Scanning - Shortwave - Ham Radio
Equipment - Computers

Monitoring Times

A Publication of Grove Enterprises

Volume 24, No. 8
August 2005

U.S. $5.95
Can. $8.95
Printed in the United States

Scanning the Texas Border

Also in this issue:

- Hurricane Communications
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- Drake: The Passing of a Legend
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AOR SR2000 Frequency Monitor

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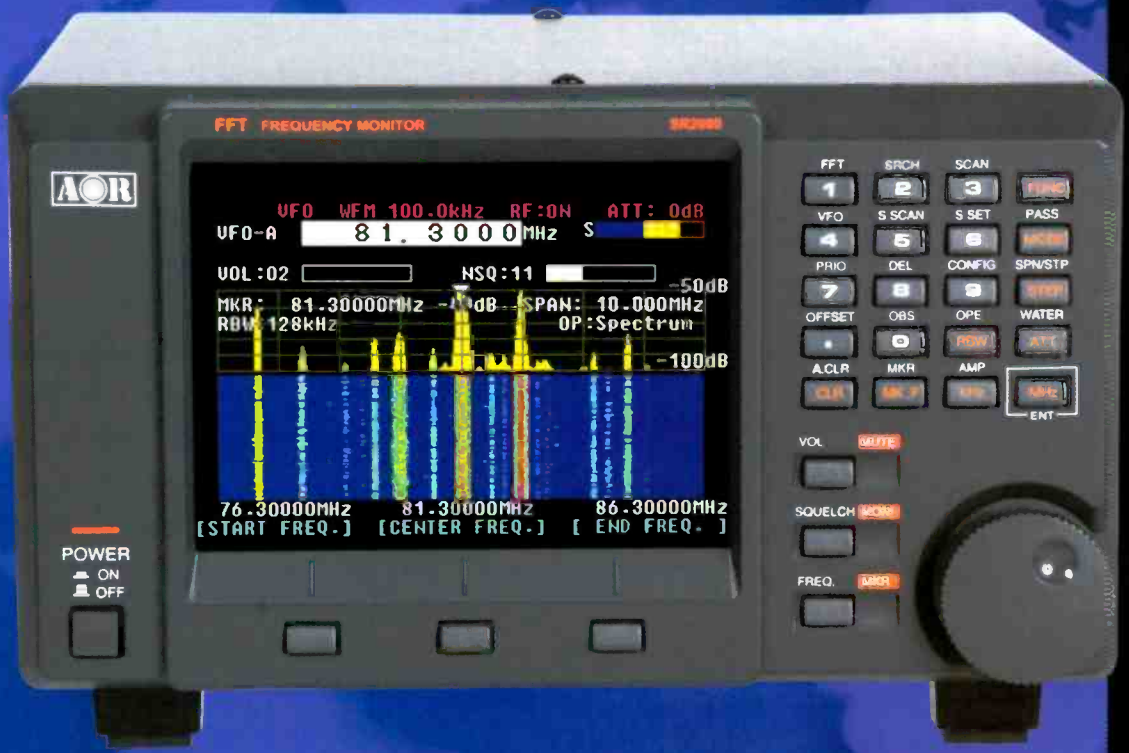

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Monitoring Times

Vol. 24, No. 8 August 2005

Cover Story

Scanning the Big Bend of Texas

By John Mayson

A visit to the Big Bend area of West Texas will introduce you to the real "wild" west – remote, sparsely-populated, and beautiful. Scanner traffic may not be brisk, but it will give you an insight into the daily lives of those intrepid souls who live and work here. What is there to hear? Well, of course there are the local sheriff's departments, local airports, and Sul Ross University. But you'll also find Big Bend National Park rangers, US Customs and Border Protection and US Immigration and Customs Enforcement communications.

Actually we don't advise you travel to Big Bend National Park in August ... but make your plans to detour to this scenic area this winter and maybe you'll be treated to the Marfa lights! (Story starts on page 10.)

On Our Cover: Big Bend National Park, photo by John Mayson

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"Harvester" by SigInt 13
By John F. Catalano

Why does John Catalano call Harvester "the mother of all databases?" Harvester is not a logging program nor an accumulation of listening schedules. Its purpose is "signal intelligence," where the user compiles as much detail as possible about each signal heard and the databases help generate a list of potential candidates for identification. Part of the beauty of the system is the level of detail and the variety of ways the information can be used, once entered.

R.L.Drake Co 16
The Passing of a Legend
By Bob Grove

After Drake divested itself of its amateur radio line in 1984, the company still produced an outstanding shortwave receiver, but a few months ago, Drake announced it would get out of the radio business entirely. MT acknowledges the place Drake has held in the evolution of modern radio, and recommends a book which provides insight into the kinds of business and production decisions which face radio manufacturers.

The Northrup-Grumman Flight Test Facility 18
By Ron Perron

Tucked away to one side of the runways at Baltimore-Washington International Airport is the Northrup-Grumman plant. The plant supports a number of U.S. military programs as well as servicing foreign customers, and naturally all new development must be tested. That's where the interesting radio traffic comes in, as the flight test facility compiles its data in the midst of one of the busiest air corridors in the world!

Reviews:

At last: WiNRADiO has unchained its popular G303 series shortwave receiver from the desktop computer and produced an external version which can travel anywhere your laptop can take it. Lee Reynolds takes a peek inside the mysterious box of the **WR G303e** (see page 70).

Just what the doctor ordered, says John Catalano of the **RxPlus** receiver control, database, logging, DSP filtering, and decoding software that does it ALL (page 72).

The **Eton G4000A** is basically a Grundig Yacht Boy 400PE in a silver suit. Jim Clarke runs it through its paces anyway and reminds us of the receiver's abilities and limitations (see page 68).

Toss that cheap earphone away, advises Joseph Pasquini, and get yourself quality audio worthy of your radio. Joseph recommends models from **OTTO** and **Easy To Get Wireless** (page 66).

MONITORING TIMES (ISSN: 0889-5341; Publishers Mail Agreement #1253492) is published monthly by Grove Enterprises, Inc., Brasstown, North Carolina, USA.

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Subscriptions:	order@grove-ent.com

Subscription Rates: $28.95 in US; $39.50 Canada; and $58.50 foreign elsewhere, US funds. Label indicates last issue of subscription. **See page 75 for subscription information.**

Postmaster:
Send address changes to Monitoring Times,
7540 Highway 64 West, Brasstown, NC 28902-0098.

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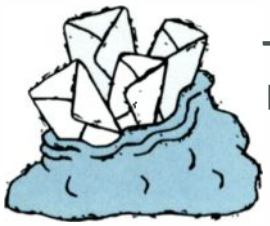

TO THE EDITOR

Embedded Technicians: A New Approach to Emergency Communication

A Guest Editorial by Alan Dove N3IMU

From the 9/11 Commission to the local firehouse, emergency communication has been a big topic of discussion recently. The discussion centers mainly on the lack of communication between different agencies, and how that might be fixed. But with millions of dollars being spent on fancy new radio equipment and plans afoot to spend billions more, it is striking how little has actually changed on the ground.

New York City, the nation's largest city and the target of the 9/11 attacks, demonstrates just how serious the problem is. More than three years after the attacks, police and firefighters still have problems communicating with each other, and other responding agencies are still completely out of the loop. Despite some large dollops of porkbarrel spending scattered around the country, things are not much better elsewhere.

For the major urban areas where most Americans live, it is not clear that any amount of money can fix the problems.

Consider a "typical" urban emergency like a building fire. The fire department, EMS, and police arrive at the scene and begin doing their work, generally communicating on separate radio systems. Even if those can be linked, the linkage never includes the other agencies that show up: the Housing department, utility companies, Red Cross, and Salvation Army, to name a few. Local hospitals are also out of the immediate loop, even though they may have to adapt quickly to a mass casualty incident like a major fire.

It is easy to see the kinds of problems this can cause. For example, if a police officer is in the basement of the building as part of an arson investigation, and notices that several structural beams are starting to give way, how can he notify the other responders? In most cases, he will have to call another officer outside the building, who will call the police dispatcher, who will call up the police chain of command to the high-level liaison with the fire department, who will then call down that chain of command to inform the firefighters and, possibly, EMS workers on the scene. This takes precious minutes, and worse, it doesn't reach everyone who needs to know.

These problems are not hypothetical, as anybody who reads a newspaper should realize.

Radio Linking

Instead of the up-and-down relay through different (and often antagonistic) chains of command in different agencies, vendors of radio equipment have started offering radio linking systems. As the sales pitch goes, these systems seamlessly integrate the existing radio gear from different agencies at the scene of a disaster, allowing them to communicate as if they were one agency, and eliminating all of the communication problems.

Dream on.

While several cities, including New York, have invested heavily in this type of technology, its flaws have already become apparent. In one recent full-scale exercise, one of these big-ticket interlinking systems did precisely what it was supposed to do, but with unintended consequences. Police, firefighters, and other groups plugged their radios into the unit, a type of portable repeater link, and suddenly anything said on the fire department frequency could be heard by all of the police officers and other responders. Great.

The problems were that nobody knew how to control communication traffic through the system, or that a spurious signal or open microphone on any radio instantly blacked out all communication at the scene, for all of the agencies. As a result, the linking system paralyzed communication more often than it facilitated it.

Having paid for this expensive gadget, there is no doubt that the city will continue to use it, and that they will continue to have the same sorts of problems in real emergencies.

Coordinated Systems

I can hear the response already: that linking systems is a temporary solution, so of course it is not perfect. Unfortunately, the elaborate, carefully planned systems that are on the horizon are not much better. One major problem is that these systems are expensive, so their purchase must be authorized by politicians – a group uniquely unqualified to evaluate advanced telecommunication systems. New York's original proposal for a high-tech statewide 800 MHz trunking system is a prime example of the results this can produce. That system would totally exclude coverage of the state's major urban centers, while relying on frequencies that will propagate poorly in the state's rural areas. Other than the vendor, it is unclear who would benefit from such a system.

Hams to the Rescue?

These issues have been discussed extensively among amateur radio operators, usually in the context of gloating. If you have ever spoken to an amateur radio operator about emergency communication, you will have heard a sales pitch about the "only fail-safe communication system in the world," and how hams can solve the most severe emergency communication problems better than any professional system. This is, of course, a load of hooey.

I know this, because I am a ham radio operator, I have helped in emergency responses, and I have some formal (albeit highly specialized) emergency response training outside of my radio hobby. The average ham is not trained or prepared to be an emergency responder. At the actual scene of a disaster, most amateur radio operators are about as useful as housecats – and about as easy to manage.

To try to address this in the post-9/11 world, the amateur radio community has recently embarked on a crusade, browbeating its dwindling population of participants to get trained, get prepared, and become more suitable for emergency response duty. This new religion preaches networking with local police, fire, and emergency management officials, training with those groups, and preparing a "go bag" with everything from spare batteries to a three-day supply of food for field deployment.

There are benefits to this approach, but it will never be applied by more than a tiny segment of the amateur radio community. Most hams are more concerned with erecting antenna towers in their back yards to boost their scores in radio contests, or communicating through archaic modes of operation. Ham radio is, after all, a hobby – nobody expects model railroaders to repair the subway system, so why should radio enthusiasts become emergency workers? There is also another sad truth that no ham radio organization points out: a huge proportion of amateur radio hobbyists fail to meet even minimal standards of physical fitness. They are far more likely to be a liability than an asset at a disaster scene.

The few hams who are dedicated to "emcomm," or emergency and public service communication, are mostly the kinds of people who would have ended up volunteering for disaster response anyway. They just happen to have an interest in radio as well. Unfortunately, this small subset of the ham radio community is completely inadequate to cover all of the communication needs in a real emergency. Even within this subset, we have other commitments, and are not professional emergency responders. If a large building caught fire in my neighborhood at 3:00 a.m., I would not receive or answer a call to help. I have to go to work in the morning, and putting out fires is the fire department's job.

Even with all of these drawbacks, though, the amateur radio system offers some tempting advantages for emergency communication. For one thing, hams have access to vast stretches of the radio spectrum; there may be congestion in one frequency band, but finding a clear frequency somewhere in the amateur radio allocations is never a problem. This is especially true for VHF and above, the frequencies most needed by public service agencies.

Besides all of the empty electromagnetic territory, hams enjoy a massively overbuilt infrastructure. In any major urban area, amateur radio operators with the entry-level Technician class license have access to dozens – sometimes hundreds – of different repeaters. Before the advent of cellular phones, many of these repeater systems were in regular use, but these days they mostly sit silent, waiting for traffic. More than a few have robust backup power systems, and even if those fail, other frequencies and modes are available to make the amateur radio system as close to fail-safe as an electronic technology can be.

Building in Back-up

If professional and volunteer emergency

responders could tap into the enormous surplus capacity and durability of the ham radio system, they would never have a need for expensive add-on technologies. Police and firefighters need to communicate? Start an interagency net on that great ham repeater. Does the Red Cross need to talk to the hospitals? They can use the same repeater to keep the police and firefighters in the loop, or pick a different one. Is there a need for regional communication outside the local jurisdiction? No problem, just decide how far you want to communicate and pick an appropriate frequency and mode. Did the primary repeater for EMS radios just croak? Use a ham repeater to communicate with the hospital instead.

Of course, there is a catch. Fortunately, it is a very small one.

In order to use amateur radio frequencies, one needs an amateur radio license. But not every police officer, firefighter, Red Cross volunteer, or electrical utility worker would need to get licensed to make this system work for them. If only one firefighter in a battalion is a ham, he can relay information from the fire department's radio system to an emergency net on an agreed-upon amateur frequency. The same goes for a few police officers in each precinct, a handful of Red Cross volunteers, a few utility workers, and a few hospital employees. When a disaster develops, these people – who are already participating in the response professionally – could simply start their own communication net for interagency messages.

Let's return to our burning building to see how this works. The officer in the basement uses his police radio to call an officer outside, telling him about the collapsing beams. That officer, who happens to have an amateur radio license, pulls a ham radio handheld unit off his belt and informs the amateur radio net of the situation. The firefighter-ham, Red Cross-ham, Salvation Army-ham, utility worker-ham, and housing department-ham all hear the information at the same time, because they are on the same amateur radio frequency. They then use their own agencies' communication systems to tell their people to evacuate.

Unlike commercial radio-linking systems, this one incorporates expertise as well as gadgets. Because their introductory ham radio licensing course taught them how the system works, all of these embedded amateur radio operators know how to fix common communication problems as they arise. They can instantly change hats to become radio experts, then change back into firefighters, police officers, or whatever else and continue responding to the emergency. Since these people are already emergency professionals, the traditional problems of using ham radio – nearly all of which stem from having untrained volunteers on the scene – disappear.

Emergency responders should start thinking of amateur radio as a category of technology, not as a group of eager nerds laden with radios. The Technician-class amateur radio license is not hard to get. It involves a 35-question multiple-choice exam that virtually anyone can pass with a bit of studying. There is no longer a Morse code requirement for the entry-level license. The exam fee is $12, renewing the license every ten years is free, and a durable, high-quality handheld radio suitable for emergency work runs about $250 brand new. Training is free. Best of all, this technology can be implemented at the lowest levels of agencies. The top brass does not even need to approve it, just avoid obstructing it.

Amateur radio operators should start thinking of themselves as a group of teachers and consultants for emergency professionals, not as a group of superheroes who will fly in to save the day. Instead of building networks with police and emergency management officials in order to get invited to the next disaster, build the network in order to recruit students to the next licensing class. Stop badgering hobbyists to assemble "go bags," and focus on getting ten percent of your local firefighters through their Technician exams. Then, teach them how to use their new abilities in emergencies, running a few practice nets and inviting them to your events. Above all, start viewing ham radio as one tool in the emergency communication toolkit, not as the answer to all questions.

Alan Dove, N3IMU, is active in New York City Amateur Radio Emergency Service and Radio and the Amateur Radio Emergency Communications Service (ARECS). You are invited to visit the ARECS website at **http://www.nyc-arecs.org/** for more information and discussion on the above proposal.

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

Happy monitoring!

-Rachel Baughn, KE4OPD, editor

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AMATEUR RADIO

Ham Call for Back-up

The guest editorial on page 6 may be the first time you've heard of using ham radio as a back-up service for public safety, but they're already doing that in Bentonville, Arkansas. Capt. Kenny Farmer, who first obtained his license in 2002 as a hobby, talked to Chief Deputy James Wozniak who agreed it might be a good idea to have some ham radios in the patrol cars used by the deputies and a base unit in the office.

Currently, there are nine people at the Bentonville Sheriff's Office licensed to be ham operators: two are dispatchers and six are deputies. "It's a backup means of communication if there's ever a problem," Farmer said.

STORM SEASON

Weather Spotters

"We don't have eyes everywhere," Steve DiRienzo, who works in the Weather Service office in Albany, NY, said during a Skywarn training class. "What we rely on are citizens to spot weather for us. The radar does a good job but it has its limitations."

National weather service stations rely on what they call "ground truth," or local testimony of trained volunteer spotters before making decisions such as the level of the emergency, for example.

"Close to half of the spotter reports are from ham radio operators, so they really are the backbone. The rest comes from law enforcement with some reports from the public," said David Tucek, warning coordination meteorologist for the National Weather Service's headquarters in Indianapolis. "Communication is the key to public safety."

Because of the combination of weather spotters, new technology and media coverage, the number of people being killed by tornadoes has dropped significantly in the last 10 to 20 years.

Weather spotting is open to all; for example, Keith Reedy is blind, but he serves as Skywarn coordinator for "Illiana" Skywarn and is an expert on radio equipment and passing messages. For more information on the Skywarn program and how to become a spotter, visit **http://www.weather.gov**.

Preparing for the Worst

"Rehearsals" for the 2005 hurricane season have been held all up and down the Atlantic coast. The National Oceanic and Atmospheric Administration is predicting 12 to 15 Atlantic tropical storms during the hurricane season of June 1 to Nov. 30.

Although it has been 14 years since Cape Cod was last hit by a hurricane, annual hurricane exercises help keep their skills from getting rusty. This year the area concentrated on communications, and amateur radio was a key element. "If all else fails, they want us to be trained to use ham radio and have access to amateur operators," one official said.

In their emergency preparations, Florida communities are looking at what didn't work so well during last year's storm season, such as power for communications and traffic lights. Boca Raton is buying more generators to power temporary fire stations, waste water lift stations and drinking water wells during an outage. Boca Raton is also boosting its emergency radio station on 1650 AM with two new antennas, and has a trailer-mounted back-up antenna.

"After an outage, people can't get TV," Assistant City Manager Mike Wioka said. "But almost everybody can get a radio station." 1650 is dedicated to local information, so in an emergency folks don't have to wait for news about Boca Raton while listening to a major network.

New Hurricane Resource

NASA launched an Internet resource page highlighting the agency's diverse hurricane research. The site opens just in time for the 2005 Atlantic Ocean hurricane season at **http://www.nasa.gov/hurricane**

For the most up-to-date information on hurricane-related radio frequencies, visit Utility World's website **http://www.ominous-valve.com/hurricne.txt**

LOW POWER FM

Freeze

Following allegations that three Idaho companies made $800,000 last year selling radio permits for which they paid nothing, in March the Federal Communications Commission issued a six-month freeze on authorizing low-powered radio licenses. The FCC said that it would consider whether to restrict both outside and multiple ownership of low-powered facilities "in order to give local citizens a voice in their community."

The watch groups claim that the Idaho companies have been aggressively acquiring and brokering radio translator licenses to build a quasi nationwide broadcast network. They allege the proliferation of translator facilities will gobble up scarce airwaves and deprive other churches, community organizations, and nonprofits organizations of media access via low-power broadcast facilities.

"If it's a choice between a local low-power FM facility providing local programming and a translator bringing in a signal from hundreds of miles away via satellite, the local programming should win," said Harold Feld, a lawyer for the coalition.

Congress Gets into the Act

Sen. John McCain, R-Ariz., introduced the Local Community Radio Act of 2005 to the Senate in February to remove the restrictions which prevent low power FM stations from being granted licenses in crowded urban markets. Opposition from the National Association of Broadcasters, which represents most commercial radio operators, is strong.

"We don't have any objection to low-power radio; it's the interference that we strongly object to," said Dennis Wharton, spokesman for the broadcasters. He said the FCC study might have reassured some advocates for low-power stations but that commercial broadcasters quickly saw its "fatal flaws."

Rep. Louise Slaughter, D., N.Y., planned to introduce a similar Community Radio Act of 2005 into the House in June. In addition to removing the restrictions, her bill would also protect the existing 600 LPFM stations against encroachment by larger stations.

BULLETIN BOARD

The 2005 IRCA/DecalcoMania convention will be held Aug. 25 - 27, 2005 at the Days Inn, 1111 S. Harbor Blvd. Anaheim CA 92805 (reservations 714-533-8830: request the special $59 room rate.) Registration fee (not including banquet) $25. Activities will include station tours, business meeting, auction, and banquet. For more information visit http://www.ircaonline.org

The National Radio Club/DX Audio Service is hosting the annual Labor Day NRC convention at Best Western "The Inn at Towamencin" (800-277-3615 for room reservations), Kulpsville, Pennsylvania, this year. Contact National Radio Club Inc., P.O. Box 164, Mannsville NY 13661 http://www.nrc.org for more information. Registration fee (not including banquet) $20. Activities include station tours, auction, displays, and banquet.

Communications is compiled by editor Rachel Baughn KE4OPD (editor@monitoringtimes.com) from news submitted by our readers. Thanks to this month's stable of fine reporters: Anonymous, Azizul Alam Al-Amin, Mark Cobbeldick, Arnal Cook, Ian G3ZHI, Bob Grove, Norman Hill, Jerry None, Doug Robertson, Brian Rogers, Robert Thomas, Gayle Van Horn, Larry Van Horn, Ron Walsh, Robert Wyman, and Ed Yeary.

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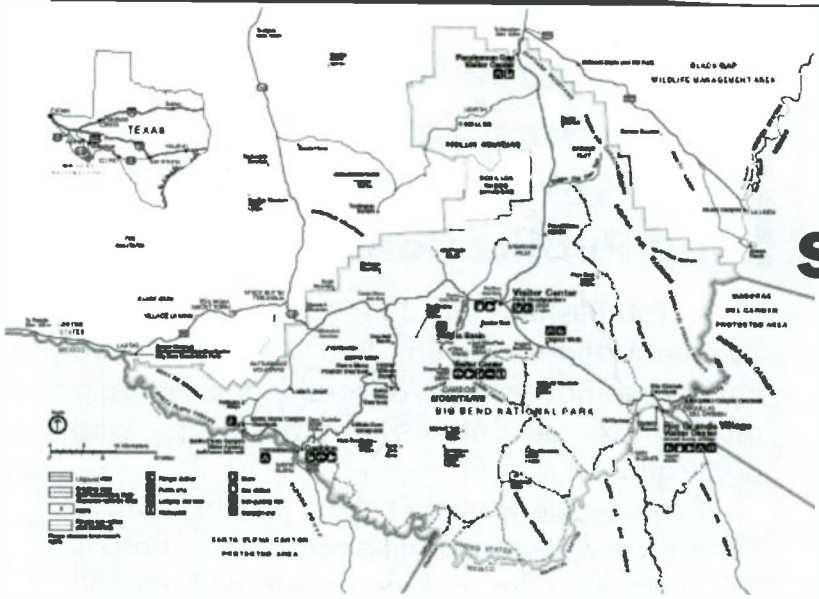


Scanning the Big Bend of Texas

By John Mayson

Imagine having the state of Rhode Island all to yourself. It would be rather difficult to evacuate an entire state for that purpose, but you can capture that feeling in Big Bend National Park, Texas. The park encompasses 1,250 square miles, making it slightly larger than Rhode Island. Despite being one of the largest parks in the National Park system, it is among the least visited.

Between El Paso and San Antonio, the state of Texas makes a southerly "dip." This part of the state is known as the Big Bend area. It is perhaps one of the most desolate, but most beautiful parts of Texas.

This month we'll focus on four counties that make up this part of the world.

Brewster County

Brewster County is home to the cities of Alpine and Marathon, a state university, and Big Bend National Park. Slightly fewer than 10,000 people call this 6,193 square mile county home. How big is that? It's over three times as large as Delaware!

Here's a piece of inside tourist information that you won't find in many travel magazines, but you'll read right here in *Monitoring Times*: On SH-118 about 18 miles south of Alpine, just past the Border Patrol checkpoint, is the Woodward Ranch. A wonderful couple runs the ranch and they offer camping, hiking, bicycling, and – most importantly – rock hunting. This is the only place on earth where people can find the Texas Red Plume, a rock that is absolutely beautiful once it's properly cut and polished. Rock hunters can also find pom pom and plume agates as well as moss, banded, and iris agates. Trey and Jayson will be more than happy to see you, so be sure to stop in, but please call first at (432) 364-2271.

There *is* a radio angle to this. Telephones in this area are linked by microwave (sorry, no frequencies). Microwave telephone service does not support data, so credit card machines, fax machines, and modems will not work.

Law enforcement is provided by the sheriff's department in much of the county. Alpine and Sul Ross State University have their own police forces. The county dispatches for both the Sheriff's Department and the Alpine PD.

Frequency	Tone	Agency
155.655	136.5	Brewster County Sheriff's Department
154.025		Big Bend Regional Medical Center
154.995		Sul Ross State University PD
155.160		Terlingua Medics

The Texas Department of Public safety uses at least two frequency pairs in Brewster County. They use APCO-25 digital in much of this part of the state.

Output	Input	Tone	Callsign Location
159.2100	154.6650	123.0	WRE396 Alpine
158.8275		P25	WPNS517 Marathon

Jeff Davis County Public Library

Aviation buffs will be happy to learn that Alpine has a small airport. Remember, all of these communities are less than 100 miles from the Mexican border. It would not be out of the question to hear Customs aircraft operating out of Alpine or other area airports.

Alpine-Casparis Municipal Airport (E38)
119.025 WX AWOS-3
122.800 CTAF/UNICOM

Big Bend National Park

Summer is not exactly the tourist season for Big Bend. It probably has a lot to do with the searing heat on the desert floor that I can only liken to standing in front of a giant hair dryer. At times it seemed that my family and I were the only human beings in the park. I tell you all of this, because I heard next to no traffic on my scanner while in the park. I was able to confirm one frequency I found on the Internet and I discovered the repeater tone.

Frequency	Tone	Description
162.975		Unconfirmed
163.725	123.0	Park Rangers
166.375		Unconfirmed
166.975		Unconfirmed

Intersection in "downtown" Fort Davis

By the end of 2007, the entire federal spectrum will use APCO-25 digital. In this part of the world even the Border Patrol continues to use analog. But everyone has to make the switch, so keep this in mind if you travel to Big Bend towards the end of the decade.

Big Bend National Park is most definitely a "get away from it all" vacation spot. I mostly heard automated repeater identifications on my scanner and almost no traffic. Apparently there's not a whole lot of crime or other emergencies. No AM, FM, or television stations can be heard in the park. Cell phones do not work. There are very few telephones and you will get strange looks if you ask about Internet access. My kind of place!

The park is rich in history. I really enjoyed visiting Castolon, population: 1. It started out as a remote Army outpost during the time of the Mexican civil war almost 100 years ago. The enlisted men's barracks has been converted into a store. The officer's quarters now serve as guest quarters for researchers working in the park. Please stop in and say "Hi" to Edward. He's the lone resident and runs the store. Prior to 9/11 many residents of Chihuahua, Mexico, crossed over for mail, milk, meat, and household goods. One of the outcomes of 9/11 was the closing of all the border crossings in and near the park. Edward's business is off by 80%.

Regardless of the time of year you visit, remember to bring lots of water and sunscreen. Just because the weather is cool doesn't mean you can't get sunburned or dehydrated. When visiting during the hot months take it easy, particularly if you're from a cooler climate and not acclimated to the heat. This is not a city park. Expert trauma care is not a simple 9-1-1 call away and there are no nearby hospitals. But it's one of the most beautiful spots on earth and a place every American should visit.

Jeff Davis County Frequencies

Output	Input	Tone	Agency	Description
155.655	154.830		Jeff Davis County Sheriff	
158.730	155.550		Jeff Davis County Sheriff	
154.115		CSQ	McDonald Observatory	Paging

The Texas Department of Public Safety has two frequencies in use in the county. Both are APCO-25.

Frequency	Tone	Callsign	Location
155.7375	P25	KKE225	Fort Davis
159.2175	P25	KKE225	Fort Davis

Pecos County Frequencies

Output	Input	Tone	Agency	Description
155.535	154.785	88.5	Pecos County Sheriff's Department	
155.580	154.845	103.5	Pecos County Sheriff's Department, Countywide	

Aviation
122.800 Fort Stockton-Pecos County Airport (FST) CTAF/UNICOM
118.525 Fort Stockton-Pecos County Airport (FST) WX ASOS
135.875/343.600 Albuquerque Center – Fort Stockton RCAG

Jeff Davis County

When you think of the American Civil War, the Chihuahuan Desert probably does not spring to mind. But this end of Texas does have some Civil War history. Confederate forces in the area fought to stop the flow of gold and other goods from California to the rest of the Union. Eventually troops from California occupied and held the region. After the war, Confederate President Jefferson Davis visited his former charges to whom he once said, "Troops from other states have their reputations to gain, but the sons of the Alamo have theirs to maintain." The county was named for him in 1887.

The Jeff Davis County Sheriff's Department is the only law enforcement agency in the county because there are no incorporated cities. About 2,200 people call this county home and the county seat is in Fort Davis. The University of Texas at Austin operates the McDonald Observatory located northwest of Fort Davis.

Pecos County

IH-10 runs from Jacksonville, Florida, all the way to Los Angeles, California. Along the way it passes through Pecos County, Texas. The principle cities of Pecos County include Fort Stockton, Bakersfield, and Iraan.

Presidio County

West of Brewster County lies Presidio County, home to almost 7,600 residents. The principle cities are Marfa and Presidio. It is home to Big Bend Ranch State Park (not to be confused with the national park) and has a border crossing at Presidio to a quaint little town called Ojinaga, Chihuahua, Mexico.

Any reader who is an Art Bell fan or who gets a kick out of the paranormal has probably heard of Marfa. About nine miles east of the city along US-90 is an area known for *Marfa's Mystery Lights*. As far back as the 1800s, people have seen mysterious lights

Jeff Davis County Sheriff's Department vehicle

that move around, change colors, and change in intensity. To date no one has been able to explain this phenomenon.

If you want to experience driving in total desolation or feel like you're driving on another planet, like Mars, I suggest a trip along FM-170 between Presidio and Study Butte. Expect to see more road runners than people and more wild burros than automobiles.

Frequency	Agency
154.770	Presidio County Sheriff's Department
154.830	Presidio County Sheriff's Department
155.010	Presidio County Sheriff's Department
155.655	Presidio County Sheriff's Department
159.270	Big Bend Ranch State Park
151.415	Big Bend Ranch State Park
151.340	Big Bend Ranch State Park

Aviation	
122.800	Marfa Municipal Airport (MRF) CTAF/UNICOM
134.025	Marfa Municipal Airport (MRF) WX AWOS-3
122.900	Presidio Lely International Airport (T77) CTAF
122.100	El Paso Radio Marfa RCO

Jeff Davis County Courthouse in Fort Davis

Department of Homeland Security

There have been recent changes to how our government protects its borders. These functions fall under the Department of Homeland Security. The U. S. Border Patrol is now part of the U. S. Customs and Border Protection (CBP). What was formerly known as the Immigration and Nationalization Service (INS) has been split into the U. S. Citizenship and Immigration Services (CIS), which helps foreign nationals become citizens and the U. S. Immigration and Customs Enforcement (ICE) which processes visitors to our country.

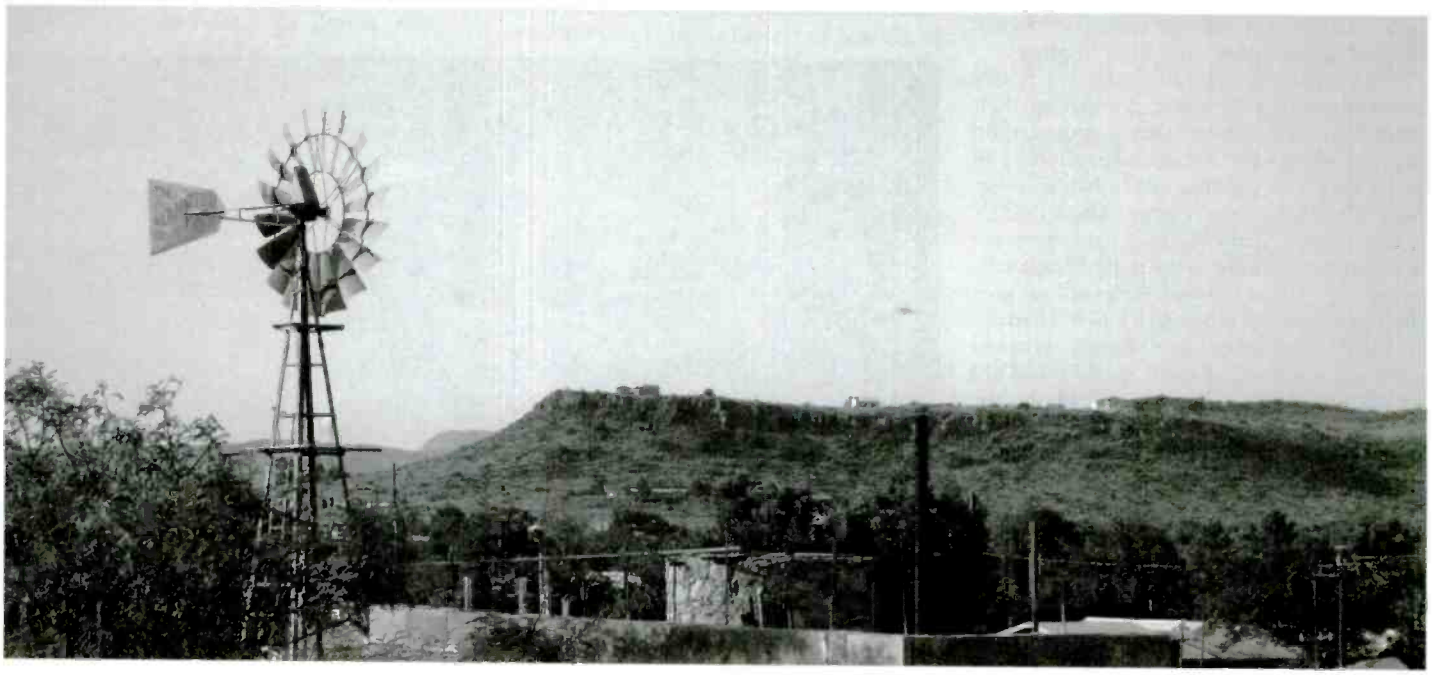
Visitors driving in from Mexico will first encounter a CIS agent. All along the border with Mexico the Border Patrol has interior checkpoints and all travelers must stop for inspection even if they never left the country. Border Patrol vehicles are highly visible in the area.

As of July 2004, the Border Patrol was still using analog radios in the clear. This was the only exciting communications I heard on my scanner all week. Remember, all federal agencies must be APCO-25 by the end of 2007. With all of the focus Homeland Security receives, it doesn't take a whole lot of imagination to guess any future radio system deployed in the area will be unmonitorable. APCO-25 encryption is already used along much of the border.

Frequency	Tone	Agency
163.625	100.0	Border Patrol (encrypted)
163.775	100.0	Border Patrol (quite active!)
165.850	100.0	Border Patrol

Hope to See You Soon!

We are fortunate to have such a great national park system. I have visited several and enjoyed every single one, but Big Bend is my favorite, hands down. It's not on the way to anything, but if you're passing through west Texas and have the time, please take a detour and visit this beautiful part of our country.



"Harvester" by SigInt
Using the Mother of All Databases

By John F. Catalano

Last month in Part 1, we became acquainted with Harvester from SigInt Systems. The essence of Harvester is to capture as much detail as possible about each signal heard, identified or not. The details which Harvester gathers range from basic data (e.g., frequency), to minutia (the announcer's accent). The *harvested* signal intelligence data is stored in a database where each entry has over seventy (70) potential fields of details. By deductive reasoning and data correlation, Harvester's goal is to generate a list of potential candidates for unknown signals.

This methodology is not new. Governments around the world have used SigInt (signal intelligence) for decades as part of their intelligence gathering networks. Governments use powerful computers that are not available to the public. In 2005 home PCs are reaching high computational power levels. Can Harvester together with the 21st century PC do the job? Let's see.

First Things First

Since Part 1 was published, the people at SigInt have been busy adding new features to Harvester. This time we will be using the latest standard version, 2.0.83. Therefore, some screens may look different from what appeared in Part 1 last month. I am sure that the added capability of sharing Harvester database files will more than make up for any inconvenience. The Harvester User Manual has been updated to version 1.1.

Here's the plan. Let's start by downloading the update. Then we'll download a database file and import it into Harvester. Finally, we will try the Harvester Search and Query functions.

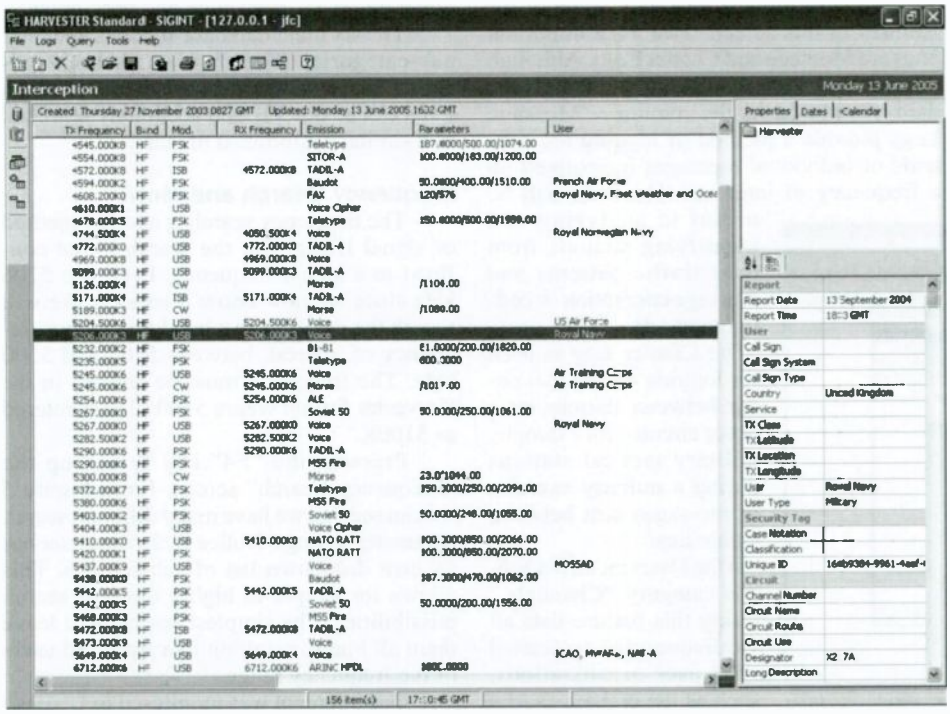


Figure 1 - Harvester's interception screen displaying the HF worldwide database entries. Detailed properties of one listing is seen at lower right.

