 51-Unknown US military, possibly a KC-135R tanker, patch via Andrews HF-GCS to Liberator Control (Andrews AFB, MD), at 1532. (Cleary-SC)
4935.0	YIP-Possible Ypsilanti, MI National Guard, ALE sounding at 2259. (Metcalfe-KY)	9007.0	Trenton Military-Canadian Forces, Trenton, ONT, passing weather to an unheard aircraft at 0235. (MDMonitor-MD)
5383.0	Dude Ranch-Unknown US agency, working Seagull Control at 2050. (Metcalfe-KY)	9035.0	Unid-Probable Avianca LDOC, Bogotá, Colombia, Spanish-speaking male with aviation weather for an unheard aircraft, at 0025. (MDMonitor-MD)
5446.5	American Forces Network-US Navy rebroadcast of Armed Forces Radio "Interruptible Voice Channel" downlink, Saddlebunch Key, FL, at 0801. (Severt-KS)	9106.0	KTQ313-US Environmental Protection Agency, ALE sounding at 1659. 359WPLV-AT&T WPLV 359, HI, ALE sounding at 1856. (Metcalfe-KY)
5565.0	Virgin 604-Virgin Atlantic A340, registration G-VFOX, answering selcal EK-MR from unknown ground station, at 2230. (Privat-France)	9120.0	Nighthawk 7-US Marine Corps HMX-1 ("Marine One" Presidential transport squadron) helicopter, working other Nighthawks, clear and secure, at 1742. (Cleary-SC)
5598.0	New York, selcal check with Martinair 070, at 0635. (Stern-FL)	9240.0	Cuban SK01, PSK220F numbers on an AM carrier, at 1003. (Severt-KS)
5696.0	CAMSLANT Chesapeake-US Coast Guard, search and rescue with unid aircraft, at 0547. (Severt-KS). CAMSLANT, position check from unheard helicopter Coast Guard 2133, at 2023. (MDMonitor-MD) CAMSLANT, giving Swordfish 02 the Sector Key West report of a go-fast boat, at 2358. (Cleary-SC)	9414.5	WGY9441-Unknown FEMA auxiliary station, ALE sound, also on 8023, at 1621. (MDMonitor-MD)
5732.0	Panther-DEA Operations, Bahamas and Tortugas, taking ops-normal from Rescue 12, telling them an ambulance would meet the aircraft, at 0306. (Severt-KS) LGV-USCG Cutter Legare, calling JOR (Cutter Gallatin), ALE at 1334. (Cleary-SC)	9960.0	Unid.-"Cherta" Slavic numbers station (\$11a), message 214/00, at 1030. (Mike-UK)
5778.5	R26604-US Army helicopter, calling B1Z171 (1-171 Aviation), ALE at 1840. (Cleary-SC)	10320.0	American Forces Network-US Navy downlink rebroadcast, Pearl Harbor, HI, at 1915. (Severt-KS)
5898.0	V02a, 5-figure groups in progress, AM at 0815. (Severt-KS)	10345.0	Cuban SK01, AM RDFT signal, passing files 47831916.abc and 49831916.abc, at 1600. SK01, RDFT file 16694437.txt, twice at 1610 and 1615. (Severt-KS) [Frequency also used for a time by the mysterious M08a transmissions from inside the US. -Hugh]
6215.0	CAMSLANT-USCG, VA, calling unknown station at 2113. (Cleary-SC)	10588.0	IN5FEM-FEMA Region 5, IN, ALE sounding at 2041. (MDMonitor-MD)
6316.0	MNM-USCG, Portsmouth, VA, CW identifier in SITOR-A sync bursts, at 0030. (MDMonitor-MD)	10816.5	HQ703N-US National Guard headquarters, working NJC21NG, New Jersey Weapons of Mass Destruction strike team, ALE at 2022. (Metcalfe-KY)
6519.0	WLO-Mobile/Shipcom Radio, AL, voice maritime weather at 0001. (MDMonitor-MD)	10871.9	"S"-Russian CW beacon (MX), Archangelsk, at 0013. (Boender-Netherlands)
6529.0	The Babbler-Incoherent Cuban Spanish numbers, at 1423. (Severt-KS)	10993.6	Coast Guard 2105-USCG, on a search with Sector Key West, FL, at 2213. (Cleary-SC) Shark 311-USCG patrol vessel, working "15," an unknown aircraft, clear and secure at 2233. (MDMonitor-MD)
6586.0	New York, selcalling Martinair 070 with partial clearance to Amsterdam, Netherlands, at 0545. (Stern-FL)	11095.0	AKALN2-Pemex, ALE sounding at 1305. ATASTA1-Pemex, ALE sounding at 2213. REBOM1-Pemex, ALE sounding at 2324. (MDMonitor-MD)
6721.0	544840-USAF KC-135R tanker, calling ADW (Andrews HF-GCS), ALE at 1326. (Cleary-SC)	11175.0	Sigonella-USAF HF-GCS, Sicily, morale patch from Trump Card 06 (US 73rd Expeditionary Air Control Squadron, Afghanistan), at 0445. Air Transport 530-USAF Eastern Test Range contractor flight, calling MacDill with no joy, since MacDill Global closed decades ago, at 1812. (Stern-FL) Outlaw 22-Probable US Navy, patch via Andrews HF-GCS for El Salvador arrival weather, at 1327. (Cleary-SC) Offutt-USAF HF-GCS, radio checks with Music 55 (TN Air National Guard C-130, Nashville), at 1713. (MDMonitor-MD) Offutt-USAF, NE, several EAMs "for Sappy," then patching Team 78 to McGuire Command Post, at 1904. (Jeff Haverlah-TX)
6721.0	544840-USAF KC-135R tanker, calling ADW (Andrews HF-GCS), ALE at 1326. (Cleary-SC)	11232.0	Atlas 23-Canadian Forces CC-130, working Trenton Military, told that the Rescue Coordination Centre (RCC) had no traffic, at 1740. (MDMonitor-MD) Trenton Military-Canadian Forces, patching Sentry 06 (USAF E-3 AWACS) to Tinker AFB for formatted ops report, at 2150. (Stern-FL)
6768.0	V02a, 5-figure groups in progress, AM at 0418. (Severt-KS)	11494.0	Hammer-US Customs, March Air Reserve Base, CA, Parkhill encryption, then clear voice passing a target of interest to an unknown station, at 1558. (Cleary-SC)
6792.5	Unid-HAARP (High-Frequency Active Auroral Research Project, Gakona, AK), 2-second CW key-downs, loud lunar echoes heard in 3-second listening intervals, at 0527. (Severt-KS) [Science experiment using HF earth-moon-earth propagation, with amazingly loud, Doppler-shifted echoes. -Hugh]	12070.0	G323-Unknown US Army Corps of Engineers, ALE sounding at 1532 USB/ALE sounding. (MDMonitor-MD)
6800.0	Lowest of many carriers spaced approximately 1.2 kHz, all the way to 6900, each with low Cuban AM voice numbers (V02a) audio, at 2055. Normal V02a started at 2100. (Chris Smolinski-MD)	13510.0	CFH-Canadian Forces, Halifax, RTTY weather codes at 2032. (Severt-KS)
6855.0	Cuban Spanish AM numbers (V02a), partial callup 12626, at 2103. (Cam Castillo-Panama)	13927.0	AFA4DD-USAF MARS, patch to Oak Ops, PR, for C-130 Shark 67, a Coronet Oak Caribbean support mission, at 2035. AFA1YY-USAF MARS, NY, working AWACS Sentry 51, went to 7633.5, at 2155. (Stern-FL)
6955.0	Radio First Termer-Unknown pirate broadcast, playing recordings of the famous 1960s Viet Nam US military pirate, at 1923. (Severt-KS)	13993.0	AFA4MP-USAF MARS Transcon Net control, roll call of 11 stations, at 1830. AFA2DT, PR, calling same net at 1904. (Stern-FL)
7407.5	Unid-HAARP earth-moon-earth experiment, bad broadcast interference, CW at 0600. (Severt-KS) [The second night was in the clear, and I heard some very loud echoes. -Hugh]	14606.0	AFA6PF-USAF MARS, came from 13927 with Hawk 02, faded, at 1826. (Stern-FL)
7450.0	REBOM1-Petroleos Mexicanos (Pemex) oilfield net, Rebombeo Complex, ALE sounding at 0458. ATASTA2-Pemex, Atasta pipeline or nitrogen station, ALE sounding at 0603. AKALN2-Pemex, Akal offshore field, platform N2, ALE sounding at 0604. (MDMonitor-MD)	16540.0	Glory Atlantic-Singapore registered bulk carrier vessel, calling Paricoy, no joy at 1310. Unid-Probably a vessel, raised Paricoy in English, then conversation in Tagalog, also at 1310. (MDMonitor-MD)
7527.0	Coast Guard 1719-USCG HC-130, patch via Service Center (US Customs) to Clearwater Air, FL, at 1839. (Cleary-SC)	17146.4	CBV-Chilean Navy, Playa Ancha, FAX satellite image of South America, at 1846. (Hugh Stegman-CA)
7633.5	AFA1YY-USAF MARS, NY, came from 13927 for a patch to Tinker AFB from Sentry 51 (E-3 AWACS), then Darkstar (aircraft back end) with Iron Horse, at 2158. (Stern-FL)	17435.0	Cuban SK01, sent small binary file 47831916.abc in RDFT, low audio from Radio Reloj on signal, at 1754. (Stegman-CA)
7635.0	Head Cap 40, Civil Air Patrol net with Head Cap 50 and a Louisiana station, at 1511. (Cleary-SC)	17487.0	82KNY-NTCN KNY 82, KS, working 885WPDY, AT&T WPDY 885, NV, ALE at 1814. (Metcalfe-KY)
7887.0	Cuban V02a, AM Spanish callup 03267 86666-11604, at 2003. (Castillo-Panama)	17515.0	V02a, late start and already in progress, audio dropping out, then abrupt stop at 1630 for RDFT transfer of file 33641294.txt, all in AM, at 1604. (Severt-KS)
8097.0	Cuban MCW "cut numbers" (M08a), letter-substituted callup 32031 58717 38476, at 1901. M08a, MCW in progress at 1910. (Castillo-Panama)	21934.0	LA0622-LAN Chile Boeing 767, registration CC-CXC, HFDL position for ground station 01, San Francisco, CA, at 2100. (Stegman-CA)
8103.5	"V"-Probable Russian Navy CW channel marker, Khiva, good signal at 2019. (Mike-West Sussex, UK)		
8156.0	Coral Harbour Base-Royal Bahamas Defence Force, working an unknown station at 1242. (Cleary-SC)		
8180.0	Cuban RDFT mode (SK01), passed file 80975312.txt, at 0930. (Severt-KS)		
8195.0	Unid-Spanish-speaking male passing formatted data with unheard station, ship half of marine channel 801, at 0005. (MDMonitor-MD)		
8294.0	WBN 3016-Crowley Maritime seagoing tug Defender, position for WPE Jacksonville at 1810, then ship to ship with tug Monitor, at 1813. (Stern-FL)		
8424.0	NMC-USCG, Point Reyes, CA, CW identifier in SITOR-A sync bursts, at 0045. (MDMonitor-MD)		

Russian Forces Signals

Before we dive into Russian signals, we have a few notes on some interesting ALE networks to listen out for.

❖ “LP90” and “HM90” Net Uncovered

Back in the May 2007 column, we noted a network using a curious set of identifiers all ending in “LP90” or “HM90.” At the time, we speculated about the location being in North Africa. Recent reports of a change in ALE identifiers in use by the Algerian Police would seem to suggest that this is also the origin of this network.

Identifiers: JT40HM90, ZB40LP90, BX30LP90, CI30LP90, FU30LP90, HJ30LP90, LP30LP90, LU40HM90, PC30LP90, RK30LP90, TS30LP90, DA40HM90, HJ40HM90, NF40HM90 and PA40HM90

Frequencies: 5220, 5254, 6820, 7730, 7740, 11415, 12225 and 12806 kHz USB

❖ PR0nn Net

This one seems to have arrived on air in the fall of 2007 and remains a mystery. Here are the frequencies on which the net has been heard.

Frequencies: 5361.5, 7588.5, 9178.5, 10767.5, 13426.0 kHz USB

No traffic has been heard so far, other than soundings by the dozen or so participants. Judging by propagation, this is likely to be of US origin. The identifier T1126 also appears on the 5 MHz channel and there have been some reports of identifiers OPS171 (associated with the US National Guard) on the same channel, but it is not known if this is a case of simple channel sharing or whether the OPS stations are part of the same network. No exchanges between PR0NN and OPS stations have been noted.

Identifiers: PR04, 10, 11, 12, 13, 15 and 17

❖ STANAG4197 Voice Modem

This is an interesting and rarely heard signal which can easily be mistaken for the MIL-STD-188-110A Appendix B 16 or 39 tone high-speed modems. STANAG4197 has the same signal structure (16 or 39 tones) of parallel PSK data, but does not have the telltale pilot tone at +393.75Hz above the carrier point.

Both types of modem have a distinctive sequence of four tones that briefly sound before the modem synchronization data, and then traffic begins. The tones are at 787.5, 1462.5, 2137.5, and 2812.5 Hz above the carrier point. Like most other high speed modems, the signal is usually on a kilohertz or half kilohertz point. The STANAG4197 modem most usually carries digitized voice with KY99 encryption.

Listen out on the following frequencies, for an hour or so and you'll probably hear a brief exchange or two:

Frequencies: 4672, 5142.5, 5319.5, 5320, 5699, 10507, 10528, 10993 and 11228 kHz USB

❖ Russian Military Signals on the Rise

Aside from the usual slew of CW stations from the Russian Forces, the turn of the year has seen a big increase in traffic from this area of the world, with many frequencies active. Perhaps this was in conjunction with the recent elections or exercises underway?

There are three distinctive modems associated with the Russian Forces: the BEE or T600 FSK modem used by the Navy, the 75bd FSK modem used by the Army and Navy, and the MS5 PSK modem used by the Air Force and other units.

The BEE (aka T600 aka 36-50) modem is easily recognized by ear when idling with the distinctive 36bd or 50bd reversals. This modem shows a brief autocorrelation (ACF) of



70 during the modem synchronization phase but is then encrypted (ACF = 0). BEEs are most usually found with 200Hz or 250Hz shift.

Used by the Navy for broadcast purposes, messages are usually short with long periods of idles in between. Sometimes, CW is used after modem transmissions to confirm receipt or for other information. These messages are usually sent by the High Command callsign RDL. Recently heard channels include:

4602, 5178, 5203, 5398, 5861, 7836, 8436, 9044, 9224, 9346, 11088 and 12741

kHz (center of data)

A number of frequencies, depending on propagation conditions, are on a schedule and start at 08, 28 and 48 minutes past the hour: 8076, 10712, 11426, 11468, 14411, 14581, 14664, 15706, 16234, 18576 kHz (center of data)

The 75bd modem (no known code name) again usually carries a distinctive 200Hz or 250Hz shift. In contrast to the Navy BEE transmissions, the 75bd modems are usually on the air for many hours with on-line encrypted data (ACF=0). These modems have been resurgent with more than a dozen frequencies active in the last few months when they had not been heard for at least a year.

Many listeners know that, when watching a NATO KG84 encrypted modem (most usually with 75bd and 850Hz shift) with standard Baudot selected, one will see the crypto lead-in of reversals (displayed as RYRYRY) followed by the key exchange which shows as “VMGTCNJBH”. In the case of the Russian system, a string of VMGTCNREX consistently shows. Recently active frequencies include:

3170, 4018, 4396, 4447, 5152, 5296, 5322, 5454, 6452, 8138, 8302 and 10280kHz (center of data)

The final modem that is often associated with an increase in Russian activity is the MS5 (aka FIRE aka AT3000-series) 12 tone PSK modem. We've featured it very often in these columns. The distinctive 12 channels of PSK and pilot tone at 3300Hz above the carrier point are very easy to tell by ear. The modem can be used for both low-quality encoded voice and data.



❖ Digital Bandscan (5100 to 5300 kHz)

This month, we look at part of the spectrum that provides good local coverage by day and opens up to transatlantic traffic during the night.

5105.00	US Coast Guard	MIL-188-110A
5107.00	US Coast Guard	MIL-188-110A
5113.50	US MARS	PacTOR



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Another Shortwave Station Coming in Tennessee

George McClintock tells me he has filed an application for a new shortwave station near Nashville, TN. He is the former GM and still a partner at WWCR, and also has been managing KAIJ near Dallas. On January 31, FCC accepted the application for filing, the first step.

Studio will be in Murfreesboro TN, the same location from which KAIJ has been programmed; transmitter site at Lebanon TN. Lebanon and Murfreesboro form a triangle with Nashville, east and southeast of it.

The application calls for one Harris SW100 transmitter to a rhombic at 50 degrees, which will cover Europe as well as parts of Africa, and the USA. Further plans are for a total of two or three transmitters; the application can be amended if necessary.

The company is called Leap of Faith, Inc., get it? And the preferred call letters would be WLOF, altho these are currently held by a religious FM station in Attica, New York, on 101.7. They would have

to agree to WLOF also being used by a station on another band, which is technically allowed, but seldom authorized by FCC; or it might be willing to relinquish the calls.

It is difficult to predict exactly when the new station would start broadcasting, but it could take some three months to grant the CP and at least another two months to build it.

Some clients have already been lined up. "WLOF" would not be totally religious, but would have programming from political and other entities which have not been on SW before. Political programming would likely skew to the right of center, simply because there is not much money or interest on the Left in SW broadcasting. The station could be useful in the 2008 presidential campaign, as soon as it can be on the air. George credits his experience with KAIJ in developing new sources of shortwave programming and revenue, never explored before, as a good experiment.

ALBANIA R. Tirana, A-08 tentative English to Eu/ENAm, except Sun/UT Mon: 1430-1500 13640; 1845-1900 7465 13640; 2000-2030 7465 13600; 0030-0045 & 0145-0200 9390; 0230-0300 & 0330-0400 7425 (Drita Çico, R. Tirana)

BOLIVIA Station in Spanish on 4450 between 2223-0005 with UT-4 timemechecks first heard in late January: different IDs sounded like Radio Eco, La Cruz del Sur, and R. Guantana, but Rogildo Aragão in Bolivia says it's R. Santa Ana del Yacuma (Lúcio Otávio Bobrowiec, Brasil, DX LISTENING DIGEST) The latter nominal 4805, previously on 4649 (WRTH 2008) On 4451.2, at 2313-2326, tentatively "Eco Radio" (Carlos Gonçalves, Portugal, DXLD)

R. Universitaria, Cobija, 4732.02, on suddenly with brief announcer and up-tempo music, *1025 until 1040 fade (Scott R. Barbour, NH, DXLD) 1050-1105 tremendous signal, slow male ballads; another morning simply blasting in at 1030-1050 (Robert Wilkner, FL, *ibid.*) Presumed at 0038 with RTTY QRM, past 0200; full ID at 1107. RTTY isn't on in the mornings (Dave Valko, PA, HCDX)

CHAD In a newscast on Radiodiffusion Nationale Tchadienne on January 16, head of technical department gave details about new SW transmitter. It's 250 kW which he described as being of "new generation" technology. Following frequencies will be used: 4905, 6165, 9615 and 11760 (??) kHz. As 4905 can be monitored mornings and evenings/nights, I suppose the others are for daytime (Christer Brunström, Sweden, DXLD) Heard weakly on 6165 at 1129-1308; at 1600 switch to 4905, very powerful (Carlos Gonçalves, Portugal, *ibid.*)

Rebel forces entered N'djamena on Feb 2 (Chris Greenway, England, *ibid.*) And 4905 went off shortly afterwards and was missing for several days (gh) AFP reported that RNT had been "destroyed" (via Alokes Gupta, *ibid.*) CNN reported it was back on the air Feb 6 (Andy Sennitt, Media Network blog) 4905 was audible sporadically, and by a week later was still irregular, nominal opening 0430, closing 2230 (gh) The daytime frequency was changed from 6165 to 7120, as announced (Jari Savolainen and Jean-Michel Aubier, DXLD)

COSTA RICA The unidentified playing music on 5954.1 continued to be heard in Jan and Feb mostly between 2300 and 2359*. No more relays of R. República, and so no more jamming, but heavy interference from WYFR on 5950 (gh, OK) 5954.15, surprisingly strong at 2310 here in Finland. Sounds like at least 50 kW (Mauno Ritola, WORLD OF RADIO)

Heard several times with full hour programs about rock music histories, e.g. Janis Joplin, but announcer had Argentinian accent rather than Cuban. 5954 was the all-time crystal-controlled frequency for my home town Puerto Limón radio station TIQ, Radio Casino, since it was born in the mid 1940s (Raúl Saavedra, Costa Rica, DXLD)

Raúl, because of the similarity of off-frequencies, suspicions remain that the current 5954.1+ is the old TIQ transmitter, even if it is no longer in Limón. Could you make inquiries to confirm this or positively rule it out? Perhaps the old transmitter has been turned on again for these transmissions. Local monitoring might show whether the signal is emanating from the TIQ facility (gh)

Glenn, 5954 mystery transmitter is now 50% solved. I phoned TIQ Radio Casino looking for the engineer

in charge, and talked to Juan Carlos Gómez, who gave me the real history of TIQ AMers. 5954 in no way is a 1 kW signal; Gómez says the old transmitter is still in Puerto Limón and off the air. The owner of TIQ, Luís Grau, transferred the rights to frequency 5954 over to an evangelical group in Alajuela. But can you imagine a group like this involved with Radio República? Why not? I live 20 km from Alajuela. I turned my Sony ICF7600GR DX attenuator to maximum and during 2300 to 2400 while playing Maná in Concert, the signal remained with practically no fading (Raúl Saavedra, Costa Rica, WORLD OF RADIO)

Evangelical in Alajuela instantly brings to mind Adventist World Radio, which used to operate on SW and still has a studio/uplink there. Is that it? (gh)

One day they were on before 2300, another day went off at 2315. I got word from Jorge Cuadra, a former ELCOR engineer, who helped install it as a free lancer: it's a 40 kW ELCOR transmitter at Guápiles, Cantón de Pococi, in the eastern province of Limón. Still unknown organization I hope to discover soon. Playing like every day lots of Mexican group Maná and Shakira songs. Still a mystery if they are religious, which I doubt; otherwise they wouldn't play such music, or could be from a political organization (Raúl Saavedra, *ibid.*)

CUBA Notice received from RHC of a new broadcast to Europe on 11750 from 20 Jan, 2000 Portuguese, 2030 Arabic, 2100-2300 Spanish (Antônio Schuler, Brasil, *logsderadio* yg) Continues on 11760 including English 2030-2130, originally for Europe. Now 11750 is in the clear, 11760 too close to WHRI 11765 (gh, OK and Bernie O'Shea, Ont., DXLD) 11750 antenna is an HR 4, 4, 1, 0 curtain array with the center of the beam at 040 degrees, and the beamwidth for the -3 db points of the horizontal pattern should be at + and - 17 degrees. Nevertheless, the -6 dB points are well into North America, and the programs should be easy to pick up from Central and Eastern North America (Arnie Coro, RHC, HCDX)

Monitoring RHC on 49m before and after 0700* turns up all kinds of errors on 6000, 6060 or 6180. Sometimes other programming mixes in on one of them, such as R. Musical Nacional, CMBF heard before 0700 on 6000, and occasionally all to itself after 0700 past 0730 on 6060 with classical music or opera; 6180 still on with a domestic talk network.

You also never know what is going to happen Sunday mornings for the Aló, Presidente program from Venezuela starting at 1400. Sometimes it appears on some regular RHC frequencies, such as 11680 or 12000 instead of the designated ones. One day at 2230 on 17705 we heard RHC in Creole instead of scheduled Guarani (gh, OK)

The "Cuban Jamming Command" continues to cause totally unnecessary collateral damage by operating beyond the hours necessary to block the opposition (and wasting precious electricity needed by The People). R. Martí used 5980 from 0700 to 1300, but jamming was running as early as 0638 and as late as 1428. Not only is R. Educación, México [q.v.], 6185 ruined by heavy jamming and R. República at 0200-0400, but remnants of jamming were still heard after 0700, as well as around 6135, another RR frequency used only at 2200-2400 (gh, OK)

ECUADOR For Ecuadorian music, seek HCJB's Conozca el Ecuador, M-F 2230-2300 on 12000. This show plays more folk music than talk (gh)

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; sesqui = one and a half; B-07=fall/winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated

HCJB has been granted an extension to continue using its SW antennas scheduled for dismantling and removal from Pifo, 18 miles east of Quito. The extension postpones, for at least six months, removals that the station agreed to two years earlier with the Quito Airport Corporation (CORPAQ) to make way for a new international airport. Once the new facility is completed, some of the SW antenna towers could obstruct the approach of landing planes. The first phase of dismantling, initiated in early 2006, saw 18 towers lowered. Twelve more were to be removed in the second phase (HCJB via Alokesha Gupta, WORLD OF RADIO)

EGYPT Wadi el Nil service for A-08: 9250 at 1900-0030 from the Abu Zabaal site, 100 kW, 160 degrees (Wolfgang Büschel, BC-DX)

On at least one occasion, Cairo's General Arabic service on 6290 switched to 6225 at 0000 instead of continuing on 6290 from the other transmitter site. 6225 had extremely weak and distorted modulation like normally heard on 6290 after 0000. Apparently this was a mistake; 6225 is supposed to be used earlier at 1600-2000 (gh) Same date, 6225 was on until 0259* (Ron Howard, CA, DXLD)

EQUATORIAL GUINEA 6250, R. Nacional, Malabo, Carrier already on at 0455, *0457-0459 Instrumental NA short version. I've already heard it go on for nearly 5 minutes. Nonstop LA dance music 0459-0506, ID, music with voice-overs. Much better signal at 0600 (Dave Valko, PA, HCDX)

ERITREA 5100, R. Banda, 1400, English ID: "This is Radio Banda of the Ministry of Education in Asmara, Eritrea, broadcasting on 1089 kHz MW and 5.1 MHz SW" (Maarten Van Delft, visiting Ethiopia, DSWCI DX Window)

ETHIOPIA R. Ethiopia is a commercial government station. The English program in the Home Service is now a full hour, M-F 1400-1500. On 5990, 7110. Mr. Melesse Edea Beyi is the head of the English language program in the Home Service as well as English, French and Arabic of the External Service as per schedule on 7165 and 9560.

R Fana now has two 100 kW transmitters, both on 6110 and 7210. 5970 appears inactive. The station will shortly increase to 18 hours daily.

The new Oromo Service on 6030, identifying as "Radio Oromia," is on the air daily at 0400-0600, 0900-1100 and 1600-1800. Excellent reception everywhere, must be 100 kW.

Mr. Fre Tesfamichael has left Voice of the Tigray Revolution. Mr. Abera Tesfay has succeeded him as director. He told me that since May 2007 they have been using a 100 kW transmitter near Addis for better nationwide coverage. Two old 10 kW at Mekelle will remain as standby. Assigned frequencies are: 5950, 5980, 6170 and 7155. I frequently heard the combination 5950 and 6170, but they were often silent altogether. They broadcast 66 hours a week in Tigrayan and 9.5 hours in Afari. They are now busy moving to a brand new building.

Before popping in at this station, I visited the impressive monument and nearby museum, dedicated to the long and bloody struggle of the TPLF (Tigrayan People's Liberation Front) against Mengistu's Derg (junta). (Maarten Van Delft, visiting Ethiopia, DSWCI DX Window)

6030 received at 1735 (end of CNR-1)-1759* (S. Aoki, S. Hasegawa, Japan, NDXC) ID in clip as "Radio Oromiya" (Mauno Ritola, Finland, DXLD) R. Oromiya has started operation on 6030. Monitored schedule 0400-0700, 1555-2100. V. of Tigray Revolution has been heard on 5950 kHz instead of 5960 (WRTH update) VOTR can be heard some days on 6170 // 5950. I've noted it usually only around 1600-1700 and at times there's also the Eritrean clanny program underneath // v7175. So, not sure if 6170 is a "real" VOTR, but Ethiopian jammer with VOTR audio or maybe serving both purposes (Jari Savolainen, Finland, DXLD)

GERMANY DW's Amharic service at 1400-1457 planned for A-08 on 11645 Sri Lanka, 15410 South Africa, 15660 Rwanda. 15620 Rwanda, heard best in NAm and without jamming in B-07, supposed to change to Russian (gh)

More SW cuts coming: In an RBB radio interview, Christoph Lanz, director of DW TV, said "we will finally say good-bye to shortwave, [reference to DW's history]. In Africa one can certainly not do without it so far, but things are entirely different in Asia although one has to make distinctions there." (Kai Ludwig, Germany, DXLD)

Media&Broadcast, operator of the SW sites in Germany, Nauen, Jülich and Wertachtal, selling time to many religious, governmental, and political broadcasters not including DW, has been sold by Deutsche Telekom, to Télédiffusion de France (via Kai Ludwig, DXLD)

GUATEMALA R. Cultural Coatán, 4780, heard in mid-January from 1333 with mariachi music, incongruously playing London Bridge with presumed ID at 1401, then non-Spanish preaching as late as 1420 (gh, OK) Signed on at *1129 with instrumental London Bridge is Falling Down ID (Scott R. Barbour, Jr., NH, DXLD) 4779.96 at 0130-0300* Spanish and maybe Indian languages, CST time checks (John Wilkins, CO, Cumbredx) Could just barely make out audio at 1400. Last time I was able to detect the carrier (tuned in SSB) was at 1438, 2:08 hours after our local sunrise!! (Dave Valko, PA, HCDX)

As reported last month, XERTA came back on a clearer frequency, 4800 but in early Feb, the silent Guatemalan also came back; asserting its priority on the frequency? (gh) 4799.75, R Buenas Nuevas, 1235, ID; CODAR QRM, fadeout 1350 (Mark Schiebelbein, MO, DXLD) 4799.75, Radio Buenas Nuevas, 0415-0433*, local religious music, closing ID at 0432 (Brian Alexander, PA, ibid.) But a few mornings later at 1100 both stations were off (Bob Wilkner, FL, Mosquito Coast DX News via Cumbre DX)

INDONESIA VOI was back on 9526 for a few days in Jan and Feb until

1500*v; the closing national anthem is by a soprano with a beautiful voice. Tune in for that if nothing else (gh, OK)

On 3578.732, at 1425, Radio Siaran Pemerintah Kabupaten, Ngada, on the island of Flores. Music but QRM from amateurs (Stig Adolfsson, Sweden, SW Bulletin)

IRAN [non] V. of Communist Party of Iran, 1705-1710 Farsi, news, ID on 3880.6 // 4365.9, both variable, intermittently jammed (Patrick Robic, Austria, A-DX via BC-DX) Presumed this on 4285 at 0450-0501 with music (José Miguel Romero, Spain, DXLD) VOCPI was heard previously on new 4283 ex-4366 at *1630 // old 3881 (Rumen Pankov, Bulgaria, BDXC-UK Communication)

KOREA NORTH UnID on 6101.18, 1641-1703 operatic-sounding selection, brief announcement in unID language over anthem at 1700 (Dan Sheedy, CA, DXLD) On 6101.22 it's KCBS at 1550, fair signal with singing in assumed Korean, // 9665 (also fair). Another off-frequency outlet is 6071.22, Voice of Korea, 1035-1049, in Japanese with Asian songs and music, best in USB, // 9650, both fair (Ron Howard, CA, ibid.)

[non] Open Radio for North Korea, which had been via KWHR Hawaaii M-F 1100-1200 on 9930, changed schedule from 31 Jan: 2100-2200 daily on 7510 (S. Aoki via S. Hasegawa, NDXC-HQ, DXLD) To theme of Pomp & Circumstance; this one has some English news segments (gh) 7510 is from Gavar, Armenia site, super powerful here in Germany (Wolfgang Büschel, BC-DX) But maybe changed again for A08 (gh)

KURDISTAN On 6335 at 1607 in mid-January, station with news in English, more at 1630; closing at 1657 sounds like "Voice of Kurdistan," then into Kurdish (Jari Savolainen, Finland, WORLD OF RADIO) New English program from VOK at 1600-1700, news and pop music. Then received E-mail form reply in English, no details, from KDP, Kurdistan Democratic Party-Iraq, party@kdp.se <http://kdp.se> and <http://kdp.nu> (Rudolf Sonntag, Germany, A-DX) Website gives the KDP Washington address as 7115 Leesburg Pike #110 A, Falls Church VA 22043. KDP Europe address is P.O. Box 301 516, D-10749 Berlin, Germany (Mike Barracough, England, WDXC Contact)

Other reports claimed an ID as V. of Turkey (gh) The English announcer of Voice of Kurdistan at times eats the last letters of the word "Kurdistan." So one hears only "Kurdi..." and that surely makes someone think he heard an ID like "Voice of Turkey" :)] (Jari Savolainen, Finland, DXLD) Also heard in non-English at 0337-0355 (Brian Alexander, PA, ibid.) Site is Salah ad Din / Salahuddin, Iraq 36 22 44.00 N, 44 12 26.00 E (Wolfgang Büschel, ibid.)

[non] On Feb 1, V. of Mesopotamia switched from Kishinev, Moldova transmitter site, to "Simferopol," Ukraine, on same frequencies, 0500-1500 11530 1500-2100 7540. Seems that Moldova came in better here until 1500. For A-08, stays on 11530 until 1800 (gh, OK)

LAOS [non] Four different Hmong clandestines took turns on 15260 via Taiwan at 0100-0130/0200 as of February, but not clear whether this would continue in A-08:

0100-0130 M/W/F Moj Them Radio; 0100-0200 Sun & Thu Hmong Lao Radio; 0100-0200 Sat Hmong World Christian Radio (NDXC) Plus 0100-0130 Tue, Haiv Hmoob Radio, 1300 Godward Ave, Suite 6900, Minneapolis, MN 55413, USA www.haivhmoobradio.com (WRTH update)

MALI R. Mali, Kati, reactivated! on 9635, 1150-1320, vernacular, talks, modern Malian songs, news, obituary? in progress at 1230, French at 1300 for newcast; 55544. Silent on 11960 & 7285 (Carlos Gonçalves, Portugal, WORLD OF RADIO) Nothing on 4782v, 4835v either. One transmitter on 9635 at 0800-1800, 5995 at 0600-0800, 1800-2400 (Wolfgang Büschel, DXLD) 9635 good and strong opening in French at 0800 (Brian Alexander, PA, ibid.)

MÉXICO XERTA, on its new frequency 4800, remained weak and difficult to hear, and by early Feb, R. Buenas Nuevas, had reactivated on same; see GUATEMALA

R. Educación, 6185, sign-on as SW station XEPPM at 0001, with current date and time, power 10 kW, live announcement in Spanish, and then same in English – a good time for monolinguals to DX them though they occasionally throw in English IDs elsewhere; a shame they don't put some effort into some real English programming. Not clear if besides the sign-on, SW programming is partially or totally identical now to MW 1060 XEEP, but no sign of a separate SW sked on the website, www.radioeducacion.edu.mx where detailed advance playlists are no longer found.

6185 faces lots of interference at night [see CUBA], but on rare occasions, so far Monday mornings only, such as Jan 28, is on air late, testing? Or back on air well after nominal 1200 UT closing; good here in OK around 1600, absolutely no interference in daytime, and stronger than its only 49 mb rival, 24-hour WBOH 5920 in NC (gh) 6185 audible as far as Pennsylvania on a DX tuner at 1657 (Hans Johnson, Cumbe DX) But gone here by half an hour later (gh)

As for Mexico's other SW stations, as of mid-Feb, XEYU, Radio Unam was usually active and often well-heard on 9599.3v; XEXQ, 6045, San Luis Potosí, had been missing again for a few weeks (gh, OK)

MONGOLIA Mongolian R. 2nd program on 7260 signs off at 1500. News in English: 0835-0845 on Tue/Thu and in Russian Mon/Wed/Fri. V. of Mongolia, daily English to Asia on 12085: 0930-1000 & 1530-1600 (WRTH Update)

MYANMAR Myanma Radio, Padauk Myay program is carried on 5986 at 2240-

0230 (WRTH update) 5985.83, Myanma Radio, English at 1430-1600*, just after Shiokaze signed-off at 1430, heard start of an English lesson. At 1514 usual marching music, local time, news, weather for Myanmar and Myanmar waters, "That was the news from Myanma Radio, Yangon," slogans about development, long segment of non-stop EZL instrumental music, before sign-off titles of music given, played National Anthem; fair-poor, after 1445 bothered by a het, after 1500 splatter from strong station on 5980. Not often that I hear them with decent reception (Ron Howard, Monterey, CA, DXLD)

5040.6v, Radio Myanmar, 1139-1216 continuous English language western pop vocals, not the usual haunting local vocals and flute melodies I enjoy from this station, 1159 Burmese announcement and march music (Rich D'Angelo, PA, NASWA Flashsheet)

PAKISTAN [non] Since the curbs on the press imposed by Musharraf last November, VOA's Urdu service to Pakistan, Radio Aap ki Duniya (Your World) has greatly increased listenership, more so than BBC's, which is also for India (Aslam Javaid, Lahore, Pakistan, REVIEW OF INTERNATIONAL BROADCASTING) Just as VOA decided to take it off SW for MW only! (gh)

PAPUA NEW GUINEA 4960, Catholic Radio Network (now known as Radio St. Gabriel) heard from 0925 tune to 1300, S2 at beginning but some improvement 1100-1230 to an occasional S3. From 1100 woman announcer but couldn't tell language – probably vernacular as it sounded like a local program, not Vatican Radio relay. Instrumental music at 1112. After 1200 most programming was devotional songs with occasional short announcements (Bruce Churchill, CA, Cumbre DX)

Wantok Radio Light, heard once in a while in January around 1120 with religious programs in English on 7324.956 (Stig Adolfsson, Sweden, SW Bulletin) Where are the NAm reports of this? (gh)

I have occasionally monitored for this one since their move to 7325 in May 2007, but had never before heard anything after the RFI sign-off via Taiwan at 1030. Must take outstanding propagation conditions, such as Jan 26, for this to be heard in NAm, tentatively at 1030-1143 at threshold level, OM and YL conversation, very slowly improving, by 1058 could tell was religious programming in English (he seemed to have an accent) and segment of religious songs in English (Ron Howard, CA, DXLD) Next day heard weakly at 1017 mixing with RFI in Chinese, 1030 English sermon, hymns, request for funds, 1047 into drums/gongs and hymns with occasional English voice-overs, 1059 brief flute/drums to 1103 (Dan Sheedy, CA, ibid.) In A-08, 7325 should be clear for WRL between 1000 and 1200 (gh)

ROMANIA 4790, weak in English until 1855*, sounded like Radio Romania, but how on this frequency? As Christoph Ratzer, Austria, A-DX also figured, it's a leapfrog of one RRI frequency over another, 9640 and 7215. Upper leapfrog would be 12065, not heard (Thorsten Hallmann, Germany, DXLD)

RUSSIA R. Tikhii Okean/Pacific Ocean, Vladivostok, not heard during *0935-1000* on 5960 or 7330, since early Jan. Website had out-of-date files, then deleted, so probably off the air. They were consistently the strongest Russian SW station and I especially enjoyed the folk songs and ballads they played. They will be missed! (Ron Howard, CA, WORLD OF RADIO)

SUDAN On 4750 at 0410 African music. 0419 ID in American English as "Radio Peace" during outstanding 60m conditions Feb 1 (Chuck Zabriskie, TX, DXLD)

SWEDEN Radio Sweden's German service on 6065, MW and FM ends after 69 years in service on March 29, 2008, says R. Sweden website (Wolfgang Büschel, DXLD) Number of listeners, especially on SW, has dropped dramatically in recent years. SR International retains, however, German for a basic service of news on the Web and as a Monday to Friday podcast. English is not affected and not in danger of being taken off the air (George Wood, Radio Sweden, Media Network blog)

SYRIA Radio Damascus on internet soon? The Syrian Radio & Television website – www.rtv.gov.sy – is now carrying an experimental internet stream of the Saout al-Shabbab (Voice of Youth) program. I hope the experimental phase will end soon so they can bring Radio Damascus, the international service, online. I am looking forward to listen to Radio Damascus on the internet; their SW is unfortunately very weak and under-modulated (Kris, DXLD)

↳ Audio link: mms://63.243.163.195/radio1 (gh)

TURKEY VOT announced it is now podcasting. You can view the archive at www.trt.net.tr I finally found the English podcast page, just seven different programs, some archived only in 2008, some back into 2007, as of mid-Feb, and not including Live from Turkey:

↳ www.trt.net.tr/wwwtrt/podcasting.aspx?dil=12 (gh)

UGANDA 4750, R. Dunamis, e-mail from Mrs. Marty McLaughlin at Bible Voice Broadcasting said they had been off the air for several months due to transmitter and antenna problem but were awaiting arrival of engineer from the US in order to get back on air by end of January (Bruce Churchill, CA, Cumbre DX) But no reports by mid-Feb (gh)

UK Found on the BBCWS website Feb 10 was a notice that it would close the remaining SW transmissions to Europe on Feb 18 (via Kevin Redding, ABDX) Further inquiries revealed that English to western Russia would continue on SW (Alan Pennington, DXLD)

This is one of the most stupid decisions made by the BBC-WS. Do they really think everyone has a satellite dish or roaming internet access wherever they go? Well, dear BBC, go ahead and let the airwaves be flooded by the very "democratic, objective, balanced" information offered by Chinese and Russian radio. Cowards (Henk, Media Network blog)

USA The Administration's FY 2009 request for the BBG is \$699.5 million dollars, an increase of 2.6% from FY 2008 levels. A key focus of the budget request is on building a significant expansion of Internet capability and programming... The proposed budget also continues funding initiatives to important Muslim and other critical audiences... The FY 2009 budget request supports a continued, more robust VOA English website as a core news delivery system, as well as shortwave English broadcasts to key markets such as Africa and China where they continue to be viable (Broadcasting Board of Governors via kimandrewelliott.com)

This would include the BBG's long-desired elimination of VOA News Now, or "Worldwide English" which would carry on as a "more robust" website. But keep in mind that VOA is one of only two media organizations with a truly global shortwave capability. VOA will be only one of hundreds of English-language news websites (Kim Andrew Elliott, ibid.)