Latest and Greatest

Harvester upgrade files are available free of charge to registered users. If you have a previous version of Harvester (version 1.0.16 or earlier), you don't have the very important capability of importing database files. Upgrade Harvester by downloading the upgrade file to your current Harvester folder. Install, but **DO NOT** run the new version yet. First run the Database Update found in the Tools section. This converts your old database into the new format so it is not lost. Now run Harvester Standard 2.0.83.

With Version 2.0.83 you can download and share database files as they become available from Harvester users at **http://www.sigint.co.uk/download/hfworldwide.hdf** Downloading is one thing. But exactly how do you import the new database?

Find the Gateway

The User Manual, with only on sentence on the subject, is very light on instructions for importing databases. Fortunately, it's very simple if you follow these steps. Download the new database file to a location that you will remember. If you look in the folder where you unzipped the upgraded Harvester, you'll find a file, *Gateway.exe*. Run this program and enter the location of your newly downloaded database file at the top of the screen. That's it. The new database data is now available to Harvester.

"Reaping" What We Have Heard

Figure 1 shows the Harvester's Interception Screen displaying the HF_Worldwide database entries. In the large area of this screen you can see some of the details of the highlighted intercept on 5206 kHz. It has been identified as a Royal Navy station broadcasting in voice transmissions in USB mode. Moving the horizontal slider at the bottom

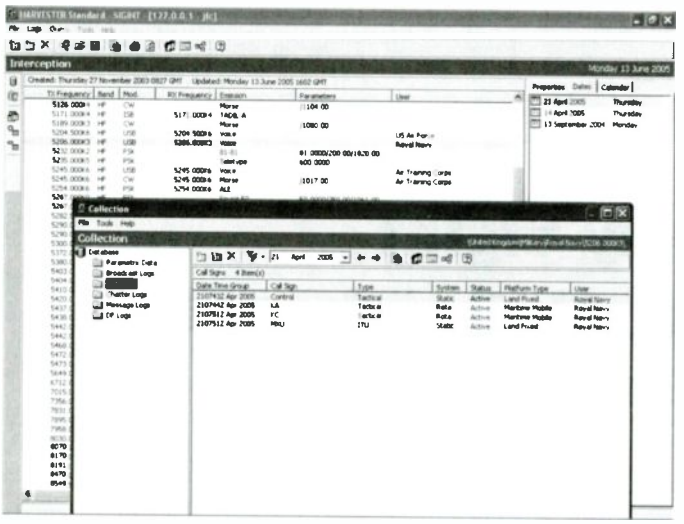


Figure 2 – Multiple intercepts of frequency 5206 kHz on various dates.

of the screen reveals more fields of data.

Notice that we have selected "Properties" in the box at the top right of Figure 1. The box on the lower right side provides all the properties of the intercept. Again, scrolling via the vertical slider is required to see all seventy-plus properties.

Multiple Intercepts

How does Harvester handle multiple loggings of the same station? Very nicely. One way of viewing multiple intercepts is to choose "Dates" in the box at the top right of Figure 1. The Properties box, at the right, is then replaced with a dated listing of every logging of this Royal Navy station on 5260 kHz. See Figure 2. Multiple loggings of the station, on the selected date, sorted by call sign, are displayed by clicking on the date of interest.

These can be displayed correlated to a number of parameters. Using an intercept from April 5, two Chatter Logs were logged on this frequency, on this date, as displayed in Figure 3. We can dig even deeper into the details by clicking on one of these intercepts, which then displays its specific details: "Do you have the ..." Talk about detailed!

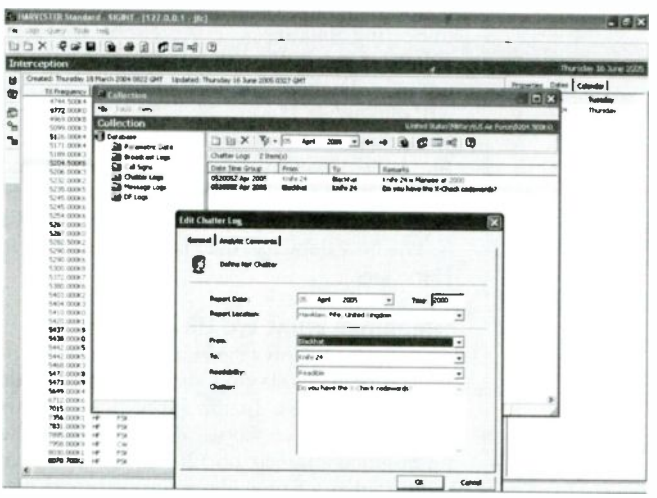


Figure 3 - Peeling the onion – Displaying the intercepts on 5206 kHz

Every Bit Is Important

When using a traditional radio database, we tend to think in terms of just frequency, station ID and time. However, we can never be sure what parameter may be key to a future search. Two important data areas are accessed via the "Edit/Add New Frequency." The first is "User" which in "Harvesterese" means minute details of the organization that we are monitoring. The other is "Technical" which defines the signal in detail with over thirty-five parameters, which could be as exotic as cryptographic preamble and character repetition cycle or as mundane as center frequency, data rate, polarity and shift.

Peeling the Onion

Harvester's structure is similar to an onion. Every top layer of information reveals a higher degree of detailed data below. And it just keeps going. The more detail the better, as a "Tip" in the manual illustrates: "Always add a new frequency for every mode you intercept, irrespective of whether the frequency has already been logged to the same User in another mode. Even a dramatic change in data rate is worth logging as a new frequency." Some refer to this as "vacuuming the spectrum."

Collection Screens

We have already looked at some of the features in this screen. Two very important ones are Message and Chatter Logs. Although related, they each provide unique searchable data. As stated in the manual, "Message Logs provide a method of logging the contents of individual messages intercepted on a frequency of interest." This info will be useful in analyzing and identifying stations from their traffic patterns and message encryption or coding methods.

The Chatter Log is used for logging events that occur between stations on a net or circuit – for example, military tactical stations during a military exercise or messages sent between embassies.

In the Users menu is a sub-sub category "Channels." Using this feature lists all the frequencies associated with user organizations, such as the embassies of a country or the stations in a tactical net.

Watch Lists

This function lets us collect a list of frequencies being used by an organization as they are monitored in real-time – for example, monitoring transatlantic commercial aircraft (ARINC) transmissions. The frequencies used by the fixed stations change as a function of aircraft position, propagation and time of day. Using Watch List, we can gather and save New York Radio frequencies as we hear them throughout the day, week or year.

So, now that we have entered all this data, what can Harvester do with it?

Deep Searches

Space allows us to cover only a few of Harvester's multitude of search options to illustrate its capabilities. One of the most useful for utility monitors is the Call Sign search. Assume we are monitoring 5206 kHz and we hear (in USB mode) a call sign "KA". Now let's try to identify it.

Who RU?

We can search the call signs of previously logged stations on that frequency in an attempt to identify "KA." Start by highlighting 5206 kHz in the Interception screen. Next under the "Logs" menu at top left choose "Collections." Here the six main database sections are listed: Parametric Data, Broadcast Logs, Call Signs, Chatter Logs, Message Logs and DF Logs. Choose "Call Sign." Then on the next screen, click on the lightning bolt symbol to the left of the date and choose "ALL" from the dropdown menu. See Figure 4.

This screen indicates that 13 call signs have been logged on this frequency. Our "KA" call is in the list and identified as a Royal Navy maritime mobile station previously monitored twice on this frequency. Clicking on an "RA" entry displays more detail on "RA". Very slick and very quick!

The six main database sections and their sub-categories (and their sub-sub categories....) form the user interface to Harvester. Each can be quickly and accurately searched in a similar customized manner.

Frequency Search and More

The frequency search is another method of signal IDing. But the search is not confined to a signal frequency. Let's use 5206 kHz since we now know it so well. We will search the database in a band around our frequency of interest, between 5100 and 5300 kHz. The frequency must be entered in the Harvester format where 5100 kHz is entered as 5100K.

Pressing the "F4" key brings up the "Frequency Search" screen. From Figure 5 we can see that we have many different search parameter settings. Notice each parameter has its own dropdown list of sub-settings. This allows for simple to highly directed search possibilities. The simplest search is to leave them all blank, resulting in a list of all users of the frequency range.

Our intercept was monitored in USB, so we have limited our search to modulation type USB. The result of our search – five users of

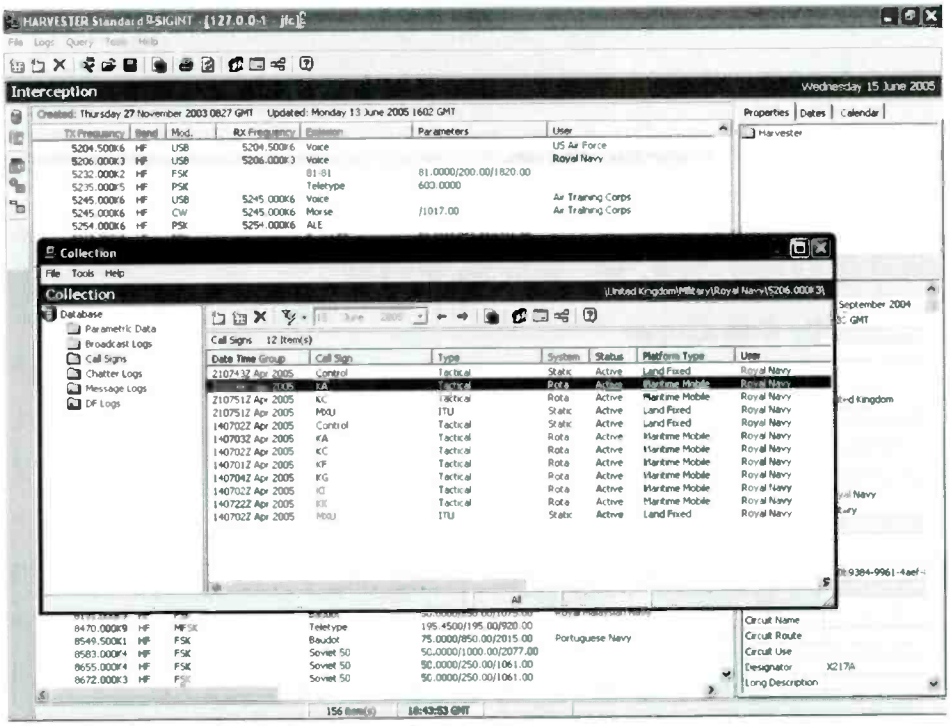


Figure 4 – Results of a call sign search For 5206 kHz

USB modulation in the frequency range of 5100 kHz to 5300 kHz – is shown in Figure 6. Lo and behold, our Royal Navy is listed as number two.

This example is a very simple search, or, in database terminology, a simple query. Frequently used, customized queries can be saved to memory to reduce typing and time – another of the many nice touches built into Harvester. We'll leave you here and let you imagine its use applied to your monitoring interests and habits.

Manual

It appears that Harvester never heard of a Total Monitoring Environment, since it provides no receiver control. So, it's manual receiver tuning, re-tuning and scanning. It also relies on cut-and-paste or manual entry for decoded message transfer.

Speaking of the other type of "manual," Harvester's uniqueness lies in its capabilities to store and search vast amounts of data using complex search methods. Therefore, in order to use such a powerful tool a simple instruction manual is not sufficient. The Harvester User Manual rev 1.1 is just not up to the task.

The current manual needs some cleaning-up. Empty example figures (e.g., Watch List, page 13, does not show a real Watch List, only the screen), lack of an index, and words which a spell checker has replaced with the incorrect words should be addressed. Since Harvester insists on defining its own language (e.g., user = user of a frequency), a glossary is another essential which is lacking.

The rev 1.1 manual is an overview at best. Vital operational details are omitted. For example, although it has a section on Data Imports, this is a misnomer, since it only deals with exporting database files. As discussed above, the method of Importing database files is left to the *real* "user" to discover.

No "Quick Start" or useful step-by-step sequences are to be found. Instead, the manual is organized around commands. In fact it is a Command List, not a user manual.

Although this may sound picky, how fast Harvester "users" are able to advance on the learning curve will determine the success or failure of the program. With a program this rich with detail and this potentially powerful, an interactive teaching program is essential.

Summary

Harvester is the most complete and detailed radio monitoring database I have ever used. It is an ambitious, carefully conceived and well-behaved database program. As a standalone monitoring logging database, you cannot find better, perhaps at any price. The search functions work great, once you take the time to understand and learn Harvester's command structure and lingo.

Potentially, its huge number of intercept parameters and reporting functions gives Harvester the capability of helping greatly to identify signals. However, some of Harvester's detail is unrealistic, such as the antenna's ground elevation. For hard to ID stations – the kind for which we would be looking to Harvester for assistance – this data is just not available, unless you have your own intelligence agents!

In order to use Harvester to its fullest potential as an identification tool, the radio monitor must spend lots of time and effort "vacuuming" each intercept. This is why people at government monitoring stations around the world are paid for doing what some of us do for pleasure.

The full, registered program costs 35 pounds sterling. Check out Harvester's website at **http://www.sigint.co.uk/** for a free trial download and more details on the "mother of all monitoring databases." Finally, signal intelligence is available to the common man.

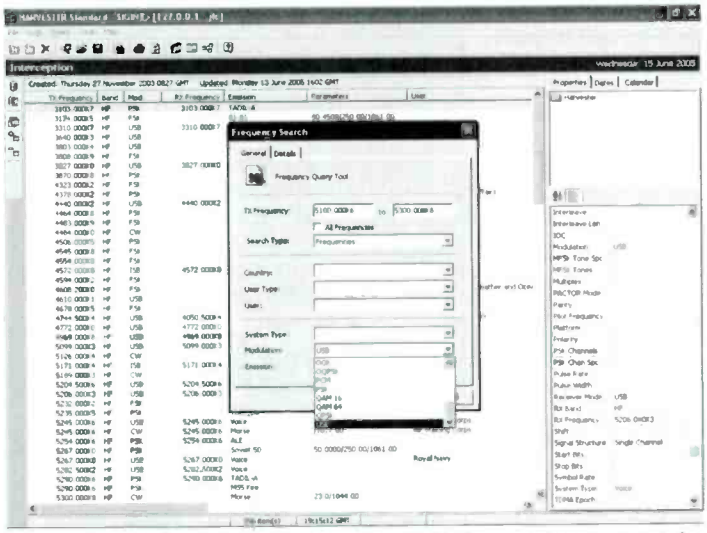


Figure 5 – The frequency search – Notice the frequency range and the number of "filtering" parameters

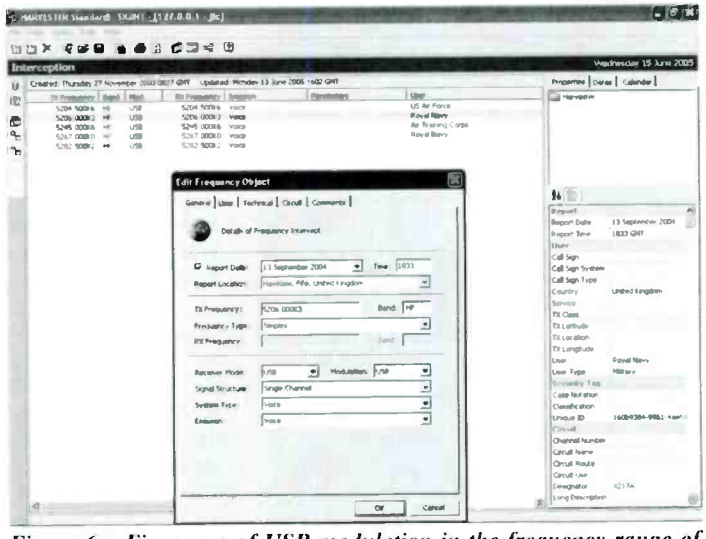


Figure 6 – Five users of USB modulation in the frequency range of 5100 kHz to 5300 kHz

R.L. DRAKE CO.
The Passing of a Legend

By Bob Grove

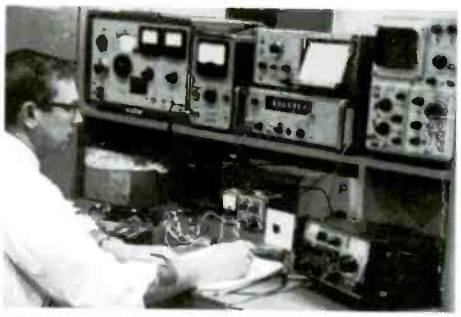
The recent announcement of R.L. Drake to cease production of all radio products was met with sadness by the shortwave and amateur radio industry. Drake was the last major U.S. manufacturer of stand-alone shortwave communications receivers for the consumer. Their venerable R8 series had become a standard of comparison to which other models were compared.

In proper perspective, the decision was inevitable. Although orders for the R8B remained steady, they weren't strong enough to justify continued production. To justify another assembly run, large quantities of components would have to be purchased – now at inflated prices. The selling price would have to have been increased substantially, reducing sales potential even further.

A Look Back

Robert Lloyd ("Bob") Drake was a visionary from Miamisburg, Ohio, producing radio accessories for the military during World War II as he founded the R.L. Drake Company in 1943. Sensing the need for cutting-edge designs for the emerging single-sideband (SSB) amateur radio market after the war, Bob led the design effort for his first receiver, the Drake 1-A in 1957.

Robert Lloyd "Bob" Drake, Sr 1910-1975



Engineer Ray Midkiff at working a research and development station in the mid-70s. Photo courtesy R.L. Drake Company.

As a young ham growing up in Rocky River, Ohio, I was using old military surplus for my shack. I remember the introduction of Drake, wishing I could use some of my college money to buy one of their receivers!

The remarkable acceptance of this product led to improved models, then to the transmitter and transceiver equipment as well. Marine radios and home TV terminals followed. The company earned a reputation of high respect; the equipment worked well, was meticulously crafted, and affordable.

Bob Drake passed away in 1975, but his legacy continued for the next three decades through the integrity of his carefully-chosen staff. The emphasis on quality, performance, and cutting-edge technology persisted as new products were envisioned, designed and manufactured.

The reverence for Drake equipment has taken a cult-like image. Drake collectors show their prizes with great pride (See the Drake Virtual Museum on the Belgian Internet site: **http://www.dproducts.be/drake%5Fmuseum/index.htm**). With the cessation of the radio line, valuation of these collectibles is bound to increase.

But the name continues. R.L. Drake is well respected in another market: video products. Head ends for satellite and cable TV systems

Now THAT'S Quality!

A QC check at Drake was not like the "final system test" procedure that all TR-7s went through... [Glenn Davis's] TR-7 checks included all of the following:

- Power output, all modes on all bands.
- Power amplifier SWR foldback and signal flattopping.
- Spurious emissions and second and third harmonics.
- Synthesizer phase noise.
- CW keying characteristics.
- VOX operation.
- Accurate setup and stability of all oscillators.
- PTO tracking, output purity, and drift performance against the temperature specifications.
- Receiver sensitivity and selectivity, all modes on all bands and through all IF filters.
- Third and fifth-order intercepts and receiver noise floor.
- BFO leakage (double-checked).
- Intermodulation (IM) distortion.
- Noise blanker and Auxiliary board, if installed.
- Incorporation of engineering change orders.
- All solder joints and connectors.

In addition, Davis placed some of his victims into their shipping cartons, put them on a shake table, and left them bouncing around to simulate the rigors of transit. (A few boxed-up radios were also dropped a few feet.) After the "trip," Davis would rerun the complete list of QC checks...

The bottom line: Customers were well served and Drake's reputation for quality was preserved. That's all that mattered. "

From *A Family Affair*, pp.85-86

Final System Test (FST) area during the early 1970s. Only the best production technicians were chosen to work in FST and only the best of the best worked on the TR-4 radios. Photo courtesy R.L. Drake Company.

A Family Affair
The R.L. Drake Story

Bigger is better. Such was the philosophy of American industry in the mid-1950s. ... To appeal to radio amateurs' machismo, Hallicrafters, National, and Hammarlund introduced ever larger models...

At the same time, a very different, very odd and very innovative radio was being conceived in central Ohio. The name chosen for Bob Drake's first radio was the 1-A. 1-A was an unimaginative model number for a revolutionary design concept. Only seven inches wide and under 20 pounds, this single sideband receiver was the antithesis of everything else on the market.

The ancestor of many models to come, the 1-A was clearly no boat anchor. This radio was the product of clean-slate, outside-the-box thinking. The 1-A was physically everything the competition was not. Small, easy to use and focused on the new upstart mode called single sideband, it would provide value not previously available. This receiver was superior in performance to its contemporaries at a fraction of the size, weight, and price. This pace-setting radio broke the long-standing trend of building larger, ever heavier receivers. The historical significance of this model is not being overlooked by astute collectors, as witnessed by recent eBay realizations near $1,000.

Every amateur knew the R.L. Drake Co. by the time it became a leading market force in the 1960s and '70s. In fact, many hams (and shortwave listeners) either owned Drake equipment or wanted to. As a shortwave listener in the late '60s, I personally lusted in my heart for the Drake SPR-4 receiver. In those days of dismal dial accuracy on the international broadcast bands, the SPR-4 permitted tuning to ±1 kHz. Today's shortwave listeners, using digital-readout radios, can scarcely appreciate this astounding accomplishment. Frequency accuracy was the No. 1 challenge for SWLs in the pre-digital age. Knowing what frequency you were on, and being able to return to it, was a continual challenge. The Drake SW-4 and SPR-4 models would solve this problem, earning a loyal following of shortwave listeners.

Drake's involvement in the amateur market eventually declined, but not as a result of the so-called rice box invasion (as the popular, pejorative, and politically incorrect term is used). This book reveals the real reasons. ...

Fred Osterman N8EKU
Universal Radio Inc.
Author, *Receivers Past and Present*

The foregoing is extracted from the foreword to an excellent photo-biography of the man and his company in the book, *A Family Affair–The R.L Drake Story* by John Loughmiller, KB9AT. Written after Drake discontinued its amateur line, but before cessation of the R8A receiver, *A Family Affair* is an honest, entertaining and educational look at the realities of radio design, trends in the radio hobby, and the operation of a family-owned business. If a good read isn't enough of a draw, the second half of the book includes 300 or so pages of technical tips, troubleshooting, mods, and appendices for Drake amateur radios.

The book is available for $24.90 plus $4.95 shipping from Universal Radio, 6830 Americana Parkway, Reynoldsburg, OH 43068-4113, or by calling toll-free (800) 431-3939.

like the "Lodgenet" line are widely utilized in motels. And their trusted service department will continue as well, providing support for their previous radio models as long as parts are available.

Our hats are removed in a salute to a fine American manufacturer, the R.L. Drake Company. May they continue to provide excellence in their redirection – the growing video market.

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The Northrop-Grumman Flight Test Facility

By Ron Perron

I live about half way between Baltimore, Maryland, and Washington DC – within "earshot" of Andrews AFB, Patuxent River Naval Air Station, and Martin State Airport. I'm perfectly situated for some lively and varied military air monitoring. However, it wasn't until a couple of years ago that I learned about a little known civilian unit, practically on my doorstep, that also provides me with some very interesting listening. This unit is based at the Northrop-Grumman plant, adjacent to the runways at Baltimore-Washington International (BWI) Airport in Linthicum, Maryland, which is only about 5 miles from my home.

Background

The unit, known as the Flight Test Facility, belongs to Northrop's Electronic Sensors and Systems Sector (ES3). Their mission is to provide test and operational data to support such on-going military programs as E-8 JSTARS, AWACS, and F-22 Raptor, as well as new, developing programs such as the Joint Strike Fighter (JSF).

The ES3 Test Facility has two components. One is ground based, while the other is an airborne unit. The ground-based component consists of several radars mounted on the roof of the Northrop-Grumman plant. The plant is nestled at the end of one of BWI runways so the radars can be tested and evaluated to see how well they track aircraft in a very dense air traffic environment.

The airborne component of the Test Facility is actually a small private "air force" consisting of some very sophisticated, specially-configured civilian aircraft: a couple of BAC-111s, two T-40 Sabreliners, a B-737, and a Britten Islander.

According to Northrop-Grumman's own web pages, their Electronic Systems Division is leading the development of the AN/APG-77 radar for F-22, and the next-generation sensor for the Joint Strike Fighter. Their radars, electro-optical, electronic countermeasures, and communications systems have flown on more than 45,000 military and public safety aircraft worldwide. Today, more than 2,000 F-16C/D fighters are equipped with their AN/APG-68 radar, dubbed "the most reliable radar in the world."

The AN/APG-66 radar, first developed for the F-16 fighter, has been upgraded and adapted to fly on military and public safety platforms in 20 nations, and is used for fighter attack, border patrol and drug interdiction. Their APN-241 navigation and weather radar is the ideal choice for a wide array of tanker and transport platforms. It is the standard for the C-130J transport aircraft.

The "real world" data used to help develop these and other airborne and avionics systems is gathered by the Test Facility aircraft. The B-737 and BAC-111s are configured inside so that they can be fitted with a variety of electronics, avionics and communications equipment, depending on the program they are working on at the time.

I moved into the Baltimore area in the mid-'60s. Back then I vividly remember seeing an A-3B Skywarrior, all silver except for its red and black nose cone fairing. I also remember seeing a B-57 Marauder, in similar paint scheme. That was long before I was a monitoring hobbyist, so I had no idea who they were or what they were doing. As I learned while doing research for this article, these aircraft were part of the then Westinghouse test unit – the forerunner of today's Flight Test Facility.

Test Areas

The Flight Test Facility uses two major areas for their flight tests. The first area is designated R-4001 and is situated in the restricted airspace over the Army's Aberdeen Proving Grounds, just north of Baltimore.

The second area is a series of restricted areas controlled by the Naval Air Station Patuxent River (Pax) test complex. Here the Northrop aircraft are under control of Bay Watch, a relatively new flight advisory controller that watches over the Pax complex as well as the Atlantic Test Range off the Maryland/Virginia coasts, just east of Patuxent River.

Both of these areas are within easy flight times and distances from their BWI base. However, this advantage comes at a price. As you can imagine, these test areas are located in very heavy air traffic areas. The Washington-New York-Boston air cor-

N57PA Raptor flight test bed aircraft parked at the Boeing Facility in Washington State (from Matt Cawby's web site)

ridors are some of the busiest in the world. NAS Patuxent River is also a very busy base. The fact that the Northrop pilots can conduct flight tests under these conditions is testimony to their capabilities and professionalism.

There's another "edge" to the crowded skies, though. It gives the test unit a chance to test their equipment under crowded sky conditions, much as it would have to do under certain operational situations.

The flight conditions in the area do sometimes dictate that the Northrop aircraft conduct their tests very early in the morning or later in the evening, when the normal traffic has subsided somewhat. The test unit has to be flexible, to fit their test schedule into what time slots are available.

Operations

The aircraft normally operate in pairs, and even take off as a pair. It's quite a sight to see these aircraft, both white with minimal markings, taking off from BWI with the BAC-111 in the lead, followed closely by the Sabreliner in a chase position.

From my listening, it appears that the majority of the testing involves using the T-40s as small, maneuverable targets. I've heard the T-40s line up to approach the BAC-111 from the front quarters or even head on, to test the radar's ability to track head-on targets. I've also heard the BAC-111s, while working with the T-40s, track and call out other aircraft flying in their area, to evaluate the radar's ability to track multiple targets. Their missions are generally a mix of moderate to high altitude tests, as well as some very low altitude tests. These low-level tests are usually conducted in the Pax restricted areas.

In early February 2005, the Northrop-Grumman Test Facility hosted a visit from Boeing 57A, whose full registration is N757A. This B-757-200 is nicknamed "Catfish," due to its unusual configuration, which features two canard wings just above the flight deck. These canards look much like the barbs that stick out of a catfish's front gills. The pictures at **http://www.microvoltradio.com/** clearly show how unusual this "bird" looks. This testbed, normally based at the Boeing plant in Washington state, is the original Boeing 757-200 prototype fitted with a radar nose in Lockheed Martin F-22A profile and representative F-22A swept wing section above flight deck containing conformal radar antennas for advanced radar trials.

From my monitoring, the trials in February appeared to be concentrated on evaluating a system called "Magic." The "Catfish" worked in conjunction with one of the T-40 Sabreliners, mostly N160W. The T-40 would maneuver in front of the "Catfish" in an apparent evaluation of how well the F-22 radar in the nose of the aircraft could detect the maneuvering T-40. They tried approaches from several frontal quarters as well as tail chases at various distances, up to 50 miles.

Other Information

In doing research for this article, I ran across a couple of items which promise that even more interesting listening is in store. The Northrop-Grumman web site says that engineers at Northrop's BWI plant are already are at work designing what Lockheed officials describe as "the best radar in the world."

"We'll design the eyes and ears of the airplane," says Bob Thompson, executive director of the Joint Strike Fighter program for Northrop Grumman (**http://www.northropgrumman.com**). Northrop is the key partner with Lockheed on the Joint Strike Fighter contract, a long-term program in which Lockheed (**http://www.lockheedmartin.com**) will design one of the savviest and most affordable fighter jets in military history.

A second item involves Northrop's involvement with foreign customers. The fact that Northrop-Grumman does some brisk sales to overseas customers also provides some interesting listening. Periodically, BWI plays host to aircraft from the Egyptian and Royal Saudi Air Forces. These aircraft fly into Baltimore to pick up replacement parts, new equipment, and probably returning some defective equipment for repair for their F-16, AWACS and other aircraft. It's not uncommon to drive by the Northrop plant that is nestled at the end of one of BWI runways and catch a glimpse of an Egyptian Air Force C-130 or a Saudi transport in desert camouflage.

AWACS is the world's premier long-range airborne surveillance platform, in use by the U.S., NATO, the United Kingdom, France, Saudi Arabia and Japan. Unmatched in its ability to manage large volumes of airspace, looking beyond the horizon to detect, track and identify airborne targets, the radar is now being upgraded to protect against smaller, stealthier targets.

A Boeing/Northrop Grumman design featuring a Multi-Role Electronically Scanned Array Radar was recently selected for the Royal Australian Air Force's next-generation Airborne Early Warning and Control aircraft. It's slated to enter service by 2005.

Both of these programs promise even more visitors to the Northrop BWI plant and more interesting listening.

Technical Information

Frequencies:

119.275	Bay Watch (Patuxent River)
123.2	Northrop Base ground control.
123.225	Northrop Base w/aircraft
248.4	Aberdeen Range Control
275.2	Unit air-to-air
314.6	assigned to Northrop
382.6	assigned to Northrop

Since the Flight Test Facility is based at Baltimore-Washington International, here are the BWI VHF Air Traffic Control frequencies:

119.0	Potomac Approach
119.4	BWI tower
119.7	Potomac Approach
125.525	Potomac Departure
128.7	Potomac Departure

NOTE: Since 2004 the frequencies previously assigned to BWI have been incorporated into the new Potomac TRACON (Terminal Radar Approach Control).

Northrop-Grumman Flight Test Facility Aircraft Registrations:

N160W	Sabreliner T-40
N162W	BAC-111
N164W	BAC-111
N165W	B-737-247
N168W	Sabreliner T-40
N360TL	Britten-Norman Islander

The "W" in some of the registrations refers to their previous "owners," the Westinghouse Corporation, which Northrop-Grumman acquired about 10 years ago. Northrop owns more aircraft, but I've only included the ones assigned to the Baltimore test unit. Those of you on the West Coast might want to check the Landings databases (**http://www.landings.com**) to find other Northrop aircraft based in your area.

Resources:

Depending on your area of interest, a good search engine such as Google will get you wealth of information about Northrop-Grumman. I used the following pages to research information for this article:

http://www.es.northropgrumman.com/products/Avionics_overview.htm
http://www.es.northropgrumman.com/es/pages/isr/isr_overview.html
http://washington.bizjournals.com/washington/stories/2001/11/05/story4.html

The Flight tests facility aircraft as they exist today with the B-737 in the background (Courtesy Northrop Grumman)

Ken Reitz, KS4ZR
kenreitz@monitoringtimes.com

A Beginner's Guide to Bargain Hunting

Getting seriously hooked on radios can be expensive. Beginners often cringe at the price tags on some of the items on their "wish list." But, a little poking around the Internet and a couple of key phone calls just might knock more than a few bucks off the high price of tuning in.

❖ Buy From a Dealer

Before you buy your next radio or antenna from e-Bay(!) or that guy at the local ham-fest operating out of the back of a rusted-out pickup truck, give a reputable dealer a break. All radio mail-order catalog companies offer big discounts on used equipment, demos, or merchandise returns. And, unlike private deals on the Internet or our friend with the pickup, these products are tested and carry a warranty. Some even offer free shipping.

How does a company wind up with these items in the first place? By offering customers an equitable returns policy, offering to buy used equipment on trade-ins, and selling off the items which have been on display in their showrooms. Old customers appreciate the service, new customers get a great deal on something they might not otherwise be able to buy, and dealers develop a reputation for fairness and service. Dealers depend on repeat customers and building up a good word-of-mouth reputation. Without either they're out of business.

Here are some tips on buying:

1) Check out the list below. All of the companies listed have scores of satisfied customers who have bought items off their used, demo or returns "shelves." They back up their sales with a returns policy and offer a warranty to the new customer. It may not be the same warranty as customers who buy new in-the-box items receive, but it's far more than you'll get from most private sales.
2) Bookmark these sites and visit them often. The merchandise is often one-of-a-kind and when it's gone, it's gone. The lists change often, so if you don't find what you're looking for, keep checking in.
3) Not sure about a certain product you see listed? Get a second, third or fourth opinion on e-ham.net. This link takes you to the list of products reviewed by real hobbyists who give their honest opinions – **http://www.eham.net/reviews**. Among the products listed are scanners, shortwave receivers, transceivers, antennas, and dozens more. Read the reviews; they'll help you make up your mind.

❖ MT Beginner's Guide to Radio Bargains

Amateur Electronic Supply: 800-668-0411
Offers extensive list of trade-ins, used and demo radios, receivers, scanners, transceivers and other radio related items. Items on the used and demo lists are limited in number and can't be ordered on-line, so use their toll-free number if you want to buy. Items on the demos list may still qualify for certain manufacturer's rebates and that discount is not reflected in the listed price. It will be deducted when you buy. Download the latest lists here: http://www.aesham.com/download.shtml

Bob's Bargain Bin: 800-438-8155
Grove Enterprises' on-line catalog store features returns, trade-ins and other assorted radio bargains. Bob says these items have been thoroughly tested and are in great condition unless otherwise noted. Look for deep discounts on scanners and portable shortwave radios: http://www.grove-ent.com/hmpgbbb.html

Burghardt Amateur Radio: 800-927-4261
Sells shortwave receivers, scanners and ham gear. Has extensive list of used equipment. I found an AOR 8200 scanner for $349 on their used equipment list. Orders over $1,500 are shipped free. That's something to think about when you're considering buying an expensive transceiver. Don't forget to check out their "monthly closeouts" list: http://www.burghardt-amateur.com/Burghardt/HTML/main_frame_used.html

Cable Wholesale.com: 888-212-8295
Specializes in audio, video, computer, and coax cable with or without connectors in all lengths including bulk. Stop paying big bucks for heavily advertised "brand name" audio and video cables. This company sells top quality cable at a fraction of the cost for similar products at other vendors. As a TVRO/videophile I've bought 35' of video component cable for HDTV for $32 and 50' of premium S video cable for $32. You can't even find video cables this long at any price at most electronics stores: http://www.cablewholesale.com/index.php

C. Crane: 800-522-8863
Has extensive list of "orphaned" products at substantial discounts including many items which have been reviewed in MT. I found everything from portable shortwave radios to battery chargers; satellite radio receivers to AM antennas; clocks, bug detectors, metal detectors – you name it! Free ground shipping on orders over $25. 30 day return policy on every product sold: http://www.ccrane.com/orphans.aspx

Crutchfield: 888-955-6000
Has extensive list of brand name home electronics including satellite radio, hi-fi and stereo gear. Has "scratch and dent" department for customer returns at discount prices. Follow this link: http://www.crutchfield.com/S-xvnl7dRUaPW/cgi-bin/ProdMenu.asp?c=4&cc=07 If you're ever near their retail outlets in Harrisonburg and Charlottesville, Virginia, you can browse the seeming endless aisles of electronic products in their massive scratch and dent department for really great bargains.

If you looked when I did you could have bought this Sangean ATS818A portable shortwave radio with built-in cassette recorder, special mods and saved $80 off the regular catalog price! (Courtesy: C. Crane)

Dave's Web Shop
Seen every month in MT's "Stock Exchange" page, Dave not only has big

This Onkyo TX-SR503 receiver with 7 channel Dolby® Digital EX, DTS-ES, and Pro-Logic IIx was a full $40 off the discount price at Crutchfield.com and $70 off the price of some on-line "discount" stores. (Courtesy: Crutchfield)

dish satellite TV equipment but some radio bargains as well. Check out the Kaito KA007 analog portable which tunes AM/FM/TV/SW and has the ham radio 2 meter band. What's more, it has solar panels and a hand crank dynamo for power! The price is $33.95. No phone number available. For more info: http://www.daveswebshop.com

Among the electronic mole repellers and Reagan silver dollars I found this AM/FM/WX/TV band crank-up portable radio at Heartland America for $19.95. Once you buy from them you'll get new catalogs every couple of weeks. (Courtesy: Heartland America)

Heartland America: 800-229-2901
Specializes in a wide range of manufacturers' refurbished products. A lot of these products are not worth the landfill space it takes to bury them, but some products are really great and the prices are rock bottom. Look for big discounts on refurbished shortwave radios. Go to their website: http:www.heartlandamerica.com – click on "electronics," then click on the category you want to check out. I found a factory refurbished Grundig Yacht Boy 400 PE for $99.99.

I found this reproduction "antique" transistor radio from Overstock.com for $24 among other portable radio jewels while sifting through pages of MP3 players. (Courtesy: Overstock.com)

Overstock.com
This well-known web site lists just about everything imaginable. Go to http://www.overstock.com and click on "electronics." Now you're confronted with a huge array of possibilities – if you're looking for audio you'll have to dig through piles of MP3 players to find a couple of nuggets. I found a desktop Midland All-Hazards SAME radio for $39.99 marked down from $99.99; a pair of 900 MHz wireless stereo headphones for $39.99 marked down from $89.99. All orders must be done online.

Universal Radio: 800-431-3939
Long-time mail-order supply house dealing in ham, SWL and scanner gear. Check out their extensive list of used radios here: http://www.universal-radio.com/index.html I found portable and table top shortwave radios and a list of "discontinued wideband" receivers, including models from Alinco, AOR, Kenwood, Icom and Yaesu. Used items carry a 60 day limited warranty. Shipping is extra.