The situation for virtually all concerned (US State Department, the American taxpayer, and the radio listener) would all be better served by a reinvigorated VOA world service in English heard virtually anywhere for at least a few hours a day. There should also be external services in languages deemed appropriate. However, let's scrap the largely blatantly propaganda-oriented Radio Martí, Radio Free Asia, Radio Farda, and Radio Sawa. Well funded, well thought out programming, including clearly announced "official comment" would be far more effective and beneficial for all concerned (Roger Chambers, NY, ODXA)

Radio Sawa, the Arabic service, had been off SW for a few years, but suddenly reappeared Jan 28-29 at 1500-1700 on 9370. This was just as the Urdu service Aap ki Duniya (see PAKISTAN) cancelled its SW frequencies in favor of MW and FM only. A mistake? Yes, apparently so, because 9370 via Tinian then switched to Deewa Radio, the Pashto service, as monitored by S. Hasegawa, Nagoya DX Circle (gh) There was a similar mixup in mid-2006 putting Sawa back on SW, apparently due to complex program feed routing from Washington to Tinian (Kai Ludwig, DXLD)

There was a vile program on shortwave and a few MW stations called American Dissident Voices. It was an absolutely sick thing. I ran across this story about the guy who was the voice of the program and what recently happened to this sick individual, Kevin Alfred Strom <http://tinyurl.com/2kg8ev> (Kevin Redding, ABDX) Pled guilty to possessing child porn, but denies he's neo-Nazi (gh)

WRMI: Starting March 30, we're switching the North American frequency to 9955 instead of 7385, so we'll now be 24 hours on 9955, but with the same current local times to North and Latin America. We are trying to do some work on the North American antenna, and hope that reception in general will be better than it has been on 7385 (Jeff White, WRMI, WORLD OF RADIO) Program schedule, including WORLD OF RADIO and other DX programs in English, Spanish, Italian: www.wrmi.net/images/wrmichart.xls (gh)

WBCQ tentatively plans to use 15120 in A-08 from 13 to 23. But their previous plans for any frequency between 9330 and 17495 have not been realized. 15120 would collide with V. of Nigeria (gh)

VENEZUELA Radio Nacional de Venezuela international service has a new short wave transmitting station under construction in Guárico state, including one 50 kW for the 60m band, and five 100 kW with several antenna arrays, high gain curtains and quadrant type omnidirectional antennas for short and medium range coverage. New transmitters are pulse step modulation, very efficient, capable of producing 100% modulated signal with much less electricity than required for a high level pulsed modulated transmitter.

The first transmitter may be on the air pretty soon. The new Venezuelan international broadcasting facility is going to be one of the most modern and energy efficient installations in the Americas, and its antenna systems were designed with coverage of the Americas as the prime target area, but may be heard around the world when propagation conditions are good.

The old Radio Nacional 50 kW transmitter on 9540 may also soon be back on the air. RNV has been broadcasting via the Radio Cuba transmitters outside Havana (Arnie Coro, RHC DXers Unlimited in mid-Feb)

Guárico is the central, largely rural state directly south of Caracas; where in it, exactly? Coro was in Venezuela to train RNV journalists about how to do shortwave programming, as if it doesn't sound enough like RHC already! What they need is better English, at least as good as Arnie's, and much less one-sided propaganda. Admit that 51% of the Venezuelan people oppose Chávez, that there is serious opposition and let their point of view be heard. Yeah, sure (gh)

Radio Amazonas, nominal 4940, heard in mid-Feb on 4935.5 with usual over-modulation, at 0036 one night, 0442 the next, off without national anthem at 0501 (Adán González, Venezuela, DXLD)

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

BROADCAST LOGS

NOTEWORTHY LOGS FROM OUR READERS

Gayle Van Horn, W4GVH

gaylevanhorn@monitoringtimes.com

<http://mt-shortwave.blogspot.com>

0000 UTC on 4500

CHINA: Xinjiang PBS-Urumqi. Five signal pips at sign-on to interval signal of soft musical tones with presumed station identification in listed Mongolian service. Announcer's text to exotic musical bits, barely audible under interference. **Voice of Punjiang** 4950, 1157-1212; **Voice of Jinling** 5860, 1211-1221. (Scott Barbour, Intervale, NH) Additional stations monitored in Chinese and various Asian languages heard: **PBS Xizang**, Lhasa 4905, 0043 // 5240, 6130; 5240; **Central People's BS** 4460, 1150-1200; **China Radio International** 5965, 0930-1010; **CRI** 4800, 1030-1100. (Chuck Bolland, Clewiston, FL) **CRI** 13580, 0002; 11710, 2212; 11750, 2353; 9860, 0042; **CPBS** 9775, 0038. (Stewart MacKenzie, Huntington Beach, CA) **CRI** website: www.cri.cn/ Internet on-demand and streaming audio <http://english.cri.cn/webcast/>

0035 UTC on 5010

INDIA: All India Radio-Thiruvananthapuram. Presumed newscast to English comments on upcoming music, shifting to Hindi. Signal fades to fair level quality. (Chuck Bolland, Clewiston, FL) 5010, 0119-0131. Vernacular programming of advertisements and ID at 0130. Fair signal quality. (Barbour) Website: <http://allindiaradio.org/> On-demand and streaming audio currently not available.

0050 UTC on 4950

ANGOLA: Radio Nacional. Steady local music to 0100. Four time ticks to signal tone. Station identification, followed by Portuguese newscast. Additional "Radio Nacional" ID to station promotional amid good signal quality. (Bolland) Audible 4949.97, 0140-0200 Portuguese talk and music to ID. (Brian Alexander, PA) 4950, 2320-2330. SINPO 23222. (Jim Evans, Germantown, TN).

 **Radio do Canal Angola** live streaming audio: www.canalangola.net/

0225 UTC 4814.99

ECUADOR: Radio El Buen Pastor (presumed). Spanish text to religious and Ecuadorian music. Station jingles to abrupt sign-off, no ID heard. Signal poor to fair. (Alexander). **HCJB-Ecuador** via Quito 9745, 2110-2116. Ecuadorian flute and string folk music. Announcer's local language for religious text. Signal better in USB despite utility interference. (Harold Fodge, Midland, MI). HCJB Ecuador 12040, 2320 German; 12020, 2322 Portuguese; 12000, 2325 Spanish. (MacKenzie, Joe Wood, Greenback, TN) **Radio Chaskis** 4909.22, 1131-1145 presumed Spanish with brief talks and music segments. (Alexander).

0345 UTC 4975.97

UGANDA: UBC Radio. Musical variety of Afro-pops and choral music. English news 0404-0421, followed by public service announcements concerning government programs and medical aid distribution. (Alexander) UBC sign-on 0208 with ID and station info. Afro pops and hip-hop. Fair signal and able to hear a full 40 minutes of local programming. (Brian Bagwell, St Louis, MO)

0505 UTC on 4885

BRAZIL: Rádio Clube do Para. Portuguese programming with echo effect station ID. Lots of ballads mixed with dance club music. Poor signal quality.
 Internet streaming audio www.radioclubedopara.com.br/
Brazilian stations in Portuguese: **Rádio Globo Santos** (presumed) 5045, 0534-0545; **Rádio Canção Nova** 9675, 0614, 0747-0754
 Internet streaming for AM/FM: www.cancaonova.com/
Rádio Central 4985, 0634-0640, 2256-2303. (Fodge) **Rádio Aparecida** 6135, 0839-0845. (Wood)
 Internet streaming audio AM, FM, SW: www.radioaparecida.com.br/
Rádio Novas de Paz 6080.15, 0845-0900 (Alexander) **Rádio Dif Macapá** 4925, 0507-0540 (Wood) **Rádio Nova Relógio** 4905, 0145-0200. (Bolland)

1006 UTC on 11784.87v

INDONESIA: Voice of Indonesia. Programming for Thai service. Fair signal quality, noting that VOI is off 9526 kHz again. (Ron Howard, Monterey, CA) **VOI** 11785, 1910 French. (MacKenzie) **RRI-Serui** (Irian Jaya) 4604.94, 1200-1210 Indonesian newscast noted on // **RRI Makassar** 4750 (Bolland) 1228-1238. (Barbour) **RRI-Ternate** 3344.97, 1404-1501* Bahasa Indonesian with close down Love Amboon melody at

1459. **RRI-Palangkaraya** 3325, 1413-1500.* (John Wilkins, Wheat Ridge, CO) **RRI-Fak Fak** 4790, 1238-1250. (Barbour) **RRI Indonesia** website: www.rri-online.com/

1134 UTC on 3315

PAPUA NEW GUINEA: Radio Manus. Tok Pison/English. Music program of Country/Western traditional ballads, classic tunes from the Everly Brothers and Cindy Lauper. Choral anthem at 1200, followed by exotic bird calls, seemingly a relay of NBC network news. National weather forecast and DJ's pop tunes. Station identification, "Radio Manus" and "NBC National Radio." Signal mostly fair, best to monitor in LSB. (Howard) PNG's **Radio Central** 3290, 1118. (Bolland) **NBC** 4890, 0845-0900. (GVH)

1145 UTC on 9810

CHINA: China National Radio/CNR-2 (Business Radio). Chinese talks to time pips and English "China Business Radio" identification. Local music variety of ballads and pop tunes. Covered by Radio Thailand's English service at their 1230 sign-on. Otherwise a fair signal. Weaker on // 6065, 6090, 7315, 7375. Audible 1200-1210 in English, weaker on // 6065, 6090, 7315, 7375. (Alexander)

1230 UTC on 2485

AUSTRALIA: ABC NT Service (Katherine). Discussion on the Australian educational system and film industry. National and local weather forecast. Signal S8. (Wood) **HCJB-Australia** 15525, 2330 Mandarin religious programming.

 Internet on-demand audio www.hcjba.org/ **Radio Australia** via Shepparton 9580, 1916; 15180, 0005 Indonesian. (MacKenzie).

 Internet on-demand and streaming audio www.radioaustralia.net.au/

1235 UTC on 3925

JAPAN: Radio Nikkei. Japanese. Classical piano music program. Signal poor at S5. (Wood) 9760, 0600 Japanese // 9595. 6055. (MacKenzie) 6055, 1240-1310 // 3925 barely audible. (Alexander) **NHK/Radio Japan** 11910, 2245 13650, 2310 Burmese; 11665, 13650, 2320 Thai; 22345 Japanese; 12650, 2348 Indonesian. (MacKenzie) 9825, 1432-1440* (Alexander)

 Internet streaming, on-demand audio, video and podcast www.nhk.or.jp/english/ Multilingual website: www.nhk.or.jp/

1335 UTC on 6050

TIBET: PBS-Lhasa. Chinese text over piano music. After years of hearing a het on this frequency, caused by Asyik FM (via RTM Malaysia 6049.64), have determined this was indeed Tibet. RTM has been off the air for several days, plus better than normal reception conditions for Tibet. **PBS-Lhasa** 6200 with CNR-8 programming at 1340. Traditional vocals, presumed in Tibetan, 4905, // 4920 (weak), 6110 (fair). Clearly station was CNR-8. (Howard).

2125 UTC on 6265

LITHUANIA: KBC. Announcer in Spanish at tune-in to somber music. Signal tones commencing at 2129 to "KBC" identification and promo in English. Pop tunes to "we are the Mighty KBC" ID. SIO 2+22. KBC 6295, 2144-2201 IDS. (Barbour). Website: www.kbcradio.eu/ Lithuania's **Radio Vilnius** 7235, 2340-2359, National news and history features. Station ID between program segments. Lithuanian pop vocals and English schedule given during programming. Signal covered by Austria's sign-on at 2359 with ID and waltz interval signal. (Fodge)

 Internet on-demand and streaming audio www.lrt.lt/ Iran's **VOIRI** via Sirkunai, Lithuania relay 6265, 2055-2128.* Spanish service of talks and music 2124-2128* // 7130, 7350 with good signal levels. (Alexander)

Additional loggings excluded for space constraints, are posted as **Blog Logs** on the Shortwave Central Blog at the above web address.

Thanks to our contributors – Have you sent in YOUR logs?

Send to Gayle Van Horn, c/o Monitoring Times

English broadcast unless otherwise noted.

¹ Station address from "World QSL Book," available from Grove Enterprises.

PROGRAMMING SPOTLIGHT

WHAT'S ON WHEN AND WHERE?

Fred Waterer

fredwaterer@monitoringtimes.com

www.doghousecharlie.com/radio

All That Jazz

Of the many things that America has exported to the world – perhaps the best – is Jazz. My father was a jazz fan; in fact, he had an extensive collection of albums (and even 78s) featuring the greats, from Louis Armstrong to Ella Fitzgerald, Scott Joplin to Dave Brubeck, Dixieland to swing, and many, many more.

"Jazz is an original American musical art form which originated around the beginning of the 20th century in African American communities in the Southern United States out of a confluence of African and European music traditions. The use of blue notes, call-and-response, improvisation, polyrhythms, syncopation and the swung note of ragtime are characteristics traceable back to jazz's West African pedigree. During its early development, jazz also incorporated music from New England's religious hymns and from 19th and 20th century American popular music based on European music traditions." (Wikipedia)

As it developed, jazz branched out into many different styles, including Dixieland, Big Band Swing, high-energy be-bop, and, as it became widespread, it influenced (and was influenced by) Cuban and African rhythms. Many elements of jazz are also found in the various genres of modern rock music as well.

And as I have discovered in recent weeks, jazz has a way of popping up in the most unexpected places.

Poland

This little excursion began when I recently discovered a program from Polish Radio External Service. **Talking Jazz** is a fortnightly program hosted by Bogdan Zaryn (pictured here) with Maciej Krzak. According to the website, "With news of jazz concerts and recordings in Poland, Bogdan (who likes be-bop) and Maciej (who likes some more modern stuff) discuss the history of Polish jazz, and what the scene is like today."



The debut broadcast dealt with the issue of what is jazz in the first place, and subsequent broadcasts have looked at Polish jazz at the cinema, famous saxophonists and leading female vocalists. The program can be heard near the end of the 1300 and 1800 UTC broadcasts on UTC Mondays. Polish Radio is a tough catch at

times, but as per the website, try 5975 and 9450 kHz at 1300, and 6015 or 7130 kHz at 1800.

One can also listen to all past editions of the program, archived at

www.polskieradio.pl/zagranica/news/archiwum.aspx?s=0&k=175

Germany

While researching a past column on the programs of Deutsche Welle, I happened to check the Russian Service web page. I was curious to see if all languages streamed DW programming, as the English service did. I discovered that they did indeed, and in fact, the Russian Service has a program called "Джаз" or as you may have guessed, Jazz.

Now the first thing you have to get past is the dialogue in the Russian language. If you can live with that, the program airs a fairly broad spectrum of styles, opening with a Glen Miller theme and going from there. The program airs in the DW Russian Service on UTC Sundays at 1545 UTC. It can be more easily heard here in North America via the DW On-Demand audio feature at:

www.dw-world.de/dw/0,2142,4356,00.html



Russia

While we are discussing jazz and Russian, one of the long-running programs on Radio Moscow/Voice of Russia has been **Jazz Show**, hosted by veteran broadcaster Carl Watts. The half hour weekly show features "Russia's best bands and soloists."



I've always enjoyed Carl's program. He has a knowledgeable, authoritative delivery. **Jazz Show** is scheduled to North America at 0330 UTC Fridays. You can also try the live stream at the Voice of Russia website.

<http://ruvr.ru/onair.php?lng=eng>

Romania

On UTC Sundays **All That Jazz**, a short weekly (?) feature on Jazz in Romania, follows **Inside Romania, Sunday Studio** and **Letter from Bucharest**.

Australia

Jazz Notes is Radio Australia's jazz program. "We showcase the best in Australia jazz. There are new CD releases of all styles and new recordings made in the ABC's studios." It can be heard UTC Saturdays at 0930. Try 9580 and 9590 kHz as per the Radio Australia website.

United Kingdom

One of the real advantages of the BBC iPlayer is that it makes available online a vast amount of programming in a considerable number of genres. **BBC Radio 3** is the BBC's home for Jazz (and classical music, too, for that matter).

Perhaps the best program on Radio 3 is **Jazz Library** hosted by Alan Shipton. Each week, Shipton selects a particular jazz artist, and "offers guidance in finding the essential recordings for building a jazz library." It airs on Fridays at 2230 UTC.

Jazz Line-Up airs Saturdays at 1600. "Jazz Line-Up focuses on the established generation, playing mainstream, straight-ahead jazz, as well as the new generation of young players. The show is presented by award winning jazz singer Claire Martin."



Jazz on 3 is broadcast on Fridays at 2330 following **Jazz Library**.

"Jez Nelson presents the pick of today's jazz recorded live in concert, talks to the leading players, reviews new CDs and revisits the tradition through in-depth features."

And finally, **Jazz Record Requests** is on the air every Saturday at 1730. "Jazz Record Requests offers a cross section of genres and eras, often in unexpected sequences, to illustrate the wonders and continuities that mark every stage of jazz history. All records are requested by the listeners and presented by Geoffrey Smith."

All of these Radio 3 jazz programs can be heard online, via the BBC iPlayer. You can access them at:

www.bbc.co.uk/radio3/jazz/index.shtml

China

Another, rather unexpected source of jazz, online, is from China. CRI Easy FM (91.5 FM in Beijing, and online) is the home of **All That**



Jazz, a bilingual English-Chinese (Mandarin?) program. You can listen to a large number of past programs, archived online. I was impressed with this show, having listened to a few episodes. One in particular played several versions of "The Girl from Ipanema." Some of the details were "lost in the translation," so to speak, still it was an enjoyable program if only for the music.

► <http://english.cri.cn/3178/more/3196/more3196.htm>

Canada

CBC Radio One has a couple of options for fans of jazz.

Tonic - With Tim Tamashiro is on the air Sundays at 11pm local time. "Tim Tamashiro is a well-known Calgary entertainer with a warm Alberta smile, an infectious laugh, and a passion for sharing a melody. He extends a hearty welcome to listeners in search of the perfect weekend music companion. Tune in Saturdays to gear up for a night on the town, or a night at home with friends and family. Tune in Sunday for a comfortable music blend; a playlist that's just right to prepare you for the week ahead. The weekend Tonic embraces the extended family of Jazz, from Diana Krall and Oscar Peterson to Michael Buble and Norah Jones." (CBC website)

The program may be available via the CBCNQ Shortwave Service. Try 9625 kHz at 0400 UTC Mondays.

Saturday Night Blues can be heard Saturday nights at 10pm local time, hosted by Holger Petersen. "Saturday Night Blues offers a broad spectrum of blues-based music – everything from Mississippi Delta blues to roots rock, zydeco and swing. Enjoy music from vintage vinyl to compact discs and concerts recorded in clubs and festivals across the country. Performers visit Holger in the studio or are interviewed backstage at concerts."

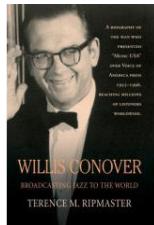
Try the CBCNQ Shortwave Service, on 9625 kHz at 0300 UTC Sundays. The other option is to listen to a domestic CBC Radio One transmitter, or, online at:

► www.cbc.ca/radio

United States

The Voice of America has had a long tradition of jazz broadcasting. And the one name associated with that long history, and revered worldwide, is that of the late Willis Conover.

"Willis Conover (October 18, 1920-May 17, 1996) was a jazz producer and broadcaster on the Voice of America for over forty years. He produced jazz concerts at the White House, the Newport Jazz Festival, and for movies and television. He created musical events where people of all races were welcome,



thereby helping to break down the color barrier in the United States. Conover is credited with keeping interest in jazz alive in the countries of eastern Europe through his nightly broadcasts during the cold war, when jazz was banned by most of the communist governments. Conover was not well known in the United States, even among jazz aficionados, but his visits to eastern Europe and Russia brought huge crowds and star treatment for him.

"Conover was a legend amongst jazz lovers primarily due to the hour-long program on the Voice of America called Voice of America Music USA. Known for his sonorous and baritone voice, many would argue that he was the most important presenter on Voice of America.

"On a trip to Moscow a taxi driver recognized him by his distinctive deep-toned voice. He was a celebrity figure in the old Soviet Union, where jazz was very popular and the Voice of America was a prime source of information as well as music." (Wikipedia)

Conover's show on VoA continues in the form of **Jazz America** as part of the **VoA Music Mix** programming stream, which can be heard online at:

► www.voanews.com/english/entertainment/musicmix.cfm

Two shortwave offerings from Voice of America include: **Découvertes Musicales** - Partez à la découverte du blues, du jazz et de toutes les musiques du monde avec Mathieu Lavoie. Samedi à 19h00-19h30 et Dimanche à 20h00-20h30 TU (The Magic of Music: Discover the world of music from Blues to Jazz and others with Mathieu Lavoie. Saturday 1900-1930 UTC and Sunday 2000-2030 UTC.)

Try 9815 12080 13735 15225 and 17580 kHz at 1900; 9780 9815 12080 13735 15225 at 2000.

Music Time In Africa - This award-winning music program features not only contemporary sounds, but also rare recordings of many African musicians. The first half of the program focuses on traditional music and the second half on pop. Saturday & Sunday 0900-1000, 2000-2100 UTC. Try 4930 6080 11975 and 13710 at 2000 UTC. VoA schedule doesn't show a broadcast at 0900.

Cuba

Cuba has a particularly vibrant music scene. On just about any night one can hear smooth Cuban jazz, emanating from the self-proclaimed "Free Territory in the Americas," via Radio Habana Cuba. Cuban jazz incorporates elements of salsa, merengue, and mambo, among others. "While the Latin influence in jazz music goes back to its earliest days, it wasn't until the 1940s that it really became popular. Thanks to musicians like Dizzy Gillespie, Tito Puente, and Stan Kenton, the Afro-Cuban sound became a popular import and an important part of the jazz canon."

► www.allaboutjazz.com/php/article.php?id=1293

Check out WRMI as well...they may sneak some cool Latin rhythms into programs such as Viva Miami or other programs.

One can hear jazz influences in any number

of styles of music from rock to rap and hip-hop. There's even a little bit of the jazz diva in recent multiple Grammy winner Amy Winehouse. Her music (and her life, for that matter) has a Billie Holiday quality to it. When you listen to Afro-pops from Gabon or other African broadcasters, there is a taste of jazz as well. Isn't it amazing how a music form originating in the South, and specifically New Orleans, has spread throughout the world? No more amazing I guess, than the language of a corner of a tiny island in Northern Europe becoming a worldwide *lingua franca*.

❖ Updating a past column...

In October 2006, this column was devoted to Language Lessons by Radio. At the time I reported:

Let's Learn Chinese – Radio Taiwan International

"Heard at the end of Monday transmissions from RTI, Let's Learn Chinese is based around a printed textbook (which may or may not be available from RTI). While checking for more information about this broadcast, it was noted that the web page for the program was blank. Hopefully by the time you read this it will be updated. The host was Carlson Wong, who suggested that individual lesson details were available on the website."

A recent check found that **Let's Learn Chinese** has been replaced by a new program called **Chinese to Go**. "Chinese to Go is a brand-new series in which you learn authentic Chinese as spoken in real life. No traditional textbooks are used, only conversations recorded [or eavesdropped?] on location. Together with the main course, the Chinese language, Shih-han also brings you a side dish of history and culture behind the language.

"Chinese to Go broadcasts worldwide every Sunday and Thursday (Taiwan Time). And don't forget to check out the weekly list of vocabulary on our website!" However, like its predecessor, the vocabulary list is missing, or very cleverly hidden on the RTI website.

I have a lot of sympathy for radio stations all over the world, big and small, which are making do, with shrinking budgets and staffs. But it seems that so many radio stations are missing out on a great opportunity by having websites which are out of date, or so confusing that one is tempted to give up trying to find the information one is seeking.

But that's a rant for another day. Cheers until next month.

MT READERS ONLY

To access the restricted website for the month of April, go to www.monitoringtimes.com,

click on the key,

and when prompted,

enter "mtreader"

under the user name.

Your password for

April is "aprilfool"

– Check in each month for new material!



THE QSL REPORT

VERIFICATIONS RECEIVED BY OUR READERS

Gayle Van Horn, W4GVH

gaylevanhorn@monitoringtimes.com

Staying Current with QSLing Trends

By knowing who or what is current in station news and QSLing trends, you can successfully achieve your station or country goals. Keep a sharp eye on this column, as well as hobby publications, club bulletins, email newsgroups, and on-line newsletters or blogs. Reading news and columns regularly (the more the better), will provide information that could result in a verification.

Pay attention to details such as enclosures and the use of currency, mint postage stamps or IRCs. Be aware of upcoming holidays or special events and DX tests. A list of active verification signers is a good idea, though station personnel can change frequently. Current affairs and the world political scene can affect changes, and new stations – including clandestines – may abruptly sign-on.

Be alert to special transmissions that occur only once or for only

a brief duration. Any of these can produce a once in a lifetime opportunity. A new transmitter or a new frequency under test is an added opportunity for verifications. Sometimes a QSL will be specially designed for the transmitter site. When reporting a new site, request that the site be specifically noted on the verification.

Some broadcasters carry special programming that is targeted to particular areas. *Last Day Transmissions* can produce special QSLs. Watch, too, for DX programs that offer their own cards. Finally, consider sending a reception report to a recently reactivated station. This presents an excellent opportunity for the station to reestablish contact with its listening audience.

The key to successful QSLing is staying current and sharing your results with the global radio hobby.

CHINA

Radio Canada International relay via Urumqi, China, 11975 kHz. Full data *Maple Leaf Mailbag* program card, signed by Bill Westenhaver, plus three poster-sized calendars and small stickers. Received in 15 days for an English report. Station address: P.O. Box 6000, Montréal, Québec H3A8, Canada. (John Wilkins, Wheat Ridge, CO)

Internet streaming audio and on-demand audio: www.rcinet.ca

CLANDESTINE

Voice of Kurdistan, 6335 kHz. Email confirmation from Alex Atrooshi. Received in five hours for email to: party@kdp.se. Email included brief history of station, and noted the station is still operated by the Kurdistan Democratic Party. Voice of Kurdistan programming consists of news, opinions of KDP, Kurdish culture and music. (Alokesh Gupta, New Delhi, India) Website: www.kdp.se

GUAM

Adventist World Radio, 11640 kHz. Waves-can special program on DW *Listeners Club*. Glossy QSL card with details on the back, signed by Ashik Eqhal Tokon, plus ICC World Cup 2007 stamps in the enclosed envelope. Received in 8 months, three months from email followup. Initial report to: GPO Box 56, Rajshahi 6000, Bangladesh. Followup email to: rosedwlc@gmail.com Website: <http://rosedwlc.tk>. (Edward Kusalik, Alberta, Canada)

MEDIUM WAVE

CFAV, 1570 kHz AM. Radio Boomer. Full data verification on station letterhead, signed by Brigitte Morin-Administrative Secretary. Received in one month for an AM report and a SASE. Station address: 2040, Autoroute Laval, Laval, QC H7S 2M9 Canada. (Gerald Williams, Ayer, MA)

Internet streaming audio [www.boomer1570.ca/](http://boomer1570.ca/)

Croatia-1134 kHz AM via Zagreb. Full data handwritten data on back, signed by Zlarko Kuretic-Director. Card comprises a sketch

of station building. Received in 92 days for a CD report, \$2.00US, and an SASE. Station address: Hrvatska Radio, Prisavlje 3, HR 10000, Zagreb, Croatia. (Patrick Martin, Seaside, OR).

KLAQ, 830 kHz AM, Orange, CA. The New AM830. Verification letter signed by Brian Clark-Director of Engineering, plus photo of transmitter site. Received in seven days for a CD report. Station address: 2000 Gene Autry Way, Anaheim, CA 92806 USA. (Martin) MW QSL # 2978.

Internet streaming audio www.830klaa.com/index.htm

KRZI, 1580 kHz AM. Full data verification letter signed by Jcole McClellan-Technician. Verification received for a 2004 reception report, despite letter being written in 2006, and postmarked in 2008. KRZI currently broadcast as 1660 AM ESPN Radio. Station address: 220 S. 2nd Street, Suite 2B2, Waco, TX 76701. (Patrick Griffith, Westminster, CO)

Internet streaming audio www.1660espn.com/

WDLM, 9060 kHz AM. Quad Cities Christian Radio. Full data QSL card and personal letter from Glenn Rogerson-Chief Engineer. Received in ten days for a CD and \$1.00US. Noted as using 101 watts PSSA-3 at time of my reception. Station address: P.O. Box 149, East Moline, IL 61244 USA. (Jim Pogue, Memphis, TN)

Internet streaming audio www.wdlm.org

WDSS, 1680 kHz AM Radio Disney. Full data verification on station letterhead, unsigned. Received in 12 days for an AM report and SASE. Station address: 4417 Broadmoor Avenue S.E., Grand Rapids, MI 29512 USA. (Eric Hopkins, Ayer, MA) Website: www.am1680wdss.com

WMWR, 1670 kHz AM. Talk.Radio 1670. No data blue/white Clear Channel post-

card with printed station technical details, unsigned. Received in 48 days for an AM report and SASE. Station address: 750 West Sandtown Rd. S.W., Dry Branch, GA 31020 USA. (Hopkins)



WSB, 750 kHz AM. News.Talk.Radio. Full data verification on station letterhead, signed by Josh Roquemore-Radio Engineering. Received in 58 days for an AM report and a SASE. Station address: 1601 West Peachtree St., N.E., Atlanta, GA 30309-2663. (Hopkins)

Internet streaming audio <http://wsbradio.com/>

UTILITY

Non-Directional Beacon 317 VC La Ronge, Canada. Full data prepared QSL card returned as verified, unsigned. Power listed as 5000 watts. Received in 49 days for \$1.00US and SASE. QSL address: Nav Canada, P.O. Box 479, La Ronge, SK S0J 1L0 Canada. (Pogue).

378 RJ Roberval, Canada. Full data prepared QSL card returned as verified, signed by Rejean-Jacques-Operations Manager. Received in 40 days for \$1.00US and SASE. Station address: Aéroport de Roberval, 1220 route de Aéroport, Roberval QC G8H 2M9 Canada. (Pogue).



390 JT Stephenville, Canada. Full data prepared QSL card returned as verified, signed by Larry L. Smith-Airport Manager, plus an info sheet, map of airport layout and business cards. Station power listed on card as 500 watts. Station address: Stephenville International Airport, 13 Tennessee Drive, Stephenville, NL A2N 2YC Canada. Very happy with this one, my first NDB QSL from the Maritimes and a new province. (Pogue)



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 Daylight Saving Time) 4, 5, 6 or 7 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, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. 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:

Codes	
s/Sun	Sunday
m/Mon	Monday
t	Tuesday
w	Wednesday
h	Thursday
f	Friday
a/Sat	Saturday
occ:	occasional
DRM:	Digital Radio Mondiale
irreg	Irregular broadcasts
vl	Various languages
USB:	Upper Sideband

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 prob-

lems, 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
ca:	Central America
do:	domestic broadcast
eu:	Europe
me:	Middle East
na:	North America
pa:	Pacific
sa:	South America
va:	various

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 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
- Note 4

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo/NASWA Flash Sheet; Rachel Baughn/MT; Alokeesh Gupta, New Delhi, India; Anker Petersen/DSWCI-DX Window; Adrian Sainsbury/R NZ Intl; Tom Taylor, UK; Harold Sellers/ODXA/DX Ontario; Wolfgang Büeschel, Germany; Daniel Sampson, WI; Robert Thomas, Bridgeport, CT; Andreas Volk, Germany; BCL News; Cumbre DX; BDX Club; DX Mix News, Bulgaria; Hard Core DX; NASWA Journal/NASWA Flashsheet; World Wide DX Club-Top News.

GLENN HAUSER'S WORLD OF RADIO
<http://www.worldofradio.com>

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 0010 vl	Croatia, Croatian Radio	7285va		0100 0156	Romania, Radio Romania Intl	6145na
0000 0020	Japan, NHK World/Radio Japan	5920eu		0100 0157	9515na	
0000 0030	6145na 13650as	17810as		0100 0157	China, China Radio Intl	6005na
0000 0030	Australia, HCJB Global	15525as		0100 0159	7130eu 7180eu	6075eu
0000 0030	Egypt, Radio Cairo	9465na		0100 0200	Netherlands, Radio	9570eu
0000 0030	Thailand, Radio	9680af		0100 0200 twhfa	Canada, Radio Canada Intl	6165na
0000 0030	UK, BBC World Service	7340as	17615as	0100 0200	Anguilla, World University Network	5840va
0000 0030	USA, Voice of America	7405af		0100 0200	Argentina, RAE	7255va
0000 0045	India, All India Radio	9705as	9950as	0100 0200	Australia, ABC NT Katherine	11710am
	11620as	11645as	13605as	0100 0200	Australia, ABC NT Katherine	5025do
0000 0057	Netherlands, Radio	6165na		0100 0200	Australia, ABC NT Tennant Creek	4910do
0000 0100	Anguilla, World University Network	6090am		0100 0200	Australia, Radio Australia	9660as
0000 0100	Australia, ABC NT Alice Springs	2310do		0100 0200	13690as 15240pa	12080as
	4835do			0100 0200	15415as	17715as
				0100 0200	17795va	
0000 0100	Australia, ABC NT Katherine	5025do		0100 0200	Canada, CFRX Toronto ON	6070na
0000 0100	Australia, ABC NT Tennant Creek	4910do		0100 0200	Canada, CFVP Calgary AB	6030na
0000 0100	Australia, Radio Australia	9660as	12080as	0100 0200	Canada, CKZN St John's NF	6160na
	13690as	15240pa	17715as	0100 0200	Canada, CKZU Vancouver BC	6160na
	17775va	17795va		0100 0200	China, China Radio Intl	9535as
0000 0100	Bulgaria, Radio	7400na	9400na	0100 0200	15115as 15785as	11870as
0000 0100	Canada, CFRX Toronto ON	6070na		0100 0200	Costa Rica, World University Network	5030va
0000 0100	Canada, CFVP Calgary AB	6030na		0100 0200	6150va 7375va	9725va
0000 0100	Canada, CKZN St John's NF	6160na		0100 0200	Cuba, Radio Havana	6000na
0000 0100	Canada, CKZU Vancouver BC	6160na		0100 0200	Guyana, Voice of	6180na
0000 0100	China, China Radio Intl	6020na	6075as	0100 0200	Indonesia, Voice of	9525al
	7130eu	7180as	9570na	0100 0200	15150as	11785pa
	13750as	15115as		0100 0200	Malaysia, RTM/Trax FM	7295as
0000 0100	Costa Rica, World University Network	5030va		0100 0200	New Zealand, Radio NZ Intl	15720pa
	6150va	7375va	9725va	0100 0200	New Zealand, Radio NZ Intl	17675pa
0000 0100	Germany, Deutsche Welle	9785as	15595as	0100 0200	North Korea, Voice of Korea	7140as
0000 0100	Guyana, Voice of	3291do		0100 0200	9730as 11735sa	15180sa
0000 0100	Malaysia, RTM/Trax FM	7295as		0100 0200	Papua New Guinea, Wantok R. Light	7325va
0000 0100	New Zealand, Radio NZ Intl	15720pa		0100 0200	Singapore, MediaCorp Radio	6150do
0000 0100 DRM	New Zealand, Radio NZ Intl	17675pa		0100 0200	Sri Lanka, SLBC	6005as 9770as
0000 0100 vl	Papua New Guinea, Wantok R. Light	7325va		0100 0200	Taiwan, Radio Taiwan Intl	11875as
0000 0100	Singapore, MediaCorp Radio	6150do		0100 0200	UK, BBC World Service	6195as
0000 0100	Spain, Radio Exterior Espana	6055na		0100 0200	11750as 15335as	7320as
0000 0100	UK, BBC World Service	6195as	9740as	0100 0200	UK, Bible Voice BC	6140as
	15335as	15360as		0100 0200	Ukraine, Radio Ukraine Intl	7440na
0000 0100 f	UK, Bible Voice BC	6140as		0100 0200	USA, American Forces Radio	4319usb
0000 0100	USA, American Forces Radio	4319usb		0100 0200	5446usb 5765usb	6350usb 7811usb
	5446usb	5765usb	6350usb	0100 0200	10320usb 12133usb	13362usb
0000 0100	10320usb	12133usb	13362usb	0100 0200	USA, KTBN Salt Lake City UT	7505na
0000 0100	USA, KTBN Salt Lake City UT	7505na		0100 0200	USA, KFHR Naalehu HI	17525as
0000 0100	USA, WBCQ Monticello ME	5110am	7415am	0100 0200	USA, Voice of America	7200va
	9330am			0100 0200	11705va	9865va
0000 0100 h	USA, WBCQ Monticello ME	17495am		0100 0200	USA, WBCQ Monticello ME	7415am
0000 0100	USA, WBOH Newport NC	5920am		0100 0200	17495am	9330am
0000 0100	USA, WEWN Vandiver AL	5810am		0100 0200	USA, WBOH Newport NC	5920am
0000 0100	USA, WHRA Greenbush ME	5890eu		0100 0200	USA, WEWN Vandiver AL	5810am
0000 0100	USA, WHRI Cypress Creek SC	7315am		0100 0200	USA, WHRA Greenbush ME	5890eu
0000 0100	USA, WINB Red Lion PA	9265am		0100 0200	USA, WHRI Cypress Creek SC	7315am
0000 0100	USA, WRMI Miami FL	9955am		0100 0200	USA, WHRI Cypress Creek SC	7490va
0000 0100	USA, WTJC Newport NC	9370na		0100 0200	USA, WINB Red Lion PA	9265am
0000 0100	USA, WWCR Nashville TN	3215na	7465na	0100 0200	USA, WRMI Miami FL	9955am
	13845na			0100 0200	USA, WTJC Newport NC	9370na
0000 0100	USA, WWRB Manchester TN	3185va	5050va	0100 0200	USA, WWCR Nashville TN	3215na
	5745va	6890va		0100 0200	7465na	5935na
0000 0100	USA, WYFR/Family Radio FL	6085na	9505na	0100 0200	USA, WWRB Manchester TN	3185va
	9715na	11720am		0100 0200	5745va 6890va	5050va
0005 0100	Canada, Radio Canada Intl	9755am		0100 0200	USA, WYFR/Family Radio FL	6065na
0005 0100	Greece, Voice of	7475va	9420va	0100 0200	15195as	9505na
0030 0045 twhfas	Albania, Radio Tirana	9390na		0100 0200	Uzbekistan, CVC International	9480as
0030 0045 Sun	Germany, Pan American BC	6165as		0105 0200 twhfa	Canada, Radio Canada Intl	9755am
0030 0100	Australia, Radio Australia	15415as		0130 0200	Iran, Voice of the Islamic Rep	6120na
0030 0100 mtwhf	Austria, Radio Austria Intl	7325am		0130 0200 twhfa	7160na	
0030 0100	Lithuania, Radio Vilnius	9875na		0145 0200 twhfas	USA, Voice of America	5960va
0030 0100	Thailand, Radio	12095na		0145 0200 twhfas	Albania, Radio Tirana	7405va
0030 0100 fas	UK, Bible Voice BC	6030as				
0030 0100	USA, Voice of America	7200va	7405va			
	9620va	11695va	11705va			
	12005va	15185va	15205va			
0043 0100 Sat	Austria, Radio Austria Intl	7325am				

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

0100 0105	Greece, Voice of	7475va	9420va	12105va
0100 0110 vl	Croatia, Croatian Radio	7285sa		
0100 0127	Czech Rep, Radio Prague	6200na	7345na	
0100 0128	Vietnam, Voice of	6175na		
0100 0130	Australia, Radio Australia	17775as		
0100 0130 mtwhfa	Serbia, International Radio Serbia	7115na		
0100 0130	Slovakia, Radio Slovakia Int	7230na	9440sa	

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

0200 0205 twhfa	Canada, Radio Canada Intl	9755am
0200 0210 vl	Croatia, Croatian Radio	7285va
0200 0227	Czech Rep, Radio Prague	5995na
	7345na	6200na
0200 0230	Iran, Voice of the Islamic Rep	6120na
0200 0230	Serbia, International Radio Serbia	7115na
0200 0230	South Korea, KBS World Radio	15575sa
0200 0300	Thailand, Radio	15275na
0200 0300	Anguilla, World University Network	6090am
0200 0300	Australia, ABC NT Alice Springs	2310do
0200 0300	4835do	
0200 0300	Australia, ABC NT Katherine	5025do
0200 0300	Australia, ABC NT Tennant Creek	4910do

0200 0300	Australia, Radio Australia	9660as	12080as	0300 0400	Canada, CFRX Toronto ON	6070na
	13690as	15240pa	15415as	0300 0400	Canada, CFVP Calgary AB	6030na
	17750va	21725va		0300 0400	Canada, CKZN St John's NF	6160na
0200 0300	Canada, CFRX Toronto ON	6070na		0300 0400	Canada, CKZU Vancouver BC	6160na
0200 0300	Canada, CFVP Calgary AB	6030na		0300 0400	China, China Radio Intl	9690na
0200 0300	Canada, CKZN St John's NF	6160na		0300 0400	11770as	9790na
0200 0300	Canada, CKZU Vancouver BC	6160na		0300 0400	13750as	15120as
0200 0300	China, China Radio Intl	11770as	13640as	0300 0400	15785as	
0200 0300	Costa Rica, World University Network	5030va		0300 0400	Costa Rica, World University Network	5030va
	6150va	7375va	9725va	0300 0400	6150va	7375va
0200 0300	Cuba, Radio Havana	6000na	6180na	0300 0400	Cuba, Radio Havana	6000na
0200 0300	Egypt, Radio Cairo	7270na		0300 0400	Germany, Deutsche Welle	9785as
0200 0300	Germany, Deutsche Welle	14665as		0300 0400	Greece, Voice of	7475va
0200 0300	Guyana, Voice of	3291do		0300 0400	Guyana, Voice of	3291do
0200 0300	Malaysia, RTM/Trax FM	7295as		0300 0400	Malaysia, RTM/Trax FM	7295as
0200 0300	New Zealand, Radio NZ Intl	15720pa		0300 0400	Malaysia, RTM/Voice of Malaysia	6175as
0200 0300 DRM	New Zealand, Radio NZ Intl	17675pa		0300 0400	9750as	15295as
0200 0300	North Korea, Voice of Korea	13650as	15100as	0300 0400	New Zealand, Radio NZ Intl	15720pa
0200 0300 vi	Papua New Guinea, Wantok R. Light	7325va		0300 0400	New Zealand, Radio NZ Intl	17675pa
0200 0300	Philippines, Radio Pilipinas	12025va	15285va	0300 0400	North Korea, Voice of Korea	7140as
	17770va			0300 0400	9730as	
0200 0300	Russia, Voice of	6240na	7250na	0300 0400	Oman, Radio Oman	15355as
	13735na			0300 0400	Papua New Guinea, Wantok R. Light	7325va
0200 0300	Singapore, MediaCorp Radio	6150do		0300 0400	Russia, Voice of	6155na
0200 0300	Sri Lanka, SLBC	6005as	9770as	0300 0400	6240na	7350na
0200 0300	Taiwan, Radio Taiwan Intl	5950na	9680na	0300 0400	Rwanda, Radio	6055do
0200 0300	UK, BBC World Service	6030af	6195me	0300 0400	Singapore, MediaCorp Radio	6150do
	6195me	7320va	11750as	0300 0400	South Africa, Channel Africa	3345af
	17760as			0300 0400	Sri Lanka, SLBC	6005as
0200 0300	USA, American Forces Radio	4319usb		0300 0400	Taiwan, Radio Taiwan Intl	5950na
	5446usb	5765usb	6350usb	0300 0400	15215as	
	10320usb	12133usb	13362usb	0300 0400	UK, BBC World Service	3255af
0200 0300	USA, KJES Vado NM	7555na		0300 0400	6145af	6005af
0200 0300	USA, KJES Vado NM	7555na		0300 0400	6190af	6195me
0200 0300	USA, KTBN Salt Lake City UT	7505na		0300 0400	7130af	
0200 0300	USA, KWHR Naalehu HI	17525as		0300 0400	15335as	11760as
0200 0300	USA, WBCQ Monticello ME	5110am	9330am	0300 0400	USA, American Forces Radio	4319usb
0200 0300 whfas	USA, WBCQ Monticello ME	7415am		0300 0400	5446usb	5765usb
0200 0300	USA, WBOH Newport NC	5920am		0300 0400	6350usb	7811usb
0200 0300	USA, WEWN Vandiver AL	5810am		0300 0400	10320usb	12133usb
0200 0300	USA, WHRA Greenbush ME	5890eu		0300 0400	13362usb	
0200 0300	USA, WHRI Cypress Creek SC	7490va		0300 0400	USA, KTBN Salt Lake City UT	7505na
0200 0300 twhfa	USA, WHRI Cypress Creek SC	5835na		0300 0400	USA, KWHR Naalehu HI	17525as
0200 0300 sm	USA, WHRI Cypress Creek SC	7315am		0300 0400	USA, Voice of America	4930af
0200 0300	USA, WINB Red Lion PA	9265am		0300 0400	9885af	6080af
0200 0300 Sun/Mon	USA, WRMI Miami FL	9955am		0300 0400	USA, WBCQ Monticello ME	5110am
0200 0300 twhfa	USA, WRMI Miami FL	7385na		0300 0400	9330am	
0200 0300	USA, WTJC Newport NC	9370na		0300 0400	USA, WBOH Newport NC	5920am
0200 0300	USA, WWCR Nashville TN	3215na	5935na	0300 0400	USA, WEWN Vandiver AL	5810am
	7465na			0300 0400	USA, WHRA Greenbush ME	5890eu
0200 0300	USA, WWRB Manchester TN	3185va	5050va	0300 0400	USA, WHRI Cypress Creek SC	7490va
	5745va	6890va		0300 0400	USA, WHRI Cypress Creek SC	5835na
0200 0300	USA, WYFR/Family Radio FL	5985am	6065na	0300 0400	USA, WHRI Cypress Creek SC	7315am
	9505na	9525na	11855am	0300 0400	0300 0400	
0200 0300	Uzbekistan, CVC International	9480as		0300 0400	USA, WINB Red Lion PA	9265am
0215 0230	Nepal, Radio	3230as	5005as	0300 0400	USA, WRMI Miami FL	9955am
	7165as			0300 0400	USA, WRMI Miami FL	7385na
0230 0258	Vietnam, Voice of	6175na		0300 0400	USA, WTJC Newport NC	9370na
0230 0300 twhfas	Albania, Radio Tirana	7425na		0300 0400	USA, WWCR Nashville TN	3215na
0230 0300	South Korea, KBS World Radio	9560na		0300 0400	5935na	
0230 0300	Sweden, Radio	6010na	11550as	0300 0400	7465na	
0245 0300	Myanmar, Myanma Radio	9730do		0300 0400	USA, WWRB Manchester TN	3185va
0250 0300 vi	Vatican City, Vatican Radio	6040na	7305na	0300 0400	5050va	
0255 0300 vi	Rwanda, Radio	6055do		0300 0400	5745va	

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

0300 0310 vi	Croatia, Croatian Radio	7285va	
0300 0320 vi	Vatican City, Vatican Radio	6040na	7305na
0300 0330	Egypt, Radio Cairo	7270na	
0300 0330	Myanmar, Myanma Radio	9730do	
0300 0330	Philippines, Radio Pilipinas	12025va	15285va
0300 0330 mtwhf	UK, Sudan Radio Service	5975af	
0300 0330	USA, KJES Vado NM	7555na	
0300 0330	Vatican City, Vatican Radio	7360af	9660as
0300 0400	Anguilla, World University Network	6090am	11550as
0300 0400	Australia, ABC NT Alice Springs	2310do	15515as
	4835do		
0300 0400	Australia, ABC NT Katherine	5025do	
0300 0400	Australia, ABC NT Tenant Creek	4910do	
0300 0400	Australia, Radio Australia	9660as	12080as
	13690as	15240pa	15415as
	17750va	21725va	15515as
0300 0400	Bulgaria, Radio	7400na	9400na
0300 0400 twhfas	Canada, CBC NQ SW Service	9625na	

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

0400 0427	Czech Rep, Radio Prague	5990na	6200na
0400 0430 mtwhf	France, Radio France Intl	7315af	9805af
0400 0430	Sri Lanka, SLBC	6005as	15745as
0400 0430	USA, Voice of America	4930af	4960af
	6080af	9885af	15580af
0400 0430	USA, WBCQ Monticello ME	5110am	9330am
0400 0430	USA, WWRB Manchester TN	3185va	
0400 0445 whfas	USA, WBCQ Monticello ME	7415am	
0400 0455	Turkey, Voice of	6020va	7240va
0400 0456	Romania, Radio Romania Intl	9515na	9690va
	9960va	11895va	
0400 0458	New Zealand, Radio NZ Intl	15720pa	
0400 0458 DRM	New Zealand, Radio NZ Intl	17675pa	
0400 0459	South Africa, Channel Africa	3345af	
0400 0500	Anguilla, World University Network	6090am	
0400 0500	Australia, ABC NT Alice Springs	2310do	
	4835do		
0400 0500	Australia, ABC NT Katherine	5025do	

0400 0500	Australia, ABC NT Tennant Creek	4910do	0500 0600	Bhutan, BBS 6035as
0400 0500	Australia, Radio Australia 9660as	12080as	0500 0600	Canada, CFRX Toronto ON 6070na
	13690as 15240pa 15415as	17750va	0500 0600	Canada, CKZN St John's NF 6160na
	21725va		0500 0600	Canada, CKZU Vancouver BC 6160na
0400 0500 twhfas	Canada, CBC NQ SW Service	9625na	0500 0600	China, China Radio Intl 11710af 11880as
0400 0500	Canada, CFRX Toronto ON 6070na		0500 0600	15350as 15465as 17505as 17540as
0400 0500	Canada, CKZN St John's NF 6160na		0500 0600	17725as 17855as
0400 0500	Canada, CKZU Vancouver BC 6160na		0500 0600	Costa Rica, World University Network 5030va
0400 0500	China, China Radio Intl 6020na	6080as	0500 0600	6150va 7375va 9725va
	13750as 15120as 15785as	17725as	0500 0600	Cuba, Radio Havana 6000na 6060na
	17855as		0500 0600	6180na 9550na 11760am
0400 0500	Costa Rica, World University Network 6150va	5030va	0500 0600	Germany, CVC Intl/Voice Africa 9430af
	7375va 9725va		0500 0600	Guyana, Voice of 3291do
0400 0500	Cuba, Radio Havana 6000na	6180na	0500 0600	Malaysia, RTM/Trax FM 7295as
0400 0500	Germany, Deutsche Welle 5905af	5945af	0500 0600	Malaysia, RTM/Voice of Malaysia 6175as
	6180af 7225af 15455	`af	0500 0600	9750as 15295as
0400 0500	Guyana, Voice of 3291do		0500 0600	New Zealand, Radio NZ Intl 15720pa
0400 0500	Malaysia, RTM/Trax FM 7295as		0500 0600	New Zealand, Radio NZ Intl 9870pa
0400 0500	Malaysia, RTM/Voice of Malaysia 9750as	6175as	0500 0600	Nigeria, Radio/Kaduna 4770do 6090al
0400 0500 vl	Papua New Guinea, Wantok R. Light 6155na	7325va	0500 0600	Papua New Guinea, Wantok R. Light 7325va
0400 0500	Russia, Voice of 6240na	7150na	0500 0600	Russia, Voice of 7150na 7350na 9550as
	7350na 9550as	9840na 9855na	0500 0600	9840na 12040na 12090as 13580as
	12010na 12030na	12040na 12090na	0500 0600	15455as 15530as 15765as 17695as
	13580as 15455as	15530as 15765as	0500 0600	17840as
0400 0500 DRM	Russia, Voice of 15735as		0500 0600	Russia, Voice of 15735as
0400 0500 vl	Rwanda, Radio 6055do		0500 0600	Singapore, MediaCorp Radio 6150do
0400 0500	Singapore, MediaCorp Radio	6150do	0500 0600	South Africa, Channel Africa 7230af 9685af
0400 0500 vl	Uganda, UBC Radio 4976do	5026do	0500 0600	Swaziland, TWR 3200af 4775af 9500af
0400 0500	UK, BBC World Service 3255af	6005af	0500 0600	Thailand, Radio 11730va
	6190af 7120af	7160af 9410as	0500 0600	Uganda, UBC Radio 4976do 5026do
	11665af 12095af	15335as 15360as	0500 0600	UK, BBC World Service 3255af 6005af
	17760as 21660as		0500 0600	6190af 6195va 7160af 9410va
0400 0500	Ukraine, Radio Ukraine Intl 7440na		0500 0600	11665af 11695as 11765af 11955as
0400 0500	USA, American Forces Radio 5446usb	4319usb	0500 0600	12095eu 15335as 15360as 15420af
	5765usb 6350usb	7811usb	0500 0600	17640af 17760as 21660as
0400 0500	USA, KTBN Salt Lake City UT 10320usb	7505na	0500 0600	UK, BBC World Service 5895eu
	12133usb 13362usb		0500 0600	USA, American Forces Radio 4319usb
0400 0500	USA, KWHR Naalehu HI 17525as		0500 0600	5446usb 5765usb 6350usb 7811usb
0400 0500	USA, WBOH Newport NC 5920am		0500 0600	10320usb 12133usb 13362usb
0400 0500	USA, WEWN Vandiver AL 5810am		0500 0600	USA, KTBN Salt Lake City UT 7505na
0400 0500	USA, WHRA Greenbush ME 5890eu		0500 0600	USA, KWHR Naalehu HI 11565as 15610as
0400 0500 twhfa	USA, WHRI Cypress Creek SC 7490va		0500 0600	USA, Voice of America 4930af 5855af
0400 0500	USA, WHRI Cypress Creek SC 5835na		0500 0600	6080af 9885af 15580af
0400 0500 sm	USA, WHRI Cypress Creek SC 7315am		0500 0600	USA, WBCQ Monticello ME 5110am 7415am
0400 0500	USA, WMLK Bethel PA 9265va		0500 0600	USA, WBOH Newport NC 5920am
0400 0500	USA, WRMI Miami FL 9955am		0500 0600	USA, WEWN Vandiver AL 5810eu 5850va
0400 0500	USA, WTJC Newport NC 9370na		0500 0600	USA, WHRA Greenbush ME 7465va
0400 0500	USA, WWCR Nashville TN 3215na	5890na	0500 0600	USA, WHRI Cypress Creek SC 7490va
	5935na		0500 0600	USA, WHRI Cypress Creek SC 5835na
0400 0500	USA, WWRB Manchester TN 3185va		0500 0600	USA, WMLK Bethel PA 9265va
0400 0500	USA, WYFR/Family Radio FL 7780va	6065na	0500 0600	USA, WRMI Miami FL 9955am
	9505na 9715na	6875na	0500 0600	USA, WTJC Newport NC 9370na
			0500 0600	USA, WWCR Nashville TN 3215na 5890na
0400 0500	Uzbekistan, CVC International	13685as	0500 0600	5935na
0430 0445	Israel, Kol Israel 6280va	7545va	0500 0600	USA, WWRB Manchester TN 3185va
0430 0457	Czech Rep, Radio Prague 9890va		0500 0600	USA, WYFR/Family Radio FL 6875na 7520va
0430 0500	Australia, Radio Australia 15415as		0500 0600	Uzbekistan, CVC International 13685as
0430 0500	Nigeria, Radio/Kaduna 6090do		0515 0530	Zambia, CVC International 6065af
0430 0500	Swaziland, TWR 3200af	4775af	0530 0600	Rwanda, Radio 6055do
0430 0500	USA, Voice of America 9430af	4960af	0530 0600	Australia, Radio Australia 15415as
0430 0500 Sun	9885af 15580af		0530 0600	Rwanda, Radio 6055do
0459 0500	6005as 9770as 15745as		0530 0600	UK, Sudan Radio Service 9525af 9560al
0459 0500 DRM	New Zealand, Radio NZ Intl 15720pa		0530 0600	13720af
	New Zealand, Radio NZ Intl 9870pa			

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

0500 0507 twhfas	Canada, CBC NQ SW Service	9625na
0500 0510 vl	Croatia, Croatian Radio	7285na 9470pa
0500 0515 Sun	Sri Lanka, SLBC	6005as 9770as 15745as
0500 0530 mtwhf	France, Radio France Intl	11995af 13680af
0500 0530	Germany, Deutsche Welle	7285af 9755af
	12045af 15410af	
0500 0530	Japan, NHK World/Radio Japan	5975eu
	6110na 9725af 9875af	17810as
0500 0530	Vatican City, Vatican Radio	7360af 9660af
	11625af	
0500 0600	Anguilla, World University Network	6090am
0500 0600	Australia, ABC NT Alice Springs	2310do
	4835do	
0500 0600	Australia, ABC NT Katherine	5025do
0500 0600	Australia, ABC NT Tennant Creek	4910do
0500 0600	Australia, Radio Australia	9660as 12080as
	13630as 13690pa 15160as	15240pa
	17750va	

0600 0600 sm	USA, WHRI Cypress Creek SC	7315am
0600 0610 vl	Croatia, Croatian Radio	9470na 11690pa
0600 0615 Sat/Sun	South Africa, TWR	11640af
0600 0630 Sat/Sun	Australia, Radio Australia	15415as
0600 0630 mtwhf	France, Radio France Intl	9765af 13680af
	15160af 15605af	
0600 0630	Germany, Deutsche Welle	5945af 7240af
	12045af	
0600 0630	Nigeria, Radio, Natl Svc/Abuja	7275do
0600 0630	Vatican City, Vatican Radio	4005eu 5965eu
	7250eu	
0600 0645 mtwhf	South Africa, TWR	11640af
0600 0657	China, China Radio Intl	6115na
0600 0658	New Zealand, Radio NZ Intl	15720pa
0600 0658 DRM	New Zealand, Radio NZ Intl	9870pa
0600 0700	Anguilla, World University Network	6090am
0600 0700	Australia, ABC NT Alice Springs	2310do
	4835do	
0600 0700	Australia, ABC NT Katherine	5025do
0600 0700	Australia, ABC NT Tennant Creek	4910do

0600 0700	Australia, CVC International	15360as		0700 0800	Canada, CFVP Calgary AB	6030na
0600 0700	Australia, Radio Australia	9660as	12080as	0700 0800	Canada, CKZN St John's NF	6160na
	13630as	13690as	15160as	0700 0800	Canada, CKZU Vancouver BC	6160na
	17750va			0700 0800	China, China Radio Intl	11785eu
0600 0700 mtwhfa	Austria, Radio Austria Intl	17870me		0700 0800	13660as	15350as
0600 0700	Bhutan, BBS	6035as		0700 0800	15465as	17490eu
0600 0700	Canada, CFRX Toronto ON	6070na		0700 0800	17540as	17710as
0600 0700	Canada, CFVP Calgary AB	6030na		0700 0800	Costa Rica, World University Network	5030va
0600 0700	Canada, CKZN St John's NF	6160na		0700 0800	6150va	7375va
0600 0700	Canada, CKZU Vancouver BC	6160na		0700 0800	9725va	11870va
0600 0700	China, China Radio Intl	11870as	11880as	0700 0800 Sat	Germany, CVC Intl/Voice Africa	15640af
	13660as	15140as	15350as	0700 0800	Greece, Voice of	7475va
	17505as	17540as	17710as	0700 0800	9420va	12105va
0600 0700	Costa Rica, World University Network	5030va		0700 0800	Guyana, Voice of	3291do
	6150va	7375va	9725va	0700 0800	5950do	
0600 0700	Cuba, Radio Havana	6000na	6060va	0700 0800	Latvia, Radio SWH	9290eu
	6180na	9550na	11760na	0700 0800	Liberia, Star Radio	9525af
0600 0700	Germany, CVC Intl/Voice Africa	11720af		0700 0800	Malaysia, RTM/Trax FM	7295as
0600 0700	Guyana, Voice of	3291do		0700 0800	Malaysia, RTM/Voice of Malaysia	6175as
0600 0700	Malaysia, RTM/Trax FM	7295as		0700 0800	9750as	15295as
0600 0700	Malaysia, RTM/Voice of Malaysia	6175as		0700 0800	Myanmar, Myanma Radio	9730do
	9750as	15295as		0700 0800	New Zealand, Radio NZ Intl	9765pa
0600 0700	Nigeria, Radio/Kaduna	4770do	6090al	0700 0800 DRM	New Zealand, Radio NZ Intl	9870pa
0600 0700 vl	Papua New Guinea, Wantok R. Light	7325va		0700 0800	Nigeria, Radio/Kaduna	4770do
0600 0700	Russia, Voice of	9550as	13580as	0700 0800	Papua New Guinea, Wantok R. Light	7325va
	13580as	17665pa	17805pa	0700 0800	Russia, Voice of	9550as
0600 0700	Singapore, MediaCorp Radio	6150do		0700 0800	Russia, Voice of	11615eu
0600 0700 vl	Solomon Islands, SIBC	5020do	9545al	0700 0800	Singapore, MediaCorp Radio	6150do
0600 0700	South Africa, Channel Africa	7230af	15255af	0700 0800 DRM	Solomon Islands, SIBC	5020do
0600 0700	Swaziland, TWR 3200af	4775af	9500af	0700 0800	South Africa, Channel Africa	9625af
0600 0700	UK, BBC World Service	6005af	6190af	0700 0800	Swaziland, TWR 4775af	6120af
	7160af	9410va	9825af	0700 0800	Taiwan, Radio Taiwan Intl	5950na
	11765af	11940af	11955as	0700 0800	UK, BBC World Service	5875eu
	15360as	15420af	17640af	0700 0800	UK, BBC World Service	6190af
	21660as			0700 0800	9410va	11760me
0600 0700 DRM	UK, BBC World Service	5895eu		0700 0800	11765af	11940af
0600 0700	Ukraine, Radio Ukraine Intl	7440eu		0700 0800	11955as	12095va
0600 0700	USA, American Forces Radio	4319usb		0700 0800	13620af	15360as
	5446usb	5765usb	6350usb	0700 0800	15400af	17760as
	10320usb	12133usb	13362usb	0700 0800	USA, American Forces Radio	4319usb
0600 0700	USA, KTBN Salt Lake City UT	7505na		0700 0800	5446usb	5765usb
0600 0700	USA, KWHR Naalehu HI	11565as	15610as	0700 0800	6350usb	7811usb
0600 0700	USA, Voice of America	6080af	9885af	0700 0800	10320usb	12133usb
	15580af			0700 0800	13362usb	
0600 0700	USA, WBCQ Monticello ME	5110am		0700 0800	USA, KTBN Salt Lake City UT	7505na
0600 0700	USA, WBOH Newport NC	5920am		0700 0800	11565as	15610as
0600 0700	USA, WEWN Vandiver AL	5810eu	5850va	0700 0800	USA, WBCQ Monticello ME	5110am
0600 0700	USA, WHRA Greenbush ME	7465va		0700 0800	USA, WBOH Newport NC	5920am
0600 0700	USA, WHRI Cypress Creek SC	7315am		0700 0800	USA, WEWN Vandiver AL	5810eu
0600 0700	USA, WMLK Bethel PA	9265va		0700 0800	USA, WHRI Cypress Creek SC	5835va
0600 0700	USA, WRMI Miami FL	9955am		0700 0800	7315am	
0600 0700	USA, WTJC Newport NC	9370na		0700 0800	USA, WMLK Bethel PA	9265va
0600 0700	USA, WWCR Nashville TN	3215na	5070na	0700 0800	USA, WRMI Miami FL	9955am
	5890na	5935na		0700 0800	USA, WTJC Newport NC	9370na
0600 0700	USA, WWRB Manchester TN	3185va		0700 0800	USA, WWCR Nashville TN	3215na
0600 0700	USA, WYFR/Family Radio FL	5745va	6000am	0700 0800	5890na	5935na
	9860na	11530va	11580af	0700 0800 Sat/Sun	USA, WWRB Manchester TN	3185va
0600 0700 vl	Vanuatu, Radio	4960da		0745 0800 mtwhfa	USA, WYFR/Family Radio FL	6875na
0600 0700	Yemen, Rep of Yemen Radio	9780me		0745 0800 Sun	9495am	9715na
0600 0700	Zambia, CVC International	6065af		0745 0800 Sun	9985af	
0630 0700	Romania, Radio Romania Intl	7180va		0745 0800 Sun	Vanuatu, Radio	4960do
	9690va	15135va	17780va			Zambia, CVC International
0630 0700	Vatican City, Vatican Radio	7360af	9660af		0730 0800	6065af
	11625af			0730 0800	Australia, HCJB Global	11750pa
0659 0700	New Zealand, Radio NZ Intl	9765pa		0730 0800	Bulgaria, Radio	7400eu
0659 0700 DRM	New Zealand, Radio NZ Intl	9870pa		0730 0800	UK, BBC World Service	15575va

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

0700 0706	UK, BBC World Service	6005af	
0700 0710 vl	Croatia, Croatian Radio	9470pa	11690pa
0700 0730	France, Radio France Intl	15605af	
0700 0730	Slovakia, Radio Slovakia Int	13715pa	15460pa
0700 0730	UK, BBC World Service	15575va	
0700 0800	Anguilla, World University Network	6090am	
0700 0800	Australia, ABC NT Alice Springs	2310da	
	4835do		
0700 0800	Australia, ABC NT Katherine	5025do	
0700 0800	Australia, ABC NT Tennant Creek	4910do	
0700 0800	Australia, CVC International	15360as	
0700 0800	Australia, Radio Australia	9475as	9710as
	11880as	12080as	13630pa
	15240pa		15160as
0700 0800	Bhutan, BBS	6035as	
0700 0800	Canada, CFRX Toronto ON	6070na	

0700 0800	Canada, CFVP Calgary AB	6030na	
0700 0800	Canada, CKZN St John's NF	6160na	
0700 0800	Canada, CKZU Vancouver BC	6160na	
0700 0800	China, China Radio Intl	11785eu	11880as
	13660as	15350as	15465as
	17540as	17710as	
0700 0800	Costa Rica, World University Network	5030va	
0700 0800	6150va	7375va	11870va
0700 0800	Germany, CVC Intl/Voice Africa	15640af	
0700 0800	Greece, Voice of	7475va	12105va
0700 0800	Guyana, Voice of	3291do	
0700 0800	Latvia, Radio SWH	9290eu	
0700 0800	Liberia, Star Radio	9525af	
0700 0800	Malaysia, RTM/Trax FM	7295as	
0700 0800	Malaysia, RTM/Voice of Malaysia	6175as	
0700 0800	9750as	15295as	
0700 0800	Myanmar, Myanma Radio	9730do	
0700 0800	New Zealand, Radio NZ Intl	9765pa	
0700 0800	New Zealand, Radio NZ Intl	9870pa	
0700 0800	China, China Radio Intl	11620as	11880as

0800 0810 vl	Croatia, Croatian Radio	11690pa	
0800 0825	Malaysia, RTM/Voice of Malaysia	6175as	
0800 0827	Czech Rep, Radio Prague	7345eu	9860eu
0800 0830	Australia, ABC NT Katherine	5025do	
0800 0830	Australia, ABC NT Tennant Creek	4910do	
0800 0845 Sat	Myanmar, Myanma Radio	9730do	
0800 0850 mtwhf	Guam, TWR/KTWR	11840pa	
0800 0850 mtwhf	Germany, TWR Europe	6105eu	
0800 0857	Monaco, TWR Europe	9800eu	
0800 0900	China, China Radio Intl	11785eu	17490eu
0800 0900	Anguilla, World University Network	6090am	
0800 0900	Australia, ABC NT Alice Springs	2310do	
0800 0900	4835do		
0800 0900	Australia, CVC International	15360as	
0800 0900	Australia, HCJB Global	11750pa	
0800 0900	Australia, Radio Australia	5995va	9475va
	9580as	9590va	11880as
0800 0900	Canada, CFRX Toronto ON	6070na	
0800 0900	Canada, CFVP Calgary AB	6030na	
0800 0900	Canada, CKZN St John's NF	6160na	
0800 0900	Canada, CKZU Vancouver BC	6160na	
0800 0900	China, China Radio Intl	11620as	11880as

0800 0900	15350as	15465as	17540as	5030va	0900 1000	Canada, CKZU Vancouver BC	6160na
	Costa Rica, World University Network				0900 1000	China, China Radio Intl	11620as
	6150va	7375va	9725va	11870va		15535as	15210pa
0800 0900	Germany, CVC Intl/Voice Africa			15640af	0900 1000	17690pa	17750as
0800 0900	Germany, Deutsche Welle	12005as				Costa Rica, World University Network	5030va
0800 0900	Germany, TWR Europe	6105eu				6150va	7375va
0800 0900	Guam, TWR/KTWR	11840pa				9725va	11870va
0800 0900	Guyana, Voice of 3291do	5950do				13750va	
0800 0900	Indonesia, Voice of	9525al	11785pa			Germany, CVC Intl/Voice Africa	7120as
	15150as					Germany, Deutsche Welle	17710as
0800 0900	Malaysia, RTM/Trax FM	7295as				Guyana, Voice of 3291do	21840as
0800 0900	Monaco, TWR Europe	9800eu				Malaysia, RTM/Trax FM	7295as
0800 0900	New Zealand, Radio NZ Intl	9765pa				New Zealand, Radio NZ Intl	9765pa
0800 0900	New Zealand, Radio NZ Intl	9870pa				New Zealand, Radio NZ Intl	9870pa
0800 0900	Nigeria, Radio/Kaduna	4770do	6090al			Nigeria, Radio/Kaduna	4770do
0800 0900	Nigeria, Voice of / Ext. Svc Lagos	9690af				Nigeria, Voice of / Ext. Svc Lagos	9690af
0800 0900	Papua New Guinea, NBC	4890do				Papua New Guinea, NBC	4890do
0800 0900	Papua New Guinea, Wantok R. Light	7325va				Papua New Guinea, Wantok R. Light	7325va
0800 0900	Russia, Voice of	9550as	13580as	13660as		Russia, Voice of	9550as
	15195as	17495pa	17665pa	17805pa		13580as	13660as
0800 0900	Russia, Voice of	11615eu				15195as	17665pa
0800 0900	Singapore, MediaCorp Radio	6150do				Russia, Voice of	11615eu
0800 0900	Solomon Islands, SIBC	5020do	9545al			Saudi Arabia, BSKSA	15250af
0800 0900	South Africa, Channel Africa	9625af				Singapore, MediaCorp Radio	6150do
0800 0900	South Africa, DX Amateur League	7205af				Solomon Islands, SIBC	5020do
0800 0900	South Korea, KBS World Radio	9570as				South Africa, Channel Africa	9625af
0800 0900	Swaziland, TWR 4775af	6120af	9500af			UK, BBC World Service	6190af
0800 0900	UK, BBC World Service	6190af	6195as			9740as	11760me
	9740as	11760me	11940af	12095va		11895as	11940af
	15285as	15400af	17640af	17760as		12095va	15285as
0800 0900	UK, BBC World Service	15575va				15400af	15400af
0800 0900	UK, Bible Voice BC	5945eu				17640af	17760as
0800 0900	USA, American Forces Radio	4319usb				17830as	21470af
	5446usb	5765usb	6350usb	7811usb		21470af	21660as
	10320usb	12133usb	13362usb			USA, American Forces Radio	4319usb
0800 0900	USA, KNLS Anchor Point AK	9615as				5446usb	5765usb
0800 0900	USA, KTBN Salt Lake City UT	7505na				6350usb	7811usb
0800 0900	USA, KWHR Naalehu HI	9930as	11565as			10320usb	12133usb
0800 0900	USA, WBCQ Monticello ME	5110am				13362usb	
0800 0900	USA, WBOH Newport NC	5920am				USA, KTBN Salt Lake City UT	7505na
0800 0900	USA, WEWN Vandiver AL	5850am				USA, KWHR Naalehu HI	9930as
0800 0900	USA, WHRI Cypress Creek SC	7315am	5835va			11565as	
0800 0900	USA, WMLK Bethel PA	9265va				USA, WBCQ Monticello ME	5110am
0800 0900	USA, WRMI Miami FL	9955am				USA, WBOH Newport NC	5920am
0800 0900	USA, WTJC Newport NC	9370na				USA, WEWN Vandiver AL	5850am
0800 0900	USA, WWCR Nashville TN	3215na	5070na			USA, WHRI Cypress Creek SC	5835va
0800 0900	USA, WWRB Manchester TN	3185va				7315am	
0800 0900	USA, WYFR/Family Radio FL	5950na	6875na			USA, WRMI Miami FL	9955am
	7455na	9985af				USA, WTJC Newport NC	9370na
0800 0900	Vanuatu, Radio	4960do				USA, WWCR Nashville TN	3215na
0800 0900	Zambia, CVC International	6065af				5890na	5935na
0805 0900	Guam, TWR/KTWR	15170as				USA, WWRB Manchester TN	3185va
0815 0850	Sat	Germany, TWR Europe	6105eu			USA, WYFR/Family Radio FL	5950na
0815 0850	Sat	Monaco, TWR Europe	9800eu			9460as	9465as
0820 0900	w	Guam, TWR/KTWR	15170as			Vanuatu, Radio	4960do
0830 0900	Australia, ABC NT Katherine	2485do				Zambia, CVC International	6065af
0830 0900	Australia, ABC NT Tennant Creek	2325do				UK, Bible Voice BC	5945eu
						Lithuania, Radio Vilnius	9710na
						Mongolia, Voice of	12085as

1000 UTC - 6AM EDT / 5AM CDT / 3AM PDT**0900 UTC - 5AM EDT / 4AM CDT / 2AM PDT**

0900 0910	vl	Croatia, Croatian Radio	11690pa		1000 1027	Czech Rep, Radio Prague	9955na
0900 0915	Sat	UK, Bible Voice BC	5945eu			21745af	
0900 0920	Sun	Germany, TWR Europe	6105eu		1000 1030	UK, BBC World Service	15285as
0900 0920	Sun	Monaco, TWR Europe	9800eu		1000 1030	Vietnam, Voice of	7285as
0900 0930		Australia, HCJB Global	11750pa		1000 1057	Netherlands, Radio	6040as
0900 0930		Japan, NHK World/Radio Japan	9825as			12065as	
		11815as	12000pa	15590as	1000 1058	New Zealand, Radio NZ Intl	9765pa
0900 0945	Sun	UK, Bible Voice BC	5945eu		1000 1058	New Zealand, Radio NZ Intl	9870pa
0900 0957		China, China Radio Intl	15270eu	17490eu	1000 1100	Anguilla, World University Network	11775am
		17570eu			1000 1100	Australia, ABC NT Alice Springs	2310do
0900 1000		Anguilla, World University Network	6090am			4835do	
0900 1000		Australia, ABC NT Alice Springs	2310do			Australia, ABC NT Katherine	2485do
		4835do				Australia, ABC NT Tennant Creek	2325do
0900 1000		Australia, ABC NT Katherine	2485do			Australia, CVC International	15270as
0900 1000		Australia, ABC NT Tennant Creek	2325do			Australia, Radio Australia	9475va
0900 1000		Australia, CVC International	15360as			9580va	
0900 1000		Australia, Radio Australia	9475va	9580va		11880as	
		11880as				Canada, CFRX Toronto ON	6070na
0900 1000		Bhutan, BBS	6035as			Canada, CFVP Calgary AB	6030na
0900 1000		Canada, CFRX Toronto ON	6070na			Canada, CKZN St John's NF	6160na
0900 1000		Canada, CFVP Calgary AB	6030na			Canada, CKZU Vancouver BC	6160na
0900 1000		Canada, CKZN St John's NF	6160na			China, China Radio Intl	5995as

0900 0910	vl	Croatia, Croatian Radio	11690pa		1000 1100	Canada, CFRX Toronto ON	6070na
0900 0915	Sat	UK, Bible Voice BC	5945eu		1000 1100	Canada, CFVP Calgary AB	6030na
0900 0920	Sun	Germany, TWR Europe	6105eu		1000 1100	Canada, CKZN St John's NF	6160na
0900 0920	Sun	Monaco, TWR Europe	9800eu		1000 1100	Canada, CKZU Vancouver BC	6160na
0900 0930		Australia, HCJB Global	11750pa			China, China Radio Intl	5995as
0900 0930		Japan, NHK World/Radio Japan	9825as			11610as	11635as
		11815as	12000pa	15590as		11650as	11795as
0900 0945	Sun	UK, Bible Voice BC	5945eu			13590as	13620as
0900 0957		China, China Radio Intl	15270eu	17490eu		13720as	15190as
		17570eu				15210as	15350as
0900 1000		Anguilla, World University Network	6090am			17490eu	17690pa
0900 1000		Australia, ABC NT Alice Springs	2310do			Costa Rica, World University Network	5030va
		4835do				6150va	7375va
0900 1000		Australia, ABC NT Katherine	2485do			9725va	11870va
0900 1000		Australia, ABC NT Tennant Creek	2325do			13750va	
0900 1000		Australia, CVC International	15360as			Germany, CVC Intl/Voice Africa	7120as
0900 1000		Australia, Radio Australia	9475va	9580va		Guyana, Voice of 3291do	5950do
		11880as				India, All India Radio	7270as
0900 1000		Bhutan, BBS	6035as			15020as	15235as
0900 1000		Canada, CFRX Toronto ON	6070na			15260as	17510pa
0900 1000		Canada, CFVP Calgary AB	6030na			17800as	17895pa
0900 1000		Canada, CKZN St John's NF	6160na			Italy, IRRS	9510va