This Grundig Satellit 800 receiver is sold widely by many retailers and via the Internet, but, when I checked into Universal Radio's web site they had a limited number of reconditioned units for just $399.95. That was $50 off their sale price, $100 off their regular price and $300 off list! It pays to check in often. (Courtesy: Universal Radio)

All examples of products listed in this article may or may not still be available. They serve as examples of what I found when randomly checking into each listed site. If you've been considering buying new radios for your listening post but have balked at the prices, I hope this helps.

Maybe you've done some "web crawling" yourself and run into some great radio bargain sites you like to share with the rest of us. If so, just zip me an e-mail with the details and I'll let the rest of us beginners know in an upcoming issue of *MT*.

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Getting Started

Ask Bob

Bob Grove, W8JHD
bobgrove@monitoringtimes.com

Q. *Will an ordinary light bulb work as a dummy load for a transceiver, and why does a dummy load have to be non-inductive? (Gabe, Glen Ellyn, IL)*

A. For most applications, yes, a tungsten-filament light bulb will work fine as a dummy load to absorb the transmitter's power for test purposes. The problem is that most of these filaments are actually a fine, helically-wound coil, and they therefore have inductance – and there's the rub.

Inductance has reactance – an opposition to the flow of radio-frequency power produced as the coil's magnetic field builds, then collapses with the frequency of the signal, producing a counter-voltage of its own. Such power reflections produce high standing waves on the line which can damage sensitive output transistors. Such experiments are best conducted at low power.

This is an oversimplification, but it's essentially the answer you're looking for.

Q. *What is the easiest way to raise and place the ten-foot sections of a tower as it is erected? (James Ashe, St. Petersburg, FL)*

A. The easiest way is to let someone else do it, but somehow I don't think that's the answer you're looking for! The most common rigging for this is called a gin pole, a rugged pole with a pulley on the top. It is braced to and erected above the top of each successive section with a cable running through the upper pulley to elevate the next section of tower as that cable is pulled by others on the ground. An excellent web site demonstrating this and suggesting sources is: **http://www.w9iix.com/ii00008.htm+gin+pole&hl=en**

Since gin poles cost several hundred dollars, if you can't find a local ham club with a member that has a gin pole, it may be just as economical to locate a crane outfit and have them lift the completed tower after it's assembled on the ground. That's what I did!

Q. *I'm new to the hobby and would like to buy a WiNRADiO. Will signals be stronger if I'm closer to the transmitter? (Shawn, email)*

A. As with any source of energy, the closer you are to a radio transmitter, the stronger its signal will be. While a good receiver is a great start, a good antenna is a mandatory accessory. While you could theoretically stick a paper clip into an antenna jack and hear something, an antenna on your roof is going to be a whole lot better!

Antennas are critical choices. A long wire (30-50 feet) will work fine for listening to worldwide shortwave signals, but won't work worth a hoot at the higher frequencies where you will want to hear police, fire and aircraft. On those frequencies you will need shorter antennas. Since the WiNRADiO covers this entire spectrum and more than 99% of anything you would ever want to hear, you need to concentrate on the best antenna(s) to do the job.

Q. *Can scanners hear the audio from digital TV signals? (Ronald Blocker, K9JON, Glenwood, IL)*

A. Not at this time, because the only digital audio which is decoded by scanners is the lowest privacy level of APCO Project 25 (P-25). However, any scanner manufacturer who would like to offer DTV audio decoding could legally do so.

Q. *I would like to use a Nil-Jon mobile antenna at 467 MHz. Can I simply mount it on a pole, and should I shorten the elements? And is mobile CB cable good enough for the job? (Howard H., email)*

A. At these ultra-high frequencies, you need low-loss coaxial cable if runs are in excess of a few feet. This means either RG-6/U (outdoor TV coax), mini-RG-8/U (RG-8/M or X), or more expensive and harder to use RG-8/U foam dielectric. Mobile coax (RG-58/U) is lossy at these higher frequencies and some of your power will be wasted simply heating the coax.

Theoretically, a basic antenna is a center-fed, half-wave dipole. It provides the nominal 50 ohm impedance match to the transmitter. Since that is computed by dividing 5616 by the frequency megahertz to get the length in inches, at 465 MHz, that's 12 inches – 6 inches on each side of the coax connection.

In a mobile installation, a 6-in. whip – half the dipole – is connected to the center conductor of the coax. The conductive metal roof of the vehicle supplies the missing element; it's actually capacitively coupled to the shield by the magnetic base, otherwise you would have to physically connect the coax to the car roof.

Interestingly, a half-wave dipole also matches the approximately-50-ohm impedance on its third harmonic, thus the 18-inch element lengths on your Nil-Jon; coincidentally, that length is just right for operation in the 150 MHz range. That's why the Nil-Jon is a dual-band antenna.

So why would the Nil-Jon work better than a 6-inch antenna at 462/467 MHz? Because the longer antenna elements provide a slight directional pattern toward their ends, thus accounting for the tilt so that the ends point more toward the horizon. This equates to gain over the simple 6-inch whip.

And remember, in radio communications, a high, outdoor antenna is the key.

Q. *How did 50 and 75 ohms become standardized as antenna impedances in radio communications? (Shirin Bahrami Rad, Sweden)*

A. These standards were set many decades ago, based on two major considerations: 50 ohms provided the most efficient match for transmission through coaxial cable (current-carrying capacity versus losses in the cable), while video reception (voltage levels rather than current) efficiency was better at 75 ohms.

The second reason was that a basic, half-wavelength, dipole antenna in free space has a 75 ohm feed-point impedance; it's a little lower in typical terrestrial installations (more like 50 ohms). Similarly, TV antennas with their multiple-element arrays are closer to 75 ohms, and 300 ohm dipoles are easily matched with 4:1 balun transformers (300:75 ohms).

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

Getting Started

Bright Ideas

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As I write this column, my monthly issue of *Monitoring Times* just arrived in my P.O. Box. I always read it cover to cover. Yes, I even read all those little ads in the back pages. I use the colorful, little pop-up flags to mark interesting pages. Pop-up flags are available at any large office supply store or on their internet site. If I find something that I need for constant reference, like a good list of frequencies for my area, I can make a photocopy, tear the page out, or pen the article title and page numbers on the front cover.

How many times have you spent valuable time thumbing through old copies of *MT* looking for that article that you need? Perhaps the dog ate your copy, or the spouse threw it out by mistake, or a friend failed to return it. There is a better option. Have you tried the electronic downloadable version known as *MT Express?* You can download a **FREE** sample at **http://www.monitoringtimes.com/MT/index.html**. If you like it, you can subscribe, or convert your current print subscription, or add it (at a substantial discount) to your existing paper copy.

What are the advantages to the electronic version of *MT* in Adobe Acrobat Reader® PDF format? It is in full color, most notably the photos. *MT Express* is searchable for a particular word, phrase, three letter acronym (e.g., FBI, or FAA), or even a specific radio frequency. You can store it forever on your hard drive or archive it on a writable CD. It is a portable, flexible resource that is available to you on a 24/7 basis. You can print it out in its entirety, or print just the page or photo you need. You can use the edit tools, like enlarge, to tweak it to your needs.

Keep in mind that *MT* is copyrighted material, not for distribution. Make certain you have the most recent version (7.01) of Adobe Acrobat Reader for best results. The download for the reader is absolutely free at **http://www.adobe.com/products/acrobat/readstep2.html.**

Speaking of *MT*, I have noticed that there are often "bright ideas" hidden in other columns. I take out my yellow highlight pen and mark them. Then I add them to my master list of bright ideas. No, I don't steal or reuse it, unless I feel it is a real gem worth repeating. Sometimes I think up another version that's better yet!

I have always looked carefully at the photos used throughout *MT*. These days I use a magnifying glass to look for small, minute details that are not easily noticed, especially on shots of someone's shack. For example, in the June 2005 issue on page 60, Skip Arey's **On the Ham Bands** column, are before and after photos of a ham shack makeover. Using *MT Express* in Adobe Acrobat Reader©, I can enlarge the *color* photo for easier viewing or printing in high resolution.

Past editions of *MT* are available as a yearly Anthology on CD (**http://www.grove-ent.com/mtanthology.html**) Search the whole year of *MT* for your desired topic! Note that current subscribers get a $5 discount off the CD. If you are viewing *MT* with Acrobat Reader, you can just click on the URL, and you will be taken to the site automatically, assuming you have your internet connection running. Now that's more than just a bright idea, that is just way cool!

I recently stumbled upon some really good websites with radio related information. The first two have a number of downloadable documents and PowerPoint© presentations related to ham radio that you can download for free. Start with **http://www.arrl.org/FandES/ead/materials/videos.html**; look under the heading "Microsoft PowerPoint Presentation." Then try **http://www.microhams.com/softcontent.aspx?scId=9**. Go to the left side column under "Resources." then click on "Education." There are so many other internet sites that I suggest you do an internet search for "Ham radio PowerPoint presentations." I recommend you do a second search substituting the word "amateur" for "ham."

If you don't have a copy of Microsoft's PowerPoint© software, you can download a **FREE** viewer at **http://www.microsoft.com/downloads/details.aspx?FamilyID=428d5727-43ab-4f24-90b7-a94784af71a4&displaylang=en**. Besides for self study, these presentations can be used at club meetings, in the classroom, or to introduce non radio type people to the magical world of amateur radio.

Do you monitor wildland fires? You can get on the free e-mailing list of the daily NIFC report. Go to **http://www.nifc.gov/information.html.** You can find some good fire radio information at this URL: **http://www.fs.fed.us/fire/niicd/docs/icfs.doc**. Click to download and save it. It is a short article and a quick download of about 30 seconds.

For rail fans, check **http://westernrailroads.com/**. The webmaster is Marlin Thorman. He is an 11th grader with a gift for photography, website creation, and management. Marlin lives just south of Spokane and has a real passion for trains. He would love to hear from you with comments or questions about his website.

First responders should check these out: **http://www.esar.org/24packlist.html**, and **http://www.nasar.org/garmin/product_info.php?cPath=24&products_id=184**. Once there, you can click on "NASAR STORE," then bookstore. From that page, look at the left hand column for specialty areas, and products.

I like to be intimately familiar with the agencies I monitor, for example, the Spokane, Washington, Fire Department. You can check their website at **http://www.spokanefire.org/stations.htm**. I downloaded and printed a high resolution copy of their map of fire stations and districts. As always, when I have a document I use daily, I protect it by placing it in a clear plastic sheet protector. The website also lists the equipment at all stations, and how many and what type of calls they responded to in 2003. (That was the last year for which statistics were available.)

While visiting the administrative headquarters, I noted the building was controlled like a police station. Visitors speak through an intercom to a front receptionist. After you receive clearance, you are "buzzed" through a heavy secure door. In fact there are two doors! Administrative personnel wear tiny, wireless earpieces that allow them to answer their phone anywhere in the building. They can dial with voice commands; even check the whereabouts of their colleagues in the building. You have to really appreciate the high technology, and how public safety agencies have embraced these new gadgets.

I have an update on the Radio Shack Pro 2051 I mentioned last month. I bought mine on sale for only $150 – a $50 savings. This practically paid for the RS Pro 83 hand held that I bought at the same time for $80. Thus, the second radio just cost me $30! The Pro 2051 and the Pro 83 have the biggest and brightest orange backlight, bar none. Even the keypad is brightly backlit. There's no trunking on the Pro 83, but it will scan conventional 800 MHz. The Pro 51 with 1,000 channels scans three types of trunked systems.

I am really pleased with these inexpensive scanners. I suggest you do some research and visit **http://www.radioshack.com/**. In the left hand column, click on "Phones and Radio Communications," then, under Radio Communications, click on Scanners, then Metro Scanners. Several are listed: click on Pro 2051 and/or Pro 83. Download info and/or the Owners Manual.

Below is my programming strategy for the Pro 83 with 10 banks of 20 channels. In my word processor, I type up my list in small 8 point type size and tape it to the outside of the back battery cover. I cover this with clear Scotch™ tape to protect the bank label from showing the certain signs of wear and sweaty fingers.

1. Local PD & SO
2. WA. State Patrol
3. Spokane Int.Airport
4. Local Fire
5. Local EMS
6. State DNR Fire
7. BLM, USFS
8. TV Media
9. Fairchild AFB
10 Fairchild AFB

I hope you noticed all the FREE ideas in this month's column. You can look forward to more (free) bright ideas next month.

Dan Veeneman
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Radio Interoperability

The ability to communicate quickly and clearly is critical during emergencies. Public safety agencies rely on their radio communication to provide an immediate link for responders and support personnel.

But what happens when multiple agencies respond to a major emergency event and discover that they cannot communicate with each other?

Dan,

I was wondering what is Public Safety Radio Interoperability and how does it work? The county I live in (Dawson County) and approximately 10 other counties are proposing a system so that all 11 counties can communicate with each other during a time of emergency. Currently none of the counties are able to communicate with each other, since they all use different frequency bands.

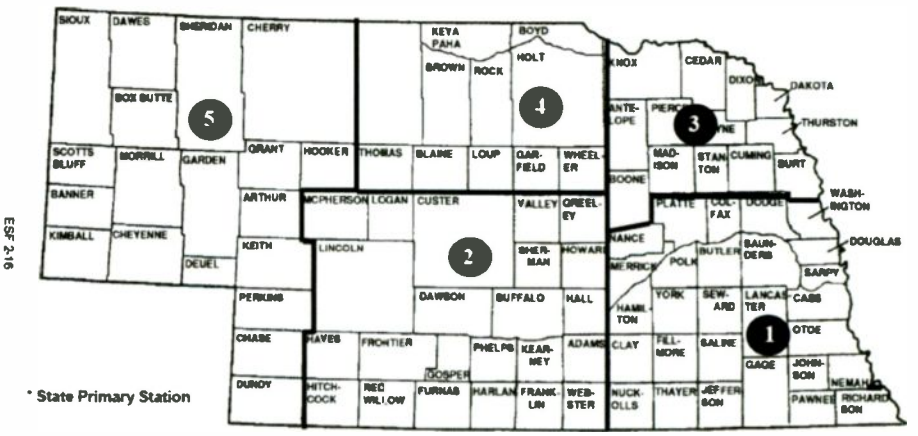
Bradley in Lexington, Nebraska

Dawson County is located in south central Nebraska and is home to about 25,000 residents. The county seat is the town of Lexington, located about 220 miles west of Omaha.

The Dawson County Sheriff's Office has 15 officers, 18 cruisers and about two dozen staff members in total. Six troopers and a sergeant from the Nebraska State Patrol are based out of the Dawson County Law Enforcement Center in Lexington. Troop D of the Nebraska State Patrol has an office in North Platte, which is responsible for covering 23 counties with 55 law enforcement officers.

Despite its mostly rural character and relatively small population, Nebraska faces

Nebraska Emergency Alert System Operational Areas



the same kinds of problems the larger cities and states face – how to make it possible for different agencies and services to communicate with each other during a crisis.

Interoperability requires more than technical compatibility. Just because everyone uses the same radios on the same frequencies, that doesn't mean that everything works smoothly.

What agencies are discovering is that they need a plan, and they need to place one agency or organization in charge of making decisions. This "lead agency" for state-level planning in Nebraska is the Emergency Management Agency (NEMA). One of NEMA's duties is to work with local and state agencies to develop regional communication systems that are able to interconnect during emergencies. This includes settling on a set of standard radio capabilities – at this point APCO Project 25 digital radios and repeaters – as well as coordinating frequency usage and other resource sharing.

Sometimes these planning efforts produce results that are tangible and obvious, like last year when the Nebraska State Police put into service a 40-foot, $500,000 mobile command post, purchased with money from the federal Department of Homeland Security. The vehicle comes equipped with two dispatch positions, multiple work station locations, a galley, and even hostage negotiation areas. A 25-foot telescoping mast and extendible antennas provide communications links during local or statewide emergencies.

During major emergencies, the Nebraska Emergency Communications Center would be activated. It is housed in the State Emergency Operating Center at 1300 Military Road in the state capitol of Lincoln. The facility has three antenna towers – two of them 60 feet tall and one 140 feet high – to communicate with local, state and federal agencies.

Other times, the outcome of planning efforts is not so obvious, but is critical to achieving interoperability. NEMA has developed a State Emergency Operations Plan (SEOP) with three primary purposes:

1) "Plan and coordinate communications support to state and local response efforts before, during, and immediately following a Governor's emergency proclamation."
2) "To coordinate the communications assets (both equipment and services) available from state agencies, voluntary groups, local agencies, the telecommunications industry, and federal government agencies."
3) "To manage state communications resources."

Note the emphasis on planning and coordination. Also notice that this work is done *before* an emergency. The hope is that if and when an actual emergency does occur, all of the challenging decisions have already been made, final plans are already in place, and everyone already knows what to do.

❖ Nebraska Statewide Public Safety

Low band operations are active across

the state, including the following common frequencies:

Sheriff..... 39.90 MHz
Fire..... 39.98 MHz
Medical..... 39.82 MHz
Nebraska State Patrol..... 42.30and42.46 MHz
Nebraska National Guard ...38.50, 38.60, 38.70 and 38.80 MHz

During emergencies, whether drills or the real thing, you might also be able to hear activity from one of the two State Emergency Management portable repeaters that operate in UHF:

1) 30-watt Tx on 453.650 and Rx on 458.650 along with 20 two-watt handhelds
2) 25-watt Tx on 453.725 and Rx on 458.725 along with 20 two-watt handhelds and 4 twenty-five watt mobiles

❖ Kansas

The state of Kansas is trying to improve interoperability by offering local public safety agencies the opportunity to make use of the existing Department of Transportation (DOT) 800 MHz repeaters. At present only DOT and the Kansas Highway Patrol use the state's 76 repeaters, most of which are configured for conventional (non-trunked) operation.

By using the existing infrastructure and a common set of radio frequencies, the state hopes to be able to save time during the first moments of an emergency by enabling first responders to directly coordinate efforts to save life and property. Without such commonality, public safety agencies would fall back on their existing equipment, much of which is incompatible with neighboring systems. This patchwork of different frequencies, different radios and different procedures, developed and built independently for each agency over the years, makes mutual aid coordination much more difficult and time-consuming than it should. The Kansas Highway Patrol points to the fire at Fort Scott in March as an example of what happens when interoperability plans and equipment are lacking.

The state is starting the process by spending $16 million on repeater and antenna upgrades in 17 counties in the southeastern part of the state. Additional improvements will be put into place as federal Homeland Security money comes in, including funding for new radio equipment.

Not everyone is ready to take advantage of the opportunity. For example, Douglas County and the city of Lawrence, located just to the southwest of Kansas City, operate an analog Motorola Type II system that is working just fine. Although the county recognizes the advantage of being able to talk with adjacent counties, they do not have an immediate need to join the statewide network – especially when the price tag for the county to do so is about $7 million.

The Douglas County/Lawrence system operates on six frequencies, 866.8125, 867.0875, 867.4500, 867.8000, 868.0750 and 868.9875 MHz. County, City, and University of Kansas Police share the system and are easily able to communicate with each other directly.

Decimal	Hex	Description
17680	451	Lawrence Police (Secondary)
17744	455	Lawrence Police (Detectives)
19216	4B1	Sheriff and Lawrence Police (Dispatch)
19248	4B3	Sheriff (Secondary)
19280	4B5	Sheriff (Jail)
19312	4B7	Sheriff (Courthouse)
20816	515	University of Kansas Police (Dispatch)
20848	517	University of Kansas Police
22416	579	Juvenile Detention Center
28816	709	Shawnee County (patch)
33616	835	Lawrence/Douglas Co Fire & Medical

Some other conventional frequencies:

44.94 Kansas Highway Patrol
44.98 Kansas Highway Patrol
45.14 Air Support
154.830 Kansas Turnpike Authority

❖ Montana

The state of Montana is taking the first steps to bring up what will eventually be a statewide digital radio system. If all goes as planned, by the time you read this, Lewis and Clark County in western Montana will be the first to operate on the new system. The county covers nearly 3,500 square miles and is home to the state capitol of Helena.

The $5.9 million system provides coverage to 99 percent of the county, greater than the original goal of 95 percent and far better than the 50 percent achieved by the old analog system. The Sheriff, Helena and East Helena Police Departments, and the Montana Highway Patrol will all make use of the new system. In the future it will be linked to another system in the northern part of the state, and it eventually spread to cover the entire state. As with many of these systems, funding came from the federal government. Another $2 million, raised from state and federal grants, will be used to increase the coverage at the northern end of the county.

A check of the FCC database shows seven repeater sites across the county, with the following frequency assignments:

Town	Location	Frequencies
Helena	County Sheriff's Office	159.120, 159.285, 159.450, 159.465
East Helena	Police Department	154.355, 156.240
Canyon Ferry	Hogback Mountain	155.610, 159.330
Marysville	Belmont Mountain	155.415, 156.105, 159.255
Fort Harrison	MacDonald Pass	154.340, 158.925, 159.315
Wolf Creek	Sunset Mountain	155.190, 155.355, 159.390
Wolf Creek	Wirth Ranch	156.105, 156.195, 158.925, 159.000

With such a new system I don't have any talkgroup information, so any readers in or traveling through Lewis and Clark County, please let me know what you discover. I do know that it uses APCO Project 25 standards, so you'll need a digital-capable scanner in order to monitor transmissions.

The existing analog system, built in 1985, will continue to operate for some time even after the new system is in place. The FCC lists a number of VHF frequencies licensed to the Lewis and Clark County Sheriff's Department, including 151.115, 151.145, 151.160, 151.205, 151.235, 151.280, 151.295, 151.310, 151.325, 151.355, 151.385, 151.445, 153.845 and 153.920 MHz. You may also wish to add the following frequencies to your scanner while in the area:

155.220 Search and Rescue (statewide)
155.520 Search and Rescue (Lewis and Clark County)

❖ FCC Paperwork

It appears that government officials in Delaware County, Indiana, failed to file the proper paperwork with the Federal Communications – and as a result will have to vacate seven frequencies that they've been using for 15 years.

Last year the FCC underwent a clean-up of their public safety radio frequency assignments, sending letters and notices to thousands of agencies across the country, asking them to confirm and in some cases justify their use. For Delaware County, their letter requested an explanation for the continued use of frequencies that were not normally assigned to public safety agencies. Apparently the county failed to respond, and as a result, the FCC reassigned those frequencies for use by two public utility companies. Barring an appeal or other delay, Delaware County has until the end of the year to stop using seven of the eight frequencies it currently uses.

Delaware County lies in east central Indiana and the city of Muncie, population 67,000 is the county seat. Muncie is home to Ball State University, perhaps most famous for being the alma mater of comedian and late night talk show host David Letterman.

The current Motorola Type II system operates analog voice on the following frequencies: 855.7375, 856.8875, 857.8875, 858.8875, 859.8875, 860.8875 and 868.7750

MHz. The primary repeater is located in Muncie at the corner of 18th and Rochester Streets.

Sometime before the end of this year, after the repeater equipment and as many as a thousand portable and mobile radios are reprogrammed, you should expect to hear the system move to the following frequencies: 855.7375, 866.0500, 866.2250, 866.3125, 866.6000, 867.1000, 868.2625 and 868.7750 MHz.

Talkgroups on the system are not expected to change.

Decimal	Hex	Description
48	003	County EMS (Dispatch)
80	005	County EMS (Tactical)
4144	103	Muncie Fire (Dispatch)
4176	105	Muncie Fire (Fireground 1)
4208	107	Muncie Fire (Fireground 2)
4240	109	Muncie Fire (Fireground 3)
8240	203	Muncie Police (Dispatch)
8272	205	Muncie Police (Tactical)
8304	207	Muncie Police (Detectives)
9648	25B	Ball State Police (Dispatch)
9680	25D	Ball State Police (Investigations)
9712	25F	Ball State Police (Special Events)
9808	265	Ball State Police (Tactical)
12336	303	Sheriff (Dispatch)

Much of the county activity outside of Muncie occurs on VHF, including on the following frequencies:

Frequency	Description
151.040	Sheriff Tactical
154.190	County Fire (Dispatch)
154.890	Sheriff (Car to Dispatcher)
155.085	County Emergency Management
155.130	Sheriff (Dispatcher to Car)
155.220	County Emergency Medical Service
155.475	Indiana Law Enforcement Emergency Network (statewide)
155.595	County Fire
155.655	Sheriff Dispatch

❖ Antennas for Digital Reception

Dan,

I was wondering if there are any antennas out on the market that can pick up digital frequencies yet. I have the PRO-96 digital scanner and I have used the 800 MHz 9-inch antenna from Radio Shack but was not very happy with it. I saw the Diamond RH77CA mentioned on your web site and I was impressed with the looks, but looks don't mean anything. I was wondering if you could give me some advice on what antenna to use or if anyone has come out with a digital antenna yet. I was thinking of trying the Diamond RH77CA. Could you tell me what you think of it?

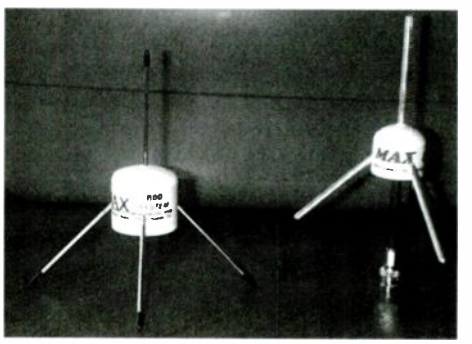
Jim, via the Internet

Digital signals are primarily in the 800 MHz band, although more and more systems are popping up in the 450 MHz range (agencies in Delaware and New Jersey, for instance) and even in the 150 MHz bands (South Dakota and Alaska, to name two).

I'm a little surprised to hear that you weren't happy with the nine-inch Radio Shack antenna (part number 20-034). It performs better than the stock antenna that comes with the scanner and certainly helps in pulling in weak or distant signals on most bands. You may want to check back at your local store – Radio Shack is selling a newer antenna specifically for 800 MHz, part number 20-283, which is about seven inches high. It retails for $17 and has worked well for many users.

The Diamond RH77CA is nearly 15 inches long, making it a quarter wave on 2 meters and 1/2 wave on 440 MHz. It retails for about $35 and has gotten positive reviews for "all around" performance on the various bands, but if you're intent on the 800 MHz, you might want to consider some other antennas.

Although more expensive at $40, the Seeker 800 MHz Duckie has gotten rave reviews for its performance. The antenna itself is nearly a foot long and has a stiff lower segment and a flexible upper segment. It's available through the Internet from Radioware (**http://www.radio-ware.com**).



If you're willing to try a more unusual-looking antenna, check the Max 800 from Max Systems. The three "legs" coming out of the base make it somewhat more difficult to carry around, but it will improve your reception in the 800 MHz band. It runs about $30.

❖ Uniden Scanner Upgrades

Owners of Uniden BC296D handheld and BC796D mobile scanner should be aware that there is a firmware update to correct a "Card Error" problem. According to Uniden, many customers have had problems with their scanner reporting this error.

A technician at the Fort Worth facility was finally been able to recreate the problem, and Uniden released a solution in June. The fix involves updating the firmware that controls the BCi96D decoder card. Uniden is recommending that all BC296D and BC796D owners perform the upgrade, even if they have not experienced the problem, in order to prevent it from happening in the future.

The firmware update can be found on the Uniden America website at
http://www.uniden.com/rn_productsupport_downloads.cfm?product=BC296d
or
http://www.uniden.com/rn_productsupport_downloads.cfm?product=BC796d

The update is named BCi96DVUP_V1_03.zip and is version 1.3. The web site also contains the proper procedure for performing the upgrade.

❖ New Uniden Scanner

Uniden is combining shortwave reception, broadcast, racetrack features and trunked radio scanning together into a new handheld receiver scheduled to be available this fall. The new model BR330T radio covers 100 kHz up to 1.3 GHz (except for the cellular bands) in AM, FM narrow and FM wide modes, providing continuous ("wideband") tuning. This includes the AM broadcast, FM broadcast, and television audio bands.

The radio will also carry over features from the earlier Uniden SC230 race scanner, allowing the user to scan and select specific drivers when at NASCAR and other automobile races.

The new radio has "dynamically allocated" memory, allowing the user to configure the 2500 memory slots into banks of variable size. Uniden is claiming this will allow more than 50 systems to be programmed and scanned at the same time.

Another nice feature is the "Fire Tone Out" operation. After programming, the radio will stay in stand-by mode until a fire tone-out or two-tone page is received.

It will include Uniden's trademarked "Close Call" frequency capture capability, allowing it to automatically tune to nearby signals.

It will be able to track analog Motorola, EDACS and LTR trunked radio systems, but will not be able to follow or decode digital transmissions.

Programming and control will be available through a separate cable and software.

Uniden indicates that the BR330T will come with an antenna, three internally rechargeable Nickel-Metal-Hydride (NiMH) batteries, and an AC charger.

That's all for this month. Enjoy these days of summer, and when you're inside cooling off you can send me electronic mail with your questions, comments, and latest frequencies and talkgroups to *danveeneman@monitoringtimes.com*. You can also find frequencies and links on my web site at **http://www.signalharbor.com**. Until next month, happy scanning!

Big Savings on Radio Scanners

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Frequency Coverage: 25.0000-512.0000 MHz., 806.000-823.9875MHz., 849.0125-868.9875 MHz., 894.0125-956.000, 1240.000-1300.000 MHz.

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300 Channels • 10 banks • Built-in CTCSS • S Meter
Size: $10^{1/2}$" Wide x $7^{1/2}$" Deep x $3^{3/8}$" High
Frequency Coverage: 29.000-54.000 MHz., 108.000-174 MHz., 216.000-512.000 MHz., 806.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-956.000 MHz.

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Trunk Lockout • Trunk Delay • Cloning Capability
10 Priority Channels • Programmed Service Search
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Frequency Coverage:
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Bearcat 248CLT 50 ch. base AM/FM/weather alert scanner	$84.95
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Bearcat Sportcat 180B handheld sports scanner	$139.95
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Frequency step programmable in multiples of 50 Hz.
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Price schedule effective December 3, 2002 AD #120302 © 2002 Communications Electronics Inc.

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Latest US Coast Guard Changes

It wouldn't be hurricane season if we didn't have some new US Coast Guard times and frequencies to pass along for weather and maritime safety information. This year we have quite a few of these, most of which became effective on June 15.

San Francisco

The most dramatic changes affect the East Pacific FAX from California's NMC. This is the Communications Area Master Station, Pacific (CAMSPAC). It's on Point Reyes, about an hour's drive north from San Francisco. You've already seen this remarkable coastline in dozens of car commercials.

For starters, the 12-megahertz frequency, which moved not that long ago, is moving again. The new one is 12786.0 kilohertz (kHz). As always, FAX mode is tuned in upper sideband (USB), and reads 1.9 kHz lower on most radios. Set decoders to 120 lines per minute, and 576 for Index Of Cooperation.

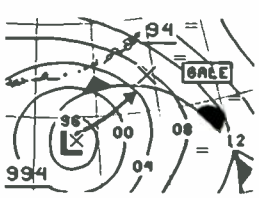
The Point Reyes transmission has also become a lot longer, with the addition of 12 new charts and 8 rebroadcasts. This has changed the time schedule. New broadcast times are 0140-0422, 0655-1019, 1120-1238, 1400-1622, and 1840-2225, and 2320-0006, all Coordinated Universal Time (UTC). Other frequencies are 4346.0 (night), 8682.0, 17151.2, and 22526.0 (day), all in kHz.

Transmitter power has been lowered from 10 to 4 kilowatts (kW), apparently to cut down interference with other stations. Landlubbers may therefore see more lines in their charts.

Other Pacific Areas

The Kodiak, Alaska FAX transmission from NOJ adds two new charts. Times are now 0400-0608, 0950-1209, 1600-1808, and 2150-0028, all UTC. Frequencies are 2054.0, 4298.0, 8459.0, and 12412.5 kHz. All transmitters are 7.5 kW.

Honolulu, Hawaii (callsign KVM70), has made some minor changes in two of its charts. There are plans in the works to add what the US government calls "an improved product suite," but meanwhile the times and frequencies are unchanged. It appears that the power has dropped to 5 kW, but "may broadcast at 10 kW at times." Frequencies (in kHz) are 9982.5 (night), 11090.0, 16135.0, and 23331.5 (night).



New Orleans (NMG) remains unchanged from its major frequency shift in 2003. It's still using 4317.9, 8503.9, 12789.9, and 17146.4 (night), all 10 kW. Its tropical product is especially relevant to hurricane season. The FAX runs a little longer at this time, sometimes cutting into the voice schedule.

Boston, as fed from NMN in Virginia, is the same except for an additional transmission of ice charts at 0438 UTC, which should not be much of a factor in late summer. Its frequencies (in kHz) are 4235.0, 6340.5, 9110.0, and 12750.0, all 10 kW. Callsign is NMF, except for NIK on the ice charts.

The detailed schedule, with all the frequencies and weather products, has been updated on this column's web site. Go to **http://www.ominous-valve.com/uteworld.html** and look for a large text file called ***uscg-fax.txt***.

USCG Teleprinter Schedule

Four Coast Guard stations broadcast text weather transmissions and interesting Maritime Safety Information bulletins a few times daily in a narrowband direct teleprinting system called SITOR-B (Simplex Telex Over Radio, Forward Error Correction mode). It's an old mode, similar to radio teletype (RTTY), but with some improvements originally designed for the maritime service.

SITOR, in its various incarnations, is still an integral part of the Global Maritime Distress and Safety System (GMDSS), and it won't be going away any time soon. It's starting to show up on more computer sound card decoders.

On June 15, the Point Reyes schedule was expanded somewhat, and also slightly shifted in time to reduce interference. The zero-zulu broadcast, which had already been pushed back five minutes, now goes to 0015 UTC. 1800 moves up half an hour, to 1735 UTC. Frequencies remain 8416.5 and 16806.5 kHz. Tuning offset varies depending on your radio settings, but often the dial will read 1.7 kHz lower.

Point Reyes also remotely keys two other Pacific stations. Honolulu (NMO) is on 8416.5 12579.0, and 22376.0 (night), at 0130, 0730, 1330, and 2030 UTC. Guam (NRV) is 12579.0, 16806.5, and 22376.0, at 0230, 0500, 0900, 1500, 1900, and 2315 UTC.

Boston (remotely keyed from NMO, VA), is on 6314.0 (night), 8416.5, 12579, and 16806.5 (day), at 0030, 0140, 1218, and 1630 UTC. 0030 and 1218 are the seasonal ice broadcasts using the NIK call.

Voice Transmissions

Voice weather broadcasts use common frequencies, and in the past there have been issues with two stations being heard at once. The new schedule is supposed to reduce interference, at least out at sea.

Some starting times have changed for Point Reyes. These are now 0430, 1030, 1630, and 2230 UTC. Frequencies are 4426, 8764, 13089, and 17314, all USB using the "Perfect Paul" speech synthesizer.

In the east, all NMN voice weather broadcasts are now simulcast by New Orleans, at 0330, 0515, 0930, 1115, 1530, 1715, 2130, and 2315 UTC. New Orleans frequencies are 4316, 8502, and 12788 kHz USB. NMN uses 4426, 6501, 8764, 13089, and 17314 kHz USB, again with Paul's dulcet tones.

The New Orleans transmitter is also used for weather FAX, which can run long in hurricane season. If this happens, the voice relay will be pre-empted.

❖ US Military on 10 Meters?

Sure looks like it. Several amateurs were puzzled by the appearance of callsigns E2A and G7X in what was definitely military-style Automatic Link Establishment (ALE) mode on 28400 kHz, in a busy part of the 10-meter ham band.

These were first thought to be amateurs trying ALE, which is perfectly legal for hams, if a bit hard on amateur-grade transceivers. Then the same net turned up with ALE on 14900 kHz, and other frequencies known to be used by the US Army and National Guard. Other calls included USA and USAAD.

USAAD can stand for a number of things, but my own stab in the dark at the present time is perhaps the US Air Ambulance Detachment of the 1/58th Army Aviation Regiment. It supports the Army's 10th Mountain Division, elements of which have served in Afghanistan, Iraq, and Djibouti.

See you next month.

Utility World

Utility Logs

Hugh Stegman
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ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
ARQ	Automatic Repeat Request teleprinting system
ARQ-E3	Single channel ARQ teleprinting system
AWACS	Airborne Warning And Control System
CAMSLANT	Communication Area Master Station, Atlantic
CAMSPAC	Communication Area Master Station, Pacific
Coq-8	Coquelet-8, French teleprinting system
CW	Morse code telegraphy ("Continuous Wave")
DEA	US Drug Enforcement Administration
DSC	Digital Selective Calling
E10a	Israeli phonetic "numbers" voice, abnormal call
EAM	Emergency Action Message
EOC	Emergency Operations Center
FBI	US Federal Bureau of Investigation
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
FEMA	US Federal Emergency Management Agency
HFDL	High-Frequency Data Link
HF-GCS	High-Frequency Global Communications System
JSTARS	Joint Surveillance Target Attack Radar System
LSB	Lower Sideband
M22	4XZ, Israeli CW weather and "numbers"
MARS	Military Affiliate Radio System
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
Pactor	Packet Teleprinting Over Radio
RTTY	Radio Teletype
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States
VFT	Voice Frequency Telegraphy
VOLMET	"Flying Weather" aviation broadcast

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 ().