1000 1100	Malaysia, RTM/Trax FM	7295as	6090al		11760me	11895as	11940af	15575va
1000 1100	Nigeria, Radio/Kaduna	4770do	6090al	1100 1200 Sat	17640af	17830af	21470af	
1000 1100	Nigeria, Voice of/ Ext. Svc Lagos	9690af		1100 1200	UK, Bible Voice BC	5950as		
1000 1100	North Korea, Voice of Korea	6185as	6285sa		USA, American Forces Radio		4319usb	
	9325sa	9850as			5446usb	5765usb	6350usb	7811usb
1000 1100	Papua New Guinea, NBC	4890do			10320usb	12133usb	13362usb	
1000 1100 vl	Papua New Guinea, Wantok R. Light	7325va		1100 1200	USA, KTBN Salt Lake City UT	7505na		
1000 1100	Saudi Arabia, BSKSA	15250af		1100 1200	USA, KWFR Naalehu HI	9930as		
1000 1100	Singapore, MediaCorp Radio	6150do		1100 1200	USA, WBOH Newport NC	5920am		
1000 1100 Sun	Slovakia, European Gospel Radio	9510va		1100 1200	USA, WEWN Vandiver AL	5850am		
1000 1100 vl	Solomon Islands, SIBC	5020do	9545al	1100 1200	USA, WHRI Cypress Creek SC		5875va	
1000 1100 vl	South Africa, Channel Africa	9625af			7315na			
1000 1100	UK, BBC World Service	6190af	6195as	1100 1200	USA, WINB Red Lion PA	9265am		
	9740as	11760me	11895as	1100 1200	USA, WRMI Miami FL	9955am		
	15575va	17640af	21470af	1100 1200	USA, WTJC Newport NC	9370na		
1000 1100 Sat/Sun	UK, BBC World Service	15400af	17830af	1100 1200	USA, WWCR Nashville TN	5070na	5890na	
1000 1100	Ukraine, Radio Ukraine Intl	9950eu			5935na	15825na		
1000 1100	USA, American Forces Radio	4319usb		1100 1200	USA, WWRB Manchester TN	3185va		
	5446usb	5765usb	6350usb	1100 1200	USA, WYFR/Family Radio FL	5950na	6890na	
	10320usb	12133usb	13362usb		7780na			
1000 1100	USA, KNLS Anchor Point AK	6150as		1100 1200	Zambia, CVC International	6065af		
1000 1100	USA, KTBN Salt Lake City UT	7505na		1105 1200	Greece, Voice of	9420va	15650va	
1000 1100	USA, KWHR Naalehu HI	9930as		1115 1130 mtwhf	UK, Bible Voice BC	5950as		
1000 1100	USA, WBCQ Monticello ME	5110am		1115 1200 Sun	UK, Bible Voice BC	5950as		
1000 1100	USA, WBOH Newport NC	5920am		1120 1157	Czech Rep, Radio Prague	11640eu	175451eu-va	
1000 1100	USA, WEWN Vandiver AL	5850am						
1000 1100	USA, WHRI Cypress Creek SC	5835va		1130 1200	Guam, AWR/KSDA	15260as		
	9865am			1130 1200	Micronesia, PMA/The Cross	4755as		
1000 1100	USA, WRMI Miami FL	9955am						
1000 1100	USA, WTJC Newport NC	9370na						
1000 1100	USA, WWCR Nashville TN	5070na	5890na					
	5935na	9985na						
1000 1100	USA, WWRB Manchester TN	3185va		1200 1215 f	UK, Bible Voice BC	5950as		
1000 1100	USA, WYFR/Family Radio FL	5950na	6000am	1200 1227	Netherlands, Radio	11675na		
	6875na	6890na	7455na	1200 1230	Australia, HCJB Global	15400as		
	11725am	11830am		1200 1230	France, Radio France Intl	21620af		
1000 1100	Zambia, CVC International	6065af		1200 1230	Germany, AWR Europe	15495as		
1015 1045 Sun	UK, Bible Voice BC	5985as		1200 1230	Japan, NHK World/Radio Japan	6120na		
1030 1045	Israel, Kol Israel	13855va	15760va	1200 1230	9625pa	13660as	17585eu	
1030 1100	Iran, Voice of the Islamic Rep	15460as		1200 1230 Sun	UK, Bible Voice BC	5945eu		
	17660as			1200 1257	China, China Radio Intl	13655eu	13790eu	
1059 1100	New Zealand, Radio NZ Intl	13840pa			17490eu			
1059 1100 DRM	New Zealand, Radio NZ Intl	9870pa		1200 1257 DRM/ mtwhf	Netherlands, Radio	5955eu		

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

1100 1128	Vietnam, Voice of	9840as	7220as	7285as	1200 1300	UK, ABC NT Katherine	2485do	
1100 1130	Iran, Voice of the Islamic Rep	15460as			1200 1300	Australia, ABC NT Tennant Creek	2325do	
1100 1130	UK, BBC World Service	15400af			1200 1300	Australia, CVC International	13635as	
1100 1200	Anguilla, World University Network		11775am		1200 1300	Australia, Radio Australia	6020va	9475as
1100 1200	Australia, ABC NT Alice Springs	2310do			1200 1300 DRM	9560pa	9590as	11880as
1100 1200	4835do				1200 1300 Sat/Sun	Australia, Radio Australia	5995va	
1100 1200	Australia, ABC NT Katherine	2485do			1200 1300	Canada, CBC NQ SW Service		9625na
1100 1200	Australia, ABC NT Tennant Creek	2325do			1200 1300	Canada, CFRX Toronto ON	6070na	
1100 1200	Australia, CVC International	13635as			1200 1300	Canada, CFVP Calgary AB	6030na	
1100 1200	Australia, Radio Australia	5995va	6020va		1200 1300	Canada, CKZN St John's NF	6160na	
	9475va	9560as	9580va		1200 1300	Canada, CKZU Vancouver BC		6160na
	11880as	12080as			1200 1300	China, China Radio Intl	5995as	9460as
1100 1200 Sat/Sun	Canada, CBC NQ SW Service	9625na			1200 1300	9730as	9760pa	11650as
1100 1200	Canada, CFRX Toronto ON	6070na			1200 1300	11690as	11760pa	11980as
1100 1200	Canada, CFVP Calgary AB	6030na			1200 1300	Costa Rica, World University Network		9725va
1100 1200	Canada, CKZN St John's NF	6160na			1200 1300	11870va	13750va	
1100 1200	Canada, CKZU Vancouver BC	6160na			1200 1300 Sun	Italy, IRRS	9510va	
1100 1200	China, China Radio Intl	6040na	11750na		1200 1300	Latvia, Radio SWH		9290eu
	13655eu	17490eu			1200 1300	Malaysia, RTM/Trax FM	7295as	
1100 1200	Costa Rica, World University Network	5030va	6150va		1200 1300	Nigeria, Radio/Kaduna	4770do	6090al
	7375va	9725va	11870va		1200 1300	Nigeria, Voice of/ Ext. Svc Lagos		9690af
1100 1200	6150va	7375va	9725va		1200 1300	Papua New Guinea, NBC	4890do	
	13750va				1200 1300	Papua New Guinea, Wantok R. Light	7325va	
1100 1200 DRM	Germany, CVC Intl/Voice Africa	7120as			1200 1300	Saudi Arabia, BSKSA	15250af	
1100 1200	Italy, IRRS	9510va			1200 1300	Singapore, Radio Singapore Intl		6080as
1100 1200	Malaysia, RTM/Trax FM	7295as			1200 1300	Singapore, Radio Ukraine Intl	6150as	
1100 1200	New Zealand, Radio NZ Intl	13840pa			1200 1300	Slovakia, European Gospel Radio		9510va
1100 1200 DRM	New Zealand, Radio NZ Intl	9870pa			1200 1300	South Korea, KBS World Radio		9650na
1100 1200	Nigeria, Radio/Kaduna	4770do	6090al		1200 1300	Taiwan, Radio Taiwan Intl	9750eu	
1100 1200	Nigeria, Voice of/ Ext. Svc Lagos	9690af			1200 1300	Taiwan, Radio Taiwan Intl	9740as	9750am
1100 1200	Papua New Guinea, NBC	4890do			1200 1300	11760me	11895as	11940af
1100 1200 vl	Papua New Guinea, Wantok R. Light	7325va			1200 1300	117640af	17830af	21470af
1100 1200	Saudi Arabia, BSKSA	15250af			1200 1300	Ukraine, Radio Ukraine Intl	9950eu	
1100 1200	Singapore, Radio Singapore Intl	6080as			1200 1300	USA, American Forces Radio		4319usb
	6150as				1200 1300	5446usb	5765usb	6350usb
1100 1200 Sun	Slovakia, European Gospel Radio	9510va			1200 1300	10320usb	12133usb	13362usb
1100 1200 vl	South Africa, Channel Africa	9625af			1200 1300	USA, KNLS Anchor Point AK	6150as	6915as
1100 1200	Taiwan, Radio Taiwan Intl	7445as			1200 1300	USA, KTBN Salt Lake City UT	7505na	
1100 1200	UK, BBC World Service	5875am	6190af					
	6195as	9660am	9740as		1200 1300			
	9750am							

1200 1300	USA, KWHR Naalehu HI	12130as		1300 1400	USA, WWRB Manchester TN	3185va	9385va
1200 1300	USA, Voice of America	9640va	9760va	1300 1400	USA, WYFR/Family Radio FL	7175as	7560as
	11705va	11730va	15190va		7780na	9485as	11520as
1200 1300	USA, WBOH Newport NC	5920am			11830na	11855na	11560as
1200 1300	USA, WEWN Vandiver AL	5850am		1300 1400	Zambia, CVC International	6065af	11970na
1200 1300	USA, WHRA Greenbush ME	13650va		1305 1330 Sat	Austria, Radio Austria Intl	17715va	
1200 1300 mtwhf	USA, WHRI Cypress Creek SC	7520na		1310 1340	Japan, NHK World/Radio Japan	9875as	
1200 1300	USA, WHRI Cypress Creek SC	9660am		1315 1330 mwa	Australia, HCJB Global	15540as	
1200 1300	USA, WINB Red Lion PA	9265am		1330 1345 Sun	Austria, Radio Austria Intl	17715va	
1200 1300	USA, WRMI Miami FL	9955am		1330 1357 DRM/Fri-Sat	Czech Rep, Radio Prague	9750eu	
1200 1300	USA, WTJC Newport NC	9370na		1330 1400 mtwhfa	Guam, AWR/KSDA	15660as	
1200 1300	USA, WWCR Nashville TN	5070na	5890na	1330 1400	India, All India Radio	9690as	11620as
	5935na	15825na			13710as		
1200 1300	USA, WWRB Manchester TN	3185va		1330 1400	Laos, National Radio	7145as	
1200 1300	USA, WYFR/Family Radio FL	5900as	6890na	1330 1400	Sweden, Radio	7420as	15240na
	7780na	11530am	11970na	1330 1400	Turkey, Voice of	11735va	12035eu
1200 1300	Zambia, CVC International	6065af					
1215 1300	Egypt, Radio Cairo	17835as					
1230 1245 Sun	Australia, HCJB Global	15540as					
1230 1258	Vietnam, Voice of	9840as	12020as				
1230 1300	Bangladesh, Bangla Betar	7185as					
1230 1300	Bulgaria, Radio	11700eu	15700eu				
1230 1300	Thailand, Radio	9810va					
1245 1300 Sat/Sun	UK, Bible Voice BC	5950as					
1259 1300	New Zealand, Radio NZ Intl	5950pa					

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

1300 1330	Egypt, Radio Cairo	17835as		1400 1415 Sat	Germany, Pan American BC	13645me	
1300 1330 Sun	Italy, IRRS	15750as		1400 1415	Russia, FEBA	7150eu	
1300 1330 Sun	Slovakia, Universal Life	15750as		1400 1425	Turkey, Voice of	11735va	12035eu
1300 1356	Romania, Radio Romania Intl	15105eu		1400 1429	Czech Rep, Radio Prague	11600as	13580na
	17745eu			1400 1430 w	Germany, Pan American BC	15205as	
1300 1357	China, China Radio Intl	13610eu	13790eu	1400 1430 mhf	Guam, TWR/KTWR	9975as	
	15540sa			1400 1430	Japan, NHK World/Radio Japan	7200as	
1300 1400	Anguilla, World University Network	11775am			9875as	11705na	11780af
1300 1400	Australia, CVC International	13635as		1400 1430	Serbia, International Radio Serbia	7240eu	
1300 1400	Australia, Radio Australia	6020va	9560as	1400 1457	Thailand, Radio	9725va	
	9580va	9590va		1400 1457	China, China Radio Intl	9700eu	9795eu
1300 1400 DRM	Australia, Radio Australia	5995va		1400 1500	Netherlands, Radio	9345as	12080as
1300 1400 mtwhf	Austria, Radio Austria Intl	17715va		1400 1500	15595as		
1300 1400 Sat/Sun	Canada, CBC NQ SW Service	9625na		1400 1500	Anguilla, World University Network	11775am	
1300 1400	Canada, CFRX Toronto ON	6070na		1400 1500	Australia, CVC International	13635as	
1300 1400	Canada, CFVP Calgary AB	6030na		1400 1500	Australia, Radio Australia	5995va	6080va
1300 1400	Canada, CKZN St John's NF	6160na		1400 1500	7240va	9590va	
1300 1400	Canada, CKZU Vancouver BC	6160na		1400 1500	Bhutan, BBS	6035as	
1300 1400	China, China Radio Intl	5995as	9570na	1400 1500 Sat/Sun	Canada, CBC NQ SW Service	9625na	
	9650na	9730as	9760pa	1400 1500	Canada, CFRX Toronto ON	6070na	
	9870as	11660as	11760pa	1400 1500	Canada, CFVP Calgary AB	6030na	
	13755as	15260na		1400 1500	Canada, CKZN St John's NF	6160na	
1300 1400	Costa Rica, World University Network	9725va		1400 1500	Canada, CKZU Vancouver BC	6160na	
	11870va	13750va		1400 1500	China, China Radio Intl	5995as	9560as
1300 1400	Malaysia, RTM/Trax FM	7295as		1400 1500	9765as	9870as	11675as
1300 1400	New Zealand, Radio NZ Intl	5950pa		1400 1500	11775as	13685af	13740na
1300 1400	Nigeria, Radio/Kaduna	4770do	6090al	1400 1500	17630af		
1300 1400	Nigeria, Voice of/ Ext. Svc Lagos	9690af		1400 1500	Costa Rica, World University Network	9725va	
1300 1400	North Korea, Voice of Korea	7570eu	9335na	1400 1500	11870va	13750va	
	11710na	12015eu		1400 1500	Germany, CVC Intl/Voice Africa	7145as	
1300 1400	Papua New Guinea, NBC	4890do		1400 1500	Germany, Overcomer Ministries	6110va	
1300 1400 vl	Papua New Guinea, Wantok R. Light	7325va		1400 1500	13810va	15325va	
1300 1400	Poland, Polish Radio	5975eu	9450eu	1400 1500	Guam, TWR/KTWR	9975as	
1300 1400	Singapore, Radio Singapore Intl	6080as		1400 1500	India, All India Radio	9690as	11620as
1300 1400	South Korea, KBS World Radio	9570na		1400 1500	13710as		
	9770as			1400 1500	Libya, Voice of Africa	17725af	21695af
1300 1400	UK, BBC World Service	5975as	6190af	1400 1500	Malaysia, RTM/Trax FM	7295as	
	6195as	9740as	11895as	1400 1500	New Zealand, Radio NZ Intl	5950pa	
	15420af	15575va	17640af	1400 1500	Nigeria, Radio/Kaduna	4770do	6090al
	21470af			1400 1500	Nigeria, Voice of/ Ext. Svc Lagos	9690af	
1300 1400	USA, American Forces Radio	4319usb		1400 1500	Papua New Guinea, Wantok R. Light	7325va	
	5446usb	5765usb	6350usb	1400 1500	Singapore, MediaCorp Radio	6150do	
	10320usb	12133usb	13362usb	1400 1500	South Africa, Channel Africa	9625af	
1300 1400	USA, KJES Vado NM	11715na		1400 1500	UK, BBC World Service	5975as	6190af
1300 1400	USA, KTBN Salt Lake City UT	7505na		1400 1500	6195as	9740as	11760va
1300 1400	USA, KWHR Naalehu HI	12130as		1400 1500	11920as	11940af	17830af
1300 1400	USA, Voice of America	9760va	11705va	1400 1500	21660af		
1300 1400	USA, WBOH Newport NC	5920am		1400 1500 Sat	UK, BBC World Service	9410va	
1300 1400	USA, WEWN Vandiver AL	5850am		1400 1500 Sat/Sun	UK, Bible Voice BC	11695as	
1300 1400	USA, WHRA Greenbush ME	15665va		1400 1500	USA, American Forces Radio	4319usb	
1300 1400	USA, WHRI Cypress Creek SC	9840na		1400 1500	5446usb	5765usb	6350usb
1300 1400 Sat/Sun	USA, WHRI Cypress Creek SC	11785na		1400 1500	10320usb	12133usb	13362usb
1300 1400	USA, WINB Red Lion PA	13570am		1400 1500	USA, KJES Vado NM	11715na	
1300 1400	USA, WRMI Miami FL	9955am		1400 1500	USA, KNLS Anchor Point AK	6150as	
1300 1400	USA, WTJC Newport NC	9370na		1400 1500	USA, KTBN Salt Lake City UT	7505na	15590na
1300 1400	USA, WWCR Nashville TN	5890na	9985na	1400 1500	USA, KWHR Naalehu HI	9930as	
	13845na	15825na		1400 1500	USA, Voice of America	4930af	6080af
				1400 1500	9760va	9865va	11885va
				1400 1500	15205va	15580af	17715af
1400 1500	USA, WBCQ Monticello ME	17495am		1400 1500	17895af		
1400 1500	USA, WBOH Newport NC	5920am		1400 1500	USA, WBOH Newport NC	5920am	
1400 1500	USA, WEWN Vandiver AL	5850am		1400 1500	USA, WEWN Vandiver AL	5850am	
1400 1500	USA, WHRA Greenbush ME	15665va		1400 1500	USA, WHRA Greenbush ME	15665va	
1400 1500	USA, WHRI Cypress Creek SC	9840na		1400 1500	USA, WHRI Cypress Creek SC	9495na	
1400 1500	USA, WHRI Cypress Creek SC	11785na		1400 1500	USA, WHRI Cypress Creek SC	9840na	
1400 1500	USA, WINB Red Lion PA	13570am		1400 1500	USA, WHRI Cypress Creek SC	11785na	
1400 1500	USA, WRMI Miami FL	9955am		1400 1500	USA, WINB Red Lion PA	13570am	
1400 1500	USA, WTJC Newport NC	9370na		1400 1500	USA, WRMI Miami FL	9955am	

1400 1500	USA, WTJC Newport NC	9370na			17715af	17895af	
1400 1500	USA, WWCR Nashville TN	5890na	9985na		1500 1600 Sun	USA, WBCQ Monticello ME	17495am
	13845na	15825na			1500 1600	USA, WBOH Newport NC	5920am
1400 1500	USA, WWRB Manchester TN	9385va			1500 1600	USA, WEWN Vandiver AL	11530am
1400 1500	USA, WYFR/Family Radio FL	5920as	6225as		1500 1600 mtwhfa	USA, WHRA Greenbush ME	15665va
	7175as	7560as	11520as	11560as	1500 1600	USA, WHRI Cypress Creek SC	9840na
	11565na	11855na	13695na	17760as	1500 1600	USA, WHRI Cypress Creek SC	11785na
1400 1500	Zambia, CVC International	6065af			1500 1600	USA, WINB Red Lion PA	13570am
1415 1430	Germany, Pan American BC	13645as			1500 1600	USA, WRMI Miami FL	7385na
1415 1430	Nepal, Radio	3230as	5005as	6100as	1500 1600	USA, WTJC Newport NC	9370na
	7165as				1500 1600	USA, WWCR Nashville TN	9985na
1415 1445	UAE, FEBA	12045eu				13845na	15825na
1425 1500	Micronesia, PMA/The Cross	4755as			1500 1600	USA, WWRB Manchester TN	9385va
1430 1445	Sun Germany, Pan American BC	13645as			1500 1600	USA, WYFR/Family Radio FL	5920as
1430 1445	UAE, FEBA	12045eu				11565na	11855va
1430 1500	Albania, Radio Tirana	13640na			1500 1600	Zambia, CVC International	4965af
1430 1500	Australia, Radio Australia	9475va	11660pa		1500 1600	7570eu	9335na
1430 1500	Ethiopia, Radio	5990af	7110af	9704af	1510 1545	Swaziland, TWR	4760af
1430 1500	South Korea, KBS World Radio				1515 1600 Sat	UK, Bible Voice BC	12035as
1430 1500	Sweden, Radio	9440va			1530 1545	India, All India Radio	7255af
1430 1500	USA, Voice of America	6105va	7225va			9910af	9820af
	9715va	15130va			1530 1600	Germany, AWR Europe	11675as

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

1500 1510	mtwhfa Turkmenistan, Turkmen Radio	5015eu			1530 1600	Mongolia, Voice of	12085as
1500 1527	Czech Rep, Radio Prague	7385na			1530 1600	Sweden, Radio	7440va
1500 1528	Vietnam, Voice of 9550va	9840va	12020va		1530 1600 mh	UK, Bible Voice BC	12035as
	13860va				1530 1600	UK, Sudan Radio Service	9840af
1500 1530	Guam, AWR/KSDA	12105as			1530 1600	USA, Voice of America	6105va
1500 1530	Nigeria, Radio, Natl Svc/Abuja	7275do				9760va	15460va
1500 1530	UK, BBC World Service	11860af	15420af				
	17640af						
1500 1530	UK, Bible Voice BC	11895as			1600 1615	Pakistan, Radio	6230eu
1500 1530	UK, Sudan Radio Service	9840af			1600 1628	Vietnam, Voice of	7280va
1500 1530	USA, Voice of America	6105va	9760va			11630va	13860va
	15460va				1600 1630	Guam, AWR/KSDA	9585as
1500 1545	Sweden, IBRA Radio	7340as			1600 1630	Iran, Voice of the Islamic Rep	11690as
1500 1557	Canada, Radio Canada Intl	9635va	11975va			7330as	
1500 1557	China, China Radio Intl	9435eu	9525eu		1600 1630	Myanmar, Myanma Radio	9730do
1500 1557	Netherlands, Radio	9345af	12080as		1600 1630	Nigeria, Voice of/ Ext. Svc Lagos	9690af
	15595as				1600 1630 Sat/Sun	Swaziland, TWR	4760af
1500 1600	Anguilla, World University Network	11775am			1600 1650	New Zealand, Radio NZ Intl	5950pa
1500 1600	Australia, CVC International	13635as			1600 1657	China, China Radio Intl	7255eu
1500 1600	Australia, Radio Australia	5995va	6080va			9525eu	9435eu
	7240as	9475va	9590as		1600 1700	Anguilla, World University Network	11775am
1500 1600	Canada, CBC NQ SW Service	9625na			1600 1700	Australia, CVC International	13635as
1500 1600	Canada, CFRX Toronto ON	6070na			1600 1700	Australia, Radio Australia	5995va
1500 1600	Canada, CFVP Calgary AB	6030na			1600 1700	7240as	6080va
1500 1600	Canada, CKZN St John's NF	6160na			1600 1700	Austria, Radio Austria Intl	13675am
1500 1600	Canada, CKZU Vancouver BC	6160na			1600 1700 mtwhf	Canada, CBC NQ SW Service	9625na
1500 1600	China, China Radio Intl	5955as	6100af		1600 1700 Sat	Canada, CFRX Toronto ON	6070na
	7160as	7325as	9785as	9870as	1600 1700	Canada, CFVP Calgary AB	6030na
	11775as	13685af	13740na	17630af	1600 1700	Canada, CKZN St John's NF	6160na
1500 1600	Costa Rica, World University Network	9725va			1600 1700	Canada, CKZU Vancouver BC	6160na
	11870va	13750va			1600 1700	China, China Radio Intl	6100af
	13810va	15325va			1600 1700	11800af	9570af
1500 1600	Germany, CVC Intl/Voice Africa	7145as			1600 1700	Costa Rica, World University Network	11870va
1500 1600	Germany, CVC Intl/Voice Africa	15680af				13750va	
1500 1600	Germany, Overcomer Ministries	6110va					
	13810va	15325va			1600 1700	Egypt, Radio Cairo	11740af
1500 1600	Italy, IRRS	9825af			1600 1700	Ethiopia, Radio	7165af
1500 1600	Libya, Voice of Africa	17725af	21695af		1600 1700	9560af	
1500 1600	Malaysia, RTM/Trax FM	7295as			1600 1700	France, Radio France Intl	15605af
1500 1600	Myanmar, Myanma Radio	5985as			1600 1700	Germany, CVC Intl/Voice Africa	15680af
1500 1600	New Zealand, Radio NZ Intl	5950pa			1600 1700	Germany, Deutsche Welle	5965as
1500 1600	Nigeria, Radio/Kaduna	4770do	6090al		1600 1700	Germany, Overcomer Ministries	6110va
1500 1600	Nigeria, Voice of/ Ext. Svc Lagos	9690af			1600 1700 1st Sun	Germany, Overcomer Ministries	6110eu
1500 1600	Papua New Guinea, Wantok R. Light	7325va			1600 1700	Italy, IRRS	9825af
1500 1600	Russia, Voice of	7350as	7260as	9660as	1600 1700	Jordan, Radio	11690na
1500 1600	Russia, Voice of	5905eu			1600 1700	Malaysia, RTM/Trax FM	7295as
1500 1600	Singapore, MediaCorp Radio	6150do			1600 1700	Nigeria, Radio/Kaduna	4770do
1500 1600	Slovakia, Miraya FM	9825af			1600 1700	6090al	
1500 1600	South Africa, Channel Africa	17770af			1600 1700	North Korea, Voice of	9990va
1500 1600	UK, BBC World Service	6040as	6190af		1600 1700	7325va	
	6195as	9740as	11920as	11940af	1600 1700	Russia, Voice of	4965va
	12095va	15105af	17640af	17830af	1600 1700	7260as	4975va
	21470af	21660af			1600 1700	7305as	6130eu
1500 1600	UK, BBC World Service	9410va			1600 1700	7320eu	9470me
1500 1600	USA, American Forces Radio	4319usb			1600 1700	Rwanda, Radio	6055do
	5446usb	5765usb	6350usb	7811usb	1600 1700	Slovakia, Miraya FM	9825af
	10320usb	12133usb	13362usb		1600 1700	South Korea, KBS World Radio	9515eu
1500 1600	USA, KTBN Salt Lake City UT	7505na	15590na		1600 1700	Taiwan, Radio Taiwan Intl	9785as
1500 1600	USA, KWHR Naalehu HI	9930as			1600 1700	3255af	11550as
1500 1600	USA, Voice of America	4930af	6080af		1600 1700	6190af	11665va
	7125af	9520va	9865va	11525va	1600 1700	12095va	11920as
	11765va	12150va	13735va	15580af	1600 1700	17830af	15400af
1500 1600	USA, WWCR Nashville TN	5890na	9985na		1600 1700	21470af	21660af
	13845na	15825na			1600 1700	9410va	
1500 1600	Zambia, CVC International	6065af			1600 1700	USA, American Forces Radio	4319usb
	15210am	17760na			1600 1700	5446usb	5765usb
	17760na	17690af			1600 1700	6350usb	7811usb

1600	1700	10320usb	12133usb	13362usb		1700	1800	Taiwan, Radio Taiwan Intl	11850af
1600	1700	USA, KJES Vado NM		11715na		1700	1800	UK, BBC World Service	5895eu
1600	1700	USA, KTBN Salt Lake City UT		15590na		1700	1800	UK, BBC World Service	3255af
1600	1700	USA, KWHR Naalehu HI		9930as			6190af	11665va	3915as
1600	1700	USA, Voice of America		4930af	6080af		12095af	15400af	11955as
		15580af	13600va	13615va	15445va			17830af	21470af
1600	1700	Sun	17715af	17895af		1700	1800	UK, Bible Voice BC	9460me
1600	1700	USA, WBCQ Monticello ME		17495am		1700	1800	USA, American Forces Radio	4319usb
1600	1700	USA, WBOH Newport NC		5920am			5446usb	5765usb	6350usb
1600	1700	USA, WEWN Vandiver AL		11530am	15785eu		10320usb	12133usb	7811usb
1600	1700	USA, WHRA Greenbush ME		17650af		1700	1800	USA, KTBN Salt Lake City UT	15590na
1600	1700	USA, WHRI Cypress Creek SC		9840na		1700	1800	USA, KWHR Naalehu HI	9930as
		15285am				1700	1800	USA, Voice of America	6080af
1600	1700	USA, WINB Red Lion PA		13570am			15580af	17895af	13710af
1600	1700	smtwhf	USA, WMLK Bethel PA	9265va		1700	1800	USA, WBCQ Monticello ME	17495am
1600	1700	USA, WRMI Miami FL		7385na		1700	1800	USA, WBOH Newport NC	5920am
1600	1700	USA, WTJC Newport NC		9370na		1700	1800	USA, WEWN Vandiver AL	11530am
1600	1700	USA, WWCR Nashville TN	9985na	12160na		1700	1800	15785eu	15285am
		13845na	15825na			1700	1800	USA, WHRI Cypress Creek SC	
1600	1700	Sun	USA, WWRB Manchester TN	11920af		1700	1800	USA, WINB Red Lion PA	13570am
1600	1700	USA, WWRB Manchester TN	9385va	12180va		1700	1800	USA, WMLK Bethel PA	9265va
1600	1700	USA, WYFR/Family Radio FL	6085am	9885af		1700	1800	USA, WRMI Miami FL	9955am
		11565na	11830na	11845na	12010as	1700	1800	USA, WTJC Newport NC	9370na
		13695na	15325af	17690af	17760na	1700	1800	USA, WWCR Nashville TN	9985na
		18980va	21455va			1700	1800	12160na	
1600	1700	Zambia, CVC International		4965af			13845na	15825na	
1605	1630	Sat/Sun	Austria, Radio Austria Intl	13675am		1700	1800	USA, WWRB Manchester TN	11920af
1605	1700	Canada, Radio Canada Intl		9610na		1700	1800	USA, WWRB Manchester TN	9285va
1615	1645	mtwhf	Swaziland, TWR 6130af			1700	1800	USA, WYFR/Family Radio FL	12180va
1615	1700	Sat/Sun	UK, BBC World Service	11860af	15420af		13695na	17555na	9885af
		17640af				1700	1800	13955va	18980va
1630	1645	Sun	Germany, Pan American BC	9850me		1715	1730	21455va	21455va
1630	1700	Guam, AWR/KSDA		11980as		1715	1745	h	
1630	1700	Nigeria, Voice of/ Ext. Svc	Lagos	15120af		1730	1745	h	
1630	1700	Sat/Sun	Swaziland, TWR 6130af			1730	1800	UK, Bible Voice BC	9460me
1630	1700	Sun	UK, Bible Voice BC	9460me		1730	1800	UK, Bible Voice BC	9460me
1640	1650	mtwhfa	Turkmenistan, Turkmen Radio	4930eu		1730	1800	Guam, AWR/KSDA	9980me
1640	1700	mtwhf	UK, Bible Voice BC	9460me		1730	1800	Slovakia, Radio Slovakia Int	5915eu
1645	1700	f	Sweden, IBRA Radio	9830as		1730	1800	Swaziland, TWR 9500af	6055eu
1645	1700	Tajikistan, Tajik Radio		7245as		1730	1800	UK, Bible Voice BC	9460me
1645	1700	UK, Bible Voice BC	9460me			1730	1800	UK, Bible Voice BC	9615me
1651	1700	DRM	New Zealand, Radio NZ Intl	9890pa		1730	1800	UK, Sudan Radio Service	9840af
1651	1700	New Zealand, Radio NZ Intl	9615pa			1730	1800	USA, Voice of America	4930af

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

1700	1715		Swaziland, TWR 6130af	
1700	1715	twhfa	UK, Bible Voice BC	9460me
1700	1720	twhfa	Moldova, Radio PMR/Pridnestrovie	6235eu
1700	1727		Czech Rep, Radio Prague	5930eu
1700	1730		Jordan, Radio	11690na
1700	1740	f	Moldova, Radio PMR/Pridnestrovie	6235eu
1700	1745		UK, BBC World Service	6005af
1700	1757		China, China Radio Intl	6100eu
			7255eu	7335eu
1700	1800		Anguilla, World University Network	11775am
1700	1800	mtwhf	Argentina, RAE	15344eu
1700	1800		Australia, CVC International	13635as
1700	1800		Australia, Radio Australia	5995va
1700	1800	Sat	9475as	9580va
1700	1800		Canada, CBC NQ SW Service	9710as
1700	1800		Canada, CFRX Toronto ON	6070na
1700	1800		Canada, CFVP Calgary AB	6030na
1700	1800		Canada, CKZN St John's NF	6160na
1700	1800	DRM	Canada, CKZU Vancouver BC	6160na
1700	1800		Canada, Radio Canada Intl	9800na
1700	1800		China, China Radio Intl	9570af
1700	1800		Costa Rica, World University Network	11900af
			13750va	11870va
1700	1800		Egypt, Radio Cairo	11740af
1700	1800		Eqt. Guinea, Radio Africa	15190af
1700	1800		Germany, CVC Intl/Voice Africa	15680af
1700	1800		Italy, IRRS	9825va
1700	1800		Italy, IRRS	9825af
1700	1800		Malaysia, RTM/Trax FM	7295as
1700	1800	DRM	New Zealand, Radio NZ Intl	9615pa
1700	1800		New Zealand, Radio NZ Intl	9890pa
1700	1800		Nigeria, Radio/Kaduna	4770do
1700	1800		Nigeria, Voice of/ Ext. Svc Lagos	6090al
1700	1800	vl	Papua New Guinea, Wantok R. Light	15120af
1700	1800		Russia, Voice of	7325va
			6125as	7235as
			7270va	7320eu
1700	1800	vl	9470me	
1700	1800	vl	Rwanda, Radio	6055do
1700	1800		Slovakia, Miraya FM	9825af
1700	1800		South Africa, Channel Africa	15235af
1700	1800		Swaziland, TWR	3200af

1700	1800	Taiwan, Radio Taiwan Intl	11850af
1700	1800	DRM	5895eu
1700	1800	UK, BBC World Service	3255af
		UK, BBC World Service	3915as
		6190af	11755af
		11665va	11955as
		12095af	15400af
		15780af	21470af
1700	1800	Sun	9460me
1700	1800	USA, American Forces Radio	4319usb
		5446usb	5765usb
		6350usb	7811usb
		10320usb	12133usb
		13362usb	
1700	1800	USA, KTBN Salt Lake City UT	15590na
1700	1800	USA, KWHR Naalehu HI	9930as
1700	1800	USA, Voice of America	6080af
		15580af	13710af
1700	1800	Sun	17895af
1700	1800	USA, WBCQ Monticello ME	17495am
1700	1800	USA, WBOH Newport NC	5920am
1700	1800	USA, WEWN Vandiver AL	11530am
1700	1800	USA, WHRI Cypress Creek SC	15785eu
1700	1800	USA, WINB Red Lion PA	15285am
1700	1800	USA, WMLK Bethel PA	13570am
1700	1800	USA, WRMI Miami FL	9265va
1700	1800	USA, WTJC Newport NC	9955am
1700	1800	USA, WWCR Nashville TN	9370na
		9985na	12160na
		13845na	15825na
1700	1800	Sun	11920af
1700	1800	USA, WWRB Manchester TN	9285va
1700	1800	USA, WYFR/Family Radio FL	3955va
		13695na	17555na
		18980va	21455va
1700	1800		21680af
1700	1800	Zambia, CVC International	4965af
1715	1730	h	9460me
1715	1745	t	9460me
1730	1745	h	9460me
1730	1800	UK, Bible Voice BC	9980me
1730	1800	Guam, AWR/KSDA	5915eu
1730	1800	Slovakia, Radio Slovakia Int	6055eu
1730	1800	Swaziland, TWR 9500af	
1730	1800	UK, Bible Voice BC	9460me
1730	1800	UK, Bible Voice BC	9615me
1730	1800	UK, Sudan Radio Service	9840af
1730	1800	USA, Voice of America	4930af
		15775af	12080af
1730	1800	USA, Voice of America	4930af
		15775af	12080af
1730	1800	USA, Voice of America	4930af
		15775af	12080af
1730	1800	Vatican City, Vatican Radio	9755af
		13765af	11625af
1745	1800	Bangladesh, Bangla Betar	7185as
1745	1800	India, All India Radio	7410eu
		9950eu	9445af
		11620eu	13605af
		11935af	
		15075af	17670af
1745	1800	UK, Bible Voice BC	9460me
		11830af	
1800	1830	UK, BBC World Service	11955as
1800	1830	Sat/Sun	9460me
1800	1830	UK, Bible Voice BC	4930af
		11975af	6080af
		13710af	17895af
1800	1856	USA, Voice of America	7215eu
		15580af	
1800	1856	Romania, Radio Romania Intl	9640eu
		9400va	
1800	1857	China, China Radio Intl	6100eu
1800	1857	Netherlands, Radio	6020af
		12050af	11655af
1800	1900	Anguilla, World University Network	7110eu
1800	1900	Australia, Radio Australia	6080va
		9475va	7240as
		9580as	11880as
1800	1900	Bangladesh, Bangla Betar	9710as
1800	1900	Canada, CFRX Toronto ON	7185eu
1800	1900	Canada, CFVP Calgary AB	6030na
1800	1900	Canada, CKZN St John's NF	6160na
1800	1900	Canada, CKZU Vancouver BC	6160na
1800	1900	Canada, Radio Canada Intl	7185af
		13650af	11875af
		15365af	17790af
1800	1900	Costa Rica, World University Network	11870va
		13750va	
1800	1900	Egypt, Radio Cairo	11740af
1800	1900	Eqt. Guinea, Radio Africa	15190af

1800 1900	Germany, CVC Intl/Voice Africa	9490af	1900 2000	Canada, CFRX Toronto ON	6070na
1800 1900	India, All India Radio	7410eu 9445af	1900 2000	Canada, CFVP Calgary AB	6030na
	9950eu 11620eu 11935af	13605af	1900 2000	Canada, CKZN St John's NF	6160na
	15075af 15155af	17670af	1900 2000	Canada, CKZU Vancouver BC	6160na
1800 1900 fas	Italy, IRRS	7285va	1900 2000	Canada, Radio Canada Intl	17790af
1800 1900	Kuwait, Radio Kuwait	11990na	1900 2000	China, China Radio Intl	7295va 9435va
1800 1900	Malaysia, RTM/Trax FM	7295as	1900 2000	9440va	
1800 1900	New Zealand, Radio NZ Intl	9615pa	1900 2000	Costa Rica, World University Network	11870va
1800 1900 DRM	New Zealand, Radio NZ Intl	9890pa	1900 2000	13750va	
1800 1900	Nigeria, Radio/Kaduna	4770do	6090al	Egypt, Radio Cairo	15375af
1800 1900	Nigeria, Voice of Ext. Svc Lagos		15120af	Eqt Guinea, Radio Africa	15190af
1800 1900	North Korea, Voice of Korea	7570eu	12015eu	Germany, CVC Intl/Voice Africa	9490af
1800 1900 vl	Papua New Guinea, Wantok R. Light	7325va	1900 2000 fas	Italy, IRRS	7285va
1800 1900	Poland, Polish Radio	6015eu	7130eu	Malaysia, RTM/Trax FM	7295as
1800 1900	Russia, Voice of	6125as	7105eu	Nigeria, Radio/Kaduna	4770do 6090al
	7235as	7270af	7320eu	Nigeria, Voice of Ext. Svc Lagos	15120af
	11510af		7335va	North Korea, Voice of Korea	7100af 9975va
1800 1900 Sat/Sun	Russia, Voice of	6055eu	6175eu	11910af 11535va	
1800 1900 vl	Rwanda, Radio	6055do		Papua New Guinea, NBC	4890do
1800 1900 fas	Slovakia, European Gospel Radio	7285va	1900 2000 vl	Papua New Guinea, Wantok R. Light	7325va
1800 1900	South Korea, KBS World Radio	7275eu	1900 2000	Russia, Voice of	5955as 6175eu 7105eu
1800 1900	Swaziland, TWR 9500af			7290eu 7335af 11510af	
1800 1900	Taiwan, Radio Taiwan Intl	3965eu	1900 2000 vl	Rwanda, Radio	6055do
1800 1900	UK, BBC World Service	3255af	5875va	Slovakia, European Gospel Radio	7285va
	5955as	6005af	6190af 6195va	Solomon Islands, SIBC	5020do 9545al
	9410af	9480va	11755af	South Africa, Channel Africa	3345af
	15400af	17830af	12095af	South Africa, DX Amateur League	3215af
1800 1900 DRM	UK, BBC World Service	5895eu	1900 2000	Thailand, Radio	9805eu
1800 1900 Sat	UK, Bible Voice BC	9615me	1900 2000	Uganda, UBC Radio	4976do 5026do
1800 1900	USA, American Forces Radio		1900 2000	UK, BBC World Service	3255af 5875va
	5446usb	5765usb	6350usb 7811usb	6005af 6190af 6195va	9410af
	10320usb	12133usb	13362usb	9480va 9630af	12095af 15400af
1800 1900	USA, KJES Vado NM	15385na		17830af	
1800 1900	USA, KTBN Salt Lake City UT	15590na	1900 2000 DRM	UK, BBC World Service	5895eu
1800 1900 Sat/Sun	USA, WBCQ Monticello ME	9330am	17495am	UK, Bible Voice BC	9470me
1800 1900	USA, WBOH Newport NC	5920am	1900 2000 Sun	UK, Bible Voice BC	7260af
1800 1900	USA, WEWN Vandiver AL	11530am	15785eu	USA, American Forces Radio	4319usb
1800 1900 mtwhf	USA, WHRI Cypress Creek SC	15670va	1900 2000	5446usb 5765usb	6350usb 7811usb
1800 1900 Sat/Sun	USA, WHRI Cypress Creek SC	15285va		10320usb 12133usb	13362usb
1800 1900	USA, WINB Red Lion PA	13570am	1900 2000	USA, KJES Vado NM	15385na
1800 1900 smtwhf	USA, WMLK Bethel PA	9265va	1900 2000	USA, KTBN Salt Lake City UT	15590na
1800 1900	USA, WRMI Miami FL	9955am	1900 2000	USA, Voice of America	4930af 6080af
1800 1900	USA, WTJC Newport NC	9370na		11975af 13710af	15580af 17895af
1800 1900	USA, WWCR Nashville TN	9985na	12160na	USA, WBCQ Monticello ME	9330am 17495am
	13845na	15825na		USA, WBCQ Monticello ME	7415am
1800 1900 Sun	USA, WWRB Manchester TN	11920af	1900 2000	USA, WBOH Newport NC	5920am
1800 1900	USA, WWRB Manchester TN	9385va	12180va	USA, WEWN Vandiver AL	11530am 15785eu
1800 1900	USA, WYFR/Family Radio FL	7240eu	1900 2000	USA, WHRA Greenbush ME	11785va
	7395af	9435af	9785eu 9885af	USA, WHRI Cypress Creek SC	9840na
	9895af	11665af	13695na 15115af	17640am	
	17555na	18980va		USA, WINB Red Lion PA	13570am
1800 1900	Yemen, Rep of Yemen Radio	9780me	1900 2000 smtwhf	USA, WMLK Bethel PA	9265va
1800 1900	Zambia, CVC International	4965af		USA, WRMI Miami FL	9955am
1830 1845	Israel, Kol Israel	6985va	9345va	USA, WTJC Newport NC	9370na
	15640af			USA, WWCR Nashville TN	9975na 12160na
1830 1900	Bulgaria, Radio	7400eu		13845na 15825na	
1830 1900 whf	Sweden, Radio	6065va		USA, WWRB Manchester TN	11920va
1830 1900	UK, BBC World Service	6005af	9630af	USA, WWRB Manchester TN	9385va 12180va
1830 1900 f	UK, Bible Voice BC	9460me		USA, WYFR/Family Radio FL	3230af 6020af
1830 1900 Sun	UK, Bible Voice BC	9615me		6085am 7160eu	7345me 7395af
1830 1900	USA, Voice of America	4930af	6080af	9480af 13695na	15115va 15565na
	6105va	7220va	9650af 11975af	17555na 17535va	18980va
	13710af	15580af	17895af	Zambia, CVC International	4965af
1845 1900 mtwhfa	Albania, Radio Tirana	7465eu	13640eu	Kuwait, Radio Kuwait	11990na
1845 1900 Sun	UK, Bible Voice BC	7260af		Germany, Pan American BC	6020va