2658.0 421FEMAUX-FEMA Region 3 Auxiliary, Winchester, VA, ALE sound, also 3388 and 5378, at 0244. (Ron Perron-MD)

4165.0 CIO ADF893Z645ZB-Abnormal Israeli Intelligence callup (E10a), also on 5230 and 6912, at 1950. (Ary Boender-Netherlands)

4241.0 4XZ-Israeli Navy, Haifa, message in offline-encrypted 5-letter groups (M22), then back to marker, at 1839. (Day Watson-UK)

4244.0 DAO4A-Kiel Radio, Pactor bursts identified in CW every 3 minutes, at 1828. (Watson-UK)

4250.5 HEB01-Bern Radio, Pactor bursts identified in CW every 3 minutes, at 0817. (Watson-UK)

4270.7 CFH-Canadian Forces Meteo and Oceanographic Centre, Halifax, NS, with RTTY weather followed by FAX charts, at 0006. (Bob Hall-RSA)

4320.3 MGJ-UK Royal Navy, Faslane, 3-channel VFT at 1447. (Watson-UK)

5422.5 Oceana Radio-US Coast Guard Auxiliary, checking Coast Guard stations into the District 5 Emergency Net, at 2303. (Mark Cleary-SC)

5616.0 Gander-North Atlantic air traffic net, working Northwest 44, at 0305. (Jeff Seale-KY)

5690.0 CAMSLANT-US Coast Guard, VA, working Coast Guard 2109 at 0010. CAMSLANT, working Coast Guard 6014 at 0017. CAMSLANT, working "India-3-India" at 0038. (Allan Stern-FL)

5696.0 Coast Guard 1503-US Coast Guard, working "E-City Air," Elizabeth City, at 0028. Control-Unknown station calling "General Lee," no joy at 0137. CAMSPAC Point Reyes-US Coast Guard, CA, working Coast Guard 1715, at 0144. (Rick Baker-OH) CAMSLANT-US Coast Guard, VA, working "Q-3-W" at 0255. (Seale-KY)

5711.0 NCS025-US National Communications System Regional Managers Net, working AAR1DDMARS, US Army MARS, at 1724. (Perron-MD)

5875.0 EAATS-Eastern Army Aviation Training Site, PA, ALE sound at 1845. (Perron-MD)

6347.7 FUE-French Navy, Brest, RTTY test loop at 0050. (Hall-RSA)

6348.0 FUE-French Navy, Brest, working unknown ship in 150-baud RTTY, at 1352. (Watson-UK)

6358.6 PBC-Dutch Navy, Goeree Island, RTTY channel status marker at 2214. (Watson-UK)

6360.3 MGJ-UK Royal Navy, Faslane, 3-channel VFT at 2219. (Watson-UK)

6379.0 4XZ-Israeli Navy, Haifa, CW marker at 2238. (Watson-UK)

6483.0 PBB-Dutch Navy, Den Helder, RTTY channel status marker at 0932. (Watson-UK)

6490.0 LOR-Argentine Navy, Puerto Belgrano, coded RTTY message in 5-letter groups, at 2115. (Hall-RSA)

6532.0 CO0046-Continental Airlines, HFDL position for station 04, Shannon, Ireland, at 0404. (Seale-KY)

6628.0 New York-North Atlantic oceanic air traffic net, working LTU 901 at 0043, and Delta 20 at 0215. (Seale-KY)

6712.0 CO0038-Continental Airlines, HFDL position for ground station 03, Reykjavik, Iceland, at 0239. Continental 41, position for Reykjavik, also at 0239. UP6742-United Parcel Service freighter, position for Reykjavik at 0240. (Seale-KY)

6739.0 Offutt-US Air Force HF-GCS, NE, 28-character EAM simulcast on 8992 and 11175, at 0245 and 0305. (Seale-KY)

6761.0 Skull 21-US Air Force, calling Indy 82, an Air Force Reserve tanker, at 1840. (Cleary-SC)

7650.0 R0539-US Army helicopter, calling T14AVN (1/4th Aviation, TX), ALE at 0221. (Perron-MD)

7805.0 MA1NC-New Hampshire Emergency Net, Manchester EOC, ALE sound at 1248. WPFJ625-NH State EOC, sounding at 1252. HI1LL-Hillsborough EOC, sounding at 1303. (Perron-MD)

7900.0 DORADO-Mexican military, calling DORADO1 in ALE, at 0059. (Perron-MD)

7903.5 BA1-FBI, Baltimore, MD, calling RH1, Richmond, VA, at 0349. SE1-FBI, Seattle, WA, calling AN1, Anchorage, AK, at 0504. (Perron-MD)

8047.0 HQ703N-US Army National Guard Readiness Center, VA, calling R010IN, RI, at 1508. (Perron-MD)

8100.0 DT1-Rockwell/Collins net, passing message "The slow brown fox never made it to the outhouse" to RV1, in ALE at 0358 and 0510. CO2, calling DT1 in ALE at 0351, sounding at 0430. (Perron-MD) *[New frequency for this net. -Hugh]*

8275.0 PNRN5-Venezuelan Navy, Rio Negro, calling BRIFFRI5, LSB ALE at 0014. (Perron-MD)

8420.5 CBV-Valparaiso Radio, Chile, CW identifier in SITOR-A sync marker at 0235. (Seale-KY)

8439.0 PBC-Dutch Navy, Goeree Island, RTTY channel status marker at 0915. (Watson-UK)

8460.3 MGJ-UK Royal Navy, Faslane, 4-channel VFT at 1311. (Watson-UK)

8475.5 RFVIE-French Navy, Le Port, Reunion Island, RTTY test loop at 0300. (Seale-KY)

8618.0 Unid-Two stations exchanging weather codes in CW, bad sending and no callsigns heard, at 1747. (Watson-UK)

8642.1 MGJ-UK Royal Navy, Faslane, VFT at 1317. (Watson-UK)

8646.0 VTP-Indian Navy Vishakapatnam, weather broadcast and then working VWGZ, CW at 2017. (Watson-UK)

8734.0 SVO-Olympia Radio, Greece, voice-loop marker at 0012. (Seale-KY)

8788.0 WLO-Mobile Radio, AL, voice synthesized weather and traffic list at 0303. (Seale-KY) *[Jeff calls the "female" voice "Perfect Pauline." Works for me. -Hugh]*

8906.0 Alpha Mike 1 Flight-Unknown aircraft relaying to New York for Reach 1000, who is returning to Bermuda; gave positions, and finally both were handed off to Bermuda Airport, at 2155.

(Cliff-UK)

8912.0 Coast Guard 1705-US Coast Guard HC-130, setting guard with CAMSLANT at 1235. (Cleary-SC)

8918.0 New York-Caribbean oceanic air traffic net, working KLM 662 at 2324. (Seale-KY)

8971.0 Range Control-Probable US Navy, working Fiddle, FL, on a live-fire exercise at 1144. (Cleary-SC)

8983.0 Rescue 1712-US Coast Guard over a capsized vessel off Florida, working CAMSLANT at 2245. (Seale-KY) Coast Guard 1099-US Coast Guard helicopter, radio check with CAMSLANT at 2308. (Cleary-SC)

8992.0 Reach 926-US Air Force Air Mobility Command, calling Andrews HF-GCS at 0032. (Seale-KY) Scramble-US military exercise, 6-character EAM at 1245, then same EAM from Offutt at 1255. Scramble (sounded like), taking a standby for traffic at 1304. Reach 408, attempting patch to Diego Ops via Hickam, no joy on signal, at 1328. Primitive-US military, with EAM at 1735. (Haverlah-TX)

9050.0 SVS-Mexican military, calling DIAMANTE in ALE, at 0246. (Perron-MD)

9106.0 KNY90-National Telecommunications Coordination Network, Arlington, VA, calling KNY61, Culpepper, VA, at 1708. (Perron-MD)

9295.0 ALBNY-NY National Guard, Albany, ALE calls to BUFNY, Buffalo, at 0001; CPSNY, Cooperstown, at 0200; and RVHNY, Riverhead, at 0300. SYRNY-NY National Guard, Syracuse, ALE sound at 0128. (Watson-UK)

10242.0 19C-US Coast Guard 6019 on a drug operation, setting guard with Panther (DEA, Bahamas) at 1212. (Cleary-SC)

10600.0 CORE7-Venezuelan military, Puerto La Cruz, working CGGN in ALE at 0320. (Watson-UK)

10780.0 Cape Radio-US Air Force, Cape Canaveral, FL, radio check with US Navy Red Wolf 23, at 1525. Cape Radio, patching Peach 05 (E-8C JSTARS) to Peachtree Ops (Robins AFB, GA), at 1635. (Stern-FL)

11175.0 Offutt-US Air Force HF-GCS, Offutt AFB, NE, with a 28-character EAM at 0144. (Seale-KY) Puerto Rico-US Air Force HF-GCS, Salinas, PR, attempted patch to Nellis AFB for tanker Hoist 76, also tried 13200 and 15016, too weak on all, at 1455. (Stern-FL) Force 64-Unknown US military in an exercise patch via Offutt to Little Rock, interrupted by (sounded like) Scramble for a 45-character EAM simulcast on 8992 and 15016, at 1234. Offutt, same EAM at 1245. Scramble, with a 28-character EAM, then by for traffic, at 1404. Aussie 651-Royal Australian Air Force C-130, HF-GCS patch to Travis Command Post, at 1751. (Haverlah-TX) Red Talon 71B-US military P-3C, patch via Offutt HF-GCS, NE, passing a Spare Group report to Fiddle, FL, at 2349. (Cleary-SC)

11205.0 Smasher-US Southern Command, Key West, FL, taking position from Evergreen 352 (Air Mobility Command contract transport), at 2015. (Perron-MD)

11232.0 Peach 93-US Air Force E-8 JSTARS, patch via Trenton Military to Peachtree for a gas 'n' go at Incirlik, Turkey, at 0108. Rescue 328-Canadian Forces CC-130E, on a rescue in whiteout conditions, patch via Trenton to Halifax at 1852. (Cleary-SC) Trenton Military-Canadian Forces, radio check with aircraft Challenger 17 at 1930. (Perron-MD)

11271.0 Sentry 60-US Air Force E-3 AWACS, patch via Trenton to Tinker Radar Maintenance, at 2229. (Cleary-SC)

11309.0 New York-North Atlantic oceanic air traffic net, working Air France 621 at 0100. (Seale-KY)

11315.0 NW0424-Northwest Airlines, HFDL position for ground station 04, New York (Riverhead, NY), at 1359. Virgin Atlantic flight 17, HFDL position for New York at 0106. (Seale-KY)

11384.0 CO0024-Continental Airlines, HFDL position for ground station 07, Shannon, Ireland, at 0150. Continental 22, position for Shannon at 0151. (Seale-KY)

11494.0 61A-Aircraft on drug interdiction, position for Panther at 1356. (Cleary-SC)

12437.0 ERMSAL-Brazilian Navy, Salvador, calling FLIBER, Frigate *Liberal*, at 0032. (Perron-MD)

12590.5 NMC-US Coast Guard CAMSPAC, Pacific satellite image FAX at 0300. (Seale-KY) *[Replaced 12730; now moved again to 12786. -Hugh]*

12596.0 RLK7-Arkhangelsk Radio, Russia, traffic list in 3rd-shift Cyrillic SITOR-B, at 1400. (Watson-UK)

12788 NMG-US Coast Guard, New Orleans, with FAX tropical weather chart showing first East Pacific depression of the season *[Became Adrian -Hugh]*, at 0019. (Seale-KY)

13276.0 N584HA-Hawaiian Air flight 10 (a 767), getting Los Angeles arrival information "India" from ground station 01, Dixon, CA, HFDL at 1542. (Hugh Stegman-CA) NW0780-Northwest Airlines, HFDL position for ground station 01, San Francisco (Dixon, CA), at 2046. Northwest 576, HFDL position for San Francisco at 2052. (Seale-KY)

13315.0 VS0017-Virgin Atlantic, HFDL position for ground station 13, Santa Cruz, Bolivia, at 0158. FedEx 3, HFDL position for Santa Cruz at 0201. (Seale-KY)

13444.0 RFQP-French Forces, Djibouti, ARQ-E3 idler at 1510. (Hall-RSA)

13503.6 KRC82-Unknown US embassy, calling KRC81, also 18248.6, ALE at 1252. (Perron-MD)

13886.2 Unid-Moscow Meteo, clear FAX charts at 1540. (Hall-RSA)

13907.0 Hammer-US Customs, CA, leaving Parkhill scrambling to call Omaha 6CS in the clear, at 2305. (Cleary-SC)

13927.0 Baton 54-US Air National Guard Commando Solo EC-130E, MARS patch to Baton Ops (PA), declared in-flight emergency for bad number 1 engine, at 1705. Peach 94-US Air Force E-8C JSTARS, morale patch on return from Europe, at 1734. (Stern-FL)

14396.0 ELPASO-El Paso EOC, TX, ALE sound in an unknown emergency net, at 1425. TYLER-Tyler, TX, EOC, sounding at 1942. Arlington, TX, sounding at 1944. TEMPLE-Temple, TX, sounding at 2228. (Perron-MD)

14582.0 BR1-Brazilian Army headquarters, Brasilia, calling MS1, Manaus, ALE at 0127. (Perron-MD)

14900.0 G7X-Possible US Army, calling E2A in ALE, at 1519. (Perron-MD) *[Similar non-ham military traffic has been copied in the 10 meter amateur band. ?? -Hugh]*

15867.0 16C-US Coast Guard 6016, position report for Panther at 0015. (Cleary-SC)

15988.0 DDK7-Hamburg Meteo, RTTY weather codes at 1521. (Hall-RSA)

16283.6 KMN94-US State Department, FL, calling WNG 751, ALE at 1127. (Perron-MD)

16351.7 RFFD-French Ministry of Defense, Paris, ARQ-E3 idler at 1719. (Hall-RSA)

16822.0 Unid-Station with long SITOR-A message in Spanish, gone without giving call at 2221. (Watson-UK)

16927.0 UIW-Kaliningrad Radio, Russia, RTTY navigation warnings at 1005. (Watson-UK)

16951.0 6WW-French Navy, Dakar, Senegal, RTTY test loop at 1515. (Hall-RSA)

16951.5 6WW-French Navy, Dakar, Senegal, RTTY test loop at 1013. (Watson-UK)

17010.0 ERMSAL-Brazilian Navy, Salvador, calling NAESPO, carrier *Sao Paolo*, at 0004. (Perron-MD)

17020.0 UDK2-Murmansk Radio, Russia, working UDAA in fast CW, then *Kirowakan* in RTTY, at 1037. (Watson-UK)

17069.6 JJC-Tokyo Radio, with a Japanese Kyodo newspaper in 60 line-per-minute FAX, at 1640. (Watson-UK)

17147.0 URL-Sevastopol Radio, Ukraine, CW marker and fast traffic, at 1533. (Watson-UK)

17206.1 IAR-Rome Radio, Italy, CW marker at 1557. (Watson-UK)

17466.0 49F-Chilean Navy, sounding in LSB ALE, at 0047. (Perron-MD)

17982.0 HERMES-Brazilian Air Force, Brasilia, ALE sounding at 0013. (Perron-MD)

18183.4 7RQ20-Algerian MFA, Algiers, long Coq-8 message in French text at 1524. 7RQ20, relaying a Coq-8 message in French from Harare, Zimbabwe, at 1639. 7RQ20, Coq-8 message in French from Abuja, Nigeria, at 1641. (Hall-RSA)

18334.7 Unid-Egyptian MFA, SITOR-A idler at 1759, then Arabic signoff at 1759. (Watson-UK)

19969.0 AF6-US Air Force C-20, ALE sounding at 1931. (Perron-MD)

24526.0 481FEMAUX-FEMA Region 8 Auxiliary Station, ALE sound, also on 14776, 15708, and 17519, at 0033. (Perron-MD)

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ALE Refresher

Resources:

HF ALE Clips	http://rover.vistecprivat.de/~signals/TABLES/ALE.HTML
PC-ALE	http://www.chbrain.dircon.co.uk/pcale.html
Multimode	http://www.blackcatsystems.com
UMC ALE Database	http://www.chace-ortiz.org/umc/identa.html
UMC ALE Networks	http://www.chace-ortiz.org/umc/alenets.html
ALE Handbook	http://www.its.bldrdoc.gov/pub/oa-rpt/hf-ale/handbook

Mike Agner, maintainer of Utility Monitoring Central's hardware and software decoder page emailed a gentle nudge to me about a refresher for readers on the subject of ALE (Automatic Link Establishment). So here goes...

❖ What is ALE?

ALE is actually a generic term for any form of Automatic Link Establishment over a radio circuit. It is a way of automatically managing the setup, maintenance and closedown of a radio communications link without the intervention of a human operator.

The most common form of ALE (in fact so common that it is often used as a synonym for ALE itself) is the MIL-STD-188-141A standard. There are, however, many other forms of HF ALE including: ALIS (Rohde & Schwarz radios), Chirp (Codan radios) and Autocall (Tadiran radios).

Since it is the most common form of ALE, we'll concentrate our descriptions using the 141A terminology, though the same principles apply to many other proprietary systems.

The 125bd 8 tone MIL-188-141A signal is very distinctive when heard on-air and may be likened to a burbling or gurgling sound. As ever, you can find an audio clip on the Digital Signals website (See Resources). The majority of transmissions are centered on a whole kilohertz point using a USB filter.

PC users can decode ALE using Charles Brain's excellent and free PC-ALE program. Mac users should opt for Black Cat Systems' Multimode.

❖ How does ALE work?

All ALE systems use a computerized link processor that is connected to, or built into all the radios in a network of stations. These processors have knowledge of a couple of basic parameters of the network.

First, they are programmed with a unique address or identifier by which the station is known, in addition to the addresses of the other stations in the network. Addresses may be cryptic, like BFG or 00001212, or more meaningful, like DAMASCUS.

The link processor is also programmed with a list of channels on which the network operates. Depending on the operator of the network, these channels may be long-term fixed frequencies or – in more security-conscious organizations – regularly changing. Link processors regularly scan all frequencies looking for transmissions that are intended for it or for all stations on the network.

Using this basic address and channel information, the link processors are able to accomplish all of the key aspects of an ALE-enabled network.

❖ Communications Quality Measurement

In most networks, the link processors regularly send out short transmissions to each or all nodes in the network to determine the quality of the communications on any or all of the channels allocated to the network.

In 141A parlance, a link check between two stations is called an LQA or Link Quality Assessment. A more general broadcast transmission by any station allowing others to assess prevailing conditions is called a Sounding.

Most ALE decoders display these types of messages, showing TIS (This Is) or TWS (This Was) codes and the station address (in the case of soundings), and perhaps also displaying the signal quality information that is embedded in an LQA between two stations.

❖ Setting Up the Link

When the operator wants to speak or when a modem needs to pass data across the network to a specific station, they/it no longer need concern themselves about which frequency to select, or which of several usable frequencies might provide the best quality link. Using the knowledge gained from soundings and LQAs, the link processor simply looks up the desired destination address, selects the best channel and begins the process of establishing the link by calling the desired station address.

This initial calling message between stations can also provide special instructions to select the type of communications desired – for example, trigger a fax modem, data modem or voice scrambler rather than a plain voice circuit. This kind of data is sent using an optional UUF command. By monitoring the UUF command bytes on networks that have multi-use equipment, you will soon discover which command triggers which type of equipment. Again, most ALE decoders will show the UUF data sent during such exchanges.

❖ Anyone for Text?

As you might expect, it is often useful to be able to send short messages across the network, just like SMS or text messages on a mobile phone. The 141A standard allows this through AMD (Automatic Message Display), Data Text Message (DTM) and Data Block Mode (DBM) messages. Again, most ALE decoders will display these codes along with the text sent.

It is quite common to see AMD messages on ALE networks and much can be gleaned from them in the case of unidentified networks or unlocated stations, for example "HELLO BAGHDAD, THIS IS KEH34" might help sort out some of the addresses used on the US State Department HF ALE network.

❖ Got Secrets?

While most 141A ALE found on HF today is "in the clear," the operator of the network can opt to encrypt transmissions.

Exchanges on encrypted networks sound exactly the same, as it's still 8 tone 125bd MFSK, but they either won't synchronize, will print gibberish or will print misleading information. In many cases, you can identify these transmissions, since the decoder recognizes a special part of the message – the frame type – which distinguishes clear from encrypted signals. Any traffic decoded with an AL0 frame type is in the clear, anything else is garbage, even if it prints meaningful looking traffic and identifiers.

❖ On the Air

The amount of 141A on-air is staggering and it's quite difficult nowadays to tune a radio through a swath of HF spectrum without coming across an ALE burst. The system has been widely deployed by military, diplomatic, and commercial organizations across the globe. The majority of transmissions are easy to tune as they are sent on the whole kilohertz point using USB.

Utility Monitoring Central's ALE database (see Resources) is currently listing around 7,000 unique station identifiers and many hundreds of frequencies. UMC also contains a page with links to profiles of some of the largest and most active networks.

Probably the best place to start listening to ALE is the US Air Force's extensive worldwide network. This system provides global coverage at any time of day on a wide variety of frequencies:

2805.0 3059.0 3068.0 3137.0 4490.0 4721.0 4724.0 5684.0 5708.0 6685.0 6715.0 6721.0 6761.0 7632.0 7840.0 8965.0 8992.0 9019.0 9025.0 9026.0 9027.0 9057.0 11175.0 11226.0 11250.0 13209.0 13215.0 15016.0 15043.0 18000.0 18003.0 20031.0 20631.0 23337.0 27870.0 kHz USB

ALE is a lot of fun for the digital utility listener. Give it a go; it's really quite addictive.

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Plans for a New Progressive SW Station

Preliminary plans are underway for a new left-wing shortwave station in Illinois per a very long offline article in the May 20 Champaign *News-Gazette* – a profile of Bill Taylor, the force behind WEFT 90.1 FM Champaign. He mentioned wanting to raise money for the construction of a 50 kW shortwave station to be located at Monticello, Illinois, says Curtis Sadowski on the *WTFDA Soundoff* list. This could be interesting – a radio duel between the two Monticellos! See also **http://www.ucimc.org/feature/display/35393./index.php** which says:

"Currently, U.S. shortwave is dominated by right wing kooks and propaganda. We're working to build a high-power listener-sponsored shortwave station near Champaign-Urbana which will be able to bring progressive programming to all areas of the U.S., and at the same time show the outside world that there are many people here who have a worldview which differs with that of our government. For more about these projects, call Bill Taylor at (217) 762-9561 or email btaylor@prairienet.org." This could amount to a revival of Radio For Peace International, ex-Costa Rica.

ITU Monitoring Reports

The International Telecommunication Union carries out extensive monitoring of the SW bands, from 2850 kHz past 27 MHz, both utility and broadcast bands, and publishes its logs in pdf via **http://www.itu.int/ITU-R/terrestrial/monitoring/**

The latest one is #306, **http://www.itu.int/ITU-R/terrestrial/monitoring/files/pdffiles/306.pdf** but other recent files are also available; #304 runs to 236 pages of valuable info, when used in conjunction with HFCC and other theoretical frequency listings. Thanks to José Miguel Romero and Oscar Prieto for pointing these out on the *Noticias DX* list from Spain.

ANTARCTICA [and non] After almost three months of colliding with LRA-36 on 15476 at 1B00-2100, Voz Cristã, via Chile, announced June 10 that from June 20 it would shift to 154B5, at 1200-2400, also ending the collision with Gabon at 1600-1900. However, BBCWS from UK to North Africa was already scheduled on 154B5 until 1700. It would be nice if LRA-36 would shift one hour later to avoid Gabon, where it was colliding long before VC moved in, to 1900-2200, now that VC is no longer on 15475 after 2100 – but that may be too much to ask (gh) LRA-36 has a 10 kW CCA transmitter, and a 3-bay open-wire rhombic (QSL Certificate received by Scott Barbour, NH, NASWA *Journal*)

AUSTRALIA Dale Cheesson in Nhulunbuy NT, of ARDS, Aboriginal Resource Development Service, told me that on May 26, SW 5050 at Humpty Doo returned to broadcasting 24h. They had to repair the antenna; a faulty balun caused mismatching of the old DCA AM20 transmitter. Now 400 watts with a clean signal. They are also on MW, FM and satellite. Cheesson said he verifies reports with a detailed letter; see **http://www.ards.com.au/** (Chris Martin, Australia, *ARDXC*) 5049.8, ARDS, improved strength, political discussion 1010, English, May 28 (Craig Seager, NSW, *ADXN*) Can anyone hear this outside Australia now? (gh)

BELGIUM [non] The right wing Flemish political party, Vlaams Belang, which advocates secession of Flanders from Belgium, announced it would start a DRM broadcast, *VB6015*, Sundays from May 29 at 0900-1100 on 6015 via Germany (*Media Network*) Brokered by TDP; see **http://www.vlaamsbelang.org** (Bernd Trutenau, **BCDX**) Another 6015 customer from Belgium, Maeva FM, objected and suspended its own broadcast to make it clear it had no connexion with VB, but that broadcast failed to appear as scheduled. Hans Weber says DTK management cancelled it after being informed about its possible content (Kai Ludwig, Germany) Then VB announced it would start the following Sunday from another site, Rampisham, UK, and had submitted a program in advance for clearance by VT (*Media Network*) That too failed to appear (Ludo Maes, TDP, via Kai Ludwig) Another week later, VB finally appeared at 0900 from 'eastern Europe' on 13680 (Kai Ludwig, *DX LISTENING DIGEST*)

BOLIVIA R. Santa Cruz, 6135, is the best-heard Bolivian, opening every day at 0900 and closing around 0107, with songs, and sports (Manuel Méndez, visiting Dominican Republic, *DXLD*)

BURMA [non] Democratic V. of Burma on new 15480 from *1428, heavy interference from BBC 154B5, not heard on // 5910 Almaty or Madagascar 17625, due to propagation (Wolfang Büschel, Germany, **BCDX**) But may have replaced one of those? DVB website no help (gh)

CANADA RCI has an online scrapbook featuring Mailbag listeners' monitoring posts: **http://www.rcinet.ca/rci/en/scrapbook.shtml** (Henry Brice, BDXC-UK)

CENTRAL AFRICAN REPUBLIC [non] Radio Ndeke Luka via VT: 1830-1930 on 11760, UAE site, 250 kW, 245 degrees to CAf in French/Sango (*Observer*, Bulgaria)

COLOMBIA FARC's clandestine radio station La Voz de la Resistencia was active one Thursday in May, very distorted on three channels: around 5BB0, 6000 and 6120, impossible to listen in SSB, best around 6120, to 2313* saying they would be back next day at 2230 (Björn Malm, Ecuador, *DXLD*) Notice they are 120 kHz apart; perhaps 6000 plus spurs? Inaudible here on any of them, tho there was something under Habana on 6000. If I were picking a frequency for my station it would not be one used by Habana (gh)

CROATIA At the NASB meeting in May at RFA in Washington, Darko Cvjetko of RIZ Transmitters in Croatia gave a PowerPoint presentation about his company's DRM equipment and tests they are doing on 25800 in Zagreb, maximum 200 watts of DRM power. Vertically polarized 3-element yagi is on a mountain 610 meters above sea level. Zagreb can be covered with 45 dB or more of field strength – most of it with 50-60 dB – using 100 watts of power and a 10 or 20 kHz bandwidth with this high antenna position. See the complete PPP at the NASB website **http://www.shortwave.org** (Jeff White, *NASB*) This and the 11m from ITALY, q.v., could be DXed by sporadic E, or even on a good F2 day (gh)

CUBA We missed English from Habana in the mornings; then we got it! But it was for only three days, June 2-4, live coverage of an anti-terrorism conference in Habana, Fidel presiding, blaming the CIA and USA for most unfortunate events in Latin America over the past 50 years; English version was on 9550, 12000 and 13680, from before 1400 into the evening, with Spanish on several more, pre-empting other programming (gh)

ECUADOR To avoid interference with Cuba, HCJB in Spanish to SAm at 1100-1500 moved May 23 from 11760 to 11690; in turn, RHC in the morning was to move away from 12000 due to HCJB on 12005 in English (Allen Graham, *DX Partyline*) RHC had totally blocked HCJB here on 11760, but weeks later was still on 12000; now HCJB blocks Jordan, q.v.

EQUATORIAL GUINEA On 5005, Radio Nacional, Bata, extended schedule an hour, now closing at 2306 after sign-off announcement, *"Viva su Excelencia el Presidente de la República, Arriba la República de Guinea Ecuatorial,"* and national anthem (Manuel Méndez, Spain, *DXLD*) Time-checks were 2 minutes off (José Miguel Romero, *Noticias DX*)

ERITREA [non] Voice of Liberty Eritrea in Tigrigna/Arabic, 0600-0700 added Fri to Wed/Sun on 15675 via Armavir, Russia, 250 kW, 188 degrees (*Observer*, Bulgaria)

ETHIOPIA [non] Tensae Ethiopian Voice of Unity in Amharic: expanded to Sun-Fri, instead of Sunday only, 1500-1600 on 15660 via Samara, Russia, 250 kW, 199 degrees (*Observer*, Bulgaria)

FALKLAND ISLANDS [non] Falklanders are in just as bad a spot as the Antarcticans were; here, far away from both target areas, I found that the BBCWS' *Calling the Falklands*, which is only half an hour a week, Tue & Fri 2130-2145, direct from UK on 11720 for A-05, collides with China Radio International via Chile, also on 11720 daily at 2100-2200 in Portuguese to Brasil; both of these were

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

probably coordinated by VT (gh, OK)

GREECE IBB's Kavala and Rhodes sites are well managed, with hardly any downtime, but face an impending crisis in workforce. Of the 92 Foreign Service nationals (FSN) at the two sites as of January 2004, over half were at least 50 years old; many key managerial personnel are scheduled to retire in the next few years. The station needs to train new people, but IBB announced a hiring freeze through FY 2004. The State Dept. Office of Inspector General recommended that IBB continue to support the station. IBB reported that it would consider using a buildings-and-grounds maintenance contract to hire "fill-in" employees for critical positions affected by the IBB worldwide FSN hiring freeze.

The Kavala property is leased from the Greek government. Over the years, local citizens have populated one area with various beach structures and a church. An American supervisor estimated that the encroached area is about 11 percent of the total, with an apportioned lease cost of over $46,000 annually. IBB is concerned about the safety of the area and possible liability issues. OIG recommended that IBB modify its land lease agreement with the Greek government, returning the encroached area to the government and seeking a guarantee from the government to maintain the integrity of the remaining portion of the lease. IBB said that it would address this issue in 2007, when the lease came up for renewal, but OIG believes that some interim action is necessary (DOS OIG last August via John Babbis, *DXLD*) There are also rumors that the VOA Kavala site will be closed, but no decision has yet been made (Dan Ferguson, IBB, *NASB Newsletter*)

GUATEMALA R. Cultural quit SW, but occasionally fires up a transmitter, for tests? (gh) Heard June 2 at 1050 on 5954.967, same DJ as always, religious music (Björn Malm, Ecuador, *DXLD*)

INDONESIA Some extraordinary propagation occurred when a major geomagnetic storm caused the K-index to hit 9, on May 15 at 0900 (gh) Tony Mann in Perth heard RRI Fak2 on its 9th harmonic, 42749.9, due to F2 enhancement (via Tim Bucknall *harmonics* yahoogroup) So it's probably putting out lower harmonics, too, and even higher: Look for Fak Fak near 9500, 14250, 19000, 23750, 28500, 33250, 38000, 42750, 47500, 52250... (gh)

VOI's Japanese service, M-F at 1130, has been voiced since 1977 by 75-year-old Machiko Katagiri, with news, Indonesian music and daily life features. Program coordinator Haruyo Tadera, 62, whose Indonesian name is Hariyati Prabowo, said unlike other RRI language services, Japanese does field reporting. However, its future is in doubt because of difficulty in finding replacements for Katagiri and Hariyati. Hariyati said the monthly operational budget for the service is US$45, not enough to attract Japanese native speakers to host the program. Katagiri suggests that when she and Hariyati retire, they be replaced by Indonesian staff. Since the Internet era began, the number of listeners [writing in] has fallen from thousands to only a few dozen. But it is still the most popular foreign program broadcast by RRI, she said (*Jakarta Post* via Kim Elliott, Sheldon Harvey)

IRAN While many of the Big Boys cut transmissions and make listener contact an undesirable activity, smaller stations long for any form of listener contact. One such is The Voice of the Islamic Republic of Iran. They may not be a favorite, but I have found them to be relatively quick verifiers, and they like to mail all sorts of interesting material. I received four packages in less than a month. My wife suggested that I open an Islamic fundamentalist reading room (Richard A. D'Angelo, PA, *NASWA Journal*) I received an oversized envelope from IRIB; it was sturdy but had been opened at one end with enclosures confiscated. Someone must have considered the printed material too sensitive for Americans. The equivalent of almost $5.68 in postage was a lot for the QSL card and satellite schedules which remained (Roger Chambers, Utica, New York, *DXLD*) This is totally unacceptable in our 'free' country!! (gh)

IRELAND I ask people who would like to see RTÉ return to shortwave to please e-mail their views to hearus@rte.ie and hopefully people power will rule once more! (Paul Guckian, County Clare, Ireland, *DXLD*)

ITALY New experimental DRM project is Radio Maria, on 26000 kHz from Andrate in north Italy for local coverage. They are broadcasting in AM mode since May 10 because their digital modulator is still not available. Power less than 50 watts. They expect to have a special QSL for the few reports they get (Roberto Scaglione, June 5, *DXLD* and *Play DX*) Weakly heard at 1040 June 7 on 26000 // FM (Giampiero Bernardini, Avvenire, Milano, Italy, *BCLNews.it*) see CROATIA

JORDAN HCJB [see ECUADOR] moved to 11690 at 1100-1500, despite that being R. Jordan's only English frequency, at 1300-1630. Altho HCJB is beamed south, that's enough, along with the RTTY, to keep us from hearing R. Jordan in CNAm; at least Jordan runs a sesquihour beyond. Per HFCC A-05, Jordan targets USA as well as Europe. How is reception in ENAm and Eu before and after 1500? (gh, OK) R. Jordan English at 1300-1630 is not on air every day, but when it is, reception at my location is always good strength and clear of QRM (Noel R. Green, Blackpool UK, *DXLD*)

KURDISTAN Voice of Iranian Kurdistan on 4850 ex-4860 at +0151-0203+. Kurdish songs non-stop warming up to the sign-on hymn at 0200 and usual Kurdish ID *"Aira dengi Kurdestana Irana."* This is also one hour earlier than in winter (Finn Krone, Denmark, wwdxc *BC-DX*)

LIBERIA [non] Star Radio resumed broadcasting on 25 May at 1600. The independent news and information radio station will transmit on FM and SW to Liberia and the Subregion from its studios at Mamba Point, Monrovia. Star Radio was established by the Hirondelle Foundation in 1997 and had established itself as a primary source of independent and unbiased information for Liberians. It was forcibly closed by then-President Charles Taylor in 2000 and could not be reopened as long as he was in office. It will be on air daily from 0500 to 2200 on FM for Greater Monrovia, as well as 2 hours per day on SW for Rural Liberia and the Subregion (Hirondelle via CRW, Mike Terry, Kim Elliott)

Darcy Christen, Programme Officer for the Hirondelle Foundation, told us that SW would start in a few weeks, airtime organized "through a company in the UK.". Previously was on SW Sept 1997 to Oct 1998. New website is **http://www.starradio.org.lr/** (Andy Sennitt, *Media Network*) Three weeks later, still no info on SW time or frequency, but unlikely to be same as previous operation from inside Liberia (gh) Which was 3400 morning, 5880 evening (Stuart Austin, UK, *DXLD*) We've started on 104 FM, 1 kW, but need a few weeks to be on SW. You may find some interesting news scripts on website (Darcy Christen, Program Officer, Hirondelle Foundation, via Steve Lare, *DXLD*)

MALDIVE ISLANDS [non] Frequency change for Minivan Radio in Dhivehi via DTK T-Systems, Jülich, Germany: 1600-1700 on 11800, 100 kW, 105 degrees; ex 12015 to avoid V. of Korea (*Observer*, Bulgaria, June 7)

NIGERIA [non] New station via VT Communications, Salama Radio International: 1930-2030 Wed/Sun on 11885 via Wofferton UK, 300 kW, 180 degrees to Nigeria in Hausa/English (*Observer*, Bulgaria) Confirmed Sun June 5; not new: they were active on SW a few years ago (gh) Opened in Hausa, weak at 1930 (Mike Barraclough, UK, *DXLD*) Excellent here closing at 2028 (José Hernánded Madrid, Cartgena, Spain, *Noticias DX*) Salama Radio was broadcast via Jülich until May 2003 (Anker Petersen, DSWCI *DX Window*) Info from 2001 about this: Dr. Jacob Abdalla, President, Harvestime Ministries, P O Box 126, Chessington, Surrey KT9 2WJ, United Kingdom. Judging from language of the website **http://www.harvestime.org.uk** his ministry is charismatic or pentecostal (Dr. Hansjoerg Biener, Germany, wwdxc *BC-DX*) QSL letter in 2001 said "Our programmes will be mainly Christian, with about 30% of programmes dedicated to moral issues and African folk songs." (Patrick Robic, Austria, *A-DX* via *BCDX*)

PAPUA NEW GUINEA R. Central, Boroko, last heard in Dec 2003, active again in early May on 3290, heard between 1000 and 1201* Partly relays NBC 4890, 1120 own regional program in vernaculars, closing in English. Weak with fading, static (Roland Schulze, Philippines, DSWCI *DX Window*)

Wantok Radio Light, 7120, under construction for a few years, went on the air May 23, first reported at 0630 by Chris Hambly, Victoria, Australia, who had been sitting on this frequency for months (Johno Wright, ARDXC) Dave Olson, HCJB engineer overseeing it, told me they were about to start testing, with 1 kW, and straight-up NVIS antenna. Tentatively heard May 23 at 0830-1200 (Guy Atkins, WA, *HCDX*) Weak threshold signal next day 0830-1030, peaking at 0900; following day peaked 0855-0920 (Walt Salmaniw, BC, *DXLD*) May 25, lovely and strong in Sydney at 0900, EZL religious music, English and Pidgin. See **http://www.wantokradio.net/** (Jem VK2JEM Cullen, NSW, ARDXC) Same date, fading above noise at 0825, strengthened by 0959 with ID, *Focus on the Family* as scheduled (Guy Atkins, WA, *DXLD*) Next day, May 26 at 0729 with big signal, ID, thanks for listening, still good past 0830. Some of the local ads for program sponsors helped to give it that local sound (Don Moman, Alberta, *DXLD*) Sounds like 10 kW (Patrick Martin, Seaside OR) Part of the Papua New Guinea Christian Broadcasting Network (PNGCBN), and rebroadcasts 93.9 MHz in Port Moresby. Wantok Radio Light, P.O. Box 1273, Port Moresby, NCD, Papua New Guinea (*DXing.info*)

Heard several times in May and June from 1208 past 1402, almost a sesquihour past local sunrise. Quite good, with no interference (Edward Kusalik, Alberta, *DXLD*) Unidentified but something on 7120 at 0955-1020 (Chuck Bolland, FL, **ibid.**) Presumed, June 10 at 1006-1022, Whisper-quiet choral-like ballads poking through noise floor. More than I thought I'd get this time of year (Scott R. Barbour, Jr., NH, *ibid.*) Also heard in NZ, very good by 0800, and at 2015 mixing with China (Bryan Clark, *ripple*) Armchair copy for official inauguration June 11! (Walt Salmaniw, Grayland DXpedition, WA, *DXLD*)

7120 OK for DXers, but what about its intended audience? There are loads of stations around the world already on 7120, easily verified by checking HFCC and other references, including China, India, BBC, Netherlands/Madagascar. Why WRL picked this frequency for 24-hour use is beyond me. If they insist on using this band, where there is more likely to be a skip zone even with NVIS than on 2, 3, or 4 MHz, then they should move to a clear spot just below 7000, or above 7300, which is filling up fast, but checking through HFCC, EiBi and NDXC, it appears the best candidate would be 7435, which is vacant on some lists, and occupied by two imaginary stations on another: Lubumbashi, Congo DR, and Krishna Loka, Russia. This does not take into account possible adjacent-channel broadcast problems, or any utility stations which could monkey-wrench the idea; Klingenfuss 2002 shows the only possible problem as Seoul Meteo fax, HLL5 on 7433.5. WWCR used 7435 for a long time but had to move off for some reason, probably some USG net. There are a few other frequencies above 7300 with very limited usage, like one station for only a few minutes a day, which might be accommodated. Besides, the 7100-7200 range is being occupied by hams, so WRL will have to move anyway, sooner or later (gh)

RUSSIA From May 25, VOR in English to NAm at 0100-0500 replaced 17660 via Vladivostok with 15555 (George J. Poppin, *DXLD*)

SOMALIA [non] A new clandestine broadcast will test to Somaliland, Friday,

May 27, at 1730-1800 on 15650, and then daily except Friday. Name and sponsorship not yet confirmed (Nick Grace, *CRW*) That first test surprisingly good here, so likely UK or Germany site, not Russia; 1731 with Qur'an, 1739 presumed Somali talk, 1744 yelling, 1752 Horn of Africa music, 1759 abruptly cutting off talk with no ID heard (Glenn Hauser, OK, *DXLD*) Crash start at 1730 with no test tones prior [customary for Russians] (Steve Lare, MI, *ibid.*) Very weak here in skip zone of Jülich (Wolfgang Büschel, Stuttgart, *ibid.*) 60 over 9 here, typical DTK modulation (Roberto Scaglione, Sicily, *ibid.*) Heavy interference from Libya via France on 15660 here (Noel R. Green (NW England), *ibid.*) Then nothing heard for a few days (gh) Radio Horyaal in Somali via DTK T-Systems from June 4: 1730-1800 Sat-Thu on 15650 Jülich, 100 kW, 130 degrees \\ 12130 via Samara, Russia (*Observer*, Bulgaria) So it is not a new clandestine, just an old one with an additional broadcast/site (gh)

SUDAN 5895, R. Peace, Nuba Mountains, 5895, heard in Arabic at 0317-0322*, May 13, no ID, but must be this; missing the next day (Martien Groot, Netherlands, DSWCI *DX Window*) Reported at 0230-0400, 1600-1745 (Wolfgang Büschel, *BCDX*)

SWITZERLAND The original "Two Bobs" recording for *Switzerland in Sound* has proved so popular, that Bob Thomann and I have recorded a second, one-hour installment, discussing some of the classic technical issues in SW including propagation, antennas, receivers, and reducing man-made and natural interference. It will remain available indefinitely at **http://www.switzerlandinsound.com** (Robert "Bob" Zanotti, founder and editor, *Switzerland in Sound*, 3507 Biglen, Switzerland, *DXLD*)

TAIWAN A religious station in Mandarin called TWBM - Trans World Broadcasting Ministry, has occupied 11940 between 1300 and 1400 every day since April, with a program "Youth Left No Regret" (in Mandarin *"Qingchun Bu Liubai"*). This reminds us of Trans World Radio, Guam, which IDs as *"Huanqiu Guangbo Diantai"* while the new station is *"Huanqiu Guangbo"*, equal to "Trans World Broadcasting", but they may not be related. TWBM appears to have HQ in California, and an office in Kaohsiung, Taiwan. TWBM buys 100 kW SW time from CBS Taibei. See **http://www.twbm.com** (Eric Zhou, Nanjing, China, **http://bcl.bbs.net,** *dxing.info*) Contact info from TWBM site: contact@twbm.com Phone (925) 283-0210; 1 Spruce Street, Millbrae CA 94030. Also has a link to Voice International = CVC (gh)

UKRAINE From June 3, RUI replaced 7420 with 7490 including English to Europe at 2100-2200 (Edwin Southwell, Basingstoke, UK, *World DX Club Contact*)

U S A Be Careful What You Ask For – In a war of words being played out in *Foreign Affairs*, former VOA Director Sanford Ungar landed solid jabs and wobbled both current VOA Director, David Jackson, and BBG Chairman, Ken Tomlinson.