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

1900 1928	Vietnam, Voice of	7280va	9730va	Iran, Voice of the Islamic Rep	6010eu
1900 1930	Germany, Deutsche Welle	9735af	11690af	6225eu 7320eu	9855af 11695af
	13780af	15275af		Lithuania, Radio Vilnius	6010eu 6225eu
1900 1930 Sat	UK, Bible Voice BC	9460me		7320eu	
1900 1930 Sun	UK, Bible Voice BC	6010eu	7245af	Serbia, International Radio Serbia	6100eu
1900 1930	USA, Voice of America	9785va	12020va	7240eu	
1900 1935	New Zealand, Radio NZ Intl	9615pa		Slovakia, Radio Slovakia Int	5915eu 7345eu
1900 1935 DRM	New Zealand, Radio NZ Intl	9890pa		Turkey, Voice of	6050eu
1900 1945	India, All India Radio	7410eu	9445af	UK, Bible Voice BC	9470me
	9950eu	11620eu	11935af	USA, Voice of America	6105va 7220va
	15075af	15155af	13605af	9650va 9785va	12020va
1900 1945 Sat	UK, Bible Voice BC	6010eu		New Zealand, Radio NZ Intl	11675pa
1900 1957	Netherlands, Radio	7120af	11655af	New Zealand, Radio NZ Intl	17675pa
	11805af	12050af	17810af	New Zealand, Radio NZ Intl	15720pa
1900 1957 Sat/Sun	Netherlands, Radio	15315na	15525na		
1900 2000	Anguilla, World University Network		11775am	Germany, Pan American BC	6020va
1900 2000	Australia, Radio Australia	6080va	7240as	Turkey, Voice of	6055eu
	9500va	9580va	9710as	Lithuania, Radio Vilnius	6010eu 6225eu
			11880as	7320eu	

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

2000 2015 Sun	Germany, Pan American BC	6020va
2000 2025	Turkey, Voice of	6055eu
2000 2028	Lithuania, Radio Vilnius	6010eu 6225eu

2000	2030	mtwhfa	Albania, Radio Tirana	7465eu	13600na
2000	2030		China, China Radio Intl	7160eu	
2000	2030		Egypt, Radio Cairo	15375af	
2000	2030	fa	Germany, Pan American BC	6020me	
2000	2030		Iran, Voice of the Islamic Rep	6010eu	
			6225eu	7320eu	11695af
2000	2030		South Africa, AWR Africa	9655af	
2000	2030	Sun	UK, Bible Voice BC	6010eu	
2000	2030		USA, Voice of America	4930af	4940af
			6080af	11975af	13710af
2000	2030		Vatican City, Vatican Radio	7365af	9755af
			11625af		
2000	2057		China, China Radio Intl	7190eu	9600eu
2000	2057		Netherlands, Radio	11655af	18910af
2000	2100		Anguilla, World University Network		11775am
2000	2100		Australia, ABC NT Alice Springs		2310do
			4835do		
2000	2100		Australia, ABC NT Katherine	2485do	
2000	2100		Australia, ABC NT Tennant Creek		2325do
2000	2100	Sat/Sun	Australia, Radio Australia	12080as	
2000	2100		Australia, Radio Australia	6080va	7240as
			9500va	11650as	11660pa
2000	2100		Canada, CFRX Toronto ON	6070na	
2000	2100		Canada, CFVP Calgary AB	6030na	
2000	2100		Canada, CKZN St John's NF	6160na	
2000	2100		Canada, CKZU Vancouver BC		6160na
2000	2100		China, China Radio Intl	5960eu	7285eu
			7295af	9440af	11640af
2000	2100		Costa Rica, World University Network		13750va
2000	2100		Eqt Guinea, Radio Africa	15190af	
2000	2100		Germany, CVC Intl/Voice Africa		7285af
2000	2100		Germany, Deutsche Welle	9690af	9880af
			12780af		
2000	2100		Indonesia, Voice of	9525al	11785pa
			15150as		
2000	2100		Kuwait, Radio Kuwait	11990na	
2000	2100	vl	Liberia, ELWA	4760do	
2000	2100		Malaysia, RTM/Trax FM	7295as	
2000	2100		New Zealand, Radio NZ Intl	17675pa	
2000	2100	DRM	New Zealand, Radio NZ Intl	15720pa	
2000	2100		Nigeria, Radio/Kaduna	4770do	6090al
2000	2100		Nigeria, Voice of/ Ext. Svc Lagos		15120af
2000	2100		Papua New Guinea, NBC	4890do	
2000	2100	vl	Papua New Guinea, Wantok R. Light		7325va
2000	2100		Russia, Voice of	6145eu	7105eu
2000	2100	vl	Rwanda, Radio	6055do	7330eu
2000	2100	vl	Solomon Islands, SIBC	5020do	9545al
2000	2100	vl	South Africa, Channel Africa	3345af	
2000	2100	mtwhf	Spain, Radio Exterior Espana	9605af	9690eu
2000	2100	vl	Uganda, UBC Radio	4976do	5026do
2000	2100		UK, BBC World Service	3255af	6005af
			6190af	6195va	9410af
			12095af	15400af	17830af
2000	2100	DRM	UK, BBC World Service	5875eu	
2000	2100		Ukraine, Radio Ukraine Intl	5840eu	
2000	2100		USA, American Forces Radio		4319usb
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
2000	2100		USA, KJES Vado NM	15385na	
2000	2100		USA, KTBN Salt Lake City UT	15590na	
2000	2100		USA, WBCQ Monticello ME	7415am	9330am
2000	2100	Sat/Sun	USA, WBCQ Monticello ME	17495am	
2000	2100		USA, WBOH Newport NC	5920am	
2000	2100		USA, WEWN Vandiver AL	11530am	17595af
2000	2100	mtwhf	USA, WHRA Greenbush ME	7520va	
2000	2100	Sat/Sun	USA, WHRA Greenbush ME	11785af	
2000	2100		USA, WHRI Cypress Creek SC		17640sa
2000	2100	mtwhfa	USA, WHRI Cypress Creek SC		11765na
2000	2100	f	USA, WHRI Cypress Creek SC		15665af
2000	2100		USA, WINB Red Lion PA	13570am	
2000	2100	smtwhf	USA, WMLK Bethel PA	9265va	
2000	2100		USA, WRMI Miami FL	9955am	
2000	2100		USA, WTJC Newport NC	9370na	
2000	2100		USA, WWCR Nashville TN	9975na	13845na
			15825na		
2000	2100	Sun	USA, WWRB Manchester TN	11920af	
2000	2100		USA, WWRB Manchester TN	9385va	12180va
2000	2100		USA, WYFR/Family Radio	3230af	5745va
			6020af	6240va	6875va
			15115af	15195af	17535na
2000	2100		Zambia, CVC International	4965af	
2005	2100		Syria, Radio Damascus	9330eu	12085eu
2030	2045		Thailand, Radio	9535eu	
2030	2048		Vietnam, Voice of	7220va	9550va
			9730va		

2030	2058	Sweden, Radio	7420pa		
2030	2100	Cuba, Radio Havana	9505va	11760va	
2030	2100	USA, Voice of America	4930af	4940af	
		6080af	7595af	11975af	13710af
2045	2100	India, All India Radio	7410eu	9445eu	
		9910pa	9950eu	11620eu	11715pa
2045	2100	Vatican City, Vatican Radio	9800am		
2050	2100	Vatican City, Vatican Radio	4005eu	5885eu	
		7250eu			

2100 UTC - 5PM EDT / 4PM CDT / 2PM PDT

2100	2120		Vatican City, Vatican Radio	4005eu	5885eu
			7250eu		
2100	2127		Czech Rep, Radio Prague	5930va	9430va
2100	2130		Australia, ABC NT Katherine	2485do	
2100	2130		Australia, ABC NT Tennant Creek		2325do
2100	2130		Austria, AWR Europe	9830af	
2100	2130	Sat	Canada, CBC NQ SW Service		9625na
2100	2130		China, China Radio Intl	11640af	13630af
2100	2130		Cuba, Radio Havana	9505va	11760va
2100	2130		Nigeria, Radio, Natl Svc/Abuja		7275do
2100	2130		South Africa, AWR Africa	9830af	
2100	2130		South Korea, KBS World Radio		3955eu
2100	2157		China, China Radio Intl	5960eu	6135eu
			7190eu	7285eu	9600eu
2100	2159		Canada, Radio Canada Intl	5850eu	9770eu
2100	2200		Anguilla, World University Network		11775am
2100	2200		Australia, ABC NT Alice Springs		2310do
			4835do		
2100	2200		Australia, Radio Australia	9500as	9660as
			11650pa	11660pa	11695as
			13630as	15515as	
2100	2200		Belarus, Radio	6090eu	7360eu
2100	2200		Canada, CFRX Toronto ON	6070na	
2100	2200		Canada, CFVP Calgary AB	6030na	
2100	2200		Canada, CKZN St John's NF	6160na	
2100	2200		Canada, CKZU Vancouver BC		6160na
2100	2200		Costa Rica, World University		13750va
2100	2200		Eqt Guinea, Radio Africa	15190af	
2100	2200		Germany, Deutsche Welle	7280af	9545af
			11690af	13780af	
2100	2200		Guyana, Voice of	3291do	5950do
2100	2200		India, All India Radio	7410eu	9445eu
			9910pa	9950eu	11620eu
			Liberia, ELWA	4760do	11715pa
2100	2200	vl	Malaysia, RTM/Trax FM	7295as	
2100	2200		New Zealand, Radio NZ Intl	17675pa	
2100	2200		New Zealand, Radio NZ Intl	17675pa	
2100	2200	DRM	New Zealand, Radio NZ Intl	15720pa	
2100	2200		Nigeria, Radio/Kaduna	4770do	6090al
2100	2200		Nigeria, Voice of/ Ext. Svc	Lagos	7255af
2100	2200		North Korea, Voice of Korea	7570eu	12015eu
2100	2200		Papua New Guinea, NBC	4890do	
2100	2200	vl	Papua New Guinea, Wantok R. Light		7325va
2100	2200		Russia, Voice of	6145eu	7290eu
2100	2200	vl	South Africa, Channel Africa	3345af	7330eu
2100	2200		Syria, Radio Damascus	9330eu	12085eu
2100	2200		UK, BBC World Service	3255af	3915as
			5965as	6005af	6125as
			6195va	9410af	9525am
			15400af		11675am
2100	2200	DRM	UK, BBC World Service	5875eu	
2100	2200		USA, American Forces Radio		4319usb
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
2100	2200		USA, KTBN Salt Lake City UT	15590na	
2100	2200		USA, Voice of America	6080af	15580af
2100	2200		USA, WBCQ Monticello ME	7415am	9330am
2100	2200		USA, WBOH Newport NC	5920am	
2100	2200		USA, WEWN Vandiver AL	11530am	17595af
2100	2200		USA, WHRA Greenbush ME	7520af	
2100	2200		USA, WHRI Cypress Creek SC		9575am
2100	2200	mtwhfa	USA, WHRI Cypress Creek SC		11765na
2100	2200		USA, WINB Red Lion PA	13570am	
2100	2200		USA, WRMI Miami FL	9955am	
2100	2200		USA, WTJC Newport NC	9370na	
2100	2200		USA, WVCR Nashville TN	9975na	12160na
			13845na	15825na	
2100	2200	Sun	USA, WWRB Manchester TN	11920af	
2100	2200		USA, WWRB Manchester TN	9385va	12180va
2100	2200		USA, WYFR/Family Radio FL	5745va	6240va
			6875eu	9480af	15195af
			17535na		15565af
2115	2200		Egypt, Radio Cairo		6250eu

2115	2200	USA, WYFR/Family Radio FL	11875af
2127	2157	Sweden, Radio	7120af
2130	2156	Romania, Radio Romania Intl	6055va
		6155va	7145va
		9755va	9755va
2130	2200	Australia, ABC NT	Katherine 5025do
2130	2200	Australia, ABC NT	Tennant Creek 4910do
2130	2200	mtwhfa	Canada, CBC NQ SW Service 9625na
2130	2200	Guam, AWR/KSDA	9720as
2130	2200	Turkey, Voice of	7180va
2130	2200	USA, Voice of America	7405af

2200 UTC - 6PM EDT / 5PM CDT / 3PM PDT

2200	2210	Syria, Radio Damascus	9330eu
2200	2220	Japan, NHK World/Radio Japan	13640pa
2200	2230	India, All India Radio	7410eu
		9910pa	9950eu
		11620eu	11715pa
2200	2230	Papua New Guinea, NBC	4890do
2200	2230	Serbia, International Radio Serbia	6100eu
		7240eu	
2200	2230	Turkey, Voice of	7180va
2200	2235	New Zealand, Radio NZ Intl	17675pa
2200	2235	DRM	New Zealand, Radio NZ Intl 15720pa
2200	2245	Egypt, Radio Cairo	6250eu
2200	2257	China, China Radio Intl	7170eu
2200	2300	Anguilla, World University Network	6090am
2200	2300	Australia, ABC NT Alice Springs	2310do
		4835do	
2200	2300	Australia, ABC NT Katherine	5025do
2200	2300	Australia, ABC NT Tennant Creek	4910do
2200	2300	Australia, Radio Australia	9660va
		12010va	12080as
		13630pa	15230va
		15240pa	15515as
		15560pa	
2200	2300	Belarus, Radio	6090eu
2200	2300	Bulgaria, Radio	7400eu
2200	2300	smtwhf	Canada, CBC NQ SW Service 9625na
2200	2300	Canada, CFRX Toronto ON	6070na
2200	2300	Canada, CFVP Calgary AB	6030na
2200	2300	Canada, CKZN St John's NF	6160na
2200	2300	Canada, CKZU Vancouver BC	6160na
2200	2300	DRM	Canada, Radio Canada Intl 9800na
2200	2300	China, China Radio Intl	9590as
2200	2300	Costa Rica, World University Network	13750va
2200	2300	Eqt Guinea, Radio Africa	15190af
2200	2300	Guyana, Voice of 3291do	
2200	2300	Liberia, ELWA	4760do
2200	2300	Malaysia, RTM/Trax FM	7295as
2200	2300	Nigeria, Radio/Kaduna	4770do
2200	2300	Nigeria, Voice of/ Ext. Svc Lagos	7255af
2200	2300	vl	Papua New Guinea, Wantok R. Light 7325va
2200	2300	Sat/Sun	Solomon Islands, SIBC 5020do
2200	2300	Sun	Spain, Radio Exterior Espana 6125eu
2200	2300	Spain, Radio Exterior Espana	9595af
2200	2300	Taiwan, Radio Taiwan Intl	9355eu
2200	2300	UK, BBC World Service	5955as
		5975am	6195as
		9410af	9525am
2200	2300	DRM	UK, BBC World Service 5875eu
2200	2300	Ukraine, Radio Ukraine Intl	5830eu
2200	2300	USA, American Forces Radio	4319usb
		5446usb	5765usb
		10320usb	12133usb
		13362usb	
2200	2300	USA, KTBN Salt Lake City UT	15590na
2200	2300	USA, Voice of America	5910va
		7220va	7405af
		7425va	9490va
		11725va	
2200	2300	Sat	USA, WBCQ Monticello ME 17495am
2200	2300	USA, WBCQ Monticello ME	7415am
2200	2300	USA, WBOH Newport NC	5920am
2200	2300	USA, WEWN Vandiver AL	7560eu
2200	2300	USA, WHRA Greenbush ME	7520af
2200	2300	USA, WHRI Cypress Creek SC	9575am
2200	2300	Sun	USA, WHRI Cypress Creek SC 7490na
2200	2300	mtwhfa	USA, WINB Red Lion PA 13570am
2200	2300	Sun	USA, WRMI Miami FL 9955am
2200	2300	USA, WRMI Miami FL	7385na
2200	2300	USA, WTJC Newport NC	9370na
2200	2300	USA, WWCR Nashville TN	7465na
		12160na	13845na
2200	2300	USA, WWRB Manchester TN	12180va
2200	2300	USA, WYFR/Family Radio FL	7305af
		11875af	17690af
2230	2257	Czech Rep, Radio Prague	5930na
2230	2300	Guam, AWR/KSDA	15320as
2230	2300	Papua New Guinea, NBC	9675do

2230	2300	Sweden, Radio	6065va
2230	2300	USA, Voice of America	7230va
		15445va	
2236	2300	New Zealand, Radio NZ Intl	15720pa
2236	2300	DRM	New Zealand, Radio NZ Intl 17675pa
2245	2300	India, All India Radio	9705eu
		11620as	11645as
		13605as	

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

2300	0000	Anguilla, World University Network	6090am
2300	0000	Australia, ABC NT Alice Springs	2310do
		4835do	
2300	0000	Australia, ABC NT Katherine	5025do
2300	0000	Australia, ABC NT Tennant Creek	4910do
2300	0000	Australia, Radio Australia	9660as
		12010pa	12080pa
		13690pa	15230va
2300	0000	15240pa	15560va
		17795va	
2300	0000	Canada, CBC NQ SW Service	9625na
2300	0000	Canada, CFRX Toronto ON	6070na
2300	0000	Canada, CFVP Calgary AB	6030na
2300	0000	Canada, CKZN St John's NF	6160na
2300	0000	Canada, CKZU Vancouver BC	6160na
2300	0000	China, China Radio Intl	5915as
		6145na	7180as
		11685as	11840na
2300	0000	Costa Rica, World University Network	13750va
2300	0000	Cuba, Radio Havana	9505am
2300	0000	Egypt, Radio Cairo	9465na
		Guyana, Voice of 3291do	
2300	0000	Malaysia, RTM/Trax FM	7295as
2300	0000	New Zealand, Radio NZ Intl	15720pa
2300	0000	New Zealand, Radio NZ Intl	17675pa
2300	0000	Papua New Guinea, NBC	9675do
2300	0000	Papua New Guinea, Wantok R. Light	7325va
2300	0000	Singapore, MediaCorp Radio	6150do
2300	0000	Solomon Islands, SIBC	5020do
2300	0000	UK, BBC World Service	5945al
		9740as	11955as
2300	0000	USA, American Forces Radio	4319usb
		5446usb	5765usb
		10320usb	12133usb
		13362usb	
2300	0000	USA, KTBN Salt Lake City UT	15590na
2300	0000	USA, Voice of America	5910va
		7405va	9490va
		11725va	15185va
2300	0000	USA, WBCQ Monticello ME	7415am
2300	0000	USA, WBOH Newport NC	5920am
2300	0000	USA, WEWN Vandiver AL	7560eu
2300	0000	USA, WHRA Greenbush ME	5850eu
2300	0000	USA, WHRI Cypress Creek SC	11765na
2300	0000	USA, WHRI Cypress Creek SC	7490na
2300	0000	USA, WHRI Cypress Creek SC	11765na
2300	0000	USA, WHRI Cypress Creek SC	7315am
2300	0000	USA, WINB Red Lion PA	9265am
2300	0000	USA, WRMI Miami FL	9955am
2300	0000	USA, WTJC Newport NC	9370na
2300	0000	USA, WWCR Nashville TN	3215na
		9985na	13845na
2300	0000	USA, WWRB Manchester TN	12180va
2300	0000	USA, WYFR/Family Radio FL	9430am
		15400am	
2300	0000	Liberia, ELWA	4760do
2300	0000	Croatia, Croatian Radio	7285na
2300	0000	Nigeria, Radio/Kaduna	4770do
2300	0000	USA, WYFR/Family Radio FL	11875af
2300	0000	USA, WYFR/Family Radio FL	11875af
2300	0000	USA, Voice of America	6180va
		15150va	
2300	2345	USA, WYFR/Family Radio FL	11740na
2300	2345	Vatican City, Vatican Radio	7370am
2300	2355	Turkey, Voice of	5960va
2300	2356	Romania, Radio Romania Intl	6015va
		6115va	7105va
		9610va	
2330	0000	Australia, Radio Australia	15415as
2330	0000	Austria, Radio Austria Intl	9870sa
2330	0000	Lithuania, Radio Vilnius	7325na
2330	0000	Sweden, Radio	9800na
2330	0000	UK, BBC World Service	3915as
		5965as	6170as
		6195as	7105as
2330	0000	7340as	
2330	0000	USA, Voice of America	6180va
		11655va	13640va
		15150va	
2330	2357	Czech Rep, Radio Prague	5930na
2330	2358	Vietnam, Voice of 9840as	12020as
2335	0000	Austria, Radio Austria Intl	9870sa
2343	0000	Austria, Radio Austria Intl	9870sa
		11645as	13605as

Monitoring South Florida Milcom

When I think of south Florida, I have visions of pastel colors, Sonny and Tubbs. Okay, I admit that I was a fan of the *Miami Vice* television program. But did you know that if you live in south Florida you're also in an area that has quite bit of military air communications?

This month I have a profile of milair frequencies for the southern Florida area submitted by a contributor who wishes to remain anonymous. I want to thank him for sharing this impressive list with *MT Milcom* readers.

AIR TRAFFIC CONTROL

239.250	Miami ARTCC West Palm Beach
254.250	Miami ARTCC Vero Beach
256.875	Jacksonville ARTCC Avon Park
257.200	Miami ARTCC Miami
257.700	Miami ARTCC Avon Park
263.100	Miami ARTCC West Palm Beach
269.050	MIAMI Departure
269.200	Miami ARTCC Melbourne
269.250	Jacksonville ARTCC Lowell
269.300	Miami ARTCC Melbourne
273.550	Jacksonville ARTCC Daytona Beach
281.400	Miami ARTCC Key West
281.500	Miami ARTCC Miami (Doral)
284.700	Orlando Approach
285.500	Miami ARTCC Avon Park
290.325	Miami Approach/Departure
291.600	Miami ARTCC Pahokee
293.225	Miami ARTCC Vero Beach
306.900	Miami ARTCC Key West
306.975	Miami Approach
307.000	Orlando Approach
307.100	Miami ARTCC Pahokee
307.250	Jacksonville ARTCC St Augustine
307.300	Miami ARTCC Sarasota
317.400	Palm Beach Departure
317.600	Jacksonville ARTCC Lowell
319.000	Miami ARTCC Vero Beach
319.100	Miami ARTCC Miami
322.500	Miami ARTCC Ft Myers
323.000	Miami ARTCC Miami (Doral)
323.100	Miami ARTCC Key West
335.500	Miami ARTCC Ft Myers
346.250	Jacksonville ARTCC St Augustine
348.700	Miami ARTCC Melbourne
349.000	Miami ARTCC Avon Park
350.200	Miami Departure
353.600	Miami ARTCC West Palm Beach
353.900	Miami ARTCC Miami
354.100	Miami Approach/Departure
354.200	Miami Dep
360.700	Jacksonville ARTCC Lowell
370.850	Miami ARTCC Miami
377.100	Jacksonville ARTCC Sarasota
379.250	Miami ARTCC Melbourne
380.200	MIAMI Approach
380.300	Miami ARTCC Ft Myers
385.450	Ft Myers Approach

AVON PARK RANGE FREQUENCIES

126.150	Range Operations
264.625	Range Operations (Bravo & Foxtrot)

276.600	Range)/FAC	165.237	Customs
285.725	Range Target Scoring	225.725	JStars
	Range Control/Operations (FAC Ops)	231.750	JStars
292.200	Range Operations	238.000	Aerial Refueling
300.100	Range Control/Operations (FAC Ops)	238.900	Aerial refueling
		252.000	NORAD/Shuttle CAP
251.900	Drop Zone Ops	259.700	Shuttle Air-to-Ground
		260.900	Shuttle CAP
		264.800	NORAD
	TARPON RANGE	265.400	NORAD
228.900	230.150 237.800 250.600 250.750	277.800	Navy
	264.625 270.600 273.700 275.400	284.500	US Navy FACSFAC (Callsign: Sealord)
	300.700 301.500 311.500 314.200	324.600	Aerial Refueling Boom
	318.500 325.400 327.600 335.950	324.650	JStars
	341.500 342.600 342.900 344.200 348.650	345.000	Coast Guard
	362.200 387.800	350.025	Customs
		354.400	JStars
	BASE FREQUENCIES	355.250	JStars
123.800	Homestead GCA	364.200	NORAD AICC
126.650	Cape Tower	381.000	JStars
143.800	Mr. Mako	388.225	JStars
252.100	Homestead Reef Control	395.150	JStars
255.400	FAA FSS		
257.675	Homestead GCA		
275.800	Homestead Ground		
279.550	Homestead Tower		
283.700	Macdill Ops		
284.000	KSC Tower		
285.000	NAS Jacksonville		
289.400	Key West Approach		
303.150	Mr. Mako		
311.000	Lightning Ops		
318.650	Homestead Metro		
338.000	Key West Base Ops		
343.500	Jacksonville Metro		
344.600	Metro		
355.000	Autec Operations		
372.200	Pilot-to-Dispatcher		
381.300	Homestead Reef Control		
383.000	Patrick Command Post		

93 FIGHTER SQUADRON

(Callsigns: Makos, Sharks, Akulas, Reef)	
138.025 138.050 138.125 138.250 138.400	
139.400 139.750 139.800 141.900 142.300	
258.100 282.600 288.400 353.800	

FLORIDA ANG

(Callsigns: Snakes, Coil, Fang)	
234.800 237.000 251.250 253.700	
277.600 343.000 348.900	

AIR-TO-AIR DISCRETES

138.425 143.750 250.300 268.300	
333.300 138.075 138.100 138.175	
138.875 139.150 139.825 139.950	
141.825 142.025 142.575 143.625	
143.700 225.675 253.800 262.000	
277.200 299.500 339.500 350.025	

AIR COMBAT MANEUVERING (ACM)

271.600 272.000 348.200 349.300	
387.700	

MISCELLANEOUS: USCG, USCBP, JSTARS

123.100	Coast Guard	
136.375	Customs	

Many thanks to our anonymous contributor for the frequency list and the kind comments about this column. If you have a milair or mil LMR list you would like to share with our readers, be sure to drop me an email at the address in the masthead.

❖ Russian Navy Frequencies

One of my regular correspondents, Jim from overseas, has passed along a nice list of Russian Navy HF frequencies. Given the increased Russian military presence worldwide, these frequencies will come in handy next to the HF receiver.

RUSSIAN NAVY

All-Mode Common-User Frequencies

Stations: RMP RIW RIT RCT RCV RJS RKN CMU967 D2U53 Warships

583.0	2230.5	2525.0	2776.0	3192.0
3222.0	3264.0	3287.0	3315.5	3747.0
3755.0	3792.0	3797.0	3831.0	3850.5
3865.5	4007.0	4055.0	4079.0	4117.0
4162.5	4318.0	4394.0	4416.0	4416.5
4482.0	4517.0	4604.0	4901.0	4944.0
4948.0	4952.0	5015.0	5086.0	5104.0
5128.0	5163.0	5213.0	5223.0	5224.0
5232.0	5233.0	5300.5	5358.0	5393.0
5400.5	5411.0	5416.5	5441.0	5444.0
5454.0	5585.0	5751.0	5855.0	5881.0
5885.0	5916.0	5982.0	6262.0	6290.0
6295.0	6456.0	6501.0	6873.0	6912.0
6924.0	6936.0	6948.0	7018.0	7063.0
7196.0	7290.0	7373.5	7529.0	7537.0
7549.0	7664.0	7801.0	8306.0	8326.0
8338.0	8345.0	8347.5	8402.0	8612.0
8788.0	8816.0	9044.0	9136.0	9144.0
9145.0	9147.5	9192.0	9373.0	9483.0
9799.0	10155.0	10201.0	10244.0	10309.0
10315.0	10438.0	10492.0	10540.0	

10560.5	10676.0	10747.0	10956.0
11000.0	11064.0	11082.0	11155.0
11418.0	11513.0	11576.0	11688.0
11964.0	12056.0	12260.0	12330.0
12370.0	12374.0	12394.0	12398.0
12464.0	12524.0	12623.0	12720.0
12746.0	12838.0	12948.0	12960.0
13086.0	13469.0	14556.0	14697.0
15546.0	15936.0	16023.0	16677.5
16680.0	16942.0	17359.0	17468.0
17488.0	18073.0	18509.0	18562.0
18801.0	19224.0	20138.0	23375.0

❖ SkyNet 5B on the Move

The British military communications satellite SkyNet 5B has been moved to 53 degree East, reports Paul J. Marsh on the Hearsat-L newsgroup. Paul says that there has been a realignment of the UHF downlink channels, possibly to prevent interference from other Indian Ocean Region military satellites. Paul reports the following frequencies in current use:

Freq (MHz)	Transponder Bandwidth
245.2000	35 kHz
249.4395	8 kHz
249.4600	8 kHz
249.4995	8 kHz
249.5095	8 kHz
250.1795	8 kHz
253.9800	35 kHz
257.9000	35 kHz
261.1000	35 kHz

❖ NAF Atsugi, Japan

Taka Okamura in Tokyo, Japan, recently posted to the Milcom newsgroup a detailed frequency and callsign profile for units that are assigned to Naval Air Facility Atsugi. Taka-san runs one of the finest Milcom blogs on the net at <http://ironbird.blog01.linkclub.jp/>

Thanks, Taka, for sharing your monitoring efforts with the rest of the Milcom community.

BASE FREQUENCIES

246.300	CVW-5	Batman Base
300.850	VFA-27	Mace Base
305.000	VFA-195	Chippy Base
305.000	VFA-192	Dragon Base
330.600	VAW-115	Liberty Base
343.400	HS-14	Lightning Base
343.400	VRC-30 Det	Password Base
350.600	VFA-102	Dback Base
363.400	HSL-51	Warload Base

MISCELLANEOUS FREQUENCIES

136.975	Outlaw ## Flight Air-Air (Hawker Hunter MK58 ATAC)
235.400	Mace ## Flight Air-Air (F/A-18E VFA-27) with Dog ##
257.450	Dback ## Flight Air-Air (F/A-18F VFA-102)
	Dragon ## Flight Air-Air (F/A-18C VFA-195) <Tac11>
261.600	Dragon ## Flight Air-Air (F/A-18C VFA-192)
299.950	Mace ## Flight Air-Air (2xF/A-18E VFA-27)
303.000	Various callsigns (F/A-18 VFA-27,VFA-102,VFA-195, Hawker Hunter MK58 ATAC) <Shot Com mon>
310.400	Outlaw ## (Hunter MK58 ATAC) with Mace ## flight common
311.500	Mace ## Flight Air-Air (F/A-18E VFA-27 with Hawker Hunter MK58 ATAC) with Viper ##
319.500	Chippy ## Flight Air-Air (F/A-18C VFA-195) Mace ## Flight Air-Air (F/A-18E VFA-27) switched to 299.950 MHz
333.300	Dback ## Flight Air-Air (F/A-18F VFA-102) <Tac4>

333.375	Mace ## Flight Air-Air (F/A-18E VFA-27) Mace ## Flight Air-Air (F/A-18E VFA-27 with Hawker Hunter MK58 ATAC and Vipers ##)	277.800 234.500 234.550 270.100 280.500 239.050 292.500 293.200 303.000 311.000 381.000 336.800 364.200 328.200 314.300 341.750 375.725 376.025 349.400 381.300 333.350 357.000 360.200 314.500 318.900
366.200	Chippy ## Flight Air-Air (F/A-18C VFA-195) <Tac 2> Callsign Service Unit Aircraft Chippy ## USN VFA-195 F/A-18C Dback ## USN VFA-102 F/A-18F Dog ## USN VFA-27 F/A-18E (Range callsign) Dragon ## USN VFA-192 F/A-18C Liberty ## USN VAW-115 E-2C Lightning ## USN HS-14 SH-60 Lucifer ## Japanese Self Defense Force 6th Squadron P-3C Mace ## USN VFA-27 F/A-18E NALO ## USN Various units C-40A Navy ## USN Various units UC-12M Neptune ## Japanese Self Defense Force 3rd Squadron P-3C Ninja ## US Army 78 AVN UC-35A Outlaw ## US DoD ATAC Hawker Hunter MK58 Password ## USN VRC-30 Det C-2A Viper ## US DoD ATAC Hawker Hunter MK58 (Range callsign) Warload ## USN HSL-51 SH-60	VHF-HIGH BAND AIR (AM mode) 138.0250 139.5000 140.5000 VHF-LOW BAND AIR 36.5000 68th Medevac choppers 36.9000 68th Medevac choppers

❖ Jacksonville Area LMR Trunk

Systems

Regular Milcom contributor Robert Wyman has passed along a list of trunk radio frequencies monitored in the Jacksonville, Florida area. (See table below)

❖ Hickam/Pearl Harbor

Frequencies

A contributor in the Aloha state passes along the following active frequencies that he has recently monitored.

UHF AIR

225.800	241.000	255.400	282.800	296.650
288.400	253.800	298.300	251.000	252.000

JACKSONVILLE FLORIDA MONITORING

Frequency	System ID/Channel	Location	Miscellaneous Notes
385.0125	014/Ch-0101	Kings Bay	Freq also used by SID 014/Ch-0104
386.1875	014/Ch-0101	Kings Bay	
385.0125	014/Ch-0104	Jax Area (site unid)	Freq also used by SID 014/Ch-0101
386.2250	014/Ch-0113	Jax Area (site unid)	
386.2750	014/Ch-0115	Jax Area (site unid)	
380.4375	014/Ch-0116	Mayport	1 bar signal strength at Mayport
406.3500	0E2Eh	Kings Bay	
406.7500	0E2Eh	Kings Bay	
407.1500	0E2Eh	Kings Bay	
407.5500	0E2Eh	Kings Bay	
407.9500	0E2Eh	Kings Bay	
408.3500	0E2Eh	Kings Bay	
408.7500	0E2Eh	Kings Bay	
409.1500	0E2Eh	Kings Bay	
409.5500	0E2Eh	Kings Bay	
409.9500	0E2Eh	Kings Bay	
407.0750	5436h	Mayport	
408.1250	5436h	Mayport	
406.8500	650Dh	Mayport	
407.0750	650Dh	Mayport	
407.0750	661Dh	Mayport	
408.7000	661Dh	Mayport	
408.1500	6C25h/Ch 0005	Mayport	
408.1250	732Eh	Mayport	Freq also used by SID 5436h and 752Fh
408.1250	752Fh	Mayport	Freq also used by SID 5436h and 732Eh
408.7000	752Fh	Mayport	Freq also used by SID 661Dh and 8B03h
406.8500	7607h	Jax Area (site unid)	Freq also used by SID 5436h and 8211h
406.8500	8211h	Mayport	Freq also used by SID 650Dh and 7607h
408.7000	8B03h	Mayport	Freq also used by SID 661Dh and 752Fh

Additional possible Mayport frequencies include:

406.1125 406.1750 406.4125 406.5000 406.8125 408.2125

277.800	234.500	234.550	270.100
280.500	239.050	292.500	293.200
303.000	311.000	381.000	336.800
364.200	328.200	314.300	341.750
375.725	376.025	349.400	381.300 333.350
357.000	360.200	314.500	318.900

❖ New Zealand/Australian

Military

I recently uncovered some new information on Royal Australian/New Zealand military communications in the HF spectrum. Here is the latest information on their networks from an official source.

AUSTRALIAN DEFENSE HIGH FREQUENCY COMMUNICATIONS SYSTEM

DEFCOMMSTA Call-sign: Australia Control
Central network station: Canberra
Node stations: Exmouth, Darwin, Townsville and Riverina.

VOICE CONTACT NETWORK

VCN 1	22868.0 kHz
VCN 2	5878.0 kHz
VCN 3	9340.0 kHz
VCN 4	15962.0 kHz
VCN 5	12172.0 kHz

RNZAF AIR OPERATIONS

Communications Centre Auckland (AOCCAK)
AOCC Auckland is located at RNZAF Whenuapai, Auckland, New Zealand
Frequencies (kHz): 3032.0 5687.0 8974.0 11235.0 13206.0 (USB)

And that does it for this month. Until next time, 73 and good hunting.

Freq also used by SID 650Dh and 661Dh
Freq also used by SID 732Eh and 752Fh
Freq also used by SID 7607h and 8211h
Freq also used by SID 5436h and 661Dh
Freq also used by SID 5436h and 650Dh
Freq also used by SID 752Fh and 8B03h
Freq also used by SID 5436h and 752Fh
Freq also used by SID 5436h and 732Eh
Freq also used by SID 661Dh and 8B03h
Freq also used by SID 650Dh and 8211h
Freq also used by SID 650Dh and 7607h
Freq also used by SID 661Dh and 752Fh

TV: Countdown to Digital

We're in the home stretch. In ten months, the analog TV transmitters that have been serving American viewers since 1941 will be shut off. If you're using a regular antenna for your TV, you'll have to convert to digital – or your TV will stop working. This month, we're going to touch on exactly what's happening and how it will affect your viewing. And your DXing.

What exactly is happening on February 18, 2009?

Congress has decreed that all full-power analog TV transmitter licenses expire on this date. Your local ABC/CBS/Fox/NBC/PBS/etc. stations will be turning off their analog transmitters at midnight. They'll be transmitting only a digital signal.

Does this affect my TV?

Not if the TV is connected to cable or a satellite dish. Cable is required to continue to downconvert digital TV signals to analog for their subscribers for another two years. I strongly suspect they'll voluntarily continue to downconvert for some time after that. The government isn't forcing satellite companies to downconvert, but I think competition from cable will force satellite to convert as well.

Your TV is also not affected if it already receives digital signals. Look for an "ATSC" logo, either on the front of the TV or in the owners' manual.

If your TV is connected to a regular antenna and doesn't already receive digital signals, *it will stop working in ten months*.

What about my VCR? DVD player? DVD recorder? PVR?

The analog shutdown won't affect your ability to play back any material you've already recorded, or any DVDs or VCR tapes you may buy or rent.

As for recording new material, the situation here is the same as it is with your TV. If it's connected to cable or satellite, nothing will happen next February. If it's connected to an antenna, it will need to receive "ATSC" digital signals if it's to record past February 2009.