In a response to an earlier article written by Ungar, which appeared in the previous issue of *Foreign Affairs*, Jackson claimed that Ungar's article was "filled with errors and unsupportable accusations." In a clear effort to tag-team Ungar, Tomlinson also wrote a response saying "As much as I respect Sanford Ungar, he should deal with specific case histories as opposed to general and unsubstantiated charges."

Ungar responded by providing the specifics, again and again. In onother response, former VOA reporter Philomena Jurey wrote that the "demeaning of the VOA is continuing" in reference to the absurd plan to offshore English newswriting jobs to communist China.

In his response, Tomlinson couldn't resist slipping in outlandish claims about both Radio Sawa and Al Hurrah. By now, it is generally accepted, outside of the doors of the BBG, that both have been proven to be abject failures (AFGE Local 1812)

In stunning allegations, the former Director of VOA (and current president of Goucher College in Maryland), hos accused present VOA Director David Jackson of a range of actions aimed at forcing VOA to more closely toe the line of the Bush administration in its broadcasts. Ungar said Jackson had personally attempted to squelch reporting on violence and setbacks to U.S. military operations in favor of reporting on positive news.

"What I have done with regard to our Iraq coverage is the same thing most editors with correspondents in Iraq have done: pushed our people to go beyond the wire-service stories to tell our audiences what else is going on in Iraq. As a result, our coverage has included the daily bombings as well as – not instead of – more in-depth, enterprising stories."

More recently, Ungar says, Jackson ordered VOA division directors who implement programming in VOA's many language divisions, to include the U.S. government position "in all stories" in all languages on any issue, warning that if this did not happen, the number of broadcast editorials reflecting U.S. policy would have to be increased.

This directive led to a memo from one of VOA's senior news managers that many VOA journalists describe as having had at least a momentary chilling effect on reporting.

The outbreak of accusations between current and former VOA and BBG officials came as members of the House of Representatives prepared to hold hearings into Mr. Tomlinson's actions at CPB, and omid continuing appeals by VOA journalists for a hearing on the future of the Voice of America. Congress has yet to hold a hearing in response to a petition signed by hundreds of VOA journalists in 2004 in the wake of the ouster of a former VOA News Division Chief, Andre DeNesnera, who defended VOA's broadcast of an interview in 2001 with a Taleban leader, and had clashed with Jackson on a range of issues (VOA sources)

It is quite incredible that the director of the Voice of America cannot see the difference between British rule in Hong Kong and that of the Chinese Communists (Mike Barraclough, UK, *World DX Club Contact*)

WHRI, SC on 15785 is causing heavy interference to Galei Zahal, Israel, between 1700 and 2000; terrible frequency selection by FCC (Wolfgang Büschel, Mallorca, *DXLD*)

WORLD OF RADIO, on US SW as of mid-June: WBCQ: Wed 2200 7415, 17495-CUSB, Sun & Mon 0300 9330-CLSB, Mon 0415 7415. WWCR: Thu 2030 15825, Sat 1030 & Sun 0230 5070, Sun 0630 3210, Wed 0930 9985. WRMI 7385: Sat & Sun 1730 [from WRN], Sun 0330, Mon 0230; for latest version see **http://worldofradio.com/radioskd.html**

VANUATU Measured on 7259.66 at 0315, R. Vanuatu good with island music, Pidgin announcements, putting loud heterodyne whistle on 7260 (Bryan Clark, Mangawhai, NZ, *ripple*)

VENEZUELA Radio Amazonas, *"la voz del pueblo,"* 4939.5, opens daily at 0910 with national anthem; the only active Venezuelan SW station, with YVTO 5000 off for several weeks (Manuel Méndez, Punta Cana, Dominican Republic, *DXLD*)

VIETNAM R. Dien Bien heard on new 6442V, mostly on air at 1200-1400, but unstable schedule; ex-6379v, and is the station formerly known as Lai Chau (Kenji Takasaki, Japan, *HCDX* and *Japan Premium*)

VIETNAM [non] Introduction from Radio Hoa-Mai: a Vietnamese language station based in California with programs for people in Vietnam and overseas with webcasts and shortwave, to help promote democracy and development in Vietnam. **http://www.radiohoamai.com** (Miss Ngoc-Anh Trinh, Program Director, Radio Hoa-Mai via Martin Schöch, *CRW, DXLD*) Schedule? Website in Vietnamese confuses SW and webcasting, under the latter mentioning 11555 at 1330-1400 (gh) See the World Harvest Radio schedule for Angel 3 (Bernd Trutenau, Lithuania, *DXLD*) So it's just another program from KWHR, Sat & Sun only (gh) Received reply from Trinh Ngoc-Anh. Has been in operation since Feb 12, 2005; Archives are at **http://www.radiohoamai.org** Name in Vietnamese: *Dai Phat Thanh Hoa-Mai;* Main URL: **http://www.hoamai.org** (Vietnamese); **http://www.nvnp.org** (English); Email: radio@hoamai.org Please note that we are looking for radio broadcasting company which provides MW (AM Channels) frequencies into Vietnam (via Anker Petersen, Denmark, *DXLD*)

WESTERN SAHARA [non] LV de la República Árabe Saharaui heard on new 7466 May 23 at 2255 in Spanish (José Bueno, Spain, *Noticias DX*) via Algeria, Polisario Front changed 7460 to 7466 both evenings and mornings, surely to avoid adjacent QRM. 1700-2400 in Arabic, except Castilian 2300-2400; and MW 700. Also 0600(?)-0800 in Arabic. QRM is terrible at *1700, and WHRI 7465 also runs until 0800 (Carlos Gonçalves, Portugal, *DXLD*) Some days Arabic continues after 2300 (Manuel Méndez, Lugo, España, and Gonçalves, *DXLD*) On Fridays, 7466 runs an hour later to 0900; however, on June 3 an additional hour to 1010* carrying the Radio for Peace program originating in Italy Gonçalves, *ibid.*)

Got any idea who that is on 7465 just prior to 2200 when WWCR signs on? It's just above noise level here but when WWCR comes up I can hear about 700 Hz beat between the two. Sounds like Africa (Lou Johnson, KF4EON, GA, *DXLD*) This is it (gh) Perhaps we can get George or Adam to go over there and put their transmitter on frequency so that the beat note is not so objectionable. I know they like to take field trips. Otherwise I'll have to find another way to listen to Steve Quayle's ramblings (Lou Johnson, *ibid.*) No, George just adjusted WWCR to 7466 to eliminate the het (gh)

Looks like Polisario ought to go back to 7460 at least in mornings; but presumably moved off that due to R. Free Asia in Korean, heard before and after 2100 by José Miguel Romero, Spain, *HCDX*, and scheduled until 2300 via Moldova, per EiBi (gh)

ZIMBABWE [non] SW Radio Africa announced May 23 that it faced closure at the end of May, if pledged donor funds were not delivered (*Newzimbabwe.com* via Artie Bigley) Sadly, Tuesday 31st May will be our last broodcast on shortwave. Due to the jamming we have to broadcast on multiple frequencies and this hugely increases our costs. We also no longer have the financial support as before. As from 1st June we will be on MW in the early morning and the internet only – but our entire future remains very shaky. MW is only received over about half of Zimbabwe but we think our main audience will now be the 2m plus Zim exiles in South Africa, where our signal is clearly received. Tomorrow will be a sad day for us all (Gerry Jackson, Station Manager via Ron Howard, CA, *DXLD*) Gerry Jackson was interviewed by *Global Crisis Watch* on May 30, via clandestineradio.com saying that MW would only continue through June (gh) Final SW broadcast, as announced, heard on 12145 via Russia May 31, 1630-1745 (Anker Petersen, Denmark, *WORLD OF RADIO*) Actually, SWRA got a last-minute reprieve, staying on SW for one hour at 1700-1800 on 15145 via UK (gh) This was supposed to be for one week until June 8, and heard in the clear (David Pringle-Wood, Zimbabwe, *DXLD*) Still going June 9 (Steve Lare, MI, *ibid.*) and June 10 (David Pringle-Wood, Harare, *ibid.*)

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

Gayle Van Horn, W4GVH
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0001 UTC on 6925
PIRATE: Radio Metallica World Wide. Pirate programming with mix of several station identifications. Freq mentioned as "6955" and several loops of Johnny Rivers' *Secret Agent Man*. Pirates logged: **WHYP** 6875, 0035-0105; **Crystal Ship** 6955, 0039-0106; **Radio Boston** 6925, 2310-2342* (Joe Wood, Greenback, TN)

0005 UTC on 9220.14
BOLIVIA: Radio Virgen de los Remedios (tentative). Spanish program mix of religion and politics. "Radio Transmundial" spot with 342 SIO signal quality. Audible 0054-0103+ with Catholic program, but no ID heard. Poor signal with interference and same quality on subsequent rechecks. (Harold Frodge, Midland, MI) **Radio Municipal** 4845.6, Spanish 0915; **Radio San Miguel** 4902.5 Spanish 0130. (Fernando Garcia, Baltimore, MD) **Radio Estambul** 4498.1 Spanish 1010-1023. (Arnaldo Slaen, Buenos Aires, Argentina)

0021 UTC on 6973.11
ISRAEL: Kol Israel. Galei Zahal. English/Hebrew. Oldies tunes of *Reminiscing*, *Lady Godiva* and *Liberty Valance* to Hebrew announcement. No ID observed at 0031 for fair signal quality. (Scott Barbour, Intervale, NH) **Kol Israel** 15640 at 1900 feature on *Holocaust Remembrance Day* // 11605. (Bob Fraser, Belfast, ME)

0030 UTC on 11710
ARGENTINA: Radio Nacional. Spanish program "Cuentos narrados." Identification "Radio Nacional 870 AM Argentina Nacional nuestra radio." (Garcia, MD) 15345 Spanish 2315 soccer game commentary to "Radio Nacional" identification. (Tom Banks, Dallas, TX)

0030 UTC on 5019.2
PERU: Radio Horizonte. Spanish. Non-stop criollos to 0050. Ad for "Banco de Credito de Peru," to more music at identification at 0058. Religious programming at 010 to close down at 0128. Additional Peruvians observed; **Radio Huancabamba** 6536.5, Spanish 0045; (Garcia, MD) **La Voz de Campesino** 6956.96 Spanish 0256-0302+ (Frodge, MI) **Radio Huanta** 4899.16, Spanish 0905-0938. (Barbour, NH) **Radio Tarma** 4775, Spanish 1000. (Garcia, MD) **Radio Tawantinsuyo** 6172.94 Quecha/Spanish 1022-1027. **Radio Cusco** 6192.88 Quecha/Spanish 1016-1021. (Slaen, ARG)

0140 UTC on 7020
CHINA: Radio China Intl. Classical music program. (Howard Moser, Lincolnshire, IL) 1730-1740+ on 11940; 7285, 2137-2145+ on film industry. (Frodge, MI)

0200 UTC on 7260
EGYPT: Radio Cairo. Program sign-on to ID and prayer recitations. Strong signal but usual low modulation volume. (Moser, IL; Stokers Schartz, Bloomington, IL) 11885, 2327-2341 News of Ministries of Finance. (Barbour, NH)

0600 UTC on 4770
NIGERIA: Radio Nigeria. Vernacular language news topics to sports mentions of Barcelona and Real Madrid soccer game. (Garica, MD) 7255, Vernaculars 2159-2210 with recorded speech at 2208. (Barbour, NH)

0612 UTC on 11640
SOUTH AFRICA: TWR. *Living Word for Africa* program. Kempton Hall, South Africa P.O. Box and web info at 0630. Interval signal to *Rendevous* segment for fair signal quality. (Barbour, NH)

0730 UTC on 6139.7
COLOMBIA: Radio Lider. Spanish program "Musica para recorder" to ID as; "Radio Lider 730 AM y Melodias 96.9 FM." (Garcia, MD)

0900 UTC on 6350 USB
USA: AFRTS-Hawaii. International news into *Sports Overnight by Armed Forces Radio*. (Garcia, MD) **AFRTS-Iceland** (tentative) 7590 USB, 2158-2202+ with NPR's *All Things Considered*. (Frodge, MI) **WRMI** 7385, 2133-2201* (Frodge, MI)

1030 UTC on 4780
GUATEMALA: Radio Coatan. Spanish sign-on to time check and "a Jesucristo desde San Sebastian." (Garcia, MD)

1339 UTC on 13730
AUSTRIA: Radio Austria Int'l. Weak/poor signal for text and operatic vocals. (Wood, TN) *Report from Austria* 13755 at 1520. (Fraser, ME) **AWR**'s Austrian relay 9895, 0235-0251 including postal address for AWR Pakistan office. (Barbour, NH)

1550 UTC on 17730
CANADA: Radio China Int'l relay. *Life in China* segment on Beijing's Observatory. Canada's **RCI** 9770 // 5850, 2105. (Bob Fraser, Belfast, ME) Canada's **CFRX** 6070, 2226-2238+ // 1010 kHZ AM **CFRB**. St John's **CKZN** 6160, 2224-2232+ best in SSB. (Frodge, MI) **Radio Sweden**'s Canadian relay 15240 at 1245. (Fraser, ME)

1558 UTC on 11615
USA: WYFR. *A Minute for Your Health* segment. (Froser, ME) **Voice of America** 7405 at 0134. (Moser, IL)

1836 UTC on 15190
EQUATORIAL GUINEA: Rodio Africo. Three English religious programs. Stotion ID ot 1928 and contoct oddress; **radioafrica@myway.com** . Signol noticeobly improved after 1915 UTC. (Frodge, MI) 5005 Sponish sign-on ot 0600 into news, music ond IDs. (Gorcio, MD)

2004 UTC on 11625
VATICAN CITY: Voticon Radio. Remembronces of Pope John Poul II, followed by French service sign on 9755 ot 2030 // 11625. (Frodge, MI) 13765 // 11625 at 2020. **RAI** 11800 at 0055. (Froser, ME)

2030 UTC on 15455
RUSSIA: Voice of. *Music Around Us* segment featuring famous Russian composers, // 9890, 12070; 11630 // 9480 at 1845. (Fraser, ME) 12070, English/Russian 1918-1937 (Barbour, NH) 5900 Spanish 0200. (Garcia, MD) VOR via Armenia 11510, 1804-1809+. (Frodge, MI)

2032 UTC on 11760
CUBA: Radio Havana. News items on corruption in American projects in Iraq. Station identification at 2033. Fair signal. (Wood, TN) **Radio Nacional de Venezuela**'s Cuban relay 11760, Spanish 0030. (Fraser, ME)

2102 UTC on 15205
RWANDA: Deutsche Welle relay. News about Ethiopia and stem cell research. Station ID at 2104. (Wood, TN)

2107 UTC on 9779.8
YEMEN: Tepublic of Yeman Radio (tent). Arabic. Whisper-quiet male's musical bits alternating with text. Tentative ID at 2117 as sign-off caught me off guard. Identification is tentative at best for poor/weak signal. (Barbour, NH)

2130 UTC on 15410
MOROCCO: VOA relay. Country music program including Shelly Wright's *Tiny Town*, to mentions about Dolly Parton // 15445. Morocco's **Radio Medi Un** 9575, English 2331-2339. (Wood, TN)

2144 UTC on 7500
BULGARIA: Radio Bulgaria. Program feature *Radio Bulgaria Calling* // 5800. (Fraser, ME) 9770, 1955 with IDs, and *DX-Mix* program to sign-off at 2002. (Frank Hillton, Charleston, SC)

2209 UTC on 9736.87
PARAGUAY: Radio Nacional. Spanish sports program with usual gusto. Station ID at 2216 pause during remote broadcast. Signal much better than usual. (Frodge, MI) 9737.8, 0943-1008. Spanish ID to jingles. (Barbour, NH) 9738 Spanish 2339-0000 with IDs and music program. (Wood, TN)

2210 UTC 15515
AUSTRALIA: Radio Australic. Aussie news and features to AM *Australia* segment. (Frodge, MI) *Saturday Night Cowboy* show 9580 at 1230. (Fraser, ME)

2228 UTC on 7120
ALBANIA: Radio Tirana. Female announcer's station identification to program preview. Time/frequency information over interval jingle. News, pop music and current affairs followed by 2258 sign-off. (Schwartz, IL) 6115, *0228-0244 // 7160 (Barbour, NH) 6115, 2326-2331. (Wood, TN)

2300 UTC on 9425
INDIA: All India Radio. Hindi service for "Bollywood" music tunes and male/female duet. Above average signal strength. (Schwartz, IL) **AIR-Bangalore** (Hindi) 10330, 0305-0318 . **AIR-Aligarh** 9950, 0039-0045*. (Barbour, NH)

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

John Figliozzi
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Odds and Ends and RNZI

Writers (among whom I count myself) are notorious for starting pieces and putting them aside, always intending to get back to them. After all, one never knows when inspiration might hit again. Better to strike while the iron is hot and take things as far as they'll go.

But many times they don't go quite far enough, so they are left awaiting the next burst of creative fever which always is, of course, right around that corner. Observant readers may even recall a few times when I said that something would appear in this space the next month and it never quite did so. (It was very polite of you never to bring it up, by the way.)

August is a good time to clean up this unfinished business. Since, by popular consensus, the new SWL/DX season seems to start in September, I'm going to take this time to clear out the closet, as it were, so I can start fresh next month.

❖ About that Catalog...

Back in the spring, you might remember we spent two months on something called ***The Spring-Summer Catalog (A05)***. It took two months to publish all the listings and the plan was to spend part of this space in a third month detailing the U.S. SW broadcasters.

Unfortunately, the stateside broadcasters are really an unruly lot for the most part. Being entrepreneurial (i.e.: not government-sponsored) will do that to you. In the past, when I'd print their schedules, they'd go right out and change them before the ink was dry. I've always thought that they did this on purpose, although cooler heads assure me that this is not the case. Just as I was beginning to be persuaded, our country's sole government-sponsored English language broadcaster – the **VOA** – started behaving erratically in the same fashion as the others!

Well, now, what to do? Until I figure out how to pin these guys down a little more, it may be best if you get your program information about them from the internet. Besides, other than **VOA** (so far at least) the overwhelming majority of programming on these stations is either religiously or politically based or some strange combination of the two. Here are the addresses for the U.S. stations that have a web presence:

VOA *http://www.voanews.com*; **Overcomer Ministry** *http://www.overcomerministry.org*; **University Network** *http://www.drgenescott.com*; **Waymarks** *http://www.waymarks.org*; **WBOH/WTJC** *http://www.fbnradio.com*; **WEWN** *http://www.ewtn.com*; **WHRI** *http://www.whr.org*; **WINB** *http://www.winb.com*; **WJIE** *http://www.wjiesw.com*; **WMLK** *http://www.wmlkradio.net*; **WWCR** *http://www.wwcr.com*; **WYFR** *http://www.familyradio.com*; **WBCQ** *http://www.wbcq.us*; **WRMI** *http://www.wrmi.net*

❖ My Favorite Program

Not mine, actually; yours. For some time, I've been wracking my brain trying to figure out a way to make this column more interactive with its readers. A poll perhaps... a top ten list... point/counterpoint? Lots of ideas going nowhere. But then this short essay by Peter Bowen of Ontario, Canada arrived in my mailbox titled – simply and beautifully – "My Favorite Program."

Ah, that's the ticket! So, if you have a favorite program (and doesn't everyone?), write a brief review of it in a form similar to Peter's here and I'll share it with everyone else. (Unedited! – note the spelling of "programme" below.) You see, we at *MT* really do want to get you involved and hear what you have to say.

BBC World Service – Newshour:
by Peter Bowen (Toronto, Canada)

I'd like to introduce you to an old and trusted friend.

Newshour is one of flagship news and current affairs programmes from the **BBC World Service**. (*The World Today* would be the other one.) And, like *The World Today*, the show features a variety of presenters.

It is a 56 minute programme, starting with the usual 5 minute top-of-the-hour news bulletin. The programme is cut in half by a short news summary at the bottom of the hour, another regular feature of the World Service schedule. And during weekdays, there is a short segment of financial and business news, usually towards the end of the first half-hour.

The bulk of the programme, though, is comprised of discussions of current topics in the news, be they political, economic, scientific, arts, or sports-related. These discussions take the following formats: interviews with news makers, politicians, government officials, economists, journalists, etc.; packaged reports from BBC and other correspondents "in the field"; and live commentary on breaking stories. In addition, stories covered in the first half-hour are sometimes updated in the second.

Topics covered are those in the news at the time of broadcast, those which have been in the news in the previous few days, or those which are of ongoing concern. In addition, there is usually a nonpolitical item of lighter weight towards the end of each half-hour part.

Newshour is a well-produced programme about international news and events. It is a showcase for the depth and breadth of news coverage for which the World Service is famous. In spite of its tendency at times for it to become overly concerned with one big issue, I think that Newshour is a must-listen for both news junkies and those who have a more passing interest in world news.

Web site: *http://www.bbc.co.uk/worldservice/programmes/newshour/*
E-mail: *newshour@bbc.co.uk*

(Editor's Note: Hear it at 1200 and 2100 UT on the Americas stream on SW and via the Sirius and XM satellite radio services.)

❖ The swprograms E-mail List

I've included this plug before – always plan to do it more, but more often than not forget. And Peter (see previous item) rightfully jogged me again about this opportunity when he sent in his review.

If you enjoy the programming you hear on shortwave and via international broadcasters, there is a great e-mail list that encourages intelligent conversation and mutual sharing of advance information about such programming. Membership is open to everyone. To join, send a blank e-mail to *swprograms-request@hard-core-dx.com?subject=subscribe* or visit *http://dallas.hard-core-dx.com/mailman/listinfo/sw-programs* for details. Since it's hosted by the folks at **HardCoreDX** and managed by my good friend and **NASWA/ODXA** counterpart Richard Cuff, you know it has to be a quality operation.

I am proud to be a participant and post weekly advance details about **Radio Australia** and **Radio New Zealand International** programs. Join me and your fellow program listeners there today!

❖ Changes Coming at RNZI

And speaking of Radio New Zealand International, listeners can expect some rather significant changes in the station's programming starting around mid-September.

This is because a large proportion of RNZI's broadcast day consists of relays of programming from the nation's primary domestic public network, **National Radio**.

According to *The New Zealand Herald*, key points from the programming review include an

overhaul of the **National Radio** music policy, new programming, and the creation of a new Radio New Zealand web site to provide up to date information and audio on demand facilities to enhance what listeners can hear on air. (Radio New Zealand is the official corporate name of the national public broadcaster)

Weekday and weekend afternoons (roughly 0000-0600 UT) will see the biggest changes. A new weekday afternoon program which builds on the regional focus of the existing *In Touch with New Zealand* program will debut with the former program's magazine and lifestyle format retained. It will originate from Radio New Zealand's new Auckland studios where current *In Touch* host Wayne Mowat will continue as anchor. The new program will focus on special outside broadcasts from throughout the country, giving it a more active and roving regional feel.

National Radio's top rated **weekday evening** news program *Checkpoint* (0500 UT), hosted by Mary Wilson, will be extended from one hour to two with more business and sport added.

On **Saturday afternoons,** *Home Grown,* which showcases New Zealand contemporary music, is being expanded to three hours as part of National Radio's long-established commitment to the promotion of Kiwi music. Unfortunately, Liz Barry, the program's knowledgeable and energetic host, will not be moving with the program which now also will originate from the new studios in Auckland. Barry has chosen to remain in Wellington.

A new three and a half hour books, arts and movies program is being developed for **Sunday afternoons** with Lynn Freeman as host, replacing the present weekday afternoon arts program *What's Going On?.*

Wayne's Music, with the aforementioned Mr. Mowat continuing as compere, moves from weekday afternoons but continues as a valuable part of the continuing nostalgia listening theme of **Saturday and Sunday evenings**.

No major changes are planned for **weekday or weekend mornings** (1800-0000 UT). National Radio's premier news and current affairs programs *Morning Report* and *Nine to Noon* with Linda Clark continue, as do weekend mainstays *Kim Hill* and *Chris Laidlaw*. Since RNZI programs a significant weekday morning block of its own for the Pacific island nations, overseas listeners on shortwave might not have noticed much difference anyway.

Reaction Positive

The Research International All New Zealand Radio Survey 2004 showed that **National Radio** was New Zealand's number one radio station in terms of nationwide audience market share among people aged 15 years and over. So, the obvious question is why tamper with that level of success?

Domestic critics have long argued that National Radio was dull and needed spicing up for younger listeners. These criticisms prompted a six month internal programming review involving all staff of Radio New Zealand. It determined that, "as a public service broadcaster, the network could further improve on its Charter objective to be relevant to the society it serves."

Commentators noted the changes were conservative, but most agreed a complete overhaul would have been dangerous. Auckland University of Technology radio lecturer Matt Mollgaard said any major changes would have provoked an outcry at the station. "It is still the number one station in New Zealand and its job is not to be flashy and commercially savvy, but to be completely reliable, as well as relevant, which is hard to do."

Geoff Lealand, Waikato University screen and media studies professor and National Radio listener, said National Radio could justifiably argue it was working well as the dominant station in New Zealand. "I do value National Radio but sometimes I want it to surprise me a bit more. I would want to hear some younger, newer voices and see more active provisions to get the younger audience in."

Christchurch Broadcasting School head Paul Norris applauded the decision to set up a more comprehensive web service (see http://www.rnzi.com) and the extension of Checkpoint.

But then again there are the seemingly obligatory references to a supposed liberal bias which appear to crop up everywhere successful and popular public service broadcasters exist (the U.S. being no exception as we have learned to our chagrin recently). National Party MP Murray McCully, who has frequently argued National Radio is politically biased, said the review seemed to be much ado about nothing. "I just find it baffling they could review themselves without coming to the conclusion they have an unremitting left-wing bias being dished up." Ahem.

And The Birdcalls

A unique and interesting aspect of National Radio has been the famous Radio New Zealand birdcalls, which began in 1948 with a recorded tui on shortwave broadcasts of what is now Radio New Zealand International and they have been a feature on domestic broadcasts since starting on Waitangi Day in the mid-70s. They currently sound just before the 7 am (1900 UT) and 9 am (2100 UT) news each weekday.

A minor tempest ensued one day some months ago when presenter Sean Plunket mentioned almost in passing just after 7 am on *Morning Report* that audience opinions on the fate of the birds was being sought, asking listeners rather innocently (he thought) if the twitterings should stay or go. This perceived threat to the birdcall's future prompted a deluge of listener support. He ended up having to urge listeners to stop clogging the phone lines and send e-mails instead. Almost 1700 e-mails saying "keep the birds" had poured in by the end of the day.

Almost needless to say, the birdcall survives. Not only will it been retained, it will be expanded and integrated in a new project which will build a sound library of field recordings reflecting the social, environmental and cultural diversity of New Zealand.

The changes, which are to include a new presenting style, will be launched on September 17.

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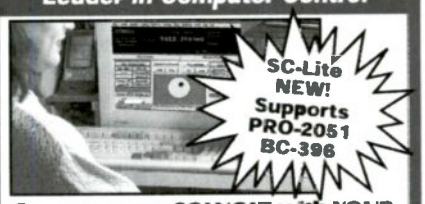

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The QSL Report

Gayle Van Horn, W4GVH
gaylevanhorn@monitoringtimes.com

QSLing Latin America

In next month's *MT* feature we will discuss DXing Central America. Here are a few tips to guide you towards the ultimate goal – those prized Latin QSLs.

Letters should be personal and conversational. State your purpose, but be polite and friendly. The QSL request should be placed in the first paragraph or near the end of your letter, but avoid the middle where it may be missed or ignored. A brief explanation defining a "QSL" will assist the smaller stations unfamiliar with the hobby.

Terms and abbreviations of the hobby should not be used when writing to most stations. You may lose a potential verification by confusing the signer. Tell a bit about yourself, hobby or profession, (but skip your latest health malady). Do a bit of research on the station or country, or include a question on either. A photo of your listening post or yourself is always a welcome and personal touch.

Finally, express the hope that your letter has been of interest or useful, and offer to report again. If you've created an interesting letter or report, you'll get that QSL, regardless of the station's past history, percentages or policy.

CLANDESTINE

Voice of Justice, 6120 kHz. Two QSL cards of Khaju Bridge in Esfahan and Khaneye Borujerdi, plus books and magazine. Received in 53 days for an English report, read on their letters program. Station address: P.O. Box 19395, 6767 Tehran, Iran. (Dan Malloy, Everett, MA)

EQUATORIAL GUINEA

Bata-Radio Africa, 15190 kHz. Full data studio pictures card. Received in 23 days for an English report and one US dollar. QSL address: Pan American Broadcasting, 2021 The Alameda Suite 240, San Jose, CA 95126-1145. Station address: Radio Africa, P.O. Box 851, Malabo, Equatorial Guinea. (Joe Wood, Greenback, TN)

GUATEMALA

Radio Amistad, 4700 kHz. No data Reception Report QSL certificate and letter from David Danielle-Media Consultant, plus religious literature. Prepared QSL card returned and signed as verified. Received in 58 days for an English letter and mint stamps. Station address: Ct. O Cronistas 200, Cd. Satelite, MX 53102 Mexico DF (or) c/o David Daniele, Aesorde Comunicaciones, Apartado Postal 25, Buleros MX, 53140 Mexico. (Frank Hillton, Charleston, SC)

Radio Verdad, 4052 kHz. Full data Templo card unsigned, plus pennant, ink pen, schedule, calendar, religious tract and two dollar receipt for my postage. Received in 28 days for an English report and two US dollars. Station address: Apartado 5, Chiquimula, Guatemala. (Bill Wilkins, Springfield, MO)

HONDURAS

HRPC-Radio Luz y Vida, 3250 kHz. Full data card signed by Donald R. Moore. Received in nine months for an English report and one US dollar. Station address: Apartado Postal 303, San Pedro Sula, Honduras. (Thomas Gibson, Spokane, WA)

MEDIUM WAVE

KLBO, 1330 kHz AM. Received bumper sticker with message "You heard us, thanks," signed by "J.B.", plus map of Monahans, Texas. Received in eight days for an AM report and an SASE. Station address: 1706 E. Sealy Ave., Monahans, TX 79756. (Patrick Martin, Seaside, OR)

KLTI, 1560 kHz AM. Note attached to night coverage map, signed by Dale Palmer-General Manager, plus station profile and business card. Received in eight days for an AM report and an SASE. Station address: 107 S. Main St., Brookfield, MO 64628-2101. (Martin, OR)

WIMA 1150 kHz AM. Full data color Reception Verification Certificate, signed by Mark D. Giehart-Director of Engineering, plus bumper sticker. Received in two weeks for an AM report and one US dollar. Station address: 667 W. Market Street, Lima, OH 45802. Report was for DX Test, but Mr. Gierhart says reports are always welcome. (Wilkins, MO)

Turks and Caicos Island; Caribbean Christian Radio-*Super Power 1020*, 1020 kHz. Full data QSL card, signed by Ron Gitschier Jr-QSL Manager. Received in 45 days for an AM report, tape of DX Test, and one US dollar. Station QSL address: 68 Roxboro Dr., Palm Coast, FL 32164. (Patrick Griffith, Westminister, CO)

PIRATE

Ann Hoffer Radio, 6925 kHz. Full data QSL card, post marked in Canada. Received in 19 days for report posted at **http://www.frn.net**. Report also sent to maildrop; P.O. Box 1, Belfast, NY 14895. (Dan Mallory, Everett, WA)

Pirate Radio Boston, 6925 kHz. Full data QSL signed by Charlie Loudenboomer, plus CD and play list. Received in nine days for an email to pirateboston@yahoo.com (Wood, TN)

South America-Radio Piraña Internacional, 6307.21 kHz. Two full data Pirana QSL cards signed by Jorge R. Garcia-Director, plus friendly Spanish letter, video CD and station photos. Received in ten months for a Spanish report. Pirate maildrop: c/o Ostra Porten 49-S, 4425 54 Ytterby, Sweden. **http://www.radiopirana.com/principal.htm** Email: rpi@radiopirana.com. (Brian Bagwell, St. Louis, MO)

SAIPAN

KFBS, 9465 kHz. Full data antennas and rainbow card unsigned, plus letter, schedule, bumper sticker and religious tract. Station address: P.O Box 500209, Saipan, MP 96950. (Wilkins, MO)

UKRAINE

Radio Ukraine Int'l, 7440 kHz. Full data QSL of Kyiv Street, unsigned, plus handwritten greetings from the staff on the back. Received in 43 days for an English report. Station address: Kreshchatik 26, 01001 Kyiv, Ukraine. (Jim Peltz, Arcadia, CA)

UNITED ARAB EMIRATES

WYFR-Family World Radio, 15520 kHz via Al Dhabayya. Full data Three Decades of Faithful Service-anniversary card, plus religious material, schedule and WYFR stickers. Received in 38 days for an English report. QSL address: Family Stations Inc., 290 Hegenberger Road, Oakland, CA 94621-1436 (or) P.O. Box 2140, Oakland, CA 94621-9985. **http://www.familyradio.com** (Edward Kusalik VE6EF, Alberta, Canada)

UNITED KINGDOM

WYFR-Family Radio, 13720 kHz via Skelton. Full data Anniversary card, plus same enclosures as UAE verification. Received in 38 days for an English report. QSL address: (see UAE/WYFR address) (Kusalik, CAN)

UTILITY

National Weather Service Station KCI95, 4125 kHz. Partial data letter signed by Nathan Foster-Meteorological Technician, plus info sheet, numerous NOAA and NWS pamplets and maps for Alaska. Metric conversion guide and book *Guide to Sea State, Wind and Clouds*, plus a business card received. Received in 22 days for a utility report, one US dollar and address label (both used). Station address: P.O. Box 68, Cold Bay, AK 99571. (Wilkins, MO)

How to Use the Shortwave Guide

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af

① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

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

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

Find the station you want to hear.

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

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

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

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

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

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

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

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

Target Areas

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

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Thank You ...

Additional Contributors to This Month's Shortwave Guide:

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Shortwave Broadcast Bands

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

Notes

Note 1 Tropical bands, 120/90/60 meters are for broadcast use only in designated tropical areas of the world.

Note 2 Broadcasters can use this frequency range on a (NIB) non-interference basis only.

Note 3 WARC-92 bands are allocated officially for use by HF broadcasting stations in 2007. They are only authorized on a non-interference basis until that date.