VCRs seem to have pretty much disappeared from store shelves before the requirement for a digital tuner went into effect. I don't know of any consumer VCRs that support recording of digital signals. For several months, the FCC has required DVD recorders and personal video recorders (like TiVO™) to record digital signals,

so newer devices should be OK. Older recorders may not work.

Is my old antenna obsolete?

Probably not. Digital signals are broadcast on the same frequencies as analog TV; if your old antenna is in good condition, it will probably work fine for digital TV.

I do have one caution. In some places, all analog TV was on UHF, but some digital stations are VHF. For example, Scranton, Pennsylvania, where the lowest analog channel was UHF channel 16. Scranton will have digital stations on channels 11 and 13. If you have a UHF-only antenna in Scranton, it may not receive a decent signal from stations WYOU and WBRE. Going the other way, in some cities all analog TV was VHF, but your VHF-only antenna won't work very well for UHF digital stations. For example, Boise, Idaho, where channels 2, 4, and 6 will be moving to channels 28, 21, and 24 respectively.

So I have to throw my TV away in 10 months?

Probably not. I expect "converter boxes" to become widely available this month. These devices are about the same size as a cable box (and look a lot like a cable box). They connect between your antenna and your TV (or VCR). They receive digital TV signals and convert them to an analog signal your old TV can view. Boxes are expected to sell for between \$40 and \$60.

Congress has appropriated money for a voucher program to subsidize purchase of these boxes. Each voucher (it looks more like a credit card with a magnetic stripe) is worth \$40 off on the price of one converter box. (Note that since some boxes are expected to cost as little as \$40, you may be able to get a converter for free.) Each household is eligible for up to two converters. See dtv2009.gov for more information on the voucher program.

What is this going to do to TV DX?

I guess we'll find out in ten months!

Many TV DXers have already been DXing digital TV. Long-haul "E-skip" DX has been rare, but several DXers have had success with it. "Tropospheric" digital DX has been a lot more common. I believe the current tropo distance record is on the order of 800 miles, for reception of Raleigh, NC, stations in Baton Rouge, Louisiana.

A major problem for DXing digital stations has been interference from analog signals. You

can identify a distant analog signal even if it's buried in interference. A digital signal in the same circumstances will refuse to decode. You'll get a blank screen. When all the analog signals are simply switched off next February, a lot of this interference goes away. I expect digital DX will become far easier when the analog interference is gone.

The other thing that's going to happen is that the E-skip-prone VHF-low channels 2-6 will be clearing out. For a number of technical reasons these channels are not well-suited for digital TV. Most stations chose higher channels. There will be only 37 U.S. stations on channels 2-6 after next February. Only two will be on channel 4! However, analog broadcasts on these channels will continue in Canada, Mexico, and other countries for some years to come. I would expect to see far more foreign DX than we've seen in the past, now that the interference from closer U.S. stations is gone.

The conversion deadline does not apply to low-power relay and community stations. These stations will be allowed to continue with analog broadcasts for a few more years. Most of these stations on VHF channels are flea-powered operations of 5-10 watts. But again, with the interference gone, might lucky DXers be seeing some of them?

❖ More AM-FM conversions in Canada

VHF TV channels 2-6 are clearing out in the US. In Canada, it's the AM radio band that's clearing out, and they aren't waiting for February 2009. The biggest news on this front involves CBC stations at opposite ends of the country.

In Moncton, New Brunswick, the big CBC signal on 1070 AM will be gone sometime this month. CBA is moving to 106.1 FM. In the west, CBU Vancouver has filed to move from 50,000 watts on 690 AM to a 8,900-watt signal on 88.1 FM. The Vancouver move hasn't been approved yet, but I think that's probably merely a formality. A second Vancouver station, CKBD-600, has also filed to move to FM. CKBD's move is not a done deal.

Both of Kingston, Ontario's AMs disappeared within a few days in January.

Toronto DXer Saul Chernos arranged a special broadcast for CFFX-960's last night on the air. The station operated at 10,000 watts, daytime pattern, with special programming celebrating the station's history. When the test



106.1 F
radio one

ended at 6am, they turned the AM transmitter off for good. CFFX is now operating on 104.3 FM. Kingston's other AM station, CKLC-1380, shut down permanently a few days later. Their new FM is on 98.9.

A Nova Scotia station is trying to move to FM, but not having a whole lot of luck. CFAB-1450 Windsor filed for 92.9 FM in 2007 but was denied. When a Canadian AM station moves to FM, the FM coverage may not exceed that of the AM station it replaces. (I suppose if the station wanted to extend its coverage, it would be required to compete with other stations' proposals to increase and with proposals for completely new FM stations.)

CFAB's first 92.9 FM proposal would have extended the station's coverage. They promptly reduced the power in their proposal and filed again. The second proposal was still too powerful, and was again rejected by the CRTC. Sooner or later they will figure out how much power they can get away with (!?) and will file a successful application. And Windsor will join Kingston and Moncton on the growing list of Canadian cities with no AM stations.

❖ Northernmost and Southernmost

The world's northernmost radio station is no more. CHAR-105.9 in Alert, Nunavut, operated from an antenna at 82-27-12N. Alert is a military base and weather station and the northernmost inhabited community on Earth. Its population lies somewhere between 5 and 300, depending on who you believe. (Apparently the exact figure is a military secret.)

The official in charge of the base has informed the CRTC that CHAR-FM has been off the air since February 2006. Blogs suggest it has become a cable-only operation. The CRTC was asked to cancel the CHAR license, and they have done so.

With CHAR off the air, it appears likely the new northernmost radio stations are at Ny Alesund, Norway, at 78-53N. There are two relay transmitters of the national NRK radio network on 91.3 and 94.8 MHz. The northernmost AM station is probably NRK's transmitter on 1485 kHz at nearby Longyearbyen, 78-13N.

Since someone asked on the American Bandsan blog... I believe the southernmost radio stations are at McMurdo Station, Antarctica, at 77-51S. There are two stations on the (US) Armed Forces Network on 93.9 and 104.5 FM. There is a manned base at the South Pole itself, but I understand the Pole is largely under radio silence to protect sensitive scientific experiments.

❖ Hello, testing, 1-2-3...

Reader Steve Green in San Diego is hearing an experimental station on 1680 kHz. WD2XUM is located in El Centro in the Imperial Valley.

It's operated by Hatfield & Dawson Consulting on behalf of the Defense Department. If you've been following this column, you've heard of several other similar AM tests for the military. You should expect more.

Steve says the programming is pretty simple: "WD2XUM, 1-ALPHA, 2-BRAVO, 3-CHARLIE, 4-DELTA, 5-XRAY; WD2XUM, 1-ALPHA, 2-BRAVO, 3-CHARLIE, 4-DELTA, 5-ECHO, 6-FOXTROT; WHISKEY DELTA 2 X-RAY UNIFORM MIKE.....(repeating with a male voice and then a long tone)." The signal is SINPO 35333 in the San Diego area, with interference from KAVT Fresno.

❖ Till next month

You'd better be DXing Canadian stations while there are some left! Have you heard any lately? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to douglasmith@monitoringtimes.com. Good DX!

WEBSITES IN THIS MONTH'S COLUMN

- <http://americanbandsan.blogspot.com>
My AM DX blog
- www.wickedlocal.com/dennis/homepage/x2130790627 Wicked Local Dennis (Mass.) article on AM Dxers
- www.dtv.gov
FCC site on digital TV
- www.dtv2009.gov
Information on DTV converter boxes and the voucher program
- www.cbc.ca/informationmorningmoncton/ CBC Moncton, New Brunswick promotional contests for new FM frequency
- www.stlradio.com/kmoxtxhistory.pdf
Pictures of KMOX-1120's transmitters
- www.ondascurtash.com/listasemissorasmw.asp
4th Edition Brazilian Medium Wave List

AMERICAN BANDSCAN STATION REPORT

NEW

New station permits granted

Fairbanks, Alas.	1300	1,000/1,000 ND
Lithonia, Ga.	1360	2,400/1,300 DA-2
Big Spring, Texas	730	230/300 DA-2
Casper, Wyo.	1600	5,000/1,500 DA-N

New station applications denied

Golden Gate, Fla.	1160
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Applications for 15 new stations

in Alaska and Hawaii, previously dismissed, have been reinstated.

Amendments to applications for new stations

Boise, Ida.	1430	from 1400; daytime power to 50,000 watts; from non-directional to DA-2
Melba, Ida.	1100	from 500 watts day & night to 50,000 day, 1,000 night
Marathon, Tex.	1470	from 1490; daytime power to 10,000 watts; from non-directional to DA-N

CHANGES

Changes denied

Knightstown, Ind.	1170	WRFM	from 990 at Muncie. Application to move to 1030 in Princeton still active.
Bexley, Ohio	1000	WSLW	from 1310 in White Sulphur Springs, W. Va. Would remove the West Virginia community's only radio station.

Stations moved to new frequencies

Saluda, SC	1200	WJES	from 1190. Increases power to 10,000 watts daytime, 4 watts night
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Stations granted moves to new cities

Turrell, Ark.	1180	WPLX	from 1170 in Germantown, Tenn.; 5,000/26 DA-3
Silvis, Ill.	1580	WKKD	from Aurora, 1,400/1,000 DA-2
Jenison, Mich.	1020	WCGO	from 1600 in Chicago Heights, Ill.; 10,000 DA-D
Bala Cynwyd, Penna.	1540	WNWR	from Philadelphia. No technical changes.

Stations deleted

Virginia, Minn.	1400	WEEP
Toronto, Ontario	1280	CFBN

Callsign changes

Fairhope, Ala.	660	WXQW	from WWFF
San Francisco	1260	KSFN	from KOIT
Santa Maria, Cal.	1240	KSMX	from KSMA
Macon, Ga.	1280	WIBB	from WLKG
Indianapolis	1070	WFNI	from WIBC (WIBC calls move to 93.1 FM)
Kansas City, Kans.	1250	KYYS	from KKHK
Pratt, Kans.	1290	KMMM	from KWLS
Frankfort, Ky.	1490	WKYW	from WFKY
Glasgow, Ky.	1230	WCDS	from WWKU
Plum Springs, Ky.	1450	WWKU	from WCDS
Jackson, Mo.	1170	KJXX	from KUGT
E. Missoula, Mont.	930	KMPT	from KLKY
Catoosa, Okla.	1570	KZLI	from KMUR
Harrogate, Tenn.	740	WCXZ	from WRWB
El Paso, Tex.	920	KQBU	from KBNA
Centerville, Utah	1600	KTUB	from KXTA
Hampton, Va.	1490	WXTG	from WLRT
Wenatchee, Wash.	1340	KZNW	from KWWX

ND: non-directional

DA-N: directional at night only

DA-D: directional during daytime only

DA-2: directional all hours, two different patterns

DA-3: directional day, night and critical hours, three different patterns

Navtex in Kingston

Due to literary deadlines, this April article must be written while it is still winter here in southern Ontario. We have had a horrible January and early February. Temperatures have gone from spring-like to freezing. Snow, freezing rain and ice pellets have made roads, etc. treacherous.

However, what has most impacted the maritime world has been the winds. A recent wind storm saw gusts of 70 miles per hour at Point Petre, west of Kingston on Lake Ontario. The wind was so bad that it caused a Sieche effect on Lake Erie. That is a change in actual water level caused by wind and/or pressure changes. The western level of Lake Erie was 6 feet below normal and the eastern end was 10 feet above normal. Ice was driven over the ice boom in the Niagara River and also right into Port Colborne harbor and up onto a dock. The level stayed this way for several hours. Bridges were closed and in our area the local ferries were tied up for most of the day because of the wind.

Activity on the VHF marine band described the conditions here. Waves on Lake Ontario were forecast at 20 feet and I am sure they were. Unfortunately, the casualty I suffered was the loss of my R-8 vertical. A guy rope broke and the mast at the top of the small tower broke. The antenna withstood the wind, but I will need a better mast. The snow, rain and cold have made it impossible to replace it at the moment. My HF antennas now consist of an 80 meter dipole and a sloper antenna.

Through the use of amateur radio, scanners, and marine radio, I was able to relay information to several mobiles and keep abreast of the weather situation. Our radio hobby has many uses and benefits!

The marine VHF is usually quite inactive during the winter, with the exception of channel 82A, 157.125 MHz. This is the channel used by Canadian Search and Rescue aircraft when they contact the Rescue Control Centre in Trenton, Ontario. You can hear some interesting traffic here as the aircraft go on searches, exercises, etc. It gives me time to monitor HF, and also have time to read manuals and install new equipment. I have purchased an Icom 756 Pro III and thoroughly enjoy the rig. I like the general coverage receiver as well. However, the manual is quite thick and I am only part way into it at present.

Amid doing household improvements, curling, preparing to teach some radio courses, etc., I have been able to spend many evenings in the shack monitoring the radio. During bad weather, a warm radio room, a hot cup of coffee and some good DX are welcome respite. Of

course, the longer nights also make for better HF reception on the lower frequencies. Like the famous weather predicting groundhogs, I have a place to hibernate for the winter.

◆ NAVTEX

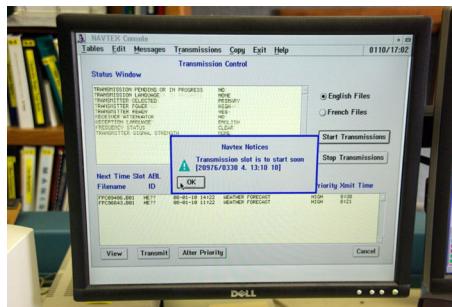
One evening I was listening to the HF marine band when I heard two fellow amateurs, Ian, VE3MUD and John, VE3CAK, on the local 2 meter repeater, discussing their short wave monitoring. They mentioned they were decoding Navtex (Navigational notices and weather printed as text) on 518 kHz. I asked them what they were using, and they said a computer program called Multi-PSK and an audio feed from the receiver.

Since I already had a Rigblaster hooked up for amateur PSK, slow scan TV, etc. I quickly asked where to get the program and if it was easy to use. To my surprise, the program is a free download and was easily put on my computer. A few minutes later, after a couple of adjustments, I was decoding Navtex on 518 kHz! I actually have to tune to 517.3 on USB to get it right on. Setting up to decode Navtex was one of my targets to complete this winter and I had achieved it in only about 15 minutes.

You can download version 4.6 for free at http://f6cte.free.fr/index_anglais.htm. The program can also be used for many other digital modes and receiver control. The full program calls for registration and payment, but I have had no trouble using the free version.

Once you have your receiver adjusted, you will notice two yellow columns appearing on the blue background of the waterfall diagram when a Navtex signal is present. Click on the right hand column and the material should begin to decode on the screen. I found that also clicking on their lock button made the signal decode better.

I have enjoyed Navtex signals from the local VBR Prescott Coast Guard Radio and as far away as San Juan, Puerto Rico. On this fre-



Navtex control screen VBR Prescott CGR

quency the signals are in international languages, while on 490 kHz they are in local languages. There are some Canadian Navtex signals on 490 kHz in French. Unfortunately, Bermuda, identifier "B", has had their Navtex station out of service for improvements. The old 500 kHz CW transmitter they were using will be replaced and the antennas moved. I have asked Steve to email me when they are back on the air.

At the website of www.beaconworld.org.uk you can get material on Navtex which is very useful. Their article on receiving Navtex gives a good overview of the service. Here, you can also find files of Navtex stations listed by frequency and time, or by country of origin.

All Navtex messages start with a code, such as FE29. The first letter, along with the start time, indicates the station transmitting, and the second letter tells what type of bulletin it is. The number is specific to the bulletin. Thus, "FE" would be a forecast from Cape Cod, Massachusetts. Most stations transmit at four-hour intervals.

I have included some Canadian and American Navtex station identifiers and bulletin codes for your use. Underlined stations have been heard here on a TS-570DG and a sloper antenna. Have fun!

Canadian Navtex Identifiers

- C Riviere Aux Renard , QC
- D Prince Rupert, BC
- H Prescott, ON
- H Tofino, BC
- O St. Johns, NL
- P Thunder Bay, ON
- Q Sydney, NS
- T Iqualuit, NU
- U Fundy, NS
- X Labrador, NL

American Navtex Identifiers

- F Cape Cod, MA
- N Chesapeake, VA
- E Savannah, GA
- A Miami, FL
- R San Juan, PR
- G New Orleans, LA
- C Point Reyes, CA
- Q Cambria, CA
- W Astoria, OR
- J or X Kodiak, AK
- O Honolulu, HI
- V Guam

Bulletin Subject Indicators

- A** – Navigational Warnings
- B** – Meteorological Warnings
- C** – Ice Reports
- D** – Search and Rescue Information and Pirate Warnings

E – Meteorological Forecasts
F – Pilot service messages
I – Omega Messages
J – Satnav messages
L – Navigational Warnings
V – Notice to Fishermen (U.S. only)
W – Environmental (U.S. only)
X or Y Special Services – allocation by IMO
 Navtex panel
Z – No message on hand

Just as an aside, if you have a true Navtex receiver on your ship, yacht, etc., be sure to program it to respond only to the stations you want. This is done by using the first two code letters. At night, you get quite long range reception on 518 kHz. My friends on the *CCGC Cape Hearne* activated their Navtex receiver after receiving the vessel for service. When they got up in the morning, the cabin deck was littered with paper as it had printed everything it received during the night.

❖ HF Monitoring

Following are some of the stations monitored in Kingston, Ontario, this winter.

RTTY	
CFH Halifax Military Hz	4271 kHz 75bd 850 0230Z
KSM Point Reyes, CA 2350Z	8433 kHz Voice
St. Johns CGR Eagle	2514 kHz to Atlantic
Labrador CGR Weather	2182 / 2598 kHz 0137Z
Fundy CGR Weather	2182 / 2749 kHz 0139Z
Port Aux Basques CGR Weather	2182 / 2598 kHz 0206Z
ZBR Bermuda radio Broadcast	2182 / 2582 kHz 0435Z
Halifax CGR Weather	2182 / 2749 kHz 0239Z
Sydney CGR Weather	2182 / 2749 kHz 0040Z
Placentia CGR Weather	2182 / 2598 kHz 0048Z
CAMSLANT Chesapeake, VA	5696 / 8983 kHz 0207Z talking to CG 2105 on scene at cruise ship
Riviere Aux Renard CGR Gale Warning	2182 / 2598 kHz 2314Z
USCG from Virginia	2182 / 2670 kHz 0202Z
Anastasis to Southbound II	12359
Weather	1947Z
CW	
KSM 12993 kHz	Press, etc. 2315Z

AMATEUR RADIO

All stations heard on the Maritime Mobile Service Net, 143000 kHz USB
 WA4JZT/mm, Ron, on a 200 foot supply ship, Big Blue Heron
 ELOBZ/mm, Jim, on the Champagne, in Ponce de Leon, FL
 N9JKB, Yacht Downtime, anchored off Key Largo, FL

I also heard CAMSLANT Chesapeake on 5732 kHz. The USCG weather broadcasts on 6501 kHz USB also come in well here. I have also been copying some West Coast SITOR signals on 8416.5 kHz.

If you want to try for some SITOR A sig-

nals, the following frequencies have been listed as active. I will try to DX these once my antenna is back up:

6246.5, 8379, 8381, 8383.5, 12479, 12482, 12490 and 16685 kHz

I received a report that 8777 kHz has been used by fishermen to discuss their catch. I believe this was on the West Coast.

❖ Local Happenings

On January 15, our last local AM radio station went off the air. They had a DX program from 0000 to 0600 EST and had a CW transmission on the hour for a DX test. CFFX was originally CKWS, and went on the air in 1941. I grew up listening to this station and of course used it to test my crystal radio. The original holder of my amateur radio call, VE3GO, was Charles "Chuck" Millar and he was the first announcer at CKWS.

Many Canadian AM radio stations have gone silent, so if you want a QSL card, get it now, as others are slated to go silent soon. They are moving to FM frequencies and changing format. We have had several new FM stations in the past year or so. (For more on this topic, see *AM Bands* - ed.)

One local FM station of note is CJAI. This community station is located on Amherst Island, about 10 miles west of Kingston. They had 5 watts output but were given a new frequency of 92.1 MHz and 250 watts because all the new FM stations and frequency changes caused interference to their signals. I traveled by ferry to the island to help a friend program a digital scanner. Fellow DXer, George Kennedy VE3GHK and I stopped at their unique station location and took a picture.



Theodore Tugboat (of children's book fame) at Halifax Harbour



Theodore Tugboat (of children's book fame) at Halifax Harbour

across. The captain is Brent VE3SBW. Radio, radio everywhere!

I remind Marine listeners on the Great Lakes that the Seaway opens around March 25, as do the locks at Sault Ste. Marie. The VHF band should become very active around this time as ships come out of winter lay-up and ocean vessels again enter the Lakes. Channels 11, 12 and 14 will be active with traffic control. I will be installing an AIS receiver at my location and I hope to have more info on that for you in the near future. I know several of you have expressed interest in this new technology.

I will be watching for the barge *ATL 2701* to leave Toronto in order to get a picture for my collection. This vessel, previously called the *Irving Whale*, was on the bottom of the Atlantic for 25 years. She had a load of fuel oil on board, but because it was an environmental hazard, the Canadian government raised her at great expense. She will probably not be on the Lakes again, but had to winter in Toronto due to late season weather conditions.

On February 2nd, Groundhog Day, the famous rodents in Ontario and Pennsylvania, predicted an early spring, I hope they are right!

Longwave Resources

✓ **Sounds of Longwave** CD or Audio Cassette (please specify) featuring WWVB, Omega, Whistlers, Beacons, European Broadcasters, and more!
\$13.95 postpaid

✓ **The BeaconFinder** A 65-page guide listing Frequency, ID and Location for hundreds of LF beacons and utility stations. Covers 0-530 kHz.
\$13.95 postpaid

Kevin Carey
P.O. Box 56, W. Bloomfield, NY 14585

The Range in Retrospect

I wonder how many column readers remember the old "A/N Radio Range" signals that were heard on longwave up until the 1970s? In some ways, these stations were similar to today's non-directional beacons (NDBs), but they also offered basic flight path navigation, using a directional-antenna array at the transmitter. Depending on which side of the beam an aircraft was flying on, the Morse Code letters A (.-) or N (-.) would be heard by the pilot.

Some time ago, *MT* reader Perry Crabill (VA) shared his recollections with me of these stations from the 1930s. His comments offer a unique insight into these now-extinct stations which have been nearly forgotten.

Perry writes:

"As a youngster, I lived in Washington, DC, and in the 1930s I used to listen to these stations in the band from 200-400 kilohertz (kilocycles in those days). The Washington range station used the call letters WWX, and operated on 332 kHz, the same frequency used by DC-332 now. It had a four-tower Adcock antenna system on the east bank of the Potomac River, more or less across from Washington National Airport.

Four-course systems had a radiation pattern with two azimuth quadrants at 180 degrees from each other where aircraft would hear the Morse letter 'A,' keyed with a 1020 Hz tone. If they were in either of the other two quadrants, the letter was 'N.' If you were 'on the beam,' (i.e., on the overlapping boundary between two quadrants), you heard a continuous 1020 Hz tone. The phasing and amplitude of the currents in the four towers was controlled to put the overlap areas on the desired azimuths for leading aircraft to the nearby airport.

The 'A' and 'N' keying was periodically interrupted to send the call letters (WWX, for example), first in one pair of quadrants, and then in the other, whereupon the navigational keying was resumed.

The 'beam' frequency was also used for communication to and with aircraft. In addition, local aviation weather information was sent on a broadcast basis on regular schedules. Originally, it was necessary to interrupt the navigation signals to do this. If the broadcast was longer than three minutes, it was stopped and the navigational signals resumed for a period so aircraft would not be without guidance too long.

Later, techniques were developed that allowed simultaneous voice and range sig-

nal operation. Aircraft receivers could be equipped with an L/C filter that had a choice of bandpass operation at 1020 Hz for beacon reception, or band rejection at 1020 Hz for clearer reception of the voice signals. The filter could also be switched out, if desired. One of these was the FL-5 filter, a popular WWII surplus item. Added outboard to a ham receiver, it afforded excellent audio selectivity for CW reception.

At times WWX had detailed 'winds aloft' reports which would have tied up the range frequency longer than desirable. When this information was ready for broadcast, pilots were told at the end of the 332 kHz weather broadcast to tune to 236 kHz to listen for this information.

The voice communication capability of the range station was also used to talk to aircraft calling in on shortwave. The planes usually called in on 3105 or 6210 kHz. The lower frequency was the night frequency for itinerant aircraft, and 6210 was the day frequency.

In those days all airport control towers used 278 kHz to communicate with aircraft, which transmitted to them on shortwave. To the best of my knowledge, these tower stations did not use call letters on the air. I often listened to the Washington tower on this frequency. I could also hear the Baltimore tower, although it was much weaker.

In those days US call signs beginning with 'WW' were assigned to the US Department of Commerce, hence WWX for the range station at Washington. A well-known example of such a call is WWV for the standard time and frequency station at Boulder, Colorado, originally located at Greenbelt, Maryland. If you look at the longwave listings in Tom Kneitel's *Radio Station Treasury*, you will find a number of these calls listed, and I believe these were all for aeronautical applications."

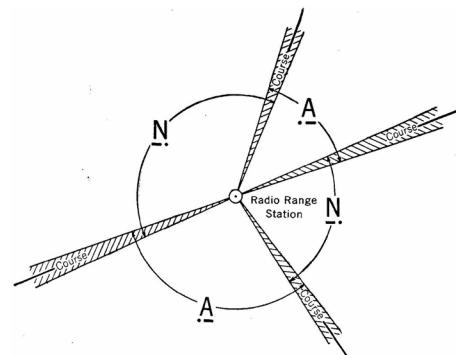
◆ Additional Details

Shortly after I received Perry's interesting comments on Range stations, Dan Wanchic (MN) wrote in with some additional details based on an old technical manual he came across. He notes that there were actually two types of antenna systems used at A/N Range stations. A common arrangement was the type we just described, with an array of vertical antennas. Dan points out that this arrangement also included a fifth antenna at the center of the array, which was fed with an offset sig-

nal, producing the 1020 Hz modulation. The second type of antenna employed two rectangular, vertical loops placed at right angles to each other, separated by another symmetrical "T" vertical antenna.

An interesting tidbit that Dan passed along involves the so-called "twilight zone." When an aircraft was flying near the center of a course, the "A" and "N" modulation percentages were nearly equal. Apparently, there was some "slop" involved in determining one's position from listening to the signal, and the pilot could not tell if his location was exactly in the center of the course. This area was called "the twilight zone." There's no known connection to the popular TV series by the same name, but the term seems quite appropriate for this situation.

A colleague of mine has acquired an *extremely rare* audio recording of A/N range stations from the early 1960s and he's in the process of producing a CD on these stations. These are the only recordings of A/N stations that I have encountered in 15 years of searching for them. I hope to have more news to report on this item in the near future. It would be great to see these historic signals available to today's listeners.



◆ End Notes

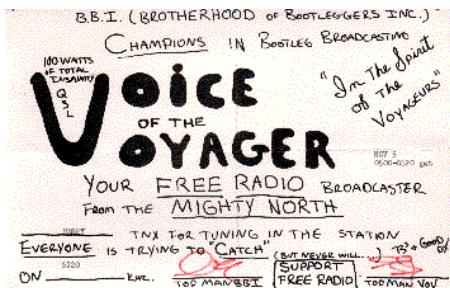
Looking for new longwave-related sites to explore online? The popular www.youtube.com site contains some interesting video clips related to LW broadcaster Atlantic 252 (Ireland) and historic Alexanderson Alternator station SAQ (17.2 kHz). Simply enter the terms "Atlantic 252" and "Alexanderson SAQ" in the search window to find these clips.

See you next month!

Voice of the Voyager, a Pirate Radio Pioneer

The most influential North American pirate of modern times was the **Voice of the Voyager**. This classic pirate station took to the air in 1978 from a transmitter location in Crystal, Minnesota. Operating on 5850 kHz, the announcers R. F. Wavelength and A. F. Gain transmitted a format of rock music mixed with comedy sketches. The target of the comedy consisted of parodies of the FCC and shortwave listeners who were actively publishing material in shortwave club bulletins at the time. That format has survived the test of time, and it still is the dominant programming genre among contemporary North American pirates thirty years later.

The station was raided by the FCC in August 1978. This did not end their broadcasting activity, since they returned to the air at least once in 1979. But, the station has been inactive since then. Nevertheless, given their enormous influence on the development of shortwave pirate broadcasting in North America, we remember the achievements of this pioneering pirate station this month. They issued the QSL that we see here, also pioneering the concept of maildrops for the purpose of communicating with pirates.



They were not the first modern pirate – a title perhaps held by **WFAT** that broadcast at the high end of the medium wave band from Brooklyn, NY. But, the Voice of the Voyager operated a regular schedule until they were raided, and their influence has endured for many decades.

FM Pirate Bust

Sharp-eyed contributor Artie Bigley points out that yet another FM pirate station has been busted by the FCC in Florida. This one had a “gangsta rap” format as it operated from Winter Haven, Florida. Numerous Florida media reported that the station was busted in early January following a raid by the FCC, the Polk County Sheriff, and the Florida State Attorney’s Office.

The *Orlando Sentinel* newspaper and other Florida media reported that Jimessia Spillman,

Wesley C. Williams Jr., and Calvin Thompson were booked in the Polk County Jail, under a charge of unauthorized transmission interference with a licensed radio station. Under Florida law, this offense is a third degree felony.

Laryngitis Web Site

The **Voice of Laryngitis** is clearly one of the most influential pirates of the last thirty years. Some pirate DXers have classified the Voice of Laryngitis as the best North American pirate station of all time. It certainly ranks among the best produced pirates who ever went on the air, along with R. F. Burns’ classic **Radio Clandestine**.

Perhaps by popular demand, Genghis Huxley, Stanley Huxley, and the Huxley Family players have created a web site that features dozens of downloadable examples of their hilarious productions from the past. If you have never heard a broadcast from this station, you will certainly want to check out what you missed at www.laryngitis.org/jin/.

1181 kHz Carrier

We still are getting reports of a mysterious AM mode carrier on 1181 kHz. Some speculate that it might be coming from Cuba, but signal reports range from strong to weak to inaudible all over North America. Veteran extra class amateur radio operator Doug Smith, W9WI, heard it with a loud signal on a Yacht Boy portable receiver in a Billings, Montana, hotel room.

Another Odd Signal

This month we hear from Neil Schwanitz, WD8CRT, currently operating from the Marshall Islands in the South Pacific. He is hearing a bizarre upper sideband signal on 7953 kHz in a time frame around 0850-0902 UTC on various days of the week. It consists of a repeated series of voice fragments in a typical South Pacific or South Asian sing-song style. I frankly have not heard anything like this one before, and neither has *MT* Publisher Bob Grove. It does not appear to be a utility mirror interval signal, and it has similarities to some “spy” numbers stations that we have heard in the past. During these times, it could be audible in parts of North America. Has anybody else been hearing this odd transmission? We are attempting to identify or classify this odd signal.

Colin Dixon Passes

Well known Europirate **Laser Hot Hits** has announced the tragic death of Colin Dixon on January 28. Dixon was a major figure in the operation

of this pirate station, and he had previous experience as the operator of Europirate **Radio Gemini**, which evolved into **Laser Hot Hits**. His death was unexpected and sudden. *Monitoring Times* extends our sympathy to his family and his many friends.

The station has announced future plans to continue pirate operations as “a tribute to the memory of a great man.” Check their web site at www.laserhohits.co.uk/

What We Are Hearing

Monitoring Times readers heard two dozen different pirate radio stations this month. You can hear them, too. Just tune your dial up and down 30 or 40 kHz above and below 6925 kHz.

Ann Hoffer Radio- This mysterious station is still being heard. It consists, not surprisingly, of music sung by Ann Hoffer. The spelling of the artist's name remains in some doubt. (None known)

Artificial Intelligence Radio- This new one combines new age space music with transmissions from the aliens who are communicating with the Earth. (None)

Captain Morgan- Rock music and audio from the old Twilight Zone television show “from the pirate zone.” (Send loggings to the Free Radio Network web site)

Long Range Radio- Diverse productions include rock music, comedy, and dramas, but little is known about them. (None)

MAC Shortwave- Paul Star still hosts the old top 40 commercial radio formats via this pirate, operating on variable frequencies including 3275, 6850, and 6925 kHz. (macshortwave@yahoo.com)

Radio Barretina- This extremely rare pirate from Catalonia was heard during the winter on 6311.1 kHz with a relay of rock music programming from Radio Arboc in France. The rare transmitter site created some DX excitement. (radiobarretina@hotmail.com)

Radio Cochiguaz- This well known South American pirate has announced an e-mail address. It also has been conducting tests from a European transmitter site to mark its 11th anniversary on the air. Their web site is at www.dxzone.com/cgi-bin/dir/jump2.cgi?ID=10323 (Santiago and radio_cochiguaz@yahoo.com)

Radio Conefrad- This new station is dominated by their air raid siren sound effects. (None)

Radio Maple Leaf- Their distinguishing feature is a rendition of the Canadian national anthem, “O Canada,” at the beginning and end of their broadcasts. They sometimes operate a pirate CW Morse Code beacon of “R.” (radio.mapleleaf@gmail.com)

Real Pirate Radio- This new one ran a Christmas show way out of season, and it also has been promoting **WBRY** and **Kracker Radio**. (None)

Oxygen Channel Parody- Sexually explicit stories and jokes are the overt format on this new one. (None)

Radio First Termer- This documentary about pirate radio broadcasts to American troops in the field during the Vietnam War gets fairly regular relays

Continued on page 61

ON THE HAM BANDS

THE FUNDAMENTALS OF AMATEUR RADIO

T.J. "Skip" Arey, N2EI

tjarey@monitoringtimes.com

Teeny Weeny Two Band Transmitters

I still think fondly of my first 2 Meter transceiver. I still use it from time to time! It resides in a place of honor in my radio shack.

When I first upgraded to Technician Class back in the '70s, I took all of my meager savings and bought a Drake TR33C. This represented a



state of the art portable rig back in the day. Its dimensions were 5.45" x 2.28" x 8.5". It weighed in at 4.4 pounds and produced 1.5 Watts RF Output. (Yes, I STILL have the original manual as well.)

Yes, there were smaller, lighter handheld units on the market back then. But not all that much smaller, and, I would strongly argue, none with the world renowned quality of a Drake rig. IC's were still relatively new toys and surface mount technology was probably still in the lab stage, if it existed at all back then. You couldn't call those '70s radios boat anchors, but you sure could call them paperweights!

Well, we have come a long way since those days when joining the repeater revolution meant that anything you hung off your belt was likely to pull your pants down if you weren't careful. (One of the reasons I chose the Drake rig was it hung from a shoulder strap instead of a belt loop.)

Recently, I had lengthy conversations with another occasional *MT* author Ed Muro K2EPM. Ed had just purchased the Yaesu VX-3R "Micro-miniature" 2 meter/440 MHz handheld. In addition to being a dual band rig (with a wideband receiver no less), it had the same power output as my Drake while using just three AA cells as opposed to the Drake's 10 cells. Better yet, it comes standard with a Lithium/Ion battery pack, a technology barely understood in the days when the TR33C was on the market.

But, most impressively, the VX3R's case size is a mere 1.9" x 3.2" x 0.9" and its weight only 4.6 oz! For comparison purposes, the Drake's 1525 EM microphone's dimensions are 2.6" x 3.5" x 1.7" and it weighs in at 8 oz. Ed's whole rig could fit inside the Drake's mic case with room for a spare set of batteries!

Coupled with features that are orders of magnitude beyond the basic transceiver features of the TR33C, you can see that ham technology has really made amazing advancements. The Drake TR33C listed for \$229.95 and the 1525 EM microphone was a \$49.95 accessory. You needed 12 crystals at \$4.50 each to fill the rig's channels. Those 10 NiCads would run you about two bucks apiece if you shopped around the surplus pages in

the back of 73 Magazine or *QST*.

Call it \$350 even to get a TR33C up and running. And *that* was in 1977 dollars – about \$1,164 in 2008 dollars. The feature-packed (and oh-so-diminutive) VX3R lists today for \$220 with a street price of around \$175! Whew! Do we live in great times or what! The only problem I can see with this modern miniature radio technology is that I know I would lose the darned thing on my desk somewhere. No problem with the TR33C in that area.

With that said, let's take a look at some of the current itsy bitsy, teeny weeny, dual band handhelds out there on the market.

YAESU VX3R

List Price \$220

www.yaesu.com/

I gave the basics about the VX3R's power and dimensions in my rambling preamble. Let's take a look at some of the features that go beyond the basics.

The VX-3R receives: 500 kHz through 999 MHz (with the obligatory blocking of the cell phone frequencies in the 800 MHz region); i.e., essentially "DC to daylight" reception. The rig has CTCSS/DCS with split tone capability and 1000 channels of memory.

Power output is 1.5 watts VHF and 1 watt UHF using the internal Lithium/Ion battery. Running the rig from 13.8 volts via an optional DC



adapter allows the VX3R to run 3 watts and 2 watts respectively! The "duckie" antenna has an SMA mount to allow for use with mobile or base antennas. Interestingly, this little rig even has room inside for a true AM Ferrite bar antenna for improved broadcast reception. It is WIRES™-II capable and includes a built-in CW training program. It is easily modified to extend its transmit functions to cover MARS/CAP frequencies. Yaesu makes an optional three AA cell battery case that allows for use of standard cells in emergencies when no other power source is available. Programming can be done by way of a number of commercial and shareware software packages.

ALINCO DJ-C7T

List Price \$230.95

www.alinco.com/

Alinco calls their various mini rigs "credit card" HTs. The DJ-C7T has a wideband receiver covering 88.1 - 107.995, 108 - 173.995 and 380 -

511.995 MHz. CTCSS encode/decode and European tone bursts are included, making this an excellent travel radio. It will allow repeater frequency offsets up to 99.995 MHz. Power output is 300 mW with the supplied Lithium/Ion battery. The power can be increased to 500 mW with an external 6 VDC source.



ICOM IC-P7A

List Price \$296.00

www.icomamerica.com/

The IC-P7A covers 2 meters with 1.5 watts output and 440 MHz with 1.0 watt output. It has a wideband receive coverage from 495 kHz to 999.99 MHz (less 800 MHz cellular). It has a weather channel alert tone.

The IC-P7A has 1000 regular memory channels, 50 band scan edges, and 200 automatic memory write channels. The regular memory channels can be grouped into 18 memory banks, each of which can hold 100 channels. Channels and banks can be named with up to 6 digit alphanumeric combinations.

The rig has CTCSS and DTCS capability. It has a flexible SMA antenna and a Lithium/Ion battery. The unit's size is 1.85" x 3.18" x 1.10" and weighs 5.64 oz.

KENWOOD TH-F6A

List Price \$403.55

www.kenwoodusa.com/Communications/

The TH-F6A is a bit more radio than the aforementioned units, in that it is a tribander operating in the 144, 200 and 440 MHz ham bands. A neat feature for emergency service is dual channel receive. The unit has 435 memories (three can be programmed as "call" frequencies.) It has standard Encode/Decode and DCS.

The rig's output is 5 watts using the supplied Lithium/Ion battery. Low power settings of 0.5 watts and 0.05 watts can also be dialed in for power



consumption control.

The TH-F6A radio has a wideband receiver covering 100 kHz in to 1300 MHz (less cellular). It can receive CW and SSB in addition to AM and FM signals.

It has a built-in ferrite bar antenna for reception of medium wave and long wave bands. It also has a full DTMF keypad and Internal VOX circuit. It has an SMA antenna mount and a supplied "duckie."

❖ Uncle Skip's Book of the Month

If you have been following my column over the last few years, you know I have written occasionally on The Global Positioning System (GPS) and its potential uses in the ham radio world. I have played with this technology quite extensively and I even gave a presentation on GPS at the 2007 Kulpsville SWL Fest.

Still, there is always more to learn, especially when a technology is evolving so rapidly. From folks just beginning to think about getting their first GPS receiver, to folks who have already integrated GPS into their ham habits, I would like to make a suggestion for your bookshelf.

GPS AND AMATEUR RADIO

By Walter Fields W4WCF
No. 9922

\$18.95 (ISBN ISBN 0-87259-992-2)

The American Radio Relay League
225 Main St

Newington, CT 06111

1-888-277-5289

www.arrl.org/catalog/

Let me start by telling you a bit about Walt W4WCF. Walt is a retired electrical engineer who actually participated in the original design for the Global Positioning System. I don't think you write about this subject with any higher credentials than that. He begins by giving an excellent overview of GPS technology.