Note 4 WRC-03 update. After March 29, 2009, the spectrum from 7100-7200 kHz will no longer be available for broadcast purposes and will be turned over to amateur radio operations worldwide

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

0000	0015	vl	Cambadia, Natianal Radia	11940as		
0000	0015		Japan, Radia	6145na	13650as	17810as
			17825na			
0000	0027		Czech Rep, Radio Prague Intl	7345na	9440na	
0000	0030		Australia, Radia	9660as	12080as	13630pa
			15240pa	17715as	17750pa	17775pa
0000	0030		Burma, Dem Voice of Burma	9435eu		
0000	0030		Egypt, Radio Cairo	11885na		
0000	0030	mtwhfa	Serbia & Montenegro, Intl Radio	9580va		
0000	0030		Thailand, Radio	9570va		
0000	0030		UK, BBC World Service	3915as	5970as	
			6195as 9410as	9740as	11945as	11955as
			15280as	15310as	15360as	17655as
			17790as			
0000	0030		USA, Voice of America	7215va	12140as	
			15185va	15290va	17820va	
0000	0045		India, All India Radio	9705as	9950as	11620as
			11645as	13605as		
0000	0057		Canada, Radio Canada Intl	9690as		
0000	0059		Spain, Radia Exterior Espana	15385na		
0000	0100		Anguilla, Caribbean Beacon	6090am		
0000	0100		Australia, ABC NT Alice Springs	2310irr	4835do	
0000	0100		Australia, ABC NT Katherine	5025do		
0000	0100		Australia, ABC NT Tennant Creek	4910do		
0000	0100		Australia, HCJB	15525as		
0000	0100		Canada, CFRX Toronto ON	6070da		
0000	0100		Canada, CFVP Calgary AB	6030do		
0000	0100		Canada, CKZN St John's NF	6160do		
0000	0100		Canada, CKZU Vancouver BC	6160do		
0000	0100		Canada, Radio Canada Intl	9755am	11990am	
			13710am			
0000	0100		China, China Radia Intl	6020na	7180as	
			9570na 13600eu			
0000	0100		Casta Rica, University Network	5030va	6150va	
			7375va 9725va			
0000	0100		Cuba, Radio Havana	12000na		
0000	0100		Germany, Deutsche Welle	7130as	9505as	
			9825as			
0000	0100		Guyana, Voice of	3290do		
0000	0100		Malaysia, Radio	7295as		
0000	0100	vl	Namibia, Namibian BC Corp	3270da	3290do	
			6060do6175da			
0000	0100		Netherlands, Radio	9845na		
0000	0100		New Zealand, Radio NZ Intl	15720pa		
0000	0100	vl	Papua New Guinea, Wantok Radio Light		7120va	
0000	0100		Sierra Leone, Radio UNAMSIL	6137do		
0000	0100		Singapore, Mediacorp Radio	6150do		
0000	0100		UK, BBC World Service	5975am		
0000	0100		Ukraine, Radio Ukraine Intl	7440na		
0000	0100		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0000	0100		USA, KAIJ Dallas TX	5755na		
0000	0100		USA, KTBN Salt Lake City UT	7505na	15590na	
0000	0100		USA, KWHR Naalehu HI	17510as		
0000	0100		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0000	0100		USA, WBOH Newport NC	5920am		
0000	0100		USA, WEWN Birmingham AL	5810va	7425va	
			13615va			
0000	0100		USA, WHRA Greenbush ME	7520na		
0000	0100	mtwhf	USA, WHRI Noblesville IN	7490am	9515am	
0000	0100	as	USA, WHRI Noblesville IN	7315am		
0000	0100		USA, WINB Red Lion PA	9320am		
0000	0100		USA, WJIE Louisville KY	13595am		
0000	0100	twhfa	USA, WMLK Bethel PA 7385am			
0000	0100	sm	USA, WMLK Bethel PA 9955am			
0000	0100		USA, WTJC Newport NC	9370na		
0000	0100		USA, WWCR Nashville TN	3210na	5070na	
			7465na 9985na	13845na		
0000	0100		USA, WWRB Manchester TN	3185na	5050na	
			5085na 5745na	6890na		
0000	0100		USA, WYFR Okeechobee FL	6065na	9505as	
			11835na	17805na		
0000	0100		Zambia, Christian Voice	4965af		
0030	0045	s	Germany, Pan American BC	9740as		
0030	0100		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	17715as	17750pa
			17775as			
0030	0100	mtwhfs	Germany, Bible Voice Broadcasting	6010as		
0030	0100		Lithuania, Radio Vilnius	11690na		
0030	0100		Sri Lanka, SLBC	6005as	11905as	15745as
0030	0100		Thailand, Radio	5890na		
0030	0100		UK, BBC World Service	5970as	6195as	
			9410as 9740as	11955as	15280as	15310as
			15360as	17790as		
0030	0100		USA, Voice of America	7215va	9780va	
			11760va	15185va	15290va	17740va
			17820va			
0035	0100	sm	Austria, Radia Austria Intl	9870sa		
0043	0058	twhfa	Austria, Radio Austria Intl	9870sa		
0045	0100		Pakistan, Radio	9340as	11565as	
0055	0100		Italy, RAI Intl	11800na		

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

0100	0115		Italy, RAI Intl	11800na		
0100	0115		Pakistan, Radio	9340as	11565as	
0100	0127		Czech Rep, Radio Prague Intl	6200na	7345na	
0100	0128	s	Hungary, Radio Budapest	9560na		
0100	0128		Vietnam, Voice of	6175na		
0100	0129	s	Germany, Universal Life	9485as		
0100	0130		Australia, Radia	9660as	12080as	13630pa
			15240pa	15415pa	17715as	17750pa
			17775as			
0100	0130	mwfa	Belarus, Radio	5970eu	7210eu	
0100	0130	mtwhfa	Hungary, Radio Budapest	9590na		
0100	0130		Slovakia, Slovak Radio	5930na	9440am	
0100	0130		Uzbekistan, Radio Tashkent	7190as	9715as	
0100	0156		Romania, Radio Ramania Intl	6040na	9690na	
			11820na	15430na		
0100	0157		Netherlands, Radio	9845na		
0100	0159		Canada, Radio Canada Intl	9755am	11990am	
			13710am			
0100	0200		Anguilla, Caribbean Beacan	6090am		
0100	0200		Australia, ABC NT Katherine	5025do		
0100	0200		Australia, ABC NT Tennant Creek	4910do		
0100	0200		Australia, HCJB	15560as		
0100	0200		Australia, Voice Intl	7355as		
0100	0200		Canada, CFRX Taronto ON	6070do		
0100	0200		Canada, CFVP Calgary AB	6030do		
0100	0200		Canada, CKZN St John's NF	6160da		
0100	0200		Canada, CKZU Vancouver BC	6160do		
0100	0200		China, China Radio Intl	6005na	6020na	
			9570na 11870as	13640as		
0100	0200		Costa Rica, University Network	5030va	6150va	
			7375va 9725va			
0100	0200		Cuba, Radio Havana	6000na	9820na	12000na
0100	0200		Guyana, Voice of	3291do		
0100	0200		Indonesia, Voice of	9525as	11785pa	15150al
0100	0200		Japan, Radio	5960as	11860as	11935sa
			153235as	17560va	17685pa	17810as
			17825ca	17845as		
0100	0200		Malaysia, Radio	7295as		
0100	0200	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060do6175do			
0100	0200		New Zealand, Radio NZ Intl	15720pa		
0100	0200		North Korea, Voice of	7140as	9345as	
			9730am	11735am	13760as	15180as
0100	0200	vl	Papua New Guinea, Wantak Radio Light		7120va	
0100	0200		Russia, Voice of	7180na	7250na	9665na
			15545na	15555na		
0100	0200		Sierra Leone, Radio UNAMSIL	6137do		
0100	0200		Singapore, Mediacorp Radio	6150do		
0100	0200		Sri Lanka, SLBC	6005as	11905as	15745as
0100	0200		UK, BBC World Service	6195as	9410as	
			11955as	15310as	17790as	
0100	0200		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0100	0200		USA, KAIJ Dallas TX	5755na		
0100	0200		USA, KTBN Salt Lake City UT	7505na		
0100	0200		USA, KWHR Naalehu HI	17510as		
0100	0200		USA, Voice of America	7115va	9885va	
			11705va	11725va		
0100	0200		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0100	0200		USA, WBOH Newport NC	5920am		
0100	0200		USA, WEWN Birmingham AL	5810va	7425va	
			13615va			
0100	0200		USA, WHRA Greenbush ME	5850na		
0100	0200	mtwhf	USA, WHRI Noblesville IN	7490am	9515am	
0100	0200	as	USA, WHRI Noblesville IN	7315am		
0100	0200		USA, WINB Red Lion PA	9320am		
0100	0200		USA, WJIE Louisville KY	13595am		
0100	0200	twhfa	USA, WMLK Bethel PA 7385am			
0100	0200		USA, WTJC Newport NC	9370na		
0100	0200		USA, WWCR Nashville TN	3210na	5070na	
			5765na 13845na			
0100	0200		USA, WWRB Manchester TN	3185na	5050na	
			5085na 5745na	6890na		
0100	0200		USA, WYFR Okeechobee FL	6065na	9505as	
0100	0200		Zambia, Christian Voice	4965af		
0100	0200	sm	USA, WMLK Bethel PA 9955am			
0105	0130	sm	Austria, Radio Austria Intl	9870am		
0113	0130	twhfa	Austria, Radio Austria Intl	9870am		
0115	0130	a	Austria, Radia Austria Intl	9870sa		
0130	0200		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	17715as	17750pa
0130	0200	s	Belarus, Radio	5970eu	7210eu	
0130	0200		Iran, Voice of the Islamic Rep	9495am	11875am	
0130	0200		Sweden, Radio	6010na	9435va	
0130	0200	twhfa	USA, Vaice af America	7405va	9775va	
			13740va			
0133	0200	sm	Austria, Radio Austria Intl	9870me		

0140	0200		Vatican City, Vatican Radio	9650as	12055as
0143	0158	twhfa	Austria, Radio Austria Intl	9870na	
0145	0158	twhfas	Albania, Radio Tirana 6115eu	7160eu	

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

0200	0230		Austria, AWR Europe 9895as		
0200	0230	mtwfa	Belarus, Radio 5970eu	7210eu	
0200	0230	vl	Croatia, Croatian Radio	9925sa	
0200	0230		Iran, Voice of the Islamic Rep	9495am	11875am
0200	0300		Anguilla, Caribbean Beacon	6090am	
0200	0300	twhfa	Argentina, RAE 11710am		
0200	0300		Australia, ABC NT Alice Springs	2310irr	4835do
0200	0300		Australia, ABC NT Katherine	5025da	
0200	0300		Australia, ABC NT Tennant Creek	4910do	
0200	0300		Australia, HCJB 15560as		
0200	0300		Australia, Radio 9660as	12080as	13630pa
			15240pa 15415pa	15515as	17750pa
			21725pa		
0200	0300		Australia, Voice Intl 7355as		
0200	0300		Bulgaria, Radio 9700na	11700na	
0200	0300		Canada, CFRX Toronto ON	6070do	
0200	0300		Canada, CFVP Calgary AB	6030do	
0200	0300		Canada, CKZN St John's NF	6160do	
0200	0300		Canada, CKZU Vancouver BC	6160da	
0200	0300		China, China Radio Intl	9580na	
0200	0300		Costa Rica, University Network	5030va	6150va
			7375va 9725va		
0200	0300		Cuba, Radio Havana 6000na	9820na	12000na
0200	0300		Egypt, Radio Cairo 7260na		
0200	0300		Guyana, Voice of 3291do		
0200	0300		Malaysia, Radio 7295as		
0200	0300	vl	Namibia, Namibian BC Corp	3270do	3290do
			6060do 6175do		
0200	0300		New Zealand, Radio NZ Intl	15720pa	
0200	0300		North Korea, Voice of	4405as	13650as
			15100as		
0200	0300	vl	Papua New Guinea, Wantok Radio Light		7120va
0200	0300		Philippines, Radio Pilipinas	11885va	15270va
0200	0300		Russia, Voice of 5945me	7180na	9665na
			9860na 15545na 15555na	15595na	17660na
0200	0300		Sierra Leone, Radio UNAMSIL	6137do	
0200	0300		Singapore, Mediacorp Radio	6150do	
0200	0300		South Korea, Radio Korea Intl	9560va	11810sa
			15575va		
0200	0300		Sri Lanka, SLBC 6005as	11905as	15745as
0200	0300		Taiwan, Radio Taiwan Intl	5950na	9680na
			11875as 15465as		
0200	0300		UK, BBC World Service	5975am	9750af
			9825am 11760me	11955as	12095am
			15280as 15310as	15360as	17790as
0200	0300		USA, AFRTS 4319usb	5446usb	5765usb
			7590usb 7812usb	12133usb	12579usb
			12133usb 12579usb	13362usb	13855usb
0200	0300		USA, KAIJ Dallas TX 5755na		
0200	0300		USA, KJES Vado NM 7555na		
0200	0300		USA, KTBN Salt Lake City UT	7505na	
0200	0300		USA, KWHR Naalehu HI	17510as	
0200	0300	mtwhf	USA, Voice of America	7115va	9885va
			11705va 11725va		
0200	0300		USA, WBCQ Kennebunk ME	5105na	7415na
			9330na		
0200	0300		USA, WBOH Newport NC	5920am	
0200	0300		USA, WEWN Birmingham AL	5810va	7425va
			13615va		
0200	0300		USA, WHRA Greenbush ME	5850na	
0200	0300	mtwhf	USA, WHRI Noblesville IN	7490am	9515am
0200	0300	as	USA, WHRI Noblesville IN	7315am	
0200	0300		USA, WINB Red Lion PA	9320am	
0200	0300		USA, WJIE Louisville KY	13595am	
0200	0300	twhfa	USA, WMLK Bethel PA 7385am		
0200	0300	sm	USA, WMLK Bethel PA 9955am		
0200	0300		USA, WTJC Newport NC	9370na	
0200	0300		USA, WWCR Nashville TN	3210na	5070na
			5765na 5935na		
0200	0300		USA, WWRB Manchester TN	3185na	5050na
			5085na 5745na 6890na		
0200	0300		USA, WYFR Okeechobee FL	5985na	6065na
			9505na 11835na 11855na		
0200	0300		Zambia, Christian Voice	4965af	
0215	0230		Nepal, Radio 3230as	5005as	6100as
			7165as		
0230	0258	twhfas	Albania, Radio Tirana 6115eu	7160eu	
0230	0258		Hungary, Radio Budapest	9795na	
0230	0258		Vietnam, Voice of 6175na		
0230	0300	s	Belarus, Radio 5970eu	7210eu	
0230	0300		Sweden, Radio 6010na		
0245	0300		Myanmar, Radio 9730do		
0250	0300		Vatican City, Vatican Radio	7305am	9605am
0256	0300		Turkey, Voice of 6140va	7270va	

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

0300	0320		Vatican City, Vatican Radio	7305am	9605am
0300	0327		Czech Rep, Radio Prague Intl	7345na	9870na
0300	0330		Egypt, Radio Cairo 7260na		
0300	0330		Myanmar, Radio 9730do		
0300	0330		Philippines, Radio Pilipinas	11885va	15270va
0300	0330		Thailand, Radio 5890na		
0300	0330		USA, KJES Vado NM 7555na		
0300	0330		USA, Voice of America 4930af	6080af	7290af 7340af
			9885af 12080af 17895af		
0300	0330		Vatican City, Vatican Radio	9660af	
0300	0350		Turkey, Voice of 6140va	7270va	
0300	0355		South Africa, Channel Africa	6150af	
0300	0400		Anguilla, Caribbean Beacon	6090am	
0300	0400		Australia, ABC NT Alice Springs	2310irr	4835do
0300	0400		Australia, ABC NT Katherine	5025da	
0300	0400		Australia, ABC NT Tennant Creek	4910do	
0300	0400		Australia, Radio 9660as	12080as	13630pa
			15240pa 15415pa	15515as	17750pa
			21725pa		
0300	0400		Australia, Voice Intl 13685as		
0300	0400	DRM	Canada, BBC World Service	11955na	
0300	0400	twhfas	Canada, CBC NQ SW Service	9625na	
0300	0400		Canada, CFRX Toronto ON	6070do	
0300	0400		Canada, CFVP Calgary AB	6030do	
0300	0400		Canada, CKZN St John's NF	6160do	
0300	0400		Canada, CKZU Vancouver BC	6160do	
0300	0400		China, China Radio Intl	9690am	9790am
			11870as 15110as		
0300	0400		Costa Rica, University Network	5030va	6150va
			7375va 9725va		
0300	0400		Cuba, Radio Havana 6000na	9820na	
0300	0400		Guyana, Voice of 3291do		
0300	0400		Japan, Radio 21610pa		
0300	0400		Malaysia, Radio 7295as		
0300	0400		Malaysia, Voice of 6175as	9750as	15295as
0300	0400	vl	Namibia, Namibian BC Corp	3270da	3290da
			6060do 6175do		
0300	0400		New Zealand, Radio NZ Intl	15720pa	
0300	0400		North Korea, Voice of 3560as	7140as	9345as
			9730as		
0300	0400	vl	Papua New Guinea, Wantok Radio Light		7120va
0300	0400		Russia, Voice of 5900na	7180na	9665na
			9860na 15545na 15555na	15595na	17660na
0300	0400	vl	Rwanda, Radio 6055do		
0300	0400		Sierra Leone, Radio UNAMSIL	6137do	
0300	0400		Singapore, Mediacorp Radio	6150da	
0300	0400		South Africa, Channel Africa	3345af	
0300	0400		Sri Lanka, SLBC 6005as	11905as	15745as
0300	0400		Taiwan, Radio Taiwan Intl	5950na	15215va
			15320va		
0300	0400	vl	Uganda, Radio 4976da	5026do	7196da
0300	0400		UK, BBC World Service	3255af	5975am
			6005af 6190af 6195eu	7160af	9410eu
			9750af 11760me 17760as	11765af	12035af
			12095as 15280as	15310as	15420af
			15575me 17760as	17790as	21660as
0300	0400	vl/ mtwhf	UK, Sudan Radio Service	9625va	
0300	0400		Ukraine, Radio Ukraine Intl	7440na	
0300	0400		USA, AFRTS 4319usb	5446usb	5765usb
			7590usb 7812usb	12133usb	12579usb
			12133usb 12579usb	13362usb	13855usb
0300	0400		USA, KAIJ Dallas TX 5755na		
0300	0400		USA, KTBN Salt Lake City UT	7505na	
0300	0400		USA, KWHR Naalehu HI	17510cs	
0300	0400		USA, WBCQ Kennebunk ME	5105na	7415na
			9330na		
0300	0400		USA, WBOH Newport NC	5920am	
0300	0400		USA, WEWN Birmingham AL	5810va	7425va
			13615va		
0300	0400		USA, WHRA Greenbush ME	5850na	
0300	0400	mtwhf	USA, WHRI Noblesville IN	5835am	7465am
0300	0400	as	USA, WHRI Noblesville IN	7315am	
0300	0400		USA, WINB Red Lion PA	9320am	
0300	0400		USA, WJIE Louisville KY	13595am	
0300	0400		USA, WMLK Bethel PA 7385am		
0300	0400		USA, WTJC Newport NC	9370nc	
0300	0400		USA, WWCR Nashville TN	3210na	5070na
			5765na 5935na		
0300	0400		USA, WWRB Manchester TN	3185na	5050na
			5085na 5745na 6890na		
0300	0400		USA, WYFR Okeechobee FL	6065na	9505na
			11740na 15255na		
0300	0400		Zambia, Christian Voice	4965af	
0300	0400	vl	Zimbabwe, ZBC Corp 5975do		
0330	0345		Hungary, Radio Budapest	6025eu	9655eu
0330	0345		Israel, Kol Israel 9345va	11605va	17600va
0330	0357		Czech Rep, Radio Prague Intl	9445va	11600va
0330	0358		Vietnam, Voice of 6175am		
0330	0400		UAE, Emirates Radio 12005na	13675na	15400na
0330	0400	mtwhf	USA, Voice of America 7290af	12080af	17895af
0330	0400		USA, Voice of America 4930af	6080af	9885af

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

0400	0430		Australia, Radio 15240pa	9660as 15515pa	12080as 17750pa	13630pa 21725pa
0400	0430		France, Radio France Intl		7315af	11700af
0400	0430		Sri Lanka, SLBC	6005as	11905as	15745as
0400	0430		USA, Voice of America 6080af 7290af 12080af	9575af 17895af	4930af	4960af 9885af 11835af
0400	0456		Romania, Radio Romania Intl 15140va	17860va	9780va	11820va
0400	0457		Netherlands, Radio	6165na	9590na	
0400	0458		New Zealand, Radio NZ Intl		15720pa	
0400	0500		Anguilla, Caribbean Beacon		6090am	
0400	0500		Australia, ABC NT Alice Springs		2310irr	4835do
0400	0500		Australia, ABC NT Katherine		5025do	
0400	0500		Australia, ABC NT Tennant Creek		4910do	
0400	0500		Australia, Voice Intl	13685as		
0400	0500	twhfas	Canada, CBC NQ SW Service		9625na	
0400	0500		Canada, CFRX Toronto ON		6070do	
0400	0500		Canada, CKZN St John's NF		6160do	
0400	0500		Canada, CKZU Vancouver BC		6160do	
0400	0500		China, China Radio Intl 9755na		9590na	9690na
0400	0500		Costa Rica, University Network 7375va 9725va		5030va	6150va
0400	0500		Cuba, Radio Havana	6000na	9820na	
0400	0500		Germany, Deutsche Welle 15445as		7170af	11945as
0400	0500		Guyana, Voice of	3291do		
0400	0500		Malaysia, Radio	7295as		
0400	0500		Malaysia, Voice of	6175as	9750as	15295as
0400	0500	vl	Namibia, Namibian BC Corp 6060do6175do		3270do	3290do
0400	0500		Nigeria, Radio/Kaduna		6090do	
0400	0500	vl	Papua New Guinea, Wantok Radio Light			7120va
0400	0500		Russia, Voice of 15555na	5900na 15595na	7180na 17660na	15545na
0400	0500	vl	Rwanda, Radio	6055do		
0400	0500		Sierra Leone, Radio UNAMSIL		6137do	
0400	0500		Singapore, Mediacorp Radio		6150do	
0400	0500		South Africa, Channel Africa		3345af	
0400	0500	vl	Uganda, Radio	4976do	5026do	7196do
0400	0500		UK, BBC World Service 6195eu 7160af 11760me 15280as 17760as	9410va 15360as 17790as	3255af 11760eu 12035af 15420af	6005af 9410va 15310as 15575me 21660as
0400	0500	vl/ mtwhf	UK, Sudan Radio Service		9625va	
0400	0500		USA, AFRTS 7590usb 12133usb	4319usb 12579usb	5446usb 13362usb	5765usb 13855usb
0400	0500		USA, KAIJ Dallas TX	5755na		
0400	0500		USA, KTBN Salt Lake City UT		7505na	
0400	0500		USA, KWHR Naalehu HI		17510as	
0400	0500		USA, WBCQ Kennebunk ME 9330na		5105na	7415na
0400	0500		USA, WBOH Newport NC		5920am	
0400	0500		USA, WEWN Birmingham AL 13615va		5810va	7425va
0400	0500		USA, WHRA Greenbush ME		5850na	
0400	0500	mtwhf	USA, WHRI Noblesville IN		5835am	7465am
0400	0500	as	USA, WHRI Noblesville IN		5835am	
0400	0500		USA, WJIE Louisville KY		13595am	
0400	0500		USA, WMLK Bethel PA	9265eu	9955eu	
0400	0500		USA, WMLK Bethel PA	7385am		
0400	0500		USA, WTJC Newport NC		9370na	
0400	0500		USA, WWCR Nashville TN 5765na 5935na		3210na	5070na
0400	0500		USA, WWRB Manchester TN 5085na 5745na	6890na	3185na	5050na
0400	0500		USA, WYFR Okeechobee FL 7355eu 9505eu	9715eu	6065na	6855eu
0400	0500		Zambia, Christian Voice		4965af	
0400	0500	vl	Zimbabwe, ZBC Corp	5975do		
0430	0500		Australia, Radio 15240pa 21725pa	9660as 15415pa	12080as 15515va	13630pa 17750pa
0430	0500		Nigeria, Radio/Ibadan		6050do	
0430	0500		Nigeria, Radio/Kaduna		4770do	
0430	0500		Nigeria, Radio/Lagos	3326do	4990do	
0430	0500		Serbia & Montenegro, Intl Radio		9580va	
0430	0500		Swaziland, TWR	3200af	4775af	
0430	0500		USA, Voice of America 7290af 9575af	11835af	4930af 12080af	4960af 17895af
0445	0500		Italy, RAI Intl	6110af	7235af	9800af
0455	0500		Vatican City, Vatican Radio		11625af	13765af
0459	0500		New Zealand, Radio NZ Intl		11820pa	

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

0500	0507	twhfas	Canada, CBC NQ SW Service	9625na
0500	0520		Vatican City, Vatican Radio	4005eu 5885eu7250eu
0500	0530		Australia, Radio 15160pa	9660as 15240pa 12080as 15515va 13630pa 17750pa
0500	0530		France, Radio France Intl	9825af 15160af
0500	0530	vl	Rwanda, Radio	6055do
0500	0530		UK, BBC World Service 11765af11940af 12095va 15575me	6005af 11955me 15280as 17760as	6190af 11765af 15310as 17790as	7160af 12035af 15420af 21660as
0500	0530		UK, BBC World Service 11765af11940af 15360as 17885af21660as	6005af 11955as 17640af	6195af 15280as 17760as	7160af 9410va 15310as 17790as
0500	0530		Vatican City, Vatican Radio		9660af	
0500	0555		South Africa, Channel Africa		9685af	
0500	0600		Anguilla, Caribbean Beacon		6090am	
0500	0600		Australia, ABC NT Alice Springs		2310irr	4835da
0500	0600		Australia, ABC NT Katherine		5025do	
0500	0600		Australia, ABC NT Tennant Creek		4910do	
0500	0600		Australia, Voice Intl	13685as		
0500	0600	DRM	Austria, Virgin Radio	9720eu		
0500	0600		Canada, CFRX Toronto ON		6070do	
0500	0600		Canada, CKZN St John's NF		6160do	
0500	0600		Canada, CKZU Vancouver BC		6160da	
0500	0600		China, China Radio Intl 11710af11880as 17540as	6190na 15350as	9560na 15465as	9590af 17505af
0500	0600		Costa Rica, University Network 9725va		5030va	6150va7375va
0500	0600		Cuba, Radio Havana 11760va	6000va	6060va	9550va
0500	0600		Germany, Deutsche Welle 15410af17800af		9630af	9700af
0500	0600		Guyana, Voice of	3291do		
0500	0600		Japan, Radio 15195as	5975eu 17810as	6110na 21755pa	7230eu
0500	0600		Malaysia, Radio	7295as		
0500	0600		Malaysia, Voice of	6175as	9750as	15295as
0500	0600	vl	Namibia, Namibian BC Corp 6060da 6175da		3270da	3290do
0500	0600		New Zealand, Radio NZ Intl		11820pa	
0500	0600		Nigeria, Radio/Ibadan	6050do		
0500	0600		Nigeria, Radio/Kaduna	4770do	6090do	
0500	0600		Nigeria, Radio/Lagos	3326do	4990da	
0500	0600		Nigeria, Voice of	15120af		
0500	0600	vl	Papua New Guinea, Wantok Radio Light			7120va
0500	0600		Russia, Voice of	17665pa	21790pa	
0500	0600		Sierra Leone, Radio UNAMSIL		6137do	
0500	0600		Singapore, Mediacorp Radio		6150da	
0500	0600		South Africa, Channel Africa		7240af	
0500	0600		Swaziland, TWR	3200af	4775af	9500af
0500	0600	vl	Uganda, Radio	4976do	5026do	7196do
0500	0600		UK, BBC World Service 15565eu	6195eu 15575me	11760me	12095eu
0500	0600	vl/ mtwhf	UK, Sudan Radio Service		11795va	
0500	0600		USA, AFRTS 7590usb 12133usb	4319usb 12579usb	5446usb 13362usb	5765usb 13855usb
0500	0600		USA, KAIJ Dallas TX	5755na		
0500	0600		USA, KTBN Salt Lake City UT		7505na	
0500	0600		USA, KWHR Naalehu HI		9510as	17510as
0500	0600		USA, Voice of America 12080af13645af	4930af	6080af	6180af 7290af
0500	0600		USA, WBCQ Kennebunk ME		7415na	
0500	0600		USA, WBOH Newport NC		5920am	
0500	0600		USA, WEWN Birmingham AL		5850va	7425va
0500	0600		USA, WHRA Greenbush ME		7490na	
0500	0600		USA, WHRI Noblesville IN		7315am	7465am
0500	0600		USA, WJIE Louisville KY	13595am		
0500	0600		USA, WMLK Bethel PA	9265eu	9955eu	
0500	0600		USA, WRMI Miami FL	7385am		
0500	0600		USA, WTJC Newport NC		9370na	
0500	0600		USA, WWCR Nashville TN 5765na 5935na		3210na	5070na
0500	0600		USA, WWRB Manchester TN 5085na 5745na		3185na	5050na
0500	0600		USA, WYFR Okeechobee FL		6855eu	9355eu
0500	0600		Zambia, Christian Voice	4965af		
0500	0600	vl	Zimbabwe, ZBC Corp	5975do		
0505	0520	m	Austria, Radio Austria Intl		17870me	
0505	0530	as	Austria, Radio Austria Intl		17870me	
0515	0600		Zambia, Christian Voice	9555af		
0525	0600	vl	Ghana, Ghana BC Corp		3366do	4915da
0530	0600		Australia, Radio 15160pa 17750as	9660as 15240va	12080as 15415as	13630as 15515pa
0530	0600		Thailand, Radio	17690va		
0530	0600		UK, BBC World Service 11765af11940af 15420af17640af	6005af 11955as 17760as	6190af 15310as 17790as	7160af 9410af 15360as 21660as
0530	0600	mtwhf	UK, BBC World Service	17885af		
0545	0600	twh	Austria, Radio Austria Intl		17870me	
0545	0600	vl	Rwanda, Radio	6055do		

Shortwave Guide

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

0600	0605	vl	Croatia, Croatian Radia		13820na	
0600	0615	as	South Africa, TWR	11640af		
0600	0630		France, Radia France Intl 17800af		11665af	15160af
0600	0645	mtwhf	South Africa, TWR	11640af		
0600	0655		South Africa, Channel Africa		15440af	
0600	0700		Anguilla, Caribbean Beacon		6090am	
0600	0700		Australia, ABC NT Alice Springs		2310irr	4835do
0600	0700		Australia, ABC NT Katherine		5025do	
0600	0700		Australia, ABC NT Tennant Creek		4910do	
0600	0700		Australia, Radio 15160pa	9660as 15240va	12080as 15415as	13630as 15515pa 17750va
0600	0700		Australia, Voice Intl	15335as		
0600	0700	DRM	Austria, Virgin Radio	9720eu		
0600	0700		Canada, CFRX Toronto ON		6070do	
0600	0700		Canada, CFVP Calgary AB		6030do	
0600	0700		Canada, CKZN St John's NF		6160do	
0600	0700		Canada, CKZU Vancouver BC		6160do	
0600	0700		China, China Radio Intl 11880as	9590af 13620me	11710af 15350as	11870me 15465as 17490eu 17505af 17540as
0600	0700		Costa Rica, University Network 9725va 11870va		5030va	6150va7375va
0600	0700		Cuba, Radio Havana 11760va	6000va	6060va	9550va
0600	0700		Germany, Deutsche Welle 15275af	17860af	6140eu	7170af
0600	0700	vl	Ghana, Ghana BC Corp		3366do	4915do
0600	0700		Guyana, Voice of	3291do		
0600	0700		Japan, Radio 11760as 21755pa	7230eu 13630va	11715as 15195as	11740as 17870pa
0600	0700		Liberia, ELWA	4760do		
0600	0700		Malaysia, Radio	7295cs		
0600	0700		Malaysia, Voice of	6175cs	9750as	15295as
0600	0700	vl	Namibia, Namibian BC Corp 6060do 6175do		3270do	3290co
0600	0700		New Zealand, Radio NZ Intl		11820pa	
0600	0700		Nigeria, Radio/Ibadan	6050do		
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do	
0600	0700		Nigeria, Radio/Lagos	3326co	4990do	
0600	0700		Nigeria, Voice of	15120af		
0600	0700	vl	Papua New Guinea, Wantok Radio Light			7120va
0600	0700		Russia, Voice of	17665pa	21790pa	
0600	0700	DRM	Russia, Voice of	15780eu		
0600	0700		Sierra Leone, Radio UNAMSIL		6137do	
0600	0700	irreg/ vl	Sierra Leone, SLBS	3316do		
0600	0700		Singapore, Mediacorp Radio		6150do	
0600	0700	vl	Solomon Islands, SIBC	5020do	9545do	
0600	0700		South Africa, Channel Africa		7240af	
0600	0700		Swaziland, TWR	4775af	6120af	9500af
0600	0700		UK, BBC World Service 11765as 15310as 15575me	6190af 11940af 15360as 17640af	7160af 11955as 15400af 17790as	9410va 12095as 15565as 21660as
0600	0700	as	UK, BBC World Service	17885af		
0600	0700		USA, AFRTS 7590usb 12133usb	4319usb 7812usb 12579usb	5446usb 12133usb 13362usb	5765usb 12579usb 13855usb
0600	0700		USA, KAIJ Dallas TX	5755na		
0600	0700		USA, KTBN Salt Lake City UT		7505na	
0600	0700		USA, KWHR Naalehu HI		9510as	13700as
0600	0700		USA, Voice of America 12080af	6080af 13645af	6180af	7290af
0600	0700		USA, WBCQ Kennebunk ME		7415na	
0600	0700		USA, WBOH Newport NC		5920am	
0600	0700		USA, WEWN Birmingham AL		5850va	7425va7570va
0600	0700		USA, WHRA Greenbush ME		7490na	
0600	0700		USA, WHRI Noblesville IN		7315am	7465am
0600	0700		USA, WJIE Louisville KY	13595am		
0600	0700		USA, WMLK Bethel PA	9265eu	9955eu	
0600	0700		USA, WRMI Miami FL	7385am		
0600	0700		USA, WTJC Newport NC		9370na	
0600	0700		USA, WWCR Nashville TN 5765na 5935na		3210na	5070na
0600	0700		USA, WWRB Manchester TN		3185na	
0600	0700		USA, WYFR Okeechobee FL 9680eu 11530eu	11580eu	5810eu	7355eu
0600	0700	vl	Vanuatu, Radio	4960do		
0600	0700		Yemen, Rep of Yemen Radio		9780me	
0600	0700		Zambia, Christian Voice		9555af	
0600	0700	vl	Zimbabwe, ZBC Corp	5975do		
0630	0645		Vatican City, Vatican Radio 9645eu 11740ca	15595ca	4005af	5885af 7250af
0630	0656		Romania, Radio Romania Intl		9655eu	11830eu
0630	0700		Bulgaria, Radio	11600eu	13600eu	
0630	0700	s	Germany, Bible Voice Broadcasting		5945eu	
0630	0700		Vatican City, Vatican Radio 15570va		11625af	13765ca
0645	0700	s	Albania, TWR	11865eu		
0645	0700	s	Monaco, TWR	9870eu		

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

0700	0705		New Zealand, Radio NZ Intl		11820pa	
0700	0727		Czech Rep, Radio Prague Intl		9880eu	11600eu
0700	0730		Slovakia, Slavak Radio		9440va	15460po
0700	0730		UK, BBC World Service		11760me	15575me
0700	0800	mtwhf	Albania, TWR	11865eu		
0700	0800		Anguilla, Caribbean Beacon		6090am	
0700	0800		Australia, ABC NT Alice Springs		2310irr	4835do
0700	0800		Australia, ABC NT Katherine		5025do	
0700	0800		Australia, ABC NT Tennant Creek		4910do	
0700	0800		Australia, HCJB	11750ou		
0700	0800		Australia, Radio 15160pa	9660as 15240va	12080as 15415as	13630as 17750pa
0700	0800		Australia, Voice Intl	15335as		
0700	0800	DRM	Austria, Virgin Radio	9720eu		
0700	0800		Canada, CFRX Toronto ON		6070do	
0700	0800		Canada, CFVP Calgary AB		6030do	
0700	0800		Canada, CKZN St John's NF		6160do	
0700	0800		Canada, CKZU Vancouver BC		6160do	
0700	0800		China, China Radio Intl 15350as		11880as 15465as	13710eu 17490eu
0700	0800		Costa Rica, University Network 7375va 9725va		5030va 11870va	6150va
0700	0800		Eqt Guinea, Radio Africa		15190af	
0700	0800		France, Radio France Intl		15605af	
0700	0800	as	Germany, Bible Voice Broadcasting		5945eu	
0700	0800		Germany, Deutsche Welle		6140eu	
0700	0800	vl	Ghana, Ghana BC Corp		3366do	4915do
0700	0800		Guyana, Voice of	3291do	5950do	
0700	0800	vl/as	Italy, IRRS 13840va			
0700	0800		Liberia, ELWA	4760do		
0700	0800		Malaysia, Radio	7295as		
0700	0800		Malaysia, Voice of	6175as	9750as	15295as
0700	0800	mtwhfa	Monaco, TWR	9870eu		
0700	0800		Myanmar, Radio	9730do		
0700	0800	vl	Namibia, Namibian BC Corp 6060do6175do		3270do	3290do
0700	0800		Nigeria, Radio/Ibadan		6050do	
0700	0800		Nigeria, Radio/Kaduna		4770do	6090do
0700	0800		Nigeria, Radio/Lagos	3326do	4990do	
0700	0800	vl	Papua New Guinea, Wantok Radio Light			7120va
0700	0800		Russia, Voice of	17495pa	17635pa	21790pa
0700	0800	DRM	Russia, Voice of	15780eu		
0700	0800		Sierra Leone, Radio UNAMSIL		6137do	
0700	0800	irreg/ vl	Sierra Leone, SLBS	3316do		
0700	0800		Singapore, Mediacorp Radio		6150do	
0700	0800	vl	Solomon Islands, SIBC	5020do	9545do	
0700	0800		South Africa, Channel Africa		7240af	
0700	0800	DRM	Sri Lanko, Deutsche Welle		21675as	
0700	0800		Swaziland, TWR	4775af	6120af	9500af
0700	0800		Swaziland, TWR	4775af	6120af	9500af
0700	0800		Taiwan, Radio Taiwan Intl		5950no	
0700	0800		UK, BBC World Service 11940af 15310as 17760as	11765af 15360as 17790as	11955as 15400af 17830af	12095af 15485af 21660as
0700	0800		USA, AFRTS 7590usb 12133usb	4319usb 7812usb 12579usb	5446usb 12133usb 13362usb	5765usb 12579usb 13855usb
0700	0800		USA, KAIJ Dallas TX	5755na		
0700	0800		USA, KTBN Salt Lake City UT		7505na	
0700	0800		USA, KWHR Naalehu HI		9510as	13700as
0700	0800		USA, Voice of America 13645af		6080af	7290af
0700	0800		USA, WBOH Newport NC		5920am	
0700	0800		USA, WEWN Birmingham AL 7570va		5850va	7475va
0700	0800		USA, WHRI Noblesville IN		7315am	7465am
0700	0800		USA, WJIE Louisville KY		13595am	
0700	0800		USA, WMLK Bethel PA	9265eu	9955eu	
0700	0800		USA, WRMI Miami FL	7385am		
0700	0800		USA, WTJC Newport NC		9370na	
0700	0800		USA, WWCR Nashville TN 5765na 5935na		3210na	5070na
0700	0800		USA, WWRB Manchester TN		3185na	
0700	0800		USA, WYFR Okeechobee FL 7355va 9505va	9715va	5985va	6855va 9930va
0700	0800	vl	Vanuatu, Radio	4960do		
0700	0800		Zambia, Christian Voice		9555af	
0706	0800		New Zealand, Radio NZ Intl		9885pa	
0715	0750	a	Albania, TWR	11865eu		
0715	0750	a	Monaco, TWR	9870eu		
0730	0800		Georgia, Radio Georgio		11805eu	
0730	0800	as	Guam, TWR/KTWR	15255as		
0730	0800	as	UK, BBC World Service		15575me	17885af
0740	0800	mtwhf	Guam, TWR/KTWR	15225as		

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

0800	0820	mtwhfs	Albania, TWR	11865eu		
0800	0820	s	Monaco, TWR	9870eu		

0800	0830		Australia, ABC NT Katherine	5025do		
0800	0830		Australia, ABC NT Tennant Creek	4910do		
0800	0830		Australia, Radia	5995as	9580as	9590as
			9710as 12080pa	13630pa	15240pa	17750pa
0800	0830	as	Australia, Radio	15415va		
0800	0830		Liberia, ELWA	4760da		
0800	0830		Malaysia, Voice of	6175as	9750as	
0800	0830		Myanmar, Radio	9730do		
0800	0830		Swaziland, TWR	4775af	6120af	9500af
0800	0845	as	Germany, Bible Voice Broadcasting	5945eu		
0800	0900		Anguilla, Caribbean Beacon	6090am		
0800	0900		Australia, ABC NT Alice Springs	2310irr	4835do	
0800	0900		Australia, HCJB	11750au		
0800	0900		Australia, Voice Intl	15335as		
0800	0900	DRM	Austria, Virgin Radio	9720eu		
0800	0900		Canada, CFRX Toronto ON	6070do		
0800	0900		Canada, CFVP Calgary AB	6030do		
0800	0900		Canada, CKZN St John's NF	6160do		
0800	0900		Canada, CKZU Vancouver BC	6160do		
0800	0900		China, China Radio Intl	11880as	13710eu	
			15350as	15465as	17490eu	17540as
0800	0900		Costa Rica, University Network	5030va	6150va	
			7375va 9725va	11870va		
0800	0900		Eqt Guinea, Radio Africa	15190af		
0800	0900		Germany, Deutsche Welle	6140eu		
0800	0900	vl	Ghana, Ghana BC Corp	3366do	4915do	
0800	0900	mtwhf	Guam, TWR/KTWR	11840as	15225as	
0800	0900		Guyana, Voice of	3291do	5950da	
0800	0900		Indonesia, Voice of	9525as	11785pa	15150al
0800	0900	vl/as	Italy, IRRS 13840va	15725al		
0800	0900		Malaysia, Radio	7295as		
0800	0900		Malaysia, Voice of	15295as		
0800	0900		New Zealand, Radio NZ tntl	9885pa		
0800	0900		Nigeria, Radio/Ibadan	6050do		
0800	0900		Nigeria, Radio/Kaduna	4770da	6090do	
0800	0900		Nigeria, Radio/Lagos	3326do	4990do	
0800	0900	vl	Pakistan, Radio	15100eu	15190eu	17835eu
0800	0900		Papua New Guinea, Catholic Radio			4960do
0800	0900		Papua New Guinea, NBC	4890do		
0800	0900	vl	Papua New Guinea, Wantok Radio Light			7120va
0800	0900		Russia, Voice of	17495pa	17635pa	21790pa
0800	0900	DRM	Russia, Voice of	15780eu		
0800	0900		Sierra Leone, Radio UNAMSIL	6137do		
0800	0900	irreg/ vl	Sierra Leone, SLBS	3316do		
0800	0900		Singapore, Mediacorp Radio	6150do		
0800	0900	vl	Solomon Islands, SIBC	5020do	9545do	
0800	0900	s	South Africa, Radio League	7205af	17565af	
0800	0900		South Korea, Radio Korea Intl	9570as	9640eu	
0800	0900	DRM	Sri Lanka, Deutsche Welle	21675as		
0800	0900		Taiwan, Radio Taiwan Intl	9610pa		
0800	0900		UK, BBC World Service	6190af	11760me	
			11940af	11955as	15310as	15360as
			15400af	15485af	15575me	17640eu
			17760as	17790as	17830af	17885af
			21470af	21660as		
0800	0900		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0800	0900		USA, KAIJ Dallas TX	5755na		
0800	0900		USA, KNLS Anchar Point AK	11870as		
0800	0900		USA, KTBN Salt Lake City UT	7505na		
0800	0900		USA, KWHR Naalehu HI	9510as	13700as	
0800	0900		USA, Voice of America	6080af	7290af	
			13645af			
0800	0900		USA, WBOH Newport NC	5920am		
0800	0900		USA, WEWN Birmingham AL	5850va	7425va	
			7570va			
0800	0900		USA, WHRI Noblesville IN	7315am	7520am	
0800	0900		USA, WJIE Louisville KY	13595am		
0800	0900		USA, WMLK Bethel PA	9265eu	9955eu	
0800	0900		USA, WRMI Miami FL	7385am		
0800	0900		USA, WTJC Newport NC	9370na		
0800	0900		USA, WWCR Nashville TN	3210na	5070na	
			5765na 5935na			
0800	0900	s	USA, WWRB Manchester TN	9320na		
0800	0900		USA, WWRB Manchester TN	3185na	5085na	
0800	0900		USA, WYFR Okeechobee FL	5950af	5985af	
			6855af 9930af			
0800	0900	vl	Vanuatu, Radio	4960da		
0800	0900		Zambia, Christian Voice	9555af		
0815	0900	as	Guam, TWR/KTWR	11840as		
0830	0900		Australia, ABC NT Katherine	2485do		
0830	0900		Australia, ABC NT Tennant Creek	2325do		
0830	0900		Australia, Radio	5995as	9580as	9590as
			9710as 12080pa	13630pa	15240pa	15415pa
			17750pa			

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

0900	0915	vl	Ghana, Ghana BC Corp	3366do	4915do	
0900	0927		Czech Rep, Radio Prague Intl	21745va		
0900	0930		Australia, Radio	9580as	9590as	15240as
0900	0930	as	Australia, Radio	15415va		
0900	0930		Guam, TWR/KTWR	11840as		
0900	1000		Anguilla, Caribbean Beacon	6090am		
0900	1000		Australia, ABC NT Alice Springs	2310da	4835irr	
0900	1000		Australia, ABC NT Katherine	2485da		
0900	1000		Australia, ABC NT Tennant Creek	2325da		
0900	1000		Australia, HCJB	11750au		
0900	1000		Australia, Voice Intl	11955as		
0900	1000	DRM	Austria, Asian Sound	11815eu		
0900	1000		Canada, CFRX Toronto ON	6070da		
0900	1000		Canada, CFVP Calgary AB	6030do		
0900	1000		Canada, CKZN St John's NF	6160do		
0900	1000		Canada, CKZU Vancouver BC	6160do		
0900	1000		China, China Radio Intl	15210pa	17490eu	
			17690pa			
0900	1000		Costa Rica, University Network	5030va	6150va	
			7375va 9725va	11870va	13750va	
0900	1000		Eqt Guinea, Radio Africa	15190af		
0900	1000		Germany, Deutsche Welle	6140eu		
0900	1000		Guyana, Voice of	3291do	5950do	
0900	1000	vl/as	Italy, IRRS 13840va	15725al		
0900	1000		Malaysia, Radio	7295as		
0900	1000		Malaysia, Voice of	15295as		
0900	1000	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060da 6175da			
0900	1000	DRM	Netherlands, Radio	7240eu		
0900	1000		New Zealand, Radio NZ Intl	9885pa		
0900	1000		Nigeria, Radio/Ibadan	6050da		
0900	1000		Nigeria, Radio/Kaduna	4770do	6090do	
0900	1000		Nigeria, Radio/Lagos	3326do	4990da	
0900	1000	vl	Pakistan, Radio	15100eu	17835eu	
0900	1000		Papua New Guinea, Catholic Radio			4960da
0900	1000		Papua New Guinea, N8C	4890do		
0900	1000	vl	Papua New Guinea, Wantok Radio Light			7120va
0900	1000	vl	Rwanda, Radio	6055da		
0900	1000		Sierra Leone, Radio UNAMSIL	6137do		
0900	1000	irreg/ v	Sierra Leone, SLBS	3316do		
0900	1000		Singapore, Mediacorp Radio	6150do		
0900	1000	vl	Solomon Islands, SIBC	5020do	9545do	
0900	1000	DRM	Sri Lanka, Deutsche Welle	21675as		
0900	1000		UK, BBC World Service	6190af	6195va	
			9605as 9740as	11760me	11940af	15310as
			15360as	15400af	15485af	15575me
			17640eu	17760as	17790as	17830af
			17885af	21470af	21660as	
0900	1000		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0900	1000		USA, KAIJ Dallas TX	5755na		
0900	1000		USA, KTBN Salt Lake City UT	7505na		
0900	1000		USA, KWHR Naalehu HI	9510as	9930as	
0900	1000		USA, Voice of America	9520va	15205va	
			17745va			
0900	1000		USA, WBOH Newport NC	5920am		
0900	1000		USA, WEWN Birmingham AL	5850na	7425na	
0900	1000		USA, WHRI Noblesville IN	7520am	9495am	
0900	1000		USA, WJIE Louisville KY	7490am	13595am	
0900	1000		USA, WRMI Miami FL	9955am		
0900	1000		USA, WTJC Newport NC	9370na		
0900	1000		USA, WWCR Nashville TN	5070na	5765na	
			5935na 9985na			
0900	1000	s	USA, WWRB Manchester TN	9320na		
0900	1000		USA, WWRB Manchester TN	3185na	5085na	
0900	1000		USA, WYFR Okeechobee FL	5985af	6855af	
			9755af			
0900	1000	vl	Vanuatu, Radio	4960do		
0900	1000		Zambia, Christian Voice	9555af		
0905	1000	vl/s	Greece, Voice of	9420eu	11645eu	15630eu
			15650eu	21530eu		
0930	0945		Israel, Kol Israel	15640va		
0930	1000		Australia, Radio	9580as	9590as	15240as
			15415pa			
0930	1000	s	UAE, Radio UNMEE	21460af		
0930	1000		Vatican City, Vatican Radio	5885eu		

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

1000	1030		Australia, Voice Intl	13685as		
1000	1030		Guam, AWR/KSDA	11930as		
1000	1030		Mongolia, Voice of	12085as		
1000	1057		Netherlands, Radio	7315va	9790va	12065va
			13820va			
1000	1059		New Zealand, Radio NZ Intl	9885pa		
1000	1100		Anguilla, Caribbean Beacon	11775am		
1000	1100		Australia, ABC NT Alice Springs	2310do	4835irr	
1000	1100		Australia, ABC NT Katherine	2485do		
1000	1100		Australia, ABC NT Tennant Creek	2325do		
1000	1100		Australia, HCJB	15425as		
1000	1100		Australia, Radio	9580as	9590as	15240as
			15415pa			
1000	1100	DRM	Austria, Asian Sound	11815eu		
1000	1100		Canada, CFRX Toronto ON	6070do		
1000	1100		Canada, CFVP Calgary AB	6030do		
1000	1100		Canada, CKZN St John's NF	6160do		

1000	1100		Canada, CKZU Vancouver BC	6160do		
1000	1100		China, China Radio Intl	15210pa	17490eu	
			17690pa			
1000	1100		Costa Rica, University Network	5030va	6150va	
			7375va 9725va	11870va	13750va	
1000	1100		Guyana, Voice of	3291do	5950do	
1000	1100		India, All India Radio	13695as	15020as	15410as
			17800as	17895as		
1000	1100	vl/as	Italy, IRRS 13840va	15725ol		
1000	1100		Japan, Radio	6120na	9695as	11730as
			17585eu	17720va	21755po	
1000	1100		Molaysia, Radio	7295as		
1000	1100		Malaysia, Voice of	15295os		
1000	1100	DRM	Netherlands, Radio	7240eu		
1000	1100		Nigeria, Voice of	15120af		
1000	1100		North Korea, Voice of	3560as	11710as	
			11735os	13650ca	15180ca	
1000	1100		Papua New Guinea, Catholic Radio		4960co	
1000	1100		Papua New Guinea, NBC	4890do		
1000	1100	vl	Papua New Guinea, Wantok Radio Light		7120va	
1000	1100		Singapore, Mediocorp Radio	6150do		
1000	1100	vl	Solomon Islands, SIBC	5020do	9545do	
1000	1100		South Africa, Channel Africa	11825af		
1000	1100	DRM	UK, BBC World Service	7320eu		
1000	1100		UK, BBC World Service	6190af	6195va	
			9605as 11760me	11940af	15310as	15360as
			15485af	15575me	17640eu	17640me
			17760as	17790as	17885af	21470af
			21660as			
1000	1100	as	UK, BBC World Service	15400af	17830af	
1000	1100		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1000	1100		USA, KAIJ Dallas TX	5755na		
1000	1100		USA, KNLS Anchor Point AK	9795os		
1000	1100		USA, KTBN Salt Lake City UT	7505na		
1000	1100		USA, KWHR Naalehu HI	9930as		
1000	1100		USA, Voice of America	9705va	15205va	
			17745va			
1000	1100		USA, WBOH Newport NC	5920am		
1000	1100		USA, WEWN Birmingham AL	5745na	7425na	
1000	1100		USA, WHRI Noblesville IN	7520am	9495am	
1000	1100		USA, WINB Red Lion PA	9320am		
1000	1100		USA, WJIE Louisville KY	7490am		
1000	1100		USA, WRMI Miami FL 9955am			
1000	1100		USA, WTJC Newport NC	9370na		
1000	1100		USA, WWCR Nashville TN	5070na	5765na	
			5935na 15825na			
1000	1100	s	USA, WWRB Manchester TN	9320na		
1000	1100		USA, WWRB Manchester TN	3185na	5085na	
1000	1100		USA, WYFR Okeechobee FL	5950na	5985no	
			6855na 9755na			
1000	1100		Zambia, Christian Voice	9555af		
1030	1045	m:twhf	Ethiopia, Radio	5990af	7110af	9704af
1030	1057		Czech Rep, Radio Prague Intl	9880eu	11615eu	
1030	1058		Vietnam, Voice of	7285as		
1030	1100		Iran, Voice of the Islamic Rep	15660as	17660as	

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

1100	1104	vl	Pakistan, Radio	15100eu	15190eu	17835eu
1100	1128		Vietnam, Voice of	9840as	7220as	7285as
1100	1130		Australia, Radio	5995as	6020as	9475as
			9560as 9580as	9590as	12080as	15240pa
1100	1130		Iran, Voice of the Islamic Rep		15660as	17660as
1100	1130		UK, BBC World Service		6190af	11940af
			15400af	15485af	17830af	17885af
			21470af			
1100	1157		Netherlands, Radio	11675na		
1100	1159	a	Germany, Universal Life		6055me	
1100	1200		Anguilla, Caribbean Beacon		11775am	
1100	1200		Australia, ABC NT Alice Springs		2310do	4835irr
1100	1200		Australia, ABC NT Katherine		2485do	
1100	1200		Australia, ABC NT Tennant Creek		2325do	
1100	1200		Australia, HCJB	15425as		
1100	1200		Australia, Voice Intl	13685as		
1100	1200	DRM	Austria, Asian Sound	11815eu		
1100	1200	as	Canada, CBC NQ SW Service	9625na		
1100	1200		Canada, CFRX Toronto ON	6070do		
1100	1200		Canada, CFVP Calgary AB	6030do		
1100	1200		Canada, CKZN St John's NF	6160do		
1100	1200		Canada, CKZU Vancouver BC	6160do		
1100	1200		China, China Radio Intl		11750na	13650eu
			17490eu			
1100	1200		Costa Rica, University Network		5030va	6150va
			7375va 9725va	11870va	13750va	
1100	1200		Ecuador, HCJB	12005am	21455am	
1100	1200		Germany, Overcomer Ministries		6110eu	
1100	1200	vl/as	Italy, IRRS 13840va	15725al		
1100	1200	vl	Italy, IRRS 13840va	15725al		
1100	1200		Japan, Radio	6120na	9695as	11730as
1100	1200		Malaysia, Radio	7295as		
1100	1200		Malaysia, Voice of	15295as		
1100	1200		New Zealand, Radio NZ Intl	9885pa		
1100	1200		Nigeria, Voice of	15120af		
1100	1200		Papua New Guinea, Catholic Radio		4960do	
1100	1200		Papua New Guinea, NBC	4890do		
1100	1200	vl	Papua New Guinea, Wantok Radio Light		7120va	
1100	1200		Singapore, Radio Singapore Intl	6080as	6150as	
1100	1200		South Africa, Channel Africa	11825af		
1100	1200		Taiwan, Radio Taiwan Intl	7445as		
1100	1200	DRM	UK, BBC World Service	7320eu		
1100	1200		UK, BBC World Service	6195as	9740as	
			11760me	11865am	15310as	15575me
			17640va	17760as	17790as	
1100	1200		Ukraine, Radio Ukraine Intl		15675eu	
1100	1200		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1100	1200		USA, KAIJ Dallas TX	5755na		
1100	1200		USA, KTBN Salt Lake City UT	7505na		
1100	1200		USA, KWHR Naalehu HI	11555as		
1100	1200		USA, Voice of America	9705va	15205va	
			17745va			
1100	1200		USA, WBOH Newport NC	5920am		
1100	1200		USA, WEWN Birmingham AL	5745na	11530na	
			13615na			
1100	1200		USA, WHRI Noblesville IN	7520am	9495am	
1100	1200		USA, WINB Red Lion PA	9320am		
1100	1200		USA, WJIE Louisville KY	7490am		
1100	1200		USA, WRMI Miami FL 9955am			
1100	1200		USA, WTJC Newport NC	9370na		
1100	1200		USA, WWCR Nashville TN	5070na	5935na	
			7465na 15825na			
1100	1200	s	USA, WWRB Manchester TN	9320na		
1100	1200		USA, WWRB Manchester TN	3185na	5085na	
1100	1200		USA, WYFR Okeechobee FL	5950va	5985va	
			7355va 9550va	9625va	9755va	
1100	1200		Zambia, Christian Voice		9555af	
1125	1200		Vatican City, Vatican Radio		15595me	
1130	1159	a	Germany, Universal Life		6055me	
1130	1200		Australia, Radio	5995as	6020as	9475as
			9560as 9580as	9590as	12080as	
1130	1200		Bulgaria, Radio	11700eu	15700eu	
1130	1200	t	UAE, Radio UNMEE	21550af		
1130	1200		UK, BBC World Service		6190af	11940af
			15485af	17830af	17885af	21470af
1130	1200		Vatican City, Vatican Radio		17515me	
1145	1200	vl	Libya, Voice of Africa	17695af	21675af	21695af

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

1200	1215	vl	Cambodia, National Radio		11940as	
1200	1230		France, Radio France Intl		17815af	21620af
1200	1230		Malaysia, Voice of	15295as		
1200	1230		UAE, AWR Africa	15135as		
1200	1230		Uzbekistan, Radio Tashkent		7285as	15295as
			17775as			
1200	1259		Canada, Radio Canada Intl		9660as	15170as
1200	1259		New Zealand, Radio NZ Intl	9885pa		
1200	1259		Poland, Radio Polonia	9525eu	11850eu	
1200	1300		Anguilla, Caribbean Beacon		11775am	
1200	1300		Australia, ABC NT Alice Springs		2310do	4835irr
1200	1300		Australia, ABC NT Katherine		2485do	
1200	1300		Australia, ABC NT Tennant Creek		2325do	
1200	1300		Australia, HCJB	15425as		
1200	1300		Australia, Radio	5995as	6020as	9475as
			9560as 9580as	9590as		
1200	1300		Australia, Voice Intl	13685as		
1200	1300	DRM	Austria, Classic Gold	11815eu		
1200	1300	as	Canada, CBC NQ SW Service		9625na	
1200	1300		Canada, CFRX Toronto ON		6070do	
1200	1300		Canada, CFVP Calgary AB		6030do	
1200	1300		Canada, CKZN St John's NF		6160do	
1200	1300		Canada, CKZU Vancouver BC		6160do	
1200	1300	mtwhf	Canada, Radio Canada Intl		9515am	13655am
			17800am			
1200	1300		China, China Radio Intl		9730as	9760pa
			11760po	11980as	13650eu	13790eu
			17490eu			
1200	1300		Costa Rica, University Network		9725va	11870va
			13750va			
1200	1300		Ecuador, HCJB	12005am	21455am	
1200	1300	vl/a	Italy, IRRS 15725va			
1200	1300		Malaysia, Radio	7295as		
1200	1300	DRM	Netherlands, Radio	7240na		
1200	1300		Nigeria, Voice of	15120af		
1200	1300		Papua New Guinea, Catholic Radio		4960da	
1200	1300		Papua New Guinea, NBC	4890do		
1200	1300	vl	Papua New Guinea, Wantok Radio Light		7120va	
1200	1300		Singapore, Radio Singapore Intl	6080as	6150as	
1200	1300		South Korea, Radio Korea Intl	9650va		
1200	1300		Taiwan, Radio Taiwan Intl	7130as		
1200	1300	DRM	UK, BBC World Service	7320eu		
1200	1300		UK, BBC World Service	6190af	9605am	
			11760me	11865am	11940af	15190am

			15485af	15565eu	15575me	17640eu
			17640me	17830me	17885af	21470af
1200	1300		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1200	1300		USA, KAIJ Dallas TX	5755na		
1200	1300		USA, KNLS Anchor Point AK	9615as		
1200	1300		USA, KTBN Salt Lake City UT	7505na		
1200	1300		USA, KWHR Naalehu HI	11555as		
1200	1300		USA, Voice of America	6160va	9645va	
			9760va 15240va			
1200	1300		USA, WBCQ Kennebunk ME	17495na		
1200	1300		USA, WBOH Newport NC	5920am		
1200	1300		USA, WEWN Birmingham AL	5745na	11530no	
			13615na			
1200	1300		USA, WHRA Greenbush ME	15310na		
1200	1300	os	USA, WHRI Noblesville IN	9840am	11785am	
1200	1300		USA, WINB Red Lion PA	9320am		
1200	1300		USA, WJIE Louisville KY	7490am		
1200	1300		USA, WRMI Miami FL	7385am		
1200	1300		USA, WTJC Newport NC	9370na		
1200	1300		USA, WWCR Nashville TN	7465na	13845na	
			9985na 15825na			
1200	1300	s	USA, WWRB Manchester TN	9320na		
1200	1300		USA, WYFR Okeechobee FL	5950na	5985na	
			17505no	17750no		
1200	1300		Zambia, Christian Voice	9555af		
1205	1220	m	Austria, Radio Austria Intl	6155va	13730va	
			17715va			
1215	1230	twhf	Austria, Radio Austria Intl	17715va		
1215	1300		Egypt, Radio Cairo	17835as		
1230	1245	h	Germany, Bible Voice Broadcasting	12065as		
1230	1245	mtwhf	Guam, TWR/KTWR	11750as		
1230	1258		Vietnam, Voice of	9840as	12020os	
1230	1300		Australia, HCJB	15405as		
1230	1300		Bangladesh, Bangla Betar	7185as		
1230	1300	s	Germany, Bible Voice Broadcasting	5890os		
1230	1300		Sweden, Radio	13580va	15240na	15735va
1230	1300		Thailand, Radio	9600vo		
1230	1300		Turkey, Voice of	15225eu	15535va	
1235	1300	as	Austria, Radio Austria Intl	17715va		
1245	1300	twhf	Austria, Radio Austria Intl	6155eu	13730eu	
			17715va			

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

1300	1315	s	Germany, Bible Voice Broadcasting	5890eu		
1300	1329		Canada, Radio Canada Intl	9660as	15170as	
1300	1329		Czech Rep, Radio Prague Intl	13580eu	21745af	
1300	1330		Ecuador, HCJB	12005am	21455am	
1300	1330		Egypt, Radio Cairo	17835as		
1300	1335		Turkey, Voice of	15225eu	15535va	
1300	1356		Romania, Radio Romania Intl	11830eu	15105eu	
1300	1357	DRM	China, China Radio Intl	7250va	11810va	
1300	1400		Anguilla, Caribbean Beacon	11775am		
1300	1400		Australia, Radio	5995as	6020as	9560pa
			9580po 9590po			
1300	1400		Australia, Voice Intl	13685as		
1300	1400	DRM	Austria, Premiur	11815eu		
1300	1400	os	Canada, CBC NQ SW Service	9625na		
1300	1400		Canada, CFRX Toronto ON	6070do		
1300	1400		Canada, CFVP Calgary AB	6030do		
1300	1400		Canada, CKZN St John's NF	6160do		
1300	1400		Canada, CKZU Vancouver BC	6160do		
1300	1400	as	Canada, Radio Canada Intl	9515am	13655am	
			17800am			
1300	1400		China, China Radio Intl	9650am	11760po	
			11900pa	11980as	13790eu	15260am
			17490eu	17625co		
1300	1400		Costa Rica, University Network	9725va	11870va	
			13750vo			
1300	1400		Germany, Deutsche Welle	6140eu		
1300	1400	vl/a	Italy, IRRS 15725vo			
1300	1400		Jordan, Radio	11690no		
1300	1400		Malaysia, Radio	7295as		
1300	1400	DRM	Netherlands, Radio	7240eu		
1300	1400		New Zealand, Radio NZ Intl	6095pa		
1300	1400		Nigeria, Voice of	15120af		
1300	1400		North Korea, Voice of	4405eu	9335eu	
			11710na	13760na	15245eu	
1300	1400		Papua New Guinea, Catholic Radio		4960do	
1300	1400		Papua New Guinea, NBC	4890do		
1300	1400	vl	Papua New Guinea, Wantok Radio Light		7120vo	
1300	1400		Singapore, Radio Singapore Intl	6080as	6150os	
1300	1400		South Korea, Radio Korea Intl	9570as	9770os	
1300	1400	DRM	UK, BBC World Service	7320eu		
1300	1400		UK, BBC World Service	6190af	6195os	
			9740as 11760me	11940af	15190am	15310os
			15420af	15485af	15565va	15575me
			17640va	17760os	17790os	17830af
			17885af	21470af		
1300	1400		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1300	1400		USA, KAIJ Dallas TX	5755na		
1300	1400		USA, KTBN Salt Lake City UT	7505na		
1300	1400		USA, KWHR Naalehu HI	11555as		
1300	1400		USA, Voice of America	9645va	9760va	
1300	1400		USA, WBCQ Kennebunk ME	17495na		
1300	1400		USA, WBOH Newport NC	5920am		
1300	1400		USA, WEWN Birmingham AL	5745na	11530na	
			13615na			
1300	1400		USA, WHRA Greenbush ME	15310na		
1300	1400	mtwhf	USA, WHRI Noblesville IN	15285am		
1300	1400		USA, WINB Red Lion PA	13570am		
1300	1400		USA, WJIE Louisville KY	7490am		
1300	1400		USA, WRMI Miami FL	7385am		
1300	1400		USA, WTJC Newport NC	9370na		
1300	1400		USA, WWCR Nashville TN	7465na	13845na	
			9985na 15825no			
1300	1400		USA, WYFR Okeechobee FL	11830va	11865va	
			11910vo	17750va		
1300	1400		Zambia, Christian Voice	9555af		
1330	1400	s	Australia, HCJB	15405as		
1330	1400	irreg	Cuba, Radio Havana	9550va	12000va	13680va
1330	1400		Guam, AWR/KSDA	11980os		
1330	1400	mwhfa	Guam, AWR/KSDA	15275os		
1330	1400		India, All India Radio	9690as	11620as	13710as
1330	1400		Laos, National Radio	7145os		
1330	1400		Sweden, Radio	15240na	15735vo	
1330	1400		Uzbekistan, Radio Tashkent	7285as	15295as	
			17775as			

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

1400	1415	h	Germany, Bible Voice Broadcasting	7485as		
1400	1415		Russia, FEBA	9500as		
1400	1430		Australia, Radio	5995as	6080as	7240as
			9590as 9625pa			
1400	1430	mtwhf	Germany, Deutsche Welle	15725na		
1400	1430		Thailand, Radio	9830va		
1400	1430	DRM/f	UK, Radio France Intl	9770eu		
1400	1430	DRM/a	UK, Radio NZ Intl	9770eu		
1400	1445	a	Germany, Pan American BC	15650me		
1400	1459	as	Canada, Radio Canada Intl	9515am	13655am	
			17800am			
1400	1500		Anguilla, Caribbean Beacon	11775am		
1400	1500		Australia, Voice Intl	15205as		
1400	1500	as	Canada, CBC NQ SW Service	9625na		
1400	1500		Canada, CFRX Toronto ON	6070do		
1400	1500		Canada, CFVP Calgary AB	6030do		
1400	1500		Canada, CKZN St John's NF	6160do		
1400	1500		Canada, CKZU Voncouver BC	6160do		
1400	1500		China, China Radio Intl	9590as	11675as	
			11765as	11775as	13685af	13740na
			13790eu	17630af	17650eu	
1400	1500	DRM	China, China Radio Intl	9610va		
1400	1500		Costa Rica, University Network	9725va	11870va	
			13750vo			
1400	1500		France, Radio France Intl	9580vo	15615va	
1400	1500	os	Germany, Bible Voice Broadcasting	7485as		
1400	1500		Germany, Deutsche Welle	6140eu		
1400	1500		Germany, Overcomer Ministries	6110eu		
1400	1500	vl/o	Greece, Voice of	9375eu	9420eu	9775eu
			12105eu	15630eu	15650eu	
1400	1500		India, All India Radio	9690as	11620as	13710os
1400	1500	vl/a	Italy, IRRS 15725vo			
1400	1500		Japan, Radio	7200as	11730as	11840pa
1400	1500		Jordan, Radio	11690na		
1400	1500		Malaysia, Radio	7295as		
1400	1500		Netherlands, Radio	9345vo	9890vo	11835vo
1400	1500		New Zealand, Radio NZ Intl	6095po		
1400	1500		Nigeria, Voice of	15120af		
1400	1500	vl	Papua New Guinea, Wantok Radio Light		7120vo	
1400	1500	DRM	Russia, Voice of	9480eu		
1400	1500		Russia, Voice of	6205as	7390os	9745as
			11755as	15605as	17645as	
1400	1500		Singapore, Mediacorp Radio	6150do		
1400	1500		South Africa, Channel Africa	11825af		
1400	1500		Taiwan, Radio Taiwan Intl	15265as		
1400	1500	DRM	UK, BBC World Service	7320eu		
1400	1500		UK, BBC World Service	6190af	6195os	
			7105os 9740os	11760me	11940af	15310as
			15485af	15565va	17640va	17790as
			17830af	21470af	21660af	
1400	1500		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1400	1500		USA, KAIJ Dallas TX	13815na		
1400	1500		USA, KJES Vado NM	11715na		
1400	1500		USA, KNLS Anchor Point AK	9795os		
1400	1500		USA, KTBN Salt Lake City UT	7505no	15590na	
1400	1500		USA, KWHR Naalehu HI	11555as		
1400	1500		USA, Voice of America	6160va	7125vo	
			9760vo 15265va			
1400	1500		USA, WBCQ Kennebunk ME	17495na		

Shortwave Guide

1400	1500		USA, WBOH Newport NC	5920am		
1400	1500		USA, WEWN Birmingham AL 15745na	9955na	11530na	
1400	1500		USA, WHRA Greenbush ME	15310na		
1400	1500		USA, WHRI Noblesville IN	9840am	15285am	
1400	1500		USA, WINB Red Lion PA	13570am		
1400	1500		USA, WJIE Louisville KY	7490am		
1400	1500		USA, WRMI Miami FL 7385am			
1400	1500		USA, WTJC Newport NC	9370na		
1400	1500		USA, WWCR Nashville TN 13845na 15825na	9985na	12160na	
1400	1500		USA, WYFR Okeechobee FL 13695va 17750va	11830va	11910va	
1400	1500		Zambia, Christian Voice	9555af		
1415	1430		Nepal, Radio 3230as 7165as	5005as	6100cs	
1430	1445	s	Germany, Pan American BC	15650as		
1430	1500		Australia, HCJB 15390as			
1430	1500		Australia, Radio 5995as 9475as 9590pa 9625pa	6080as	7240as	
1430	1500	DRM/s	UK, BYU Radio 9565eu			
1430	1500	DRM	UK, Radio Australia 9770eu			
1430	1500	DRM/f	UK, Radio Korea Intl 9770eu			
1445	1500	as	Germany, Pan American BC	15650me		

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

1500	1515	s	Germany, Pan American BC	15650as		
1500	1515		Russia, FEBA 7320as			
1500	1528	s	Hungary, Radio Budapest	6025eu	9655eu	
1500	1528		Vietnam, Voice of 9550va 13860va	9840va	12020va	
1500	1530		Mongolia, Voice of 12015eu			
1500	1530		UK, BBC World Service	6190af	6195as	
			7105as 9740as 11860af	11940af	12095af	
			15310as 15400af	15420af	15485af	
			17790as 17790as	21470af	21490af	
			21660af			
1500	1555		South Africa, Channel Africa	17770af		
1500	1557		Netherlands, Radio 9345va	9890va	11835va	
1500	1559	as	Canada, Radio Canada Intl 17800am	9515am	13655am	
1500	1600		Anguilla, Caribbean Beacon	11775am		
1500	1600		Australia, HCJB 15390as			
1500	1600		Australia, Radio 5995as 9475as 9590pa 9625pa	6080as	7240as	
1500	1600		Australia, Voice Intl 15205as			
1500	1600	as	Canada, CBC NQ SW Service	9625na		
1500	1600		Canada, CFRX Toronto ON	6070do		
1500	1600		Canada, CFVP Calgary AB	6030do		
1500	1600		Canada, CKZN St John's NF	6160do		
1500	1600		Canada, CKZU Vancouver BC	6160do		
1500	1600		Canada, Radio Canada Intl 17720as	11675as	15360as	
1500	1600		China, China Radio Intl	6100af	7160as	
			11775as 11965eu	13640eu	13685af	
			13740na 17490eu	17630af		
1500	1600	DRM	China, China Radio Intl	9610va		
1500	1600		Costa Rica, University Network 13750va	9725va	11870va	
1500	1600	a	Germany, Bible Voice Broadcasting	17510me		
1500	1600	m	Germany, Bible Voice Broadcasting	13590as		
1500	1600		Germany, Deutsche Welle	6140eu		
1500	1600		Germany, Overcomer Ministries	6110eu		
1500	1600	vl/ as	Greece, Voice of 9375va 12105va	9420va	9775va	
			15630va			
1500	1600		Guam, TWR/KTWR 12105as			
1500	1600		Japan, Radio 6190as 11730as	7200as	9505va	
1500	1600		Jordan, Radio 11690na			
1500	1600		Malaysia, Radio 7295as			
1500	1600		New Zealand, Radio NZ Intl	6095pa		
1500	1600		North Korea, Voice of 9335eu 11710na 13760va	3560af	4405eu	
				15245va		
1500	1600	vl	Papua New Guinea, Wantok Radio Light		7120va	
1500	1600		Russia, Voice of 7325me 9810eu	4965me	7315af	
				11980eu	11985me	
1500	1600		Singapore, Mediacorp Radio	6150do		
1500	1600		South Africa, Channel Africa	11825af		
1500	1600		UK, BBC World Service	15565eu	15575me	
1500	1600	DRM/f	UK, Radio Taiwan Intl 9770eu			
1500	1600	vl/ mtwhf	UK, Sudan Radio Service	15530va		
1500	1600		USA, AFRTS 7590usb 7812usb 12133usb 13362usb	4319usb	5446usb	5765usb
					12133usb	12579usb
					12579usb	13855usb
1500	1600		USA, KAIJ Dallas TX	13815na		
1500	1600		USA, KJES Vado NM	11715na		
1500	1600		USA, KTBN Salt Lake City UT	15590na		
1500	1600		USA, KWHR Naalehu HI	11555as		
1500	1600		USA, Voice of America 9850af 15195va 15445va	7125va	9825va	
				15580af		
1500	1600	mtwhf	USA, Voice of America 15105va	9645va	13690va	
1500	1600		USA, WBCQ Kennebunk ME	17495na		
1500	1600		USA, WBOH Newport NC	5920am		
1500	1600		USA, WEWN Birmingham AL 15745na	9955na	11530na	
1500	1600		USA, WHRA Greenbush ME	17640na		
1500	1600		USA, WHRI Noblesville IN	12020am	15285am	
1500	1600	as	USA, WINB Red Lion PA	9740am		
1500	1600	mtwhf	USA, WINB Red Lion PA	13570am		
1500	1600		USA, WJIE Louisville KY	7490am		
1500	1600		USA, WRMI Miami FL 7385am			
1500	1600		USA, WTJC Newport NC	9370na		
1500	1600		USA, WWCR Nashville TN 13845na 15825na	9985na	12160na	
1500	1600		USA, WYFR Okeechobee FL 15520va 15770va	11830va	11910va	
				17750va		
1500	1600		Zambia, Christian Voice	9555af		
1505	1520	m	Austria, Radio Austria Intl	13775na		
1505	1530	as	Austria, Radio Austria Intl	13775na		
1515	1530	twhf	Austria, Radio Austria Intl	13775na		
1515	1600		Russia, FEBA 7320as			
1530	1545	w	Germany, Pan American BC	11610as		
1530	1545	s	Germany, Pan American BC	15650me		
1530	1600	mwh	Germany, Bible Voice Broadcasting	17510as		
1530	1600	s	Germany, Bible Voice Broadcasting	13590me		
1530	1600		Iran, Voice of the Islamic Rep	9635os	11650as	
1530	1600	f	Russia, FEBA 9850as			
1530	1600		Russia, TWR 7535eu	7560as		
1530	1600	mtwhf	South Korea, Radio Korea Intl	15725na		
1530	1600		UAE, AWR Africa 15225as			
1530	1600		UK, BBC World Service 12095af 15400af 21660af	6190af	11940af	
				15485af	21470af	
1530	1600		USA, Voice of America 9760va 9845va 12040va	6160va	9590va	
				15550va		
1530	1600		Vatican City, Vatican Radio 15235as	12065as	13765as	
1535	1300	as	Austria, Radio Austria Intl	13775na		
1540	1600	whf	Germany, Bible Voice Broadcasting	13590me		
1545	1600	m	Austria, Radio Austria Intl	13775na		
1545	1600	twhf	Austria, Radio Austria Intl	13775na		
1545	1600	a	Germany, Bible Voice Broadcasting	13590me		
1545	1600	s	Germany, Pan American BC	15650me		