He goes on to explain an area that is often confusing to new GPS users, that of overall GPS accuracy. Folks tend to think a basic GPS unit can land you on a dime and give you nine cents change. Not so! There are a number of factors that can run you aground (literally) and these are thoroughly explained in this study.

Walt goes on to look at GPS receivers, their respective features and, more specifically, those features that are important to consider if you are planning to use GPS in the ham radio realm. He goes on to give an excellent tutorial on basic GPS navigation including using your GPS unit with topographic maps. These can either be paper maps or software derived topo maps stored in a full featured GPS receiver.

Then Walt gets down to business discussing ham radio specific applications with an emphasis on the Automatic Position Reporting System (APRS). APRS has become an essential tool in amateur radio emergency service and support. If you need to get smart about this subject in order to pull your weight with your local ARES, RACES or Skywarn group, this book will get you up to speed in no time at all.

The book also gives suggestions on selecting a GPS receiver from the current crop of units available to the consumer market. This is

important reading, because not all GPS units are created equal, especially when put into service in the ham radio world.

The book finishes out with a glossary, a list of resources and a series of appendices that include using your computer sound card as a TNC and how to make an inexpensive external GPS antenna.

But allow me to suggest another use for this fine book: As hams, we are always trying to look for ways to get folks to enter into our hobby. In recent years there has been an explosion of GPS use by folks involved in camping, hiking, bicycling, boating and all manner of other outdoor activities. GPS use has even become a hobby in its own right through the sport of Geocaching (www.geocaching.com). GPS can be a gateway to talking someone into sitting for their first ham ticket.

I do a bit of geocaching myself. I always have my handheld with me and get comments on it when I encounter other geocachers in the field. Likewise, I use APRS beaconing when I enter charity cycling events. I have introduced more than a few folks to ham radio once they saw how I set this up. So, if you have a GPS oriented friend or you are involved in another GPS enhanced hobby, you may be able to use this book to seal the deal in getting someone into your club's next licensing class.

Outer Limits continued from page 59

on the pirate band. (None)

Radio Jamba International- Their rock music is sometimes supplemented by slow scan TV digital transmissions. (Belfast)

Sycko Radio- This veteran pirate has returned with fresh shows that combine comedy with pirate radio commentary. (syckoradio@yahoo.com)

Sunshine Radio- Their female announcers programs rock music, often in coordination with **Grasscutter Radio**. (grasscutterradio@yahoo.com)

The Crystal Ship- The "Voice of the Blue States Republic," with its leftist politics and music is a veteran pirate that has been active for decades. Frequencies vary widely, but the Poet says to look for him on 1710, 3430, 5385, and 6700 kHz in the future. (Belfast and tcsshorthwave@yahoo.com)

Undercover Radio- From the middle of nowhere, Dr. Benway broadcasts rock music and stories about journeys to remote locations for mobile pirate broadcasts. (Merlin and undercoverradio@gmail.com)

Voice of the Bat- This apparent new one transmits rock music and discussions by a male announcer. It has not yet been widely heard. (None)

Voice of William Shatner- This odd new one combines Star Trek audio with songs sung by the actor who played Captain Kirk on TV. (None)

WBNY- As his campaign for President of the USA heats up, Commander Bunny supplements his Rodent Revolution pirate broadcasts with bumper stickers and other campaign material that are for sale on e-bay. (Belfast and rodenrevolutionhq@gmail.com)

WHYP- James Brownyard has been relaying other pirate stations, sometimes under an ID of the **WHYP Relay Service**. (Belfast and whypradio@gmail.com)

Wolverine Radio- Rock music and comedy dominate their broadcasts, in the historical format pioneered by the **Voice of the Voyager**. (None)

WTCR- "Twentieth Century Radio" normally programs rock music, but any music from the 20th century can show up on the broadcasts. Look for a quasi-interval signal of the MGM 20th Century Fox movie theme audio. (Belfast)

UNCLE SKIP'S CONTEST CALENDAR

QCWA Spring QSO Party

1800 UTC Apr 5 - 1800 UTC Apr 6

Missouri QSO Party

1800 UTC Apr 5 - 0500 UTC Apr 6

ARS Spartan Sprint

0100 UTC - 0300 UTC Apr 8

Georgia QSO Party

1800 UTC Apr 12 - 0359 UTC Apr 13

1400 UTC - 2359 UTC Apr 13

Holyland DX Contest

0000 UTC - 2359 UTC Apr 19

Michigan QSO Party

1600 UTC Apr 19 - 0400 UTC Apr 20

Ontario QSO Party

1800 UTC Apr 19 - 0500 UTC Apr 20

1200 UTC - 1800 UTC Apr 20

Well, spring has sprung and the new Solar Cycle has just begun. Have fun! I'll see you on the bottom end of 40 meters.

❖ QSING PIRATES

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. Letters go to these addresses, identified above in parentheses:

- PO Box 1, Belfast, NY 14711
- PO Box 109, Blue Ridge Summit, PA 17214
- PO Box 146, Stoneham, MA 02180
- Casilla 159, Santiago 14, Chile
- PO Box 293, Merlin, Ontario N0P 1W0

The best bulletins for submitting pirate loggings for potential QSL are the e-mailed Free Radio Weekly newsletter, freeradioweb@gmail.com and the Free Radio Network web site, at www.frn.net

❖ 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: Brian Alexander, Mechanicsburg, PA; Skip Arey, Beverly, NJ; John T. Arthur, Belfast, NY; Kirk Baxter, North Canton, OH; Artie Bigley, Columbus, OH; Commander Bunny, Belfast, NY; Bill Finn, Philadelphia, PA; John Figliossi, Halfmoon, NY; Harold Fodge, Midland, MI; Bob Grove, Brasstown, NC; Harry Helms, Smithville, TX; Ed Insinger, Summit, NJ; Ed Kusalik, Coaldale, Alberta; Don Jensen, Kenosha, WI; Chris Lobdell, Tewksbury, MA; Michael W. Maher, Hillsborough, NJ; Larry Magne, Penns Park, PA; Greg Majewski, Oakdale, CT; Cahito Mamani, Santiago, Chile; A. J. Michaels, Blue Ridge Summit, PA; Curt Phillips, Raleigh, NC; John Poet, Belfast, NY; Martin Schoech, Eisenach, Germany; Neil Schwanitz, Marshall Islands; Lee Silvi, Mentor, OH; Doug Smith, Pleasant View, TN; Joe Wood, Greenbriar, TN; and an anonymous contributor.

ANTENNA TOPICS

BUYING, BUILDING AND UNDERSTANDING ANTENNAS

Clem Small, KR6A

clemsmall@monitoringtimes.com

Notes on the Development of Antenna Technology

The Concept of Electrical and Magnetic Fields

When the investigation of electrical and magnetic phenomena was in its infancy, one of the important investigators was Michael Faraday. He believed that when electric current flowed, both electric fields and magnetic fields were established around the conductor of that current. Many of his contemporaries felt that the fields were created instantly when the current flowed, thus needing no time at all to fill the space that they would occupy.

In opposition to this, Faraday felt that these fields took some very small amount of time to move out from the conductor and establish themselves in the space that they would occupy. And, if they did move out, it seemed reasonable to think that perhaps they flowed out as waves of electrical or magnetic energy.

James Clerk Maxwell pondered Faraday's work and all the other work on electrical and magnetic phenomena known at that time. With a brilliant analysis he predicted that when electrical energy flowed as a changing current, then electrical and magnetic waves did indeed flow out from the conductor.

Maxwell's work produced a theory, but no actual demonstration of the hypothesized electromagnetic (EM) waves: it remained for Heinrich Hertz to show by experiment that such waves did exist. As part of his research into EM waves, Hertz devised what he termed "primary conductors" (antennas that he used for transmitting) and "secondary conductors" (antennas that he used for receiving).

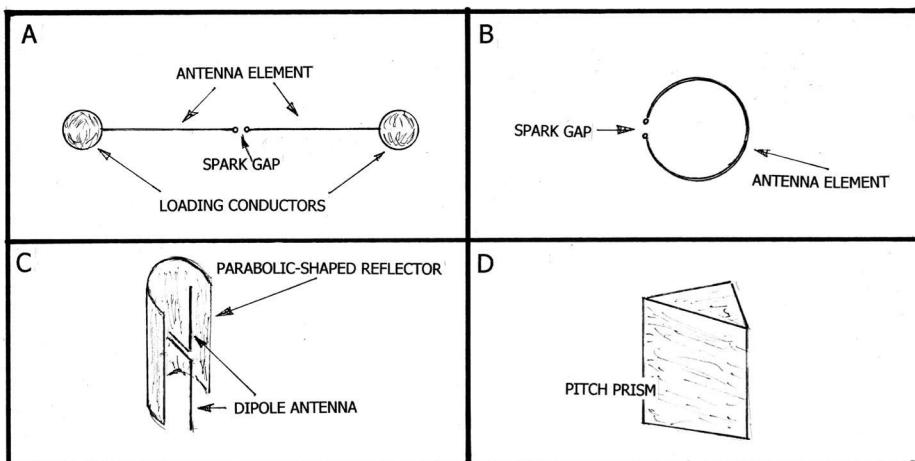


Fig. 1. Hertz's basic antenna designs from which most current antenna designs have evolved: a capacity-loaded dipole (A), a resonant receiving-loop with spark gap detector (B), a cylindrical-parabolic reflector with a dipole antenna (C), and a dielectric prism made of pitch (D).

Very Early Antennas

The antenna designs which Hertz invented for his work included the loaded, half-wavelength dipole (fig. 1A); the resonant loop (fig. 1B); the flat-reflector beam; the parabolic-reflector beam (fig. 1C), and the use of dielectric material to aim or focus his EM waves (fig. 1D) antennas. These designs are still utilized. These designs also provided a basis, or served as components, for most antenna designs developed later.

Guglielmo Marconi, often called the "Father of Radio," drew on the work of Hertz and other scientists to develop a working wireless (radio) communication system. During this work, Marconi developed the grounded, quarter-wavelength, vertical antenna. He started with a Hertzian dipole and replaced one half of it with a connection to ground. He then elevated the remaining half of the antenna vertically over the ground connection. This antenna finds wide use yet today, especially with AM broadcast stations and with hams seeking DX contacts.

Marconi and his engineers also later developed the inverted-L beam and the collinear beam. Both of these beams were useful in early wireless communications.

Parasitic Beams

Hertz had shown that a beam antenna could be made by spacing a dipole element a quarter wavelength from a reflector. His reflectors were plane or curved conductive surfaces. Later, it was found that resonant linear elements such as metallic wires or tubes would also serve as reflectors. Linear elements can also be used as directors to add gain

and directivity to the antenna. These reflectors and directors are not connected to the antenna's feed line, but operate by receiving and then re-radiating that energy (i.e., they are parasitic).

With a reflector and multiple directors, it became possible to give these beams high levels of directivity and gain. Today's Yagi-Uda and cubical quad beams are the result of these developments.

Phased Arrays

Phased arrays were also developed relatively early in the history of antennas. Antenna elements aligned in one plane and fed with signals which have a particular phase relationship to one another make what is called "phased-array beams." By adjusting the phasing, these beams can be made to give major lobes at right angles to the plane containing the elements (broadside-fire beam) or in the plane of the elements (end-fire beam). Phasing of elements is an important factor in a number of antenna designs.

Long-Wire Beams

As we make a wire progressively longer than a wavelength, then its radiation and reception activity develops lobes (directions of maximal response) and nulls (directions of minimal response). The longer the wire, the more narrow the lobes. This makes the wire into a multi-lobed beam antenna. When two such long-wire elements are arranged as a V, the resulting antenna is a V-beam with good gain and directivity. Joining two such Vs "mouth to mouth," produces the legendary rhombic design, with its potential for increased gain and directivity.

All of these long-wire designs have been important in the history of radio communication and are still useful today where there is sufficient area to erect them.

Horns

With the development of waveguide technology, horn-type beam antennas became possible. These include the simple flared-end waveguide horn and the high-gain, highly-directional Hog horn or cornucopia which has seen much use in microwave-relay towers.

Potpourri

The antenna designs mentioned above served radio communications well in the relatively early years of antenna development. A sampling of the many designs subsequently developed includes the ground-plane antenna, the discone (a broadband relative of the ground-plane antenna), the

This Month's Interesting Antenna-Related Web site:

Here is a free copy of "Electric Waves," Hertz's book on the work in which he first introduced radio waves:

http://books.google.com/books?id=8GkOAAAAIAAJ&printsec=frontcover&dq=hertz&ei=H1ldR_jiOYbosQOB1am-CA#PPP1,M1

Biographical notes about Hertz:
http://en.wikipedia.org/wiki/Heinrich_Hertz

An overview of how scientific work led to the development of communication by radio waves:

<http://kr.cs.ait.ac.th/~radok/physics/k14.htm>

half-wavelength slot antenna (a relative of the half-wavelength wire dipole), the patch (usually a square conductor over a conductive-sheet ground-plane); and the frequency-independent designs, such as the frequency-independent spiral and the log-periodic directional array.

During and after the Second World War, many specialized, high-gain, narrow-beam antennas were developed for use in the field of microwave and radar work. These typically utilize linear reflectors and directors or parabolic reflectors. Both metal lens and dielectric lens beams have also played their part.

Today, for applications such as cell phones, lap-top computers, hand-held computers, GPS devices, and other small, portable electronic devices, much attention is given to developing very small,

RADIO RIDDLES

Last Month:

I asked: "Navigators of sea-going ships can plot the shortest distance for their ship's courses by using something called a 'great-circle map.' Does such a map have anything to offer a radio operator?"

The answer is "yes," a great-circle map shows the shortest path between two points on earth, and radio waves take the shortest path from transmitting antenna to receiving antenna. Acquire a great-circle map centered on the location of your antenna. On this map

but effective antennas. Patch, microstrip (patch variants), and slot designs are often useful in these applications.

❖ Antennas and the Future

John Kraus was an almost legendary worker in the field of antenna development. He once gave a speech in which he made the following prediction for the future of antennas: "With mankind's activities expanding into space, the need for antennas will grow to an unprecedented degree. Antennas will provide the vital links to and from everything out there. The future of antennas reaches to the stars."

Dr. Kraus was right, of course. But not only does the future of antennas reach to the stars today,

draw a line from your antenna's location to a place with which you want to communicate. That line will be an arc, or segment of a great circle, and will indicate the compass bearing on which you must point a beam antenna to maximize that communication.

This Month:

Have you heard of the two "romantic antennas?" I'm not talking about when they got married (more on that later), I'm asking how their romance started.

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.

it reaches right into our very hands, into our many handheld, wireless, electronic devices, and into practically every other area in which technology is employed today.

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Finishing Touches for the BC-348

❖ From the Readers

Along with the previous Trans-Oceanic story and our earlier work on the military command receivers, this BC-348 project certainly ranks as one of the most popular in the history of "Radio Restorations." I appreciate hearing from all of the readers who e-mail me about their own BC-348 adventures – and here, to kick off the column, is the latest batch.

Bill Oelker, KN8DMK, has carried out a restoration that puts mine to shame. His BC-348P came to him unmodified and looking mint – except for a small amount of rodent damage in the wiring. It even had the dynamotor (in this case a 14-volt one) still in place. However, Bill began, as I did, by replacing all of the many molded paper capacitors under the chassis. This is a step without which no BC-348 restoration would be complete or reliable. He also replaced four carbon resistors that were burned or otherwise out of spec.

Bill's restoration experience now diverged radically from mine. As he began realigning the r.f. stages, he found that some of the trimmer capacitors were not adjusting properly. This necessitated the removal of the r.f. and oscillator modules for inspection.

To do this, one must first remove a shield from the bottom of the tuning capacitor, giving access to the short heavy leads from the modules to the capacitor. These can now be desoldered and removed. Additional wiring to various points on the module cases must also be removed after being tagged for later identification.

There is a flat shaft, rotated by the band change control, that runs through a bandswitch wafer in each module. Once its holding screw is released, the shaft can be withdrawn from the end of the receiver. This frees the modules for removal after the various screws securing them to the chassis are released.

With the modules removed from the receiver, Bill found that the rotor assemblies in a number of the adjustment trimmers were loose and shorting against the stators. The problem was caused by hairline cracks in the hex adjustment nuts. Because of those, the nuts lost compression on the rotor shafts – which then came loose, allowing the rotors to flop around.

I think that most people – including your columnist – would have now shelved the receiver, perhaps to be used as a parts donor or parts recipient after another set had been found. Not Bill, though. He found a way to reestablish compression and hold it by drilling holes in the nuts so that wire pins could be installed.

A heroic fix indeed! I had been tempted to

remove the modules myself, just to apply contact cleaner to the bandswitch wafers and check for bad fixed capacitors. I stopped short of doing that, however – particularly since my parts list showed that all of the module capacitors were mica rather than paper. So I could reasonably cross my fingers and hope that they were all good.

Jerry, NR5A, was inspired to acquire a BC-348-Q after reading some of the earlier installments of this column. After figuring out how to reconnect some of the displaced leads from the previous owner's power supply, he found that his set works like a champ! He does intend to recap the radio and has ordered all of the parts. But for now, he's having too much fun listening to it.

Jerry finds the set to be remarkably stable, and he is easily able to adjust the bfo for reception of ham ssb signals. He plans to team it up with a Knight T-50 transmitter now being restored to recreate an early Novice station.

He sent a picture of his BC-348 and I'm including a section of it here to show a solution to a problem I haven't coped with yet. Note the light-colored (red if you are looking at this in color) cylinder under the cabinet. It might be an upside-down bottle cap.

One of these is installed under the rack mount fitting at each corner. They keep the fittings from scratching furniture and also raise the cabinet up enough to clear a downward protruding front lip. Of course this strategy wouldn't be necessary if one had an original rack mount for the receiver – which would also contain a handy socket for the receiver's interface plug. But I don't know anybody who has one of those!

Thanks to **Michael D. Allen, W6EAV**, who sent some useful hints about a.c. power supplies, as well as about the transistorized "dynamotor replacement" published earlier in this column. Michael also included complete design information – unfortunately too voluminous to be included in this column – for a power supply to replace burned-out vibrator power packs in vintage auto radios. Though he didn't specifically offer, I'm taking it upon myself to include his e-mail address (it's mmddaa@hotmail.com) because the design

looks as if it could be very helpful to other restorers.

R.L."Pete" Stull, WB7AMP, happened to pick up a copy of *MT* at a Barnes and Noble bookstore and noticed the BC-348 coverage in this column. He has several of the receivers and was interested in obtaining copies of any previous article covering the BC-348 power supply. This is a good place to mention that, though I'd like to help, I'm not set up to send copies of my articles to readers. In such situations I'd have to suggest contacting *Monitoring Times** or visiting a library that carries our publication.

What I have recently done is to create a content index of all previous BC-348 articles. I e-mailed Pete a Word doc of this index, but you can now find it on the web page associated with this column (www.monitoringtimes.com/html/radio_restorations.html) along with indexes for all past "Radio Restorations" projects.



Jerry, NR5A used plastic shields (upside down bottle caps?) under the rack mount fittings of his BC-348 to protect furniture.

Clayton Hallmark, W5ZWM, writes that these columns have stirred up fond memories of a BC-348-R he owned early in his ham career. Now he's tempted to get into some restoration work himself. **Harold Richardson** has no less than three BC-348s he'd like to restore and has asked for information for my past columns on the subject. I sent him an index as well.

Bobby, K4VE, an enthusiastic reader who has corresponded with me before, is looking for suggestions on where to find a capacitor tester such as the one I've been using in these columns. He has a modern digital checker, but it lacks that all-important leakage test function. However, virtually all checkers that were made for tube radio servicing are set up to test leakage.

These are still plentiful at hamfests and antique radio meets, and I recommend one of the units made for the radio service trade by capacitor manufacturers such as Sprague or Cornell Dubilier. These usually sell in the same price range as the Heath or Eico kits and are much better units. I'll keep my eyes open for an extra unit that I can restore on these pages.

❖ A Remarkable Video

Recently someone called my attention to an amazing, almost hypnotic, 17-minute video posted online by a French ham showing how he constructs replica vintage vacuum tubes. The deftness with which he forms the glass and metal parts and the efficiency with which he solders, spot welds, and exhausts air – with much of the equipment apparently home constructed – is remarkable to behold.

The complete construction sequence is shown, followed up by the running of characteristic curves on the finished product and a demonstration of the tubes as used in an operating vintage style transmitter and receiver. Take a look! You'll find it at http://blog.makezine.com/archive/2008/01/make_your_own_vacuum_tube.html (NOTE: odd spelling of "vacuum" is correct for this URL)

❖ BC-348 R.F. Stage Problem

In the last issue, we corrected the cause of the erratic and distorted audio with which our radio was plagued. A new audio coupling capacitor was installed to replace the leaky one, and a missing tone control capacitor was also replaced. Now the audio sounded okay, but I noticed that the B plus voltage was about 80 volts too high.

Apparently the current drain of the audio stages had been abnormally high because of the bad coupling cap. Fixing it reduced the current – thereby reducing the voltage drop across the power supply series resistor and raising the B plus. Increasing the value of the series resistor corrected the problem.



The BC-348's removable r.f. modules. From left: first r.f., second r.f., converter, oscillator.

With the audio cleared up, we could proceed with the i.f. and r.f. alignment of the receiver. This certainly enhanced the sensitivity, but there was still a problem. Though the two r.f. stages were passing signals and had even seemed to peak satisfactorily during alignment, they were not amplifying. In fact, when they were bypassed by connecting the antenna directly to the converter grid, the signals actually got louder.

This month's work session began with a check of the operating voltages at the first and second r.f. tube pins. These were reasonably close to the typical values given in the maintenance manual. However, a resistance check turned up a too-high reading in the plate circuit of the first r.f. tube. Luckily, the plate resistor was not inside the first r.f. module but mounted externally on the back.

What was supposed to be a 4700-ohm resistor now measured almost 6500 ohms. After changing it, I thought it would be a good idea to recheck the r.f. alignment and it is well that I did. I was now able to get significantly higher peaks than the ones I had obtained with the bad resistor.

❖ The Mysterious Voltage Regulator

With this particular radio, correcting one

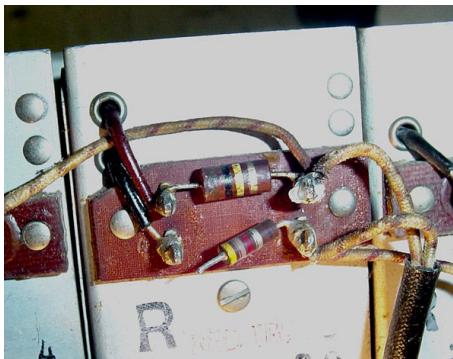
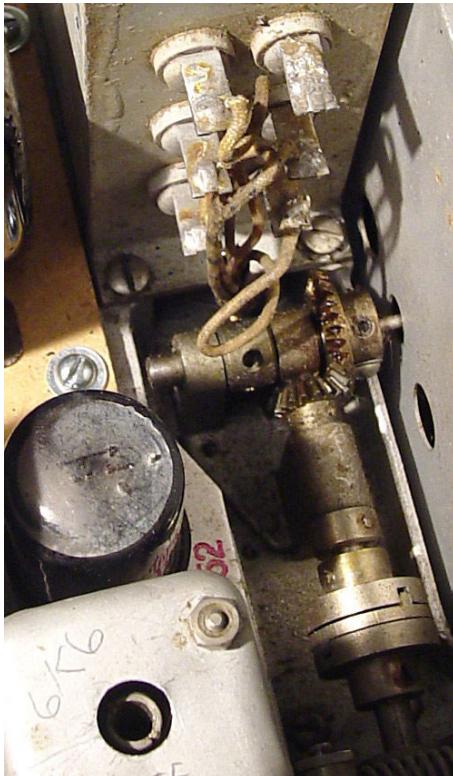


Plate and grid resistor are mounted on back panel of rf. modules. The 4700-ohm first r.f. plate resistor (shown disconnected) measured almost 6500 ohms, so was replaced.

problem often seems to lead to the uncovering of another one. And this work session was no exception. The operation of the neon oscillator voltage regulator lamp had always been erratic. It always lit when the power supply was first turned on, but usually went out after the tubes warmed up and began drawing current. But after the last work session, the lamp surprised me by remaining lit (as it was supposed to) after warmup.

I was happy to see that, and thought it might have been due to the power supply voltage adjustment I had made – even though that had lowered the plate voltage. But now I believe it was caused by the oscillator adjustment I had just made. My clue was that the lamp had reverted to its old behavior after the latest round of r.f. adjustments, which included an oscillator touch-up on some bands.

The continued ignition of the lamp is de-



Actuating shaft from geared band change control (right center) can be seen entering hole in wall of oscillator module (see text).

pendent on the oscillator plate current draw, and I remembered that at one time I had suspected some type of irregular oscillator operation as I was tuning the set during tests. As a possible remedy, I had purchased a replacement "new-old-stock" 6C5 oscillator tube during one of my last parts orders, but had not yet installed it.

Now I did install it, and the lamp promptly returned to its normal behavior, remaining on after warmup. This turn of events might seem rather odd to some readers, but temperamental oscillator operation – even with tubes that test perfect – is far from an unknown occurrence. I'll keep an eye on the lamp as I continue to use the set to see if my theory is proven true.

I'd love to tell you, now, that I had carried the set out to my garden shed shack, hooked it up to a good antenna, and found that the performance was gratifying. Maybe next time! Right now the temperature is one (1) degree with the windchill factor about 5 below. And even though I can heat the shack, I don't feel like making the frigid trip!

* In-stock back issues of MT are available for only \$4.50 for the first magazine, \$3.50 for each additional. Photocopies of individual articles may be purchased for \$3 per article plus self-addressed, stamped envelope. Best value is to purchase the 2007 anthology on CD for only \$19.95, or \$14.95 with subscriber discount. (The BC-348 project began in May 2007.) E-mail order@grove-ent.com or call 800-438-8155 for details.

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The Tangent Quattro Table-Top Internet Radio

By Larry Van Horn

Imagine sitting in your den in United States and listening to a morning drive time program from Capital FM 98.4 in Nairobi, Kenya. Then, if you want to listen to the latest weather report from 2GB – 873-AM in Sydney, Australia, you lean over to your radio on the bookshelf, press a button on the front of the cabinet and within seconds, audio from 2GB fills the room.

Now any seasoned radio listener knows that if you were using a conventional radio receiver this could never happen. But in this technological age we live in, there is another way to listen to distant radio stations from all over the globe – Internet Radio. Through this medium, the possibilities are nearly endless.

I have been in the radio hobby for nearly 45 years and, while I enjoy chasing DX, I must admit I am more of a program content radio broadcast listener than a DXer. So anything that I can do to clean up the received signal from a radio is a plus in my book. Not to mention having an opportunity to listen to a distant station that I normally can't hear at all. And the Internet and a new receiver from Tangent give me that plus.

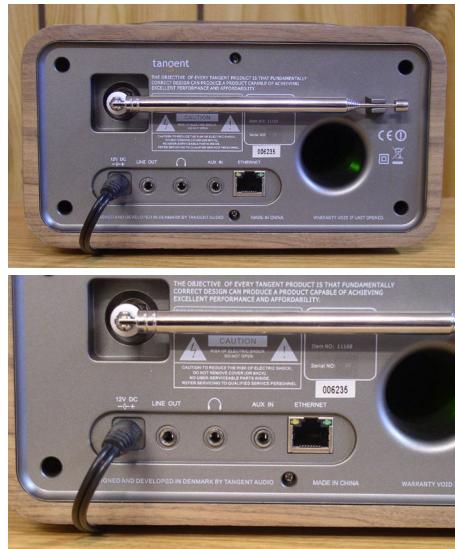
The Tangent Quattro Internet radio is the first internet-capable member of the Tangent audio family of products, and it entered the marketplace in July 2007. Connecting to over 9,900 Internet radio stations is as simple as it is pleasurable with this tabletop radio.

similar to other Tangent products. The unit we tested is housed inside a Medium Density Fiberboard (MDF) wood cabinet with real walnut veneer. It is available in four wood-like finishes – white, red, walnut veneer, and black.

This IRD measures 8.25-in W x 6.25-in H x 4.5-in D (210 x 111 x 145-mm) and is an ideal size for a bookshelf, counter top, coffee table or night stand. And the unit is lightweight, only 4.5 pounds. While the radio itself looks good, the AC-DC 1500 mA power adapter (aka wall wart) is a monster. It might be a bit hard to conceal in certain setups.

One of the more unusual aspects of the Quattro's design is its top-mounted speaker placement. The radio has a single, monophonic three-inch speaker, covered by a sturdy metal grille. The back of the unit features a one-inch rear fire speaker port that adds to the overall audio quality delivered by the unit. An alarm clock snooze button is located at the front of the top speaker.

All of the control functions for the Quattro are on the front panel. These controls include a large volume knob (left), a tuning knob that doubles for Internet and FM radio reception (right), a two-line, 2.5 inch, light blue backlit LCD display (center top), ten pill-sized push buttons for radio menu functions and presets (center bottom underneath the LCD screen) and two additional pill-sized push buttons for



power and select operation functions (left and right bottom respectively).

The LCD screen displays station, menu, and clock information. The screen was easy to read even in external light conditions, but things can get a bit cramped on station names received from the Reciva Internet portal. More on this service later.

On the rear of the radio, there is an RG-45 jack (for wired connection to the Internet, a recent addition to this model), three 3.5 mm stereo audio jacks (auxiliary input for an MP3 or CD player, headphone output, and line output), and a collapsible telescoping whip antenna for FM radio reception.

❖ What's Inside the Box

The Quattro was well packed in its display box. Our supplier C. Crane further packed the unit into a shipping container and a professional job was done to ensure the product arrived safe and undamaged. In addition to the Internet radio device (IRD), an AC-DC power wall wart, instruction book, and a 3.5mm audio cable was included.

The instruction book was extremely well written and very easy to follow. The 330-page girth comes from its numerous languages (English, French, German, Dutch, Swedish, Finnish, Italian, Spanish, and Portuguese).

The Quattro Internet radio receiver has a retro design look with distinctive Danish styling,



MT Rating [4-3/4 stars]



❖ It's what is under the hood that counts.

Once you flip through the pages of the Quattro manual, you begin to realize how capable this Internet radio really is. Not only can you listen to services streaming audio on the Internet with this unit, but it has a built-in FM tuner with RDS decoding capability for local area station reception.

The radio has a menu option to change the display language on the LCD. Languages sup-

SPECIFICATIONS

Connection:

Wired – RJ-45 Ethernet input jack for direct connection to a router
WiFi: – 802.11b and 802.11g compatible

Security: Works with both unsecured and secured networks. Offers 128-bit (max) WEP Security and also supports WPA encryption (WPA1 and WPA2).

Speaker: Built-in full range 3-inch dynamic speaker

System Output: 5 Watt RMS

Audio Frequency Range: 80-20,000 Hz

Audio Formats: Supports Real Audio, MP3, Windows media streams, OGG vorbis, AAC, WAV, AIFF or AU File formats

Radio Tuner: Built-in FM tuner with RDS capability

Connections:

- 3.5mm jack for stereo analog audio headphone output
- 3.5mm jack for stereo analog audio AUX input for MP3 devices.
- 3.5mm jack for stereo analog audio Line output

Power Supply: 12 VDC 1500 mA (via supplied AC-DC adapter)

Weight: 4.5 lbs

Size: 8.25 W x 6.25 H x 4.5 D. (210 x 111 x 145-mm)

List price: US\$349.95. Designed and developed in Denmark. Made in China.

ported by Quattro include English (GB), English (US), French, Spanish, Dutch, German, Danish, Italian, Portuguese, Finnish (Suomi), Swedish, and Norwegian.

Quattro has a built-in media player that allows you to play audio files (AAC, AIFF, AU, MP3, RM, WAV and WMA formats) stored on a networked PC. You can use the Quattro to wirelessly stream your music and audio from your computer (PC and Mac), or connect your MP3 player to the audio-in and use the Quattro as a stand alone speaker. It has been verified to work on Windows 2000 and Windows XP. The firmware package that runs the Quattro radio can be updated through the receiver's menu system from the Reciva portal.

❖ The Internet Connection

Reciva is an Internet Radio and Digital Media Player company that provides firmware technology to its industry partners for inclusion in their IRD products. They also provide a comprehensive list of validated Internet radio stations used by their partners' products. Their web site also provides that same list of validated Internet radio stations free of charge via the Internet to



your PC or Mac.

Via the Reciva portal, the Quattro radio can browse radio stations by location and genre to find your favorite radio stations that can then be added to one of the six presets. The Quattro takes full advantage of the Reciva.com portal features. There is no subscription fee and you don't even have to turn on your computer to use this IRD.

The Tangent Quattro works with both open and encrypted WiFi networks, and has no difficulty remembering WEP and WPA security passwords. If you don't expect to be moving the radio between multiple wireless networks, setting up the radio for wireless operation is quite easy and well documented in the manual.

Configuring the Tangent Quattro to stream music from another computer is a little more involved. While I was successful in getting that function to work, it does require that you use the manual's instruction precisely in order to stream your favorite music. I found an excellent instruction page on the C. Crane website at www.ccrane.com/radios/wifi-radios/tangent-quattro-wifi-internet-radio.aspx that helped enable this feature. As of this writing, the Tangent Quattro will not stream DRM-protected AAC and WMA files, so don't expect your iTunes or Rhapsody music purchases to be compatible.

❖ An Updated Version

The early release of the radio had some issues and lack of features that initial reviewers took exception to. Fortunately most of those issues have now been addressed by the manufacturer and are included in the unit that I purchased.

One of the major complaints of the early units was no capability for wired interface with the internet. You had to have a wireless network to use the radio. Tangent has now added an RG-45 jack so that the unit can be connected to the internet via a router or modem. You still have the wireless interface capability if you want to monitor your favorite stations via this type of connection.

The Quattro now has six preset buttons instead of the original five. This is a very useful feature to get you connected quickly to your favorite stations on the net. Beyond those six favorites, an unlimited number of favorite stations and internet audio streams can be set up through the Reciva portal. These include not only broadcast stations, but I also have several public safety and air traffic control audio streams listed in my favorite list that I can call up when the mood hits me. It is fun listening to various public safety agencies from around the country any time day or night.

❖ Overall Rating and Final Thoughts

Those of you who have read this column in the past know that no electronic device is perfect, at least in my book. My biggest complaint with the Quattro was the lack of tone controls. I really would like to have some treble and bass control of the streamed audio. But even without that set of tone controls, I really like the audio provided by this unit. The 5 watt amplifier feeding the top fire and back fire speakers really can

fill up a room with loud, rich-sounding audio. Most reviewers and users agree that the Quattro has the best audio of any Internet Radio in the marketplace today.

We found the alarm clock function on the Tangent Quattro to be useful and easy to program; however, I don't recommend it as a viable alarm clock solution. Casually listening to Internet radio broadcasts is one thing, but depending on your Wi-Fi connection to wake you up for work could be a bit problematic, especially in areas where power generation is questionable.

Our only real frustration with the Tangent Quattro occurred when Internet radio streams dropped out momentarily in order to rebuffer the audio. While the radio stream drop-outs have more to do with the speed of our Internet connection and the reliability of our Wi-Fi router, it's a problem that all Internet radio receivers are plagued with and that potential customers should be aware of.

Bottom line, the Tangent Quattro's small size, audio quality, and design quality more than make up for any shortcomings that I have listed above.

The real payoff using this unit was the gratification of exploring the world's Internet radio broadcasts. If you're a radio nut whose idea of heaven is listening to a live broadcast from BBC World Service or the Cook Islands, then the Tangent Quattro is just the right device for you. So if you have a high-speed Internet connection and an insatiable appetite for radio, make sure you've got a real comfortable chair, because you may end up listening for a really long, enjoyable time.



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Com One Phoenix Portable Internet Radio

By John Figliozi

But it's not really radio!" Hasn't that been the argument made by some about internet radio?

They have a point. Who wants to have to fire up and be chained to a computer to listen? And then there's that Ethernet wire. That's not radio.

Enter the Com One Phoenix WiFi Internet Radio. It's not a computer. Well, at least it doesn't look like one. It's wireless because it uses your home – or any other available – WiFi signal to connect to the internet. It's compact (8.7-in W x 4.8-in H x 3.1-in D), lightweight (22.5 oz. with batteries), and it runs on four NiMH batteries that are automatically recharged when the unit's power adapter is used. So it's portable. It also has a screen, preset buttons, a dial, a knob and its own stereo speakers. All this certainly looks more like radio.

◆ But What Is It?

The parent company of Com One is Baracoda S.A., which principally develops and designs applications utilizing Bluetooth technology. For over a year, Baracoda has had a model very similar to the Phoenix on the French market called the *Orange Liveradio*, named for the country's primary internet service provider, which has sold over 10,000 units so far. There's even an ad for it on the Radio France International web site [www.rfi.fr]. The Phoenix is an updated model prepared especially for the North American consumer market.

"Radio," in fact, may be too narrow a description for the Phoenix. Com One calls it a "wireless digital stereo content player." It can access thousands of radio stations streaming audio; but it also can be set to automatically load and play podcasts, as well as serve as a remote player for music libraries stored on a PC hard drive. An audio book file is another listening option. The Phoenix is also an alarm clock that can help you drift off to sleep at night, wake you, and then allow you to snooze those precious extra few minutes in the morning.

The Phoenix is based on an Intel PXA270 processor clocked at 300MHz. It boots Linux from 8MB of Flash, and has 32MB of RAM.

In the box, you'll find the Phoenix unit, a power adapter, four 2100mA NiMH rechargeable batteries, a quick start guide and a more detailed operating manual.

The unit's design itself is simple and modern and, to my eye at least, rather attractive. When viewed from the side, it has a back-leaning L shape, white in front, matte gray/silver on the sides and back. The cen-



ter "stack" includes a monochrome, backlit six line 128x64 pixel LCD screen. Under the screen are a soft touch navigation dial on the left (up, down, left, right, select) and volume knob to the right. Between them is a pinpoint-size blue LED indicating WiFi connectivity. Arrayed across the bottom of the unit's face are eight preset soft touch keys, bisected by a "home" key and a "bookmarks" key.

Two 1.5 in., wide band (170 Hz – 20 kHz), 8 ohm, 2x4W RMS stereo speakers with bass boost and spatialization enhancement lie on either side of the display. On the lower back of the unit are a socket for the power adapter, a standard 1/8" stereo jack (for powered external speakers or headphones, not supplied) and a USB port for connection to MP3 storage devices and Bluetooth transceivers.

Install the batteries, plug in the power adapter and the Phoenix comes to life. First, it searches for all available 802.11(b) and 802.11(g) WiFi signals. If the modem you select is protected by WEP or WPA security, the unit will ask for the unlock key and then retain it for future activations. The blue LED light flashes during the linking phase and connection is then confirmed both by a full-on light and a screen message. It all happens in less than a minute.

◆ Performance

All WiFi radio receivers like the Phoenix have extremely limited on-board storage capacity. There's enough to store operating preferences (such as backlight intensity, scrolling speed, alarm times and the like) for the device itself, but not much more. So a web-based interface is used that allows the consumer to customize each unit with a wealth of listening and organizational options.

Com One has developed its own pro-

prietary interface for the Phoenix, found at www.wifi-radio.biz. (It was in beta stage and generally worked well in testing, but will have been improved and updated with the "beta" label removed by the time you read this.) The consumer registers his unit and is duly rewarded with the ability to configure it to his listening needs.

The Phoenix comes preloaded with about a thousand radio stations and a handful of podcasting streams. However, at the web interface are several thousand more of these that can be added by the user to his or her personal account via the simple "drag and drop" action of a mouse. Furthermore, for desired content not already listed at the web site, a facility is provided for testing audio stream and podcast URLs for compatibility with the player's firmware. Links to compatible content can then be added by the user into his or her personal account without resort to any third party approval or action.

These preferences are then immediately and automatically communicated through the internet to the user's player. It's all rather simple and intuitive, though a bit more direction and handholding than is currently provided by Com One might have proven helpful on a few occasions.

The functionality of the Phoenix is similarly intuitive. It's essentially a "tree and branch" diagram construct that starts with the functions (Radios, Podcasts, Library, etc.), devolves to categories (like Local Stations, Genres and International Selection) and then proceeds to either a geographical or topical breakout. The user finds and selects these various offerings using the navigation dial.

◆ Commitment to Product Longevity

The beauty of digital devices like these is that their capabilities can be expanded and performance improved through firmware updates eliminating a need for the consumer to continually buy new hardware to obtain this added functionality. With the Phoenix these are automatically streamed as they become available to each unit via the internet.

For example, the last firmware upgrade (version 1.4 (1)) provided improved WiFi quality and stability with a WPA connection 25% faster than the previous version and with an enhanced dynamic network bandwidth manager. A new "My Network" feature was added allowing the Phoenix to access UPnP music sources



present on a home network or computer through Windows Media Player. Other new features included a "Snooze" function on the alarm clock to provide second and third wake-up sounds and a "Sleep" function to shut the radio off after a pre-set amount of time.

In a conversation with Com One's Product Manager Baptiste Benezet, it was learned that another major firmware update was planned for late February, just after this review was prepared. In light of this eventuality, it would be less than fully useful to exhaustively list the Phoenix's specifications here. Better for you to consult the website www.wifi-radio.biz for the latest.

Having said that, the Phoenix does support the major streaming formats –ASF/WMA, Real Audio, MP3 and WAV – and various protocols associated with them; as well as M3U, PLS and ASX playlist formats – and RSS feeds –through server-side decoding.

A new web site also was planned for introduction in early March. Furthermore, Mr. Benezet has inaugurated a blog devoted to the Phoenix and allowing for owner interaction with him and between Phoenix owners and users themselves at www.wifiradio.wordpress.com.

◆ Evaluation

There are more than a few parallels between listening to web streams and listening to shortwave. With the latter, for example, one has to contend with vagaries like poor propagation and adjacent channel interference. With internet audio streams, your internet and WiFi service, as well as the stream quality and format used by

the "station" (or at the server) are variables that can affect the player's ability to provide seamless and worthy audio.

Shortwave signals experience fading; internet streams can be subject to rhythmic rebuffering. Nothing's perfect. In some ways, audio streaming via the internet is still a work in progress.

Having said that, the Phoenix works very well, especially when it has a robust (say, a 64 kbps or greater), steady stereo stream to work with. Even reliable, lesser bandwidth monaural "signals" like Africa No. 1's 24 kbps can provide reasonably good, listenable audio.

The Phoenix is very easy to set up and the unit's settings and web site interface function largely intuitively. Even so, well written, professionally laid out, and more-detailed quick start and operating guides are provided.

The level of the audio provided through the 1/8" standard jack could be better, but that is a nit-pick and there are very few of those with this unit. Its batteries, size and self-sufficiency make it portable – a key aspect of radio – and convenient to take and use anywhere there's a WiFi signal available.

Moreover, the Phoenix – precisely because it works so well – seems to address that primary criticism of internet-provided radio by bringing the "feel" of radio back to the fore in the experience. The only way I can explain this personally is that I've had even more stations than the Phoenix provides available for years via my personal computer, but up to now I have only sporadically listened to them. Since I've had the Phoenix, it's been in almost constant use.

The Phoenix also addresses in a big way a fundamental yearning that radio content hounds like me have – one that even shortwave can't satisfy entirely: that insatiable desire for more. I can hear BBC Radio 4, the Swedish domestic stations and local radio from Australia. Not only that, but stations that have abandoned shortwave to North America – Deutsche Welle and Radio France International, for example – can be heard once again ON THE RADIO (!) and in quantity (24 hour streams) – something no longer economically possible on shortwave.

The Phoenix also offers the ability to, in effect, "record" or "save" content for later playback by including a convenient and automated podcast download, play, interrupt, and resume capability.

◆ In Conclusion

From my experience with it, the Phoenix deserves to receive very strong consideration from anyone looking to delve into this fascinating new form of radio.

Com One lists the Phoenix at \$249.95, but several mail order houses on the internet had it priced lower, in fact as low as \$188.11, in February. It carries a 12 month parts and labor warranty from the manufacturer.

No, you can't DX with it. (But, looked at another way, what's the difference between a relay from Sackville, Canada, and one from your computer room?) And if the internet goes down, your ability to listen does go down with it.

But is it radio? Oh, but it is, my friend! It is!

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Calibrating Azimuth Mounts Using Solar Shadows

By Ernie and John Franke

James Masfield, in his poem *Sea Fever* laments “I must go down to the sea again, to the lonely sea and the sky, and all I need is a tall ship, and a star to steer her by...” *Star Trek’s* Captain Kirk often quoted it. Just give us a tall stick and the Sun, and we’re set. The theory can be applied to more than navigation: Below is a unique solar technique to determine true azimuth (bearing) for orienting a microwave or optical dish.

Whether installing or repositioning an optical or microwave antenna, it is vital to know the azimuth or bearing for pointing your antenna. As the size of the dish increases, or the operating frequency increases and the resulting beamwidth decreases, it becomes of even greater importance to ensure correct orientation. The last little tweaking is always done by rocking the dish back-and-forth and up-and-down on the actual satellite signal. But, with dishes over 3 meters in diameter, the chances of getting a signal without achieving an initial alignment within 1 degree are pretty slim, unless the downlink signal is extremely strong.



Elevation is more easily determined with simple, readily-available equipment: an inclinometer is merely a spirit level, plumb-line and protractor. But determining true (not-magnetic) azimuth is not as easy. This article demonstrates a simple technique using the Sun’s shadow which may be applied equally well to el-az mounts or simple azimuth-only (polar) mounts. The technique was demonstrated for aiming 3.7 meter (12 ft) and 7.2-meter (24 ft) diameter Ku-Band dishes.

The source of Sun shadow information is the United States Naval Observatory (USNO) web site, <http://aa.usno.navy.mil/>, which provides information for any lat/long for any day, past or future, in time increments of the user’s choosing. The required elevation/azimuth

readings are readily obtained off the Internet, once the dish location and the desired geo-synchronous satellite’s longitude is entered. Once a known direction has been established, simple markings and interpolation can be used for determining other bearing directions.

❖ Methods of Determining Bearing

One popular method for determining azimuth is to use a compass. However, compasses are affected by local concentrations of ferrous metals, speaker magnets, and drive motors. They are also affected by the local magnetic variation or declination, which itself slowly shifts each year.

Some people are familiar with using the shadow of the Sun at local solar noon when, for the northern temperate zone, the Sun is directly south. But, you must either wait for local solar noon or, if the Sun is blocked, you must wait another day. If you know the azimuth of the Sun and your position for times other than local solar noon, you can use the shadow of the antenna to calibrate your azimuth mount any time the Sun is shining. The key is knowing the azimuth of the Sun for reasonable increments of time at the antenna location. This can be



done very easily.

As seen here, a pencil-mark is made on

the concrete foundation at the exact time of the desired azimuth. A plumb-line down from the counter-arm of the dish is later aligned parallel to the mark of the shadow-line. The same process can be done with the shadow using the USNO data from a full-Moon.

❖ Data from the US Naval Observatory



Sun or Moon Altitude/
Azimuth Table for One Day

This page provides a way for you to obtain a table of the altitude and azimuth of the Sun or Moon during a specific day, at a time interval that you specify. Simply specify the object, date, tabular interval, and place below and click on the “Compute Table” button. The altitude and azimuth values are tabulated as a function of the standard time of the place requested (daylight time is not used) on a 24-hour clock. Use Form A, for cities or towns in the U.S. or its territories. Use Form B for all other locations. Both forms are immediately below.

Please read the Notes section for details on the data and definitions of altitude and azimuth.

If one goes to <http://aa.usno.navy.mil/> and clicks on “Data Services,” they will find “Position of Selected Celestial Objects.” Clicking on “Altitude and Azimuth of the Sun or Moon During One Day” takes you to a web page with two forms. Form A is used for major U.S. cities and towns, and Form B is a more general form. Using Form B, one enters lat/long data from Google Earth and the desired date for generating a table.

Our location is Bonaire, Netherlands

Form B - Locations Worldwide

Object:	<input type="radio"/> Sun	<input type="radio"/> Moon			
Year:	2007	Month:	Sept	Day:	29
Tabular Interval: <input type="text"/> minutes (range 1-120 minutes)					
Place Name: <input type="text"/> Any Name					
The place name you enter above is used only in the table header; you can enter any identifier, or none (avoid using punctuation characters).					
Longitude: <input type="radio"/> east <input checked="" type="radio"/> west 68 degrees 17 minutes					
Latitude: <input type="radio"/> north <input checked="" type="radio"/> south 12 degrees 10 minutes					
Time Zone: <input type="text"/> hours <input type="radio"/> east of Greenwich <input checked="" type="radio"/> west of Greenwich					
<input type="button" value="Compute Table"/>			<input type="button" value="Clear all fields"/>		

Antilles (12° 10' N, 68° 17' W). When one inserts the hours west of Greenwich, England (your relative GMT or UTC time zone), the table appears in local 24-hr time. If “zero” is inserted, the table will compute the UTC/GMT time. Note that the USNO does not use Daylight Saving Time.

The Tabular Interval is the spacing in minutes between readings. One-minute intervals are the best. Once populated, click on “Compute Table.” Below is just a portion of the printout for our location.

Astronomical Applications Dept.
U.S. Naval Observatory, Washington, DC

Any Name W 68° 17', N12° 10'
Altitude & Azimuth of the Sun Sep 29, 2007

Universal Time (UTC)	Altitude (E of N)	Azimuth
14:21	56.3	113.6
14:22	56.5	113.8
14:23	56.7	114.0*
14:24	56.9	114.2
14:25	57.2	114.4
14:26	57.4	114.6
14:27	57.6	114.8
14:28	57.8	115.1
14:29	58.0	115.3
14:30	58.3	115.5
14:31	58.5	115.7
14:32	58.7	115.9

(Sun or moon altitude = elevation angle)
**Our dish must be positioned at 114.1 degrees to monitor satellite IS-3R from our location in the Caribbean.*

One can see that the azimuth (or shadow) changes only about 0.2 degrees per minute for the case given. Thus, one can get very good accuracy with reasonable timing requirements. The altitudes and azimuth correspond to the apparent center of the Sun. Interestingly, azimuth is not affected by the atmospheric refraction, whereas elevation is.

As luck would have it, we performed the calculation at the time for a shadow at an azimuth of 114°, right during a solar outage for the satellite we were monitoring. What are the chances of that happening?! In other words, the elevation corresponding to the azimuth happened to be the elevation of the satellite IS-3R (PAS-3) itself. I confirmed that this was indeed a solar outage by going to Intelsat's solar outage calculator at www.panamsat.com/global_network/calc/sun_calc.asp, as shown below. And yes indeed, there was a solar outage (Sun aligns with IS-3R/PAS-3 satellite's el-az) on September 29 at 14:25 UTC.

Sun Outage Calculator
Satellite Location: Galaxy 12 - NAIRU-YAREN
Band: C
Season: Spring
Antenna Size (mm): 3.7
Year: 2007
Antenna Pointing: Azimuth 114.032, Elevation 57.455
Longitude (UT 12:00): 43.000000
N Lat (UT 12:00): 12.17
W Lon (UT 12:00): 68.28
Predicted Outage | Start | End | Duration | Start | End
Date | GMT | GMT | /gmt | /gmt | mmdd/yyyy | hhmmss | hhmmss | mmss | hhmm:ss | hhmm:ss
09/27/2007 | 14:25:48 | 14:27:03 | 01:15 | 14:25:48 | 14:27:03
09/28/2007 | 14:24:08 | 14:27:58 | 03:50 | 14:24:08 | 14:27:58
09/29/2007 | 14:24:12 | 14:27:17 | 03:05 | 14:24:12 | 14:27:17

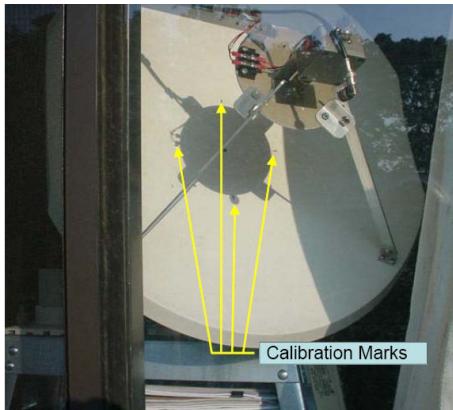
❖ Shadow Alignment for Small Dishes

For small dish alignment, one merely points the antenna at the Sun, records the exact time and date, looks up the azimuth from a chart made for that day and location, and then the azimuth heading of the antenna mount is known. Hence, the measurement can be made whenever you can get a shadow.

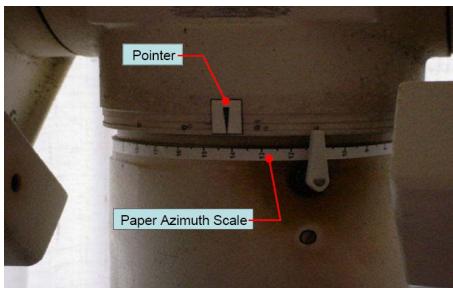
As can be seen here, we have placed several pieces of vinyl tape on the dish to know when shadow of the feed is centered on the dish surface and the antenna is pointed exactly at the Sun.

Others have suggested placing pieces of reflective tape randomly on the dish sur-

face. When the antenna is pointed directly at the Sun, the reflected spots of sunlight will converge on the center of the feed. Then data from the USNO tells the user exactly where the antenna is pointed.



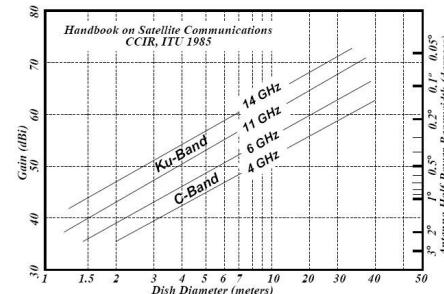
For small mounts, a PowerPoint drawing of an azimuth scale can easily be constructed, printed on sticky-back paper, and applied to the fixed or non-moving portion of the antenna mount. A small pointer is printed at the same time. Once the antenna orientation is known, the pointer is applied to the moving portion of the mount opposite the determined azimuth reading as shown below.



Scale and Pointer taped to Mount

❖ Microwave Dish Beamwidth

The shorter the wavelength (higher frequency), the narrower the antenna beamwidth, as shown below for typical dishes operating at 4-to-6 GHz (C-Band) and 11-to-14 GHz (Ku-Band). Ku-band satellite antennas have a much narrower beamwidth, the corridor through which the dish looks up at the sky, than C-band parabolic antennas of the same diameter.



Antenna gain and 3 dB (half-power) Beamwidth as a function of Antenna Diameter for Practical Antenna Efficiencies.

Thus for our case (3.7m and 7.2m dishes), we are looking at half-power beamwidths of around 0.4° and 0.2° respectively at Ku-Band, which really doesn't leave much room for error.

❖ Alternate Solar Position Calculator

Interestingly, solar calculators are available that also provide solar data, such as the Wheeler Sunpredictor™ at www.sunpredictor.com/. Its portability, intuitive graphical display and GPS based location input make it an ideal tool for cinematographers, photographers, production designers, location coordinators, architects or anyone interested in the motion of the Sun.



Digital Digest continued from page 31.

- 5129.00 Israeli Air Force MIL-188-141A ALE
- 5135.00 NH SECURE Net MIL-188-141A ALE
- 5124.50 UNID STANAG4197 Vocoder
- 5153.70 Russian Navy "D" CW Beacon
- 5153.80 Russian Navy "P" CW Beacon
- 5153.90 Russian Navy "S" CW Beacon
- 5155.00 Canadian Army MIL-188-141A ALE
- 5158.00 US Navy MARS PacTOR, ALE
- 5184.00 French Air Force 50bd/400 RTTY
- 5209.50 US National Guard MIL-188-141A ALE
- 5242.00 Russian Navy 50bd/250 BEE
- 5246.50 Globe Wireless Ships Globe-data modem
- 5252.00 Mexican Army MIL-188-141A ALE
- 5254.00 Algerian Police MIL-188-141A ALE
- 5255.00 Mexican Navy MIL-188-110A modem
- 5263.00 Mexican Army MIL-188-141A ALE
- 5268.00 Russian Navy 50bd/200 BEE
- 5282.85 CIMEL, Algeria PacTOR
- 5295.00 UK Defense Ministry MIL-188-141A ALE
- 5299.00 Russian Military MS5 12 tone modem

That's it for this month. Keep sending your emails and letters.

RESOURCES

- BEE Audio Clip [signals.taunus.de/WAV/36-50.WAV](#)
- Russian 75bd Audio Clip [signals.taunus.de/WAV/RUS-NY_75Bd.WAV](#)
- MS5 12 tone Audio Clip [signals.taunus.de/WAV/CIS12CH-TFC.WAV](#)
- STANAG4197 Audio Clip [signals.taunus.de/WAV/S4197.WAV](#)

To Laptop Computers, Cool is Hot

We are a mobile society, and the PC buying trend of consumers clearly reflects this lifestyle. During the last months of 2007, laptop/notebook sales overtook desktop PCs. Stop and think about it: Why shouldn't laptops perform equally to desktops? In most cases, the processors are the same. So why, in the past, has there been a difference between desktops and laptops? The answer lies in the changing desires of PC users.

A decade ago, laptops were marketed not on their computing power, but on their battery life and small physical size. However, in the past ten years technology and consumer needs and tastes have changed. Nickel Cadmium batteries have been replaced by the more powerful Nickel-Metal Hydride technology. Processing power has gone up exponentially, while their power consumption has just seen a linear increase. And finally, now consumers demand performance, large LCD screens (15 to 17 inches) and are only satisfied with a minimum of two hours of battery life.

As the sales figures indicate, many PC users have turned to a laptop as their main machine. The exceptions are the diehard gamers who will accept nothing less than maximum video performance. Dropping \$300+ on a high speed, high power video card is common for rabid gamers. But for the majority of us, today's laptop fills all our computing needs and is portable to boot (sorry for the pun).

I've also made the transition. Although I have a dual core processor, high-end video card, desktop PC and 19-inch wide format LCD monitor, I spend 90% of my time on my dual core laptop with its 15-inch display.

❖ Materials Considerations

But wait. What about the heat generated by all this modern day computing power squeezed into a small, enclosed, plastic laptop case? This is one consideration that laptop manufacturers' ads seem to omit.

You don't have to have a PhD in the science of solid-state devices to realize that heat is not friendly to modern electronics. Silicon, the heart of most active devices, works because it is a crystal; in fact, it is a special type, called a single crystal. All silicon atoms are arranged in a nice, perfectly ordered lattice. But heat makes these atoms move (vibrate) out of their optimum position, causing the silicon's electrical properties to change. Very high heat can permanently destroy the crystal structure. Goodbye device and hello hundreds of dollars in repair or replacement.

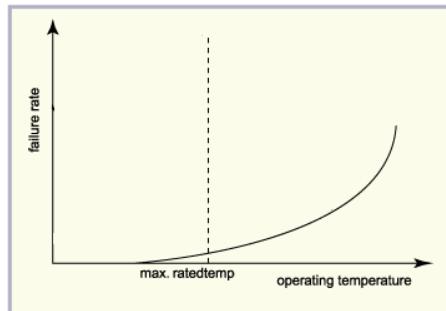


Figure 1 – The effects of temperature on electronic component failure. Cooler IS better.

Thermal energy (heat) also has a great effect on the atoms of other materials, which are purposely introduced into silicon to give it the required conductive properties.

Additionally, other materials used in semiconductor processing are negatively affected when operated at temperatures near or above their intended operational limits. One material, Copper, is used as the very fine "wires" that connect the outside world to the silicon.

As a very simplified rule of thumb, "things" start moving around significantly in solids at 50% of the material's melting point. Figure 1 is a generalized curve that shows how the failure rate of a solid-state device (all the chips in your laptop) increases with temperature above the device's maximum rated operational temperature (that's at the vertical dotted line). Notice that the failure rate goes up rapidly (i.e., exponentially) with temperature.

❖ Running at the Max

Since the name of the PC marketing game is to advertise performance, many processors are run near their limits. Did you ever feel the heatsink on a processor? I've accidentally run a PC without a heatsink or fan on the processor. It only took a few minutes before the processor was toast forever! Therefore, in most cases, we are already operating at the graph's dotted line. Additional heat pushes us further up the failure curve.

In summation, heat, at a minimum, will cause the performance of your PC to degrade, while prolonged high heat will greatly increase the chances of catastrophic failure. In either case, heat is not good.

❖ How Hot is Hot?

Let's see if we can measure how hot our

laptop processor gets. After all, there is a cooling system and/or fan built into laptops. How well does it work? Making this temperature measurement is easier than you think. Many BIOS have temperature displays on one of their screens. If you dig into your operating system, you may find it can display processor temperature. But I think that the easiest method is to use a free program called PC Wizard 2008, available at www.cpuid.com/pcwizard.php

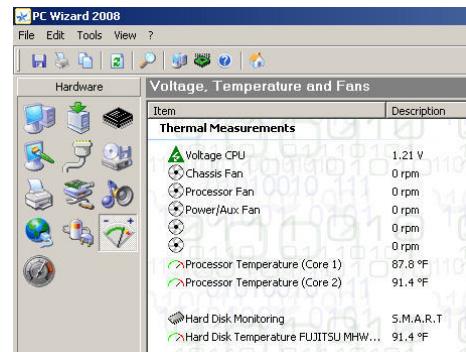


Figure 2 – PC Wizard 2008 taking the processors' temperatures while they are at rest.

Among the many, many features of this very capable program is real-time temperature monitoring of the processors and the hard drive. I suggest you use version 1.82 or newer, since earlier versions had problems with temperature measurements running under Vista. Our system is a Toshiba laptop, with an Intel Duo Core processor, 2 Meg of RAM and running Vista Basic.

PC Wizard 2008 installs quickly, easily, and in less than two minutes you will be looking at its main screen. In Figure 2 we have chosen "Hardware" and in particular "Voltage, Temperatures and Fans."

❖ Idle Reference

For our purpose, we are just interested in the three temperature measurements: one for each of the processor cores (remember this is a dual core processor) and the temperature of the hard drive. From Figure 2 we can see that the processors are running at 87.8 and 91.4 degrees F, and the hard drive is at 91.4 degrees F.

The type and number of programs that are running will have a great effect on the processors' temperature. This screen was taken with the laptop idling along with no major resource hog programs running. The processors were loaded very lightly, between 8% and 2%. This

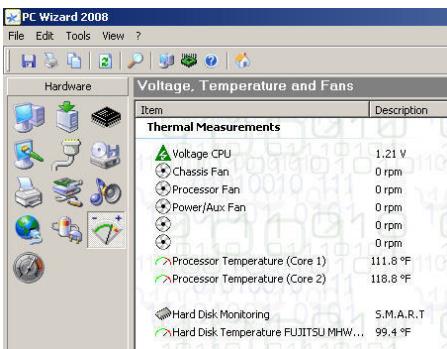


Figure 3 – Processors running hard at near 100% utilization – Look at their temps now!

can be seen on another PC Wizard screen. Although not indicated by PC Wizard, the laptop's internal fan was running at the time the measurement was taken.

❖ Pump Up the Programs

To really get the juices flowing, let's run a number of programs simultaneously. How about Microsoft Flight Simulator X, Windows Media Player running a movie on the Red Arrows flying team, and an AVI player running a clip on the SU-37 jet fighter? All are graphics intensive, while FSX is also heavily computational.

And to really push the processors to their limits, we are connected to three sites on the Internet: Live ATC Audio, eBay auctions and the eBay Countdown Timer. That puts the resource loading of the cores up to between 94% and 100%. Now let's watch their temperatures.

After ten minutes of operation, the processors' temperatures are shown in Figure 3. The processor core that was at 87.8 degrees is now up to 111.8. And the other core originally at 91.4 degrees is now 118.8. This is an increase of 24 degrees and 27.4 degrees, representing a more than 25% rise! And that's only after ten minutes of operation. Accidentally blocking a laptop airway vent by laying it on a blanket or thick rug, and we'll have an electronic heater, but maybe no computer.

❖ Help is Available

Distorting a line from the play *Becket*, "Will no one rid me of this meddlesome heat problem?" A number of commercially available solutions exist. We will use a cooler platform, which sits under the laptop. For this test we used an Antec Notebook Cooler (0761345-75004-2), which has two fans with a high/low switch. We used the "high" fan position for this test. The cooler plugs into the laptop's USB port for fan power. You can find details of this product at the Antec website www.antec.com/us/productDetails.php?ProdID=75004#

Figure 4 shows the dramatic effect that this cooler has on the processors' temperatures. They have cooled down to 99.1 and 100 degrees respectively; averaging 17 degrees lower than without the cooler. Furthermore, the temperature remained at this level after two hours of operation. The hard drive temperature was also reduced to 92.2 degrees, a drop of 7.2 degrees. So the Antec notebook cooler does its

job well. The cooler is priced at an economical \$20.

The only comment on my "never-happy list" is that the power connector used on the cooler is a bit flimsy. A USB connector at both ends would have been a better choice. But as we have factually determined, this cooler does make a major difference to our laptop's processor's operating temperature, thereby giving us a better chance of longer laptop life.

❖ Very Cool

The moral here is: if you own a new high-powered laptop computer, treat it right. Always keep its air vents clear and use it with a cooler. This will give you optimum performance and prolong your valuable laptop's life ... that is, if you don't drop it.

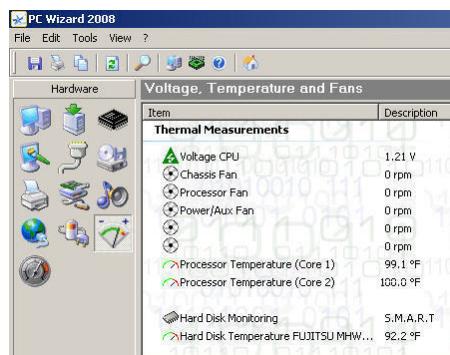


Figure 4 - The dramatic effect of a platform cooler on processor temperature, increasing laptop performance and lifetime.

I'll keep looking for other notebook/laptop cooling products and pass along any unique or outstanding ones in future columns.

❖ Rant and Rave: Extolling Great Service

Of the many things that have suffered in our world society over the past decade, one hits us in the face everyday. Where has customer service and pride in doing a job gone? It's no longer found in department stores or grocery stores. Heck, you can hardly find a person to help you. And when you do, they act as if it is a bother.

And how about all the telephone support? There is a misnomer! I recent waited for a long period on the telephone for help with a recently purchased program that would not install. The company will remain naMeleSS. After many questions about me, I was given totally wrong information by the technical customer service representative. He said that the program would not work with my configuration. I could not believe what I was hearing. So I had him repeat it. He suggested I return the program.

A Google search on the prob-

lem did uncover a solution. The program installed and is running perfectly. Not knowing your product and not caring about the customer has become the 21st century norm.

There is Hope

Well, I am happy to report that things at Yaesu couldn't be more different. In a quest to repair an FRG-8800, which I had acquired in Europe in the 1980s, I had identified the defective component. However, I could not find it in my service manual. I called Yaesu's ham division for assistance without identifying myself as the writer of this column. I was just another customer looking for help.

After the parts department tried to help me and looked for the part number for over 10 minutes, a Ron F. from Yaesu's amateur radio Tech Support got on the line. The problem was explained to Ron and he dug right in. After about 10 minutes of searching with no joy, Ron, in his professional, yet pleasant manner said, "Leave it to me. I'll get back to you when I find the answer." I thanked him. But as I hung up I suspected I had just been given a brush off line that I've heard too many times before from other company's "customer service" departments.

You can imagine my surprise eight hours later when Ron called me back with the part information and more! Although very busy, Ron did not forget about my plight. He worked on it throughout the day, in the background while attending to his other duties. He mentioned my problem to fellow colleagues during the day, soliciting their advice. And finally, at the end of his long, busy day, instead of simply shutting the lights, he remembered this ordinary customer's plight and gave me a call. Not only had he found the rare part for me over his lunchtime, it was already on its way to me!

People = Company

To Ron F. in Yaesu's amateur radio technical support department, my hat is off to you for your dedication and pride in your work. Thank you so much. To Yaesu (Vertex Standard America) for having such employees, encouraging and (hopefully) rewarding their quality work ethics, thank you. Ron is very special indeed in the 21st century. When all is said and done, great people really do make a company great. I'll look to Yaesu first for my future radio needs.

Well, that's it for this month. Till next time, stay cool ... along with your laptop!

FREE SPEECH RADIO

WBCQ Shortwave

7.415 - 9.330 - 5.110 - 18.910
wbcq.com
spacetransmissions.com

We are the only free speech shortwave station on the planet

What's NEW

Tell them you saw it in Monitoring Times

South Florida Frequency and Trunking Guide

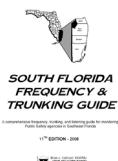
Whether you are a resident or just visiting the area, a new scanner frequency guide has just been released that will let you monitor all of the action in Southeast Florida on your scanner radio. Long time radio hobbyist Brian Cathcart has just released the 11th edition of his popular scanner publication – *South Florida Frequency and Trunking Guide*.

This new book contains the most accurate frequency and trunking information available anywhere on public safety agencies and other services in Southeast Florida. Some of the main areas of coverage in this new edition include:

- All county and city agencies radio systems within Broward, Martin, Miami Dade, and Palm Beach counties, as well as selected agencies from the state of Florida.
- The listing for each county includes frequencies and trunking information for fire, police, EMS, local government and aeronautical frequencies for area airports.
- A detailed listing for each system includes receive and transmit frequencies, complete channel descriptions, CTCSS codes, FCC callsigns, unit numbers, station locations and beat/coverage maps.
- Index section for cross referencing frequencies and talkgroup IDs.
- Miscellaneous information, including the Florida Scanner Law, 10 codes, signal codes, and a huge glossary of radio lingo and terms

Several chapters in this publication have been updated from the previous edition. Chapter 8 is devoted to 800 MHz "Rebanding." The book has detailed information describing what "rebanding" is and what impact it will have on trunk radio systems in the area and scanners in current use.

Chapter 5 covers the State of Florida radio systems, including a comprehensive write-up on the new Florida Statewide Law Enforcement Radio System (SLERS). This



new M/A-Com trunk radio system replaced the old statewide Motorola system. SLERS uses an EDACS Pro-Voice proprietary trunk system with DES-OFB encryption and Electronic System Keying (ESK). The author points out that the net result for the Florida radio hobbyist is that we will no longer be able to monitor most of the statewide agencies, including the Florida Highway Patrol.

Another new section to the state chapter is a profile of the Department of Transportation Interstate Road Rangers that uses a statewide LTR trunk radio system.

Another chapter on Broward County has been extensively updated, including new Fort Lauderdale, Pompano, and Plantation trunk radio system talkgroups.

In addition to the information above, there are also new frequencies for Miami-Dade Fire-Rescue radio system, new airport frequency information, and frequency/talkgroup updates for several other city and county radio systems.

This book is available in either printed or CD-ROM format. The printed format is a comb-bound book with black and white pages. The CD-ROM format is the entire book as an Adobe Acrobat® 8.0 file, with most of the graphics and maps in color.

The cost is \$25.00 for each book or CD-ROM, and shipping is included. You can buy both the book and CD-ROM together for \$35.00 (including shipping). Checks or money orders should be made out to Brian Cathcart and sent to: 4050 Edgewood Drive, Coconut Creek, FL 33066-1835. Brian also accepts PayPal payment (Paypal ID is scannerdude@juno.com). Inquiries can be emailed to scannerdude@juno.com and additional information and PayPal linkscan be found on Brian's website at www.scannerdude.com.

If you scan the radio spectrum in South Florida, this is one spectrum guide you need to add to your radio reference library.

Icom IC-92AD VHF/ UHF Dual Band Transceiver

Are you as tough on your ham radio handheld radios as I am? Are you looking for a dual band VHF/UHF transceiver that can take a licking and keep on ticking? Then you might want to investigate a new member of the Icom ham radio line – the Icom IC-92AD.

The IC 92AD handheld is upgraded from the IC 91AD series and most of the features are retained with improvements such as submersible protection, GPS position reporting (with optional HM 175GPS), 4 step RF power selection, 1304 memory channels, one touch reply (DV mode), built in voice recorder with auto reply (DV mode).

The four cursor direction buttons on the keypad give you quick and intuitive access to many settings. The dual volume/channel knob provides convenient channel selection and volume control.

Some of the main features of this handheld include:

- Total of 1304 memory channels
- External DC power jack (10–16V DC acceptable)
- 10 channel DTMF memory (16 digit)
- Squelch disable function to monitor a weak signal
- Built in CTCSS/DTCS tone encoder and decoder (FM mode)
- Auto power save, power off and power on
- 26 memory banks with selected bank and bank link scanning
- 10dB (approx) built in attenuator
- Automatic repeater function
- Weather channel with weather alert

The IC 92AD has a dual watch receiver capability, allowing you to receive on two bands simultaneously (including the same band). By pushing and holding the [Main/Dual] button, you can easily turn dual watch on and off, while

a single press toggles the active VFO channels (A band/B band).

Icom's original wideband PA circuit and supplied lithium ion battery pack provides 5-Watts (typical) output power on both VHF and UHF bands. The supplied BP 256 provides up to 5.5 hours of operating time.

When you don't need full power operation, you can reduce output power to 2.5, 0.5, or 0.1-Watt to reduce battery consumption.

A simple band-scope displays

spectrum activity on the LCD screen and audio is heard while sweeping.

The IC-92AD has a built-in voice recorder that records an incoming call for up to 30 seconds (available in the DV mode only). For automated outgoing calls, you can pre record up to 10 seconds of your callsign and/or CQ message in the IC 92AD's voice memory.

The four cursor direction buttons on the keypad give you quick and intuitive access to many settings. The dual volume/channel knob provides convenient channel selection and volume control.

Using the optional PC remote control capability you can connect to a PC via RS 232C, and control most functions of the IC 92AD from the PC with the optional RS 92 software. In the DV mode operation, you can send and receive short messages of 20 characters (max) via the PC.

This handheld has a large full dot matrix display that shows two line frequency settings, alphanumeric channel name, bandscope, received messages, position information, and much more. You can change the display setting to show frequency or memory name in the center of the display. In addition, automatic LCD and keypad backlighting provides bright illumination for night time operation.

With the optional HM-175-GRS GPS speaker microphone, the IC 92AD shows your position data on the display and offers automatic position reporting in DV mode. The IC 92AD shows the direction to a received D STAR station or to a memory stored with a compass like display pointer. In addition, the GPS A mode assists in easy D PRS system operation.

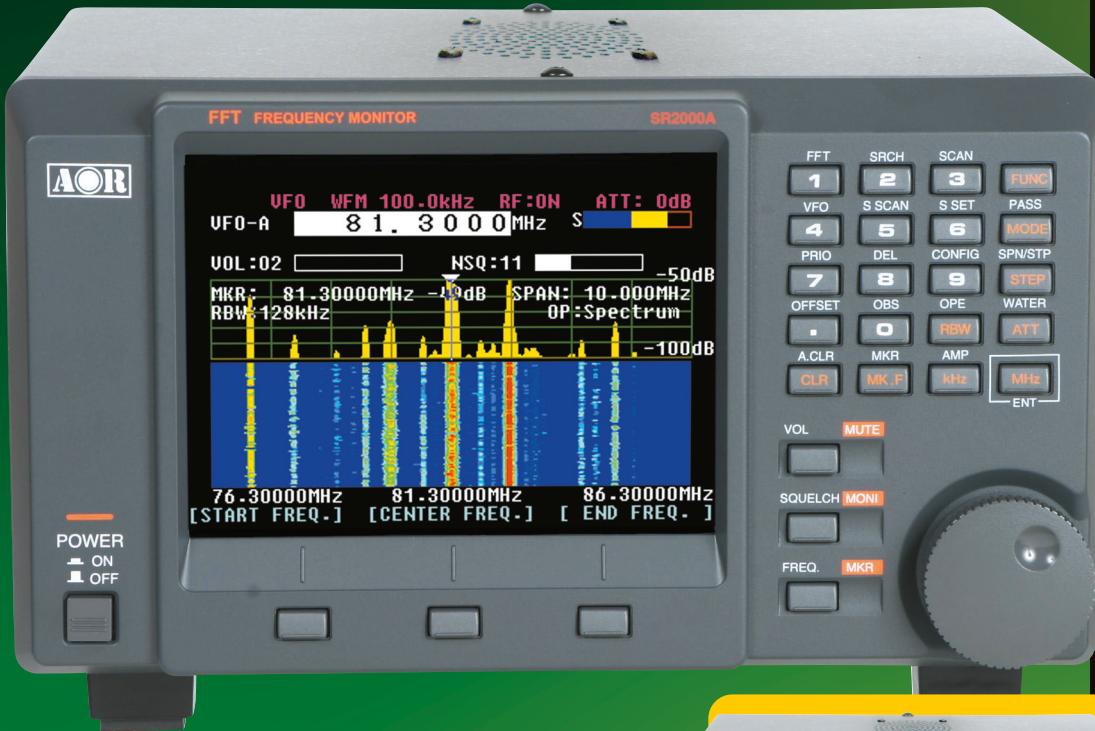
The Icom IC-92AD retails for \$696.00 and is available at amateur radio dealers nationwide.



Books and equipment for announcement or review should be sent to What's New, c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Larry Van Horn, larryvanhorn@monitoringtimes.com.

Watch What Happens!

The SR2000A is an ultra-fast spectrum display monitor that lets you SEE received signals in FULL COLOR



Using the power of FFT (Fast Fourier Transform) algorithms with a powerful receiver covering 25MHz ~ 3GHz*, the SR2000A features a color monitor that displays up to 40MHz spectrum

bandwidth or video display of NTSC, PAL or SECAM signals.

Ultra-sensitive, incredibly fast, yet easy to use, with a high quality internal speaker for crisp, clean audio signals.

Scans 10MHz in as little as 0.2 seconds! Instantly detects, captures and displays transmitted signals.



AOR SR2000A Frequency Monitor

- Frequency coverage: 25MHz ~ 3GHz (no gaps)*
- Ultra-stable, high-sensitivity triple-conversion receiver
- External video output (composite video)
- AM/NFM/WFM/SFM/TV receive modes
- Displays up to 40MHz of spectrum bandwidth (20MHz or 40MHz selectable)**
- P25 decoding function available with optional P25-8600
- Waterfall (time) display function
- 1000 memory settings (100ch x 10 memory banks)
- Average or peak value readings

- Video display function (NTSC/PAL/SECAM auto select)***
- 5 inch TFT color LCD display
- Versatile color display uses state of the art digital signal processing

- High speed FFT search quickly captures new signal transmissions
- Easy menu-driven operation
- PC control through RS232C serial port or USB interface



Authority on Radio Communications

AOR U.S.A., Inc.
20655 S. Western Ave., Suite 112, Torrance, CA 90501, USA
Tel: 310-787-8615 Fax: 310-787-8619
info@aorusa.com <http://www.aorusa.com>

*Government version. Cellular blocked for US consumer version.

**No audio is available when the frequency span is set to 20MHz or 40MHz.

***No audio available while displaying video signal on the LCD. If both video and audio need to be monitored simultaneously, an optional (external) TV2000 is required.



JRC NRD-545 RCV21DS \$1799.95

AOR

AR-5000A Plus 3	RCV44P	\$2569.95
AR-8600II	RCV11	\$889.95

KAITO	KA1103	RCV55	\$89.95
	KA1121	RCV37	\$149.95

SANGEAN

ATS-505P	RCV7	\$109.95
ATS-909	RCV8	\$239.95
ATS-818Acs	RCV18	\$184.95

ETON	E1XM	RCV34	\$499.95
	S350 DELUXE	RCV4	\$99.95
	E5	RCV10	\$149.95

ICOM

R75	RCV32	\$609.95
PCR1500	RCV15	\$499.95
R1500	RCV25	\$599.95
PCR2500	RCV35	\$729.95
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MT BLOGS

Blogs offer an opportunity for columnists to share information that does not make their columns. The news might be too timely for deadline, too short, confined to a small geographical area, too far away to be heard in North America, or even off the columnist's regular "beat." Bookmark these blogs for frequent visits!

MT: AMERICAN BANDSCAN

<http://americanbandscan.blogspot.com/> - by Doug Smith

MT: EDITOR'S DESK (Corrections posted here as well as on MT website)

<http://mt-editor.blogspot.com/> - by Rachel Baughn

MT: FED FILES

<http://mt-fedfiles.blogspot.com/> - by Chris Parris

MT: MILCOM

<http://mt-milcom.blogspot.com/> - by Larry Van Horn

Larry's Monitoring Post

<http://monitor-post.blogspot.com/> - by Larry Van Horn

MT: SHORTWAVE

<http://mt-shortwave.blogspot.com/> - by Gayle Van Horn

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