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

1600	1615	mwf	Germany, Bible Voice Broadcasting	13590me		
1600	1615		Pakistan, Radio 4790va 11570va	5027af	5080va	
				15100va		
1600	1627		Czech Rep, Radio Prague Intl	5930eu	17485af	
1600	1628		Vietnam, Voice of 7280va 11630va	9550va	9730va	
				13860va		
1600	1630	s	Germany, Pan American BC	15650	su	
1600	1630		Guam, AWR/KSDA 11640as	11680as		
1600	1630		Guam, TWR/KTWR 12105as			
1600	1630		Iran, Voice of the Islamic Rep	9635as	11650as	
1600	1630		Jordan, Radio 11690na			
1600	1630		Myanmar, Radio 9730do			
1600	1645		Russia, FEBA 9850as			
1600	1650		New Zealand, Radio NZ Intl	6095pa		
1600	1700		Anguilla, Caribbean Beacon	11775am		
1600	1700		Australia, Radio 5995as 9475as 9710as	6080as	7240as	
1600	1700		Australia, Voice Intl 11840as	13635as	15205as	
1600	1700	DRM/s	Austria, CVC International	9705eu		
1600	1700	a	Canada, CBC NQ SW Service	9625na		
1600	1700		Canada, CFRX Toronto ON	6070do		
1600	1700		Canada, CFVP Calgary AB	6030do		
1600	1700		Canada, CKZN St John's NF	6160do		
1600	1700		Canada, CKZU Vancouver BC	6160do		
1600	1700		China, China Radio Intl	6100af	9570af	
			11900af 11940eu	11965eu	13760eu	
			17490eu			
1600	1700	DRM	China, China Radio Intl	17510va		
1600	1700		Costa Rica, University Network	11870va	13750va	
1600	1700		Ethiopia, Radio 5990af 9560af 9704af	7110af	7165af	
				11800af		
1600	1700		France, Radio France Intl	7170af	15160af	
			15605af	17605af	17850af	
1600	1700	s	Germany, Bible Voice Broadcasting	13590me		
1600	1700		Germany, Deutsche Welle 17595as	6170as	7225as	
1600	1700		Germany, Overcomer Ministries	9845eu		
1600	1700	vl	Greece, Voice of 7475va 15630va	9420va	12105va	
				17705va		
1600	1700		Malaysia, Radio 7295as			
1600	1700		North Korea, Voice of 11545va	3560va	9990me	
1600	1700	vl	Papua New Guinea, Wantok Radio Light		7120va	
1600	1700		Russia, Voice of 11985af	6070va	9405as	11640as
				12055va	15540va	
1600	1700		South Korea, Radio Korea Intl	5975va	9870va	
1600	1700		Taiwan, Radio Taiwan Intl	11815as		
1600	1700		UK, BBC World Service	3915as	5975as	

			6190af 6195as	7160as	9410eu	9510as
			11940af	12095va	15105as	15310as
			15400af	15420af	15485af	15565va
			17790as	17820af	17830af	21470af
			21490af	21660af		
1600	1700	DRM/w	UK, BYU Radio	9770eu		
1600	1700	DRM/f	UK, NHK/Radio Japan		9770eu	
1600	1700	vl/ mtwhf	UK, Sudan Radio Service		15530va	
1600	1700		UK, Voice Africa	13820af		
1600	1700		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1600	1700		USA, KAIJ Dallas TX	13815na		
1600	1700		USA, KJES Vado NM	11715na		
1600	1700		USA, KTBN Salt Lake City UT		15590na	
1600	1700		USA, KWHR Naalehu HI		11555as	
1600	1700		USA, Voice of America		4930af	6160va
			7125va 9700va	9760va	9825va	9850af
			12080va	13600va	15195va	15445va
			15580af	17895va		
1600	1700		USA, WBCQ Kennebunk ME		9330na	17495na
1600	1700		USA, WBOH Newport NC		5920am	
1600	1700		USA, WEWN Birmingham AL		11530va	13615va
			15685va	15745va		
1600	1700		USA, WHRA Greenbush ME		17640na	
1600	1700		USA, WHRI Noblesville IN		12020am	15285am
1600	1700	as	USA, WINB Red Lion PA		9740am	
1600	1700	mtwhf	USA, WINB Red Lion PA		13570as	
1600	1700		USA, WJIE Louisville KY		7490am	
1600	1700	mtwhfo	USA, WMLK Bethel PA9265eu			
1600	1700		USA, WRMI Miami FL 7385am			
1600	1700		USA, WTJC Newport NC		9370na	
1600	1700		USA, WWCR Nashville TN		9985na	12160na
			13845na	15825na		
1600	1700		USA, WWRB Manchester TN		9320na	12170na
1600	1700	mtwhf	USA, WWRB Manchester TN		15250na	
1600	1700		USA, WYFR Okeechobee FL		6085va	11830va
			11865va	13695va	15520va	17750va
			18980va	21455va	21525va	
1600	1700		Zambia, Christian Voice		4965af	
1615	1630		Vatican City, Vatican Radio		4005eu	5885eu
			7250eu 9645me	15595me		
1615	1700	as	UK, BBC World Service		11860af	
1630	1700		Egypt, Radio Cairo	11880af		
1630	1700		Guam, AWR/KSDA	11975as		
1630	1700		Slovakia, Slovak Radio		5920eu	7345eu
1640	1700	t	Germany, Bible Voice Broadcasting		13590me	
1651	1700		New Zealand, Radio NZ Intl		6095pa	

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

1700	1710	mtwh	Moldova, Radio PMR	5960eu		
1700	1720	f	Moldova, Radio PMR	5960eu		
1700	1727		Czech Rep, Radio Prague Intl		5930eu	17485af
1700	1728		Vietnam, Voice of	9725eu		
1700	1730		France, Radio France Intl		15605af	17605af
1700	1730	DRM	Netherlands, Radio	5955eu		
1700	1730		Swaziland, TWR	3200af		
1700	1745		UK, BBC World Service		3255af	6005af
			6190af 9630af	12095af	15105af	15400af
			15420af	17820af	17830af	21470af
1700	1755		South Africa, Channel Africa		15325af	
1700	1759		Poland, Radio Polonia	5965eu	7285eu	
1700	1800		Anguilla, Caribbean Beacon		11775am	
1700	1800		Australia, Radio	5995as	6080as	9475as
			9580as 9710as			
1700	1800		Australia, Voice Intl	11840as	13635as	15205as
1700	1800	a	Canada, CBC NQ SW Service		9625na	
1700	1800		Canada, CFRX Toronto ON		6070do	
1700	1800		Canada, CFVP Calgary AB		6030do	
1700	1800		Canada, CKZN St John's NF		6160do	
1700	1800		Canada, CKZU Vancouver BC		6160do	
1700	1800		China, China Radio Intl		9695eu	11940eu
			13760eu			
1700	1800	DRM	China, China Radio Intl		12080va	
1700	1800		Costa Rica, University Network		11870va	13750va
1700	1800		Egypt, Radio Cairo	11880af		
1700	1800		Eqt Guinea, Radio Africa		15190af	
1700	1800	s	Germany, Bible Voice Broadcasting		13590me	
1700	1800	vl	Greece, Voice of	7475va	9420va	12105va
			15630va	17705va		
1700	1800		Japan, Radio	9535va	11970eu	15355af
1700	1800		Malaysia, Radio	7295as		
1700	1800		New Zealand, Radio NZ Intl		6095pa	
1700	1800		Nigeria, Voice of	15120va		
1700	1800	vl	Papua New Guinea, Wantok Radio Light			7120va
1700	1800		Russia, Voice of	7390eu	9405as	9820eu
			9890eu 11510af	11985af		
1700	1800	as	Russia, Voice of	11675eu		
1700	1800		UK, BBC World Service		3915as	5975as
			6195eu 7160as	9510as	12095va	15310as
			15565va			
1700	1800	vl/ mtwhf	UK, Sudan Radio Service		11715va	
1700	1800		UK, Voice Africa	13820af		
1700	1800		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1700	1800		USA, KAIJ Dallas TX	13815na		
1700	1800		USA, KTBN Salt Lake City UT		15590na	
1700	1800		USA, KWHR Naalehu HI		11555as	
1700	1800		USA, Voice of America		6160va	7125va
			9345va 9850af	15410af	15580af	
1700	1800		USA, WBCQ Kennebunk ME		9330na	17495na
1700	1800		USA, WBOH Newport NC		5920am	
1700	1800		USA, WEWN Birmingham AL		11530va	13615va
			15685va	15745va		
1700	1800		USA, WHRA Greenbush ME		17640na	
1700	1800		USA, WHRI Noblesville IN		15285am	15785am
1700	1800	as	USA, WINB Red Lion PA		9740am	
1700	1800		USA, WJIE Louisville KY		7490am	
1700	1800	mtwhfa	USA, WMLK Bethel PA9265eu			
1700	1800		USA, WMLK Bethel PA15265eu			
1700	1800		USA, WRMI Miami FL 7385am			
1700	1800		USA, WTJC Newport NC		9370na	
1700	1800		USA, WWCR Nashville TN		9985na	12160na
			13845na	15825na		
1700	1800		USA, WWRB Manchester TN		9320na	11920na
			12170na			
1700	1800	mtwhf	USA, WWRB Manchester TN		15250na	
1700	1800		USA, WYFR Okeechobee FL		3955va	13695va
			17795va	18980va	21455va	21680va
1700	1800		Zambia, Christian Voice		4965af	
1700	1800	mtwhf	USA, WINB Red Lion PA		13570am	
1730	1745		Israel, Kol Israel	9345va	11590va	15640va
1730	1745	vl	Libya, Voice of Africa	11860af		
1730	1745	mtwhf	UK, United Nations Radio		7150af	15495me
			17810af			
1730	1800		Bulgaria, Radio	9500eu	11500eu	
1730	1800		Guam, AWR/KSDA	9385me		
1730	1800		Liberia, ELWA	4760do		
1730	1800		Philippines, Radio Pilipinas		11720vo	15190va
			17720va			
1730	1800		Swaziland, TWR	3200af	9500af	
1730	1800		Sweden, Radia	6065va		
1730	1800	mtwhf	USA, Voice of America		4930af	11975af
			17895af			
1730	1800		Vatican City, Vatican Radio		11625af	13765af
			15570af			
1740	1800	as	USA, Voice of America		4930af	11975af
			17895af			
1745	1800		Bangladesh, Bangla Betar		7185eu	
1745	1800		India, All India Radio	7410eu	9445af	9950eu
			11620eu	11935af	13605af	15075af
			15155af	17670af		
1745	1800	vl	Libya, Voice of Africa	15220af	15615af	15660af
			17695af			
1745	1800		UK, BBC World Service		3255af	6190af
			12095af	15105af	15400af	15420af
			17820af	17830af	21470af	

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

1800	1815	a	Germany, Bible Voice Broadcasting		11965as	
1800	1828		Vietnam, Voice of	7280va	9730va	
1800	1829	s	Germany, Universal Life		15675af	
1800	1830	w f	Austria, AWR Europe	15280af		
1800	1830	DRM/a	Canada, Voice of NASB		11900na	
1800	1830		Egypt, Radio Cairo	11880af		
1800	1830	s	Germany, Bible Voice Broadcasting		6015eu	
1800	1830		South Africa, AWR Africa		3215af	3345af
1800	1830		Swaziland, TWR	3200af		
1800	1830		UK, BBC World Service		3255as	5975as
			6190af 9510as	12095va	15400af	15420af
			17830af	21470af		
1800	1850		New Zealand, Radio NZ Intl		6095pa	
1800	1856		Romania, Radio Romania Intl		9635eu	11830eu
1800	1857		Netherlands, Radio	6020af	9895af	11655af
1800	1859		Canada, Radio Canada Intl		9530af	9780af
			13730af	15255af	15420af	
1800	1900		Anguilla, Caribbean Beacon		11775am	
1800	1900	mtwhf	Argentina, RAE	9690eu	15345eu	
1800	1900		Australia, Radio	6080as	7240as	9475as
			9580as 9710as			
1800	1900		Australia, Voice Intl	11685as		
1800	1900		Bangladesh, Bangla Betar		7185os	
1800	1900		Canada, CFRX Toronto ON		6070do	
1800	1900		Canada, CFVP Calgary AB		6030do	
1800	1900		Canada, CKZN St John's NF		6160do	
1800	1900		Canada, CKZU Vancouver BC		6160do	
1800	1900		China, China Radio Intl		9695eu	11940eu
			13760eu			
1800	1900	DRM	China, China Radio Intl		12080va	
1800	1900		Costa Rica, University Network		11870va	13750va
1800	1900		Eqt Guinea, Radio Africa		15190af	
1800	1900	a	Germany, Bible Voice Broadcasting		6015as	9430me
1800	1900	s	Germany, Bible Voice Broadcasting		9430me	

1800	1900		India, All India Radio	7410eu	9445af	9950eu
			11620eu	11935af	13605af	15075af
			15155af	17670af		
1800	1900		Liberia, ELWA	4760do		
1800	1900		Moloysia, Radio	7295as		
1800	1900		Nigeria, Voice of	15120va		
1800	1900		North Korea, Voice of		4405eu	13760eu
			15245eu			
1800	1900	vl	Papua New Guinea, Wantok Radio Light			7120vo
1800	1900		Philippines, Radio Pilipinas		11720va	15190va
			17720va			
1800	1900		Russia, Voice of	9480eu	9745af	9890eu
			11510af			
1800	1900		Taiwan, Radio Taiwan Intl		3965eu	
1800	1900		UK, BBC World Service		6195eu	9410eu
			12095me	15310me		
1800	1900		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1800	1900		USA, KAIJ Dallas TX	13815na		
1800	1900		USA, KTBN Salt Lake City UT		15590na	
1800	1900		USA, Voice of America		4930af	9850af
			11975af	15410af	15580af	17895af
1800	1900		USA, WBCQ Kennebunk ME		7415na	9330na
			17495na			
1800	1900		USA, WBOH Newport NC		5920am	
1800	1900		USA, WEWN Birmingham AL		11530va	13615va
			15685va	15745va		
1800	1900		USA, WHRA Greenbush ME		17640no	
1800	1900		USA, WHRI Noblesville IN		15285am	15785am
1800	1900	as	USA, WINB Red Lion PA		9740am	
1800	1900	mtwhf	USA, WINB Red Lion PA		13570am	
1800	1900		USA, WJIE Louisville KY		7490am	
1800	1900	mtwhfa	USA, WMLK Bethel PA	9265eu		
1800	1900		USA, WMLK Bethel PA	15265eu		
1800	1900		USA, WRMI Miami FL	7385am		
1800	1900		USA, WTJC Newport NC		9370na	
1800	1900		USA, WWCR Nashville TN		9975na	12160na
			13845na	15825na		
1800	1900		USA, WWRB Manchester TN		9320no	11920na
			12170na			
1800	1900	mtwhf	USA, WWRB Manchester TN		15250na	
1800	1900		USA, WYFR Okeechobee FL		13695eu	13780eu
			13800eu	17525eu	17795eu	18980va
1800	1900		Yemen, Rep of Yemen Radio		9780me	
1800	1900		Zambia, Christian Voice		4965af	
1815	1830	vl	Libya, Voice of Africa	9485af	11635af	11715af
			11860af	15660af	17695af	
1830	1845		Sweden, IBRA Radio	9485eu		
1830	1858		Serbia & Montenegro, Intl Radio		6100eu	
1830	1900	vl	Greece, Voice of	7475va	9420va	12105va
			15630va	17705va		
1830	1900		Slovakia, Slovak Radio		5920eu	6055eu
1830	1900		South Africa, AWR Africa		9590af	
1830	1900		Turkey, Voice of	9785eu		
1830	1900		UK, BBC World Service		3255af	3915as
			6005af 6190af	9410af	9630af	12095af
			15400af	15420af	17830af	21470af
1845	1858	mtwhfo	Albania, Radio Tirana	6115eu	7210eu	
1845	1900		Congo, RTV Congolaise		4765af	5985af
1851	1900		New Zealand, Radio NZ Intl		9845pa	

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

1900	1915		Congo, RTV Congolaise		4765af	5985af
1900	1915	fs	Germany, Bible Voice Broadcasting		9430me	
1900	1920		Turkey, Voice of	9785eu		
1900	1925		Israel, Kol Israel	11590va	15615va	15640va
1900	1928		Hungary, Radio Budapest		3975eu	6025eu
1900	1928		Vietnam, Voice of	7280va	9730va	
1900	1929	s	Germany, Universal Life		13820me	
1900	1930	a	Germany, Bible Voice Broadcasting		9430af	
1900	1930		Lithuania, Radio Vilnius		9710eu	
1900	1930		Philippines, Radio Pilipinas		11720va	15190va
			17720va			
1900	1945		India, All India Radio	7410eu	9445af	9950eu
			11620eu	11935af	13605af	15075af
			15155af	17670af		
1900	1950		New Zealand, Rodio NZ Intl		9845pa	
1900	2000		Anguilla, Caribbean Beacon		11775am	
1900	2000		Australia, Radio	6080os	7240as	9500as
			9580as 9710as			
1900	2000		Australia, Voice Intl	11685as		
1900	2000		Canada, CFVP Calgary AB		6030do	
1900	2000		Canada, CKZN St John's NF		6160do	
1900	2000		Canado, CKZU Vancouver BC		6160do	
1900	2000		Canada, Radio Canada Intl		17765am	
1900	2000		China, China Radio Intl		7295va	9440af
			11940eu			
1900	2000	DRM	China, China Radio Intl		12080va	
1900	2000		Costa Rica, University Network		11870va	13750va
1900	2000		Eqt Guinea, Radio Africa		15190af	
1900	2000		Germany, Deutsche Welle		13780af	15520af
1900	2000	vl	Ghana, Ghana BC Corp		3366do	4915do
1900	2000	vl	Italy, IRRS 5775va			
1900	2000		Liberia, ELWA	4760do		
1900	2000		Malaysia, Radio	7295as		
1900	2000	vl	Namibia, Namibian BC Corp		3270do	3290do
			6060do6175do			
1900	2000		Netherlands, Radio	7120af	9895af	11655af
			17810af			
1900	2000	as	Netherlands, Radio	15315na	17660na	17735na
1900	2000		Nigeria, Radio/Ibadan		6050do	
1900	2000		Nigeria, Radio/Kaduna		4770do	6090do
1900	2000		Nigeria, Radio/Lagos	3326do	4990do	
1900	2000		Nigeria, Voice of	7255va		
1900	2000		North Korea, Voice of	4405eu	9975eu	11910eu
			11535eu			
1900	2000		Papua New Guinea, Catholic Radio			4960do
1900	2000		Papua New Guinea, NBC		4890do	
1900	2000	vl	Papua New Guinea, Wantok Radio Light			7120vo
1900	2000		Russia, Voice of	7380eu	9890eu	
1900	2000		Sierra Leone, Radio UNAMSIL		6137do	
1900	2000	irreg/ vl	Sierra Leone, SLBS	3316do		
1900	2000	vl	Solomon Islands, SIBC		5020do	9545do
1900	2000	m	South Africa, Radio League		3215af	
1900	2000		South Korea, Radio Korea Intl		5975va	7275eu
1900	2000	a	Sri Lanka, SLBC	6010eu		
1900	2000		Swaziland, TWR	3200af		
1900	2000		Thailand, Radio	7155eu		
1900	2000	vl	Uganda, Radio	4976do	5026do	7196do
1900	2000		UK, BBC World Service		3255af	6005af
			6190af 6195eu	9410va	9630af	12095af
			15310me	15400af	17830af	
1900	2000		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1900	2000		USA, KAIJ Dallas TX	13815na		
1900	2000		USA, KJES Vado NM	15385na		
1900	2000		USA, KTBN Salt Lake City UT		15590na	
1900	2000		USA, Voice of America		4930af	6040af
			9670va 9850af	11975af	13635va	13760af
			15410af	15445af	15580af	
1900	2000		USA, WBCQ Kennebunk ME		7415na	9330na
			17495na			
1900	2000		USA, WBOH Newport NC		5920am	
1900	2000		USA, WEWN Birmingham AL		11530va	13615va
			15685va	15745va		
1900	2000		USA, WHRA Greenbush ME		15665no	
1900	2000		USA, WHRI Noblesville IN		15285am	15785am
1900	2000	as	USA, WINB Red Lion PA		9740am	
1900	2000	mtwhf	USA, WINB Red Lion PA		13570am	
1900	2000		USA, WJIE Louisville KY		7490am	
1900	2000	mtwhfa	USA, WMLK Bethel PA	9265eu		
1900	2000		USA, WMLK Bethel PA	15265eu		
1900	2000		USA, WRMI Miami FL	7385am		
1900	2000		USA, WTJC Newport NC		9370na	
1900	2000		USA, WWCR Nashville TN		9975na	12160na
			13845na	15825no		
1900	2000		USA, WWRB Manchester TN		9320no	11920no
			12170na			
1900	2000	mtwhf	USA, WWRB Manchester TN		15250na	
1900	2000		USA, WYFR Okeechobee FL		3230af	6085af
			13695af	13800af	17795af	17845af
			18930af	18980va		
1900	2000		Zambia, Christian Voice		4965af	
1900	2000	vl	Zimbabwe, ZBC Corp	5975do		
1915	1930	vl	Libya, Voice of Africa	11635af	11715af	
1925	1945		Armenia, Voice of	4810eu	9965as	
1930	1945	vl	Libya, Voice of Africa	11715af		
1930	2000	mthf	Belarus, Radio	7105eu	7280eu	
1930	2000	as	Germany, Bible Voice Broadcasting		9430af	
1930	2000		Iran, Voice of the Islamic Rep		7205eu	9800eu
			9925af 11660af	11670af	11860af	
1930	2000		Sweden, Radio	6065va		
1930	2000	ws	UK, Salama Radio	11885va		
1935	1955		Italy, RAI Intl	5960eu	9845eu	
1945	2000	DRM	Canada, Vatican Radio		9800na	
1945	2000	vl	Rwanda, Radio	6055do		
1950	2000		Vatican City, Vatican Radio		4005eu	5885eu
			7250eu 9645eu			
1951	2000		New Zealand, Radio NZ Intl		11725pa	

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

2000	2027		Czech Rep, Radio Prague Intl		5930eu	11600va
2000	2030		Australia, Voice Intl	11685as		
2000	2030	DRM	Canada, Vatican Radio		9800na	
2000	2030		Iran, Voice of the Islamic Rep		7205eu	9800eu
			9925af 11660af	11670af	11860af	
2000	2030		Mongolia, Voice of	12015eu		
2000	2030		Swaziland, TWR	3200af		
2000	2030	ws	UK, Salama Radio	11885va		
2000	2030		USA, Voice of America		4930af	4940af
			9850af 11975af	13670af	15410af	15445af
2000	2030		Vatican City, Vatican Radio		9755af	11625af

			13765af			
2000	2050		New Zealand, Radio NZ Intl	11725pa		
2000	2057	as	Netherlands, Radio 15315na	17660na	17735na	
2000	2057	as	Netherlands, Radio 15315na	17660na	17735na	
2000	2059		Canada, Radio Canada Intl 15325eu	5850eu	11765eu	
2000	2059	mtwhf	Spain, Radio Exterior Espana	9570af	15290eu	
2000	2100		Anguilla, Caribbean Beacon	11775am		
2000	2100		Australia, ABC NT Alice Springs	2310do	4835irr	
2000	2100		Australia, ABC NT Katherine	2485da		
2000	2100		Australia, ABC NT Tennant Creek	2325do		
2000	2100		Australia, Radio 9500pa 12080as	11650as	11660as	
2000	2100		Canada, CFRX Toronto ON	6070do		
2000	2100		Canada, CFVP Calgary AB	6030do		
2000	2100		Canada, CKZN St John's NF	6160da		
2000	2100		Canada, CKZU Vancouver BC	6160do		
2000	2100		Canada, Radio Canada Intl	17765am		
2000	2100		China, China Radio Intl 7295va 9600eu 9855eu 13630af	5960eu	7285eu	11640af 11790eu
2000	2100	DRM	China, China Radio Intl	12080va		
2000	2100		Costa Rica, University Network	13750va		
2000	2100		Eqt Guinea, Radio Africa	15190af		
2000	2100		Germany, Deutsche Welle 13780af 15205af	7130af	11865af	
2000	2100	vl	Ghana, Ghana BC Corp	3366do	4915do	
2000	2100		Indonesia, Voice of 9525as	11785pa	15150al	
2000	2100	vl	Italy, IRRS 5775va			
2000	2100		Liberia, ELWA 4760do			
2000	2100		Malaysia, Radio 7295as			
2000	2100	vl	Namibia, Namibian BC Corp 6060do6175do	3270do	3290do	
2000	2100		Nigeria, Radio/Ibadan	6050do		
2000	2100		Nigeria, Radio/Kaduna	4770do	6090da	
2000	2100		Nigeria, Radio/Lagos 3326do	4990do		
2000	2100		Nigeria, Voice of 7255va			
2000	2100		Papua New Guineo, Catholic Radio		4960do	
2000	2100		Papua New Guinea, NBC	4890do		
2000	2100	vl	Papua New Guinea, Wantok Radio Light		7120va	
2000	2100		Russia, Voice of 7310eu	7330eu		
2000	2100		Sierra Leone, Radio UNAMSIL	6137do		
2000	2100	vl	Solomon Islands, SIBC	5020do	9545do	
2000	2100		South Africa, AWR Africa	7175af		
2000	2100		South Africa, Channel Africa	3345af		
2000	2100	vl	Ugando, Radio 4976do	5026do	7196do	
2000	2100		UK, BBC World Service 6195af 9410af 9630af 17830af	3255af	6005af	12095af 15400af
2000	2100		USA, AFRTS 4319usb 7590usb 7812usb 12133usb 12579usb	5446usb	5765usb	12133usb 12579usb 13362usb 13855usb
2000	2100		USA, KAIJ Dallas TX 13815no			
2000	2100		USA, KJES Vado NM 15385na			
2000	2100		USA, KTBN Salt Lake City UT	15590na		
2000	2100		USA, Voice of America 13635vo	6040va	9670va	
2000	2100		USA, WBCQ Kennebunk ME 17495na	7415na	9330na	
2000	2100		USA, WBOH Newport NC	5920am		
2000	2100		USA, WEWN Birmingham AL 15745vo 17595va	11530va	13615va	
2000	2100		USA, WHRA Greenbush ME	15665na		
2000	2100		USA, WHRI Noblesville IN	15285am	15785am	
2000	2100		USA, WINB Red Lion PA	13570am		
2000	2100		USA, WINB Red Lion PA	13570am		
2000	2100		USA, WJIE Louisville KY	7490am		
2000	2100	mtwhfa	USA, WMLK Bethel PA 9265eu			
2000	2100		USA, WMLK Bethel PA 15265eu			
2000	2100		USA, WRMI Miami FL 7385am			
2000	2100		USA, WTJC Newport NC	9370na		
2000	2100		USA, WWCR Nashville TN 13845na 15825no	9975no	12160na	
2000	2100		USA, WWRB Manchester TN 12170no	9320na	11920na	
2000	2100	mtwhf	USA, WWRB Manchester TN	15250na		
2000	2100		USA, WYFR Okeechobee FL 15195vo 17725af 17845va 18980va	3230va	13800va	17750va 17795va
2000	2100		Zombia, Christian Voice	4965af		
2000	2100	vl	Zimbabwe, ZBC Corp 5975do			
2005	2100		Syria, Radio Damoscus	9330eu	12085eu	
2025	2045		Italy, RAI Intl 6050af	11875af		
2030	2045	vl	Libya, Voice of Africa 11635af			
2030	2045		Thailond, Radio 9680eu			
2030	2058		Vietnam, Voice of 7280va 9550vo 11630va	9550va	7280va	
2030	2100	DRM	Canada, Radio Netherlands	9800na		
2030	2100		Cuba, Radio Havana 9505va	11760va		
2030	2100		Egypt, Radio Cairo 15375af			
2030	2100		Turkey, Voice of 9730va			
2030	2100		USA, Voice of America 11975af 12140as	4930af	9850af	13670af 15410af
			15445af			
2030	2100		Uzbekistan, Radio Tashkent 11905eu	5025eu	9545eu	
2045	2100		India, All India Radia 9950eu 11620pa 11715pa	7410eu	9445eu	9910pa
2051	2100		New Zealand, Radia NZ Intl	15720pa		

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

2100	2120		Turkey, Voice of 9730as			
2100	2128		Hungary, Radio Budapest	6025eu	9525af	
2100	2128		Serbia & Montenegra, Intl Radio	6100eu		
2100	2130		Australia, ABC NT Katherine	2485do		
2100	2130		Australia, ABC NT Tennant Creek	2325da		
2100	2130	s	Belarus, Radia 7105eu	7280eu		
2100	2130	a	Canada, CBC NQ SW Service	9625no		
2100	2130		Chino, Chino Radio Intl	11640af	13630af	
2100	2130		Cuba, Radio Hovano 9505va	11760va		
2100	2130	mtwhf	UK, BBC World Service	11675am		
2100	2145		Nigeria, Rodio/Ibadon	6050do		
2100	2157	DRM	China, China Radio Intl	12080va		
2100	2159	as	Spain, Radio Exterior Espana	9570va	9840va	
2100	2200		Anguillo, Coribbean Beacon	11775am		
2100	2200		Australia, ABC NT Alice Springs	2310do	4835irr	
2100	2200		Australia, Radio 9660os 12080pa	11650as 13630pa	11660as 15515po	
2100	2200		Austrio, AWR Europe 9715af			
2100	2200		Bulgario, Radio 5800eu	7500eu		
2100	2200		Canado, CFRX Toronto ON	6070do		
2100	2200		Canada, CFVP Calgary AB	6030do		
2100	2200		Canada, CKZN St John's NF	6160do		
2100	2200		Canada, CKZU Vancouver BC	6160do		
2100	2200		Canada, Radio Canada Intl	17765am		
2100	2200	DRM	Canado, Radio Conada Intl	9800na		
2100	2200		Costa Rica, University Network	13750va		
2100	2200		Egypt, Radio Cairo 15375af			
2100	2200		Eqt Guinea, Radio Africa	15190af		
2100	2200		Germany, Deutsche Welle 15205af	9440af	11865af	
2100	2200	vl	Ghana, Ghana BC Corp	3366do	4915do	
2100	2200		Guyana, Voice of 3291do	5950do		
2100	2200		India, All India Radio 9950eu 11620pa 11715pa	7410eu	9445eu	9910po
2100	2200	vl/as	Italy, IRRS 5775va			
2100	2200		Japan, Radio 11855af	6035pa 17825na	6055eu 21670pa	6180eu
2100	2200		Liberia, ELWA 4760do			
2100	2200		Malaysia, Radio 7295as			
2100	2200	vl	Namibia, Namibian BC Corp 6060do6175do	3270do	3290do	
2100	2200		New Zealand, Radio NZ Intl	15720pa		
2100	2200		Nigeria, Radio/Kaduna	4770do	6090do	
2100	2200		Nigeria, Radio/Lagos 3326do	4990do		
2100	2200		North Korea, Voice of 4405eu	13760eu	15245eu	
2100	2200		Papua New Guinea, Catholic Radio		4960do	
2100	2200		Papua New Guinea, NBC	4890do		
2100	2200	vl	Papua New Guineo, Wantok Radio Light		7120va	
2100	2200	vl	Rwanda, Radia 6055do			
2100	2200		Sierra Leone, Radio UNAMSIL	6137do		
2100	2200	irreg/ vl	Sierra Leone, SLBS 3316do			
2100	2200		South Africa, Channel Africa	3345af		
2100	2200		South Korea, Radio Korea Intl	3955eu		
2100	2200		Syria, Radio Domascus	9330eu	12085eu	
2100	2200		UK, BBC World Service 5965os 6005af 9410af 9605af	3255af 6110os 15390am	3915as 6190af 15400af	6195as
2100	2200		Ukraine, Radio Ukroine Intl	7490eu		
2100	2200		USA, AFRTS 4319usb 7590usb 7812usb 12133usb	5446usb 12579usb	5765usb 13362usb	12579usb 13855usb
2100	2200		USA, KAIJ Dallas TX 13815na			
2100	2200		USA, KTBN Salt Lake City UT	15590na		
2100	2200		USA, Voice of America 12140os 15410af	4930af	11975af	15445af
2100	2200		USA, WBCQ Kennebunk ME 17495na	7415na	9330no	
2100	2200		USA, WBOH Newport NC	5920am		
2100	2200		USA, WEWN Birminghom AL 15745va 17595vo	11530va	13615va	
2100	2200		USA, WHRA Greenbush ME	11765na		
2100	2200		USA, WHRI Noblesville IN	15285am	15785am	
2100	2200		USA, WINB Red Lion PA	13570am		
2100	2200		USA, WJIE Louisville KY	7490am		
2100	2200		USA, WMLK Bethel PA 15265eu			
2100	2200		USA, WRMI Miami FL 7385am			
2100	2200		USA, WTJC Newport NC	9370na		
2100	2200		USA, WWCR Noshville TN 13845na 15825no	9975na	12160na	
2100	2200		USA, WWRB Manchester TN 12170na	9320na	11920na	
2100	2200	mtwhf	USA, WWRB Manchester TN	15250na		

2100	2200		USA, WYFR Okeechobee FL 17725va 17795va	11565va 17845va	13800va 18980va
2100	2200		Zambia, Christian Voice	4965af	
2100	2200	vl	Zimbabwe, ZBC Corp 5975do		
2105	2159		Spain, Radio Exterior Espana	9570va	9840va
2115	2130	vl	Libya, Voice of Africa 11635af		
2115	2200		Egypt, Radio Cairo 9990eu		
2130	2145	tf	UK, BBC World Service	11720am	
2130	2156		Romania, Radio Romania Intl 9645eu 11940na	7165eu	9535eu
2130	2157		Czech Rep, Radio Prague Int	9800af	11600na
2130	2158	mtwhfa	Albania, Radio Tirana 7120eu		
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		Sweden, Radio 6065va	7420va	
2130	2200		Uzbekistan, Radio Tashkent 11905eu	5025eu	9545eu

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

2200	2210		Syria, Radio Damascus	9330eu	12085eu
2200	2230	DRM	Canada, Deutsche Welle	9800na	
2200	2230		India, All India Radio 7410eu 9950eu 11620pa 11715pa	9445eu	9910pa
2200	2230		Papua New Guinea, NBC	9675do	
2200	2230	smtwhf	Serbia & Montenegro, Intl Radio	7230po	
2200	2245		Egypt, Radio Cairo 9990eu		
2200	2250		Turkey, Voice of 9830va		
2200	2300		Anguilla, Caribbean Beacon	6090am	
2200	2300		Australia, ABC NT Alice Springs	2310do	4835irr
2200	2300		Australia, ABC NT Katherine	5025do	
2200	2300		Australia, ABC NT Tennant Creek	4910do	
2200	2300		Australia, Radio 13630as 15240pa 15515pa	13630as 21740pa	15230as
2200	2300	smtwhf	Canada, CBC NQ SW Service	9625na	
2200	2300		Canada, CFRX Toronto ON	6070do	
2200	2300		Canada, CFVP Calgary AB	6030do	
2200	2300		Canada, CKZN St John's NF	6160do	
2200	2300		Canada, CKZU Vancouver BC	6160do	
2200	2300		China, China Radio Intl	7175eu	
2200	2300		Costa Rica, University Network	13750va	
2200	2300		Eqt Guinea, Radio Africa	15190af	
2200	2300		Germany, Deutsche Welle	7115as	9720os
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do
2200	2300		Guyana, Voice of 3291do		
2200	2300		Malaysia, Radio 7295as		
2200	2300	vl	Namibia, Namibian BC Corp 6060do 6175do	3270do	3290do
2200	2300		New Zealand, Radio NZ Intl	15720pa	
2200	2300		Nigeria, Radio/Ibadan	6050do	
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do
2200	2300		Nigeria, Radio/Lagos 3326do	4990do	
2200	2300		Papua New Guinea, Catholic Radio		4960do
2200	2300	vl	Papua New Guinea, Wantok Radio Light		7120va
2200	2300		Sierra Leone, Radio UNAMSIL	6137do	
2200	2300	irreg/ vl	Sierra Leone, SLBS 3316do		
2200	2300	vl	Solomon Islands, SIBC	5020do	9545do
2200	2300		Taiwan, Radio Taiwan Intl	15600eu	
2200	2300		UK, BBC World Service 6195as 7105as 9605va 15400af	5965as 9740as	5975am 11955as
2200	2300		USA, AFRTS 4319usb 7590usb 7812usb 12133usb 12579usb	5446usb 12133usb 12579usb 13362usb	5765usb 12579usb 13855usb
2200	2300		USA, KAIJ Dallas TX 13815na		
2200	2300		USA, KTBN Salt Lake City UT	15590na	
2200	2300		USA, Voice of America 15185va 15290va 17820va	7215va 15305va	12140as 17740va
2200	2300		USA, WBCQ Kennebunk ME 9330no 17495no	5105na	7415na
2200	2300		USA, WBOH Newport NC	5920am	
2200	2300		USA, WEWN Birmingham AL	9355vo	9975va
2200	2300		USA, WHRA Greenbush ME	11765na	
2200	2300	mtwhfa	USA, WHRI Noblesville IN	9495am	
2200	2300		USA, WINB Red Lion PA	13570am	
2200	2300		USA, WJIE Louisville KY	7490am	13595am
2200	2300	as	USA, WRMI Miami FL 7385am		
2200	2300		USA, WRMI Miami FL 9955am		
2200	2300		USA, WTJC Newport NC	9370na	
2200	2300		USA, WWCR Nashville TN 12160na 13845no	7465na	9985na
2200	2300		USA, WWRB Manchester TN	6890na	11920na
2200	2300		USA, WYFR Okeechobee FL	11740va	15770va
2200	2300		Zambia, Christian Voice	4965af	
2205	2230		Italy, RAI Intl 11895as		
2215	2230	vl	Croatia, Croatian Radio	9925na	
2230	2257		Czech Rep, Radio Prague Intl	7345na	9415na
2230	2259		Canada, Radio Canada Intl	9525as	9870as
			12035as		
2230	2300	as	Australia, HCJB 15525as		
2230	2300	DRM	Canada, Radio Sweden	9800na	
2230	2300		Guam, AWR/KSDA 11850as	15320as	
2230	2300		USA, Voice of America 15145va	9570va	13755va
2245	2300		India, All India Radio 9705as 11645as	9950as 13605as	11620as

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

2300	0000		Anguilla, Caribbean Beacon	6090am	
2300	0000		Australia, ABC NT Alice Springs	2310do	4835irr
2300	0000		Australia, ABC NT Katherine	5025do	
2300	0000		Australia, ABC NT Tennant Creek	4910do	
2300	0000	as	Australia, HCJB 15525as		
2300	0000		Bulgaria, Radio 9700na	11700na	
2300	0000	DRM	Canada, BBC World Service	9800na	
2300	0000	smtwhf	Canada, CBC NQ SW Service	9625no	
2300	0000		Canada, CFRX Toronto ON	6070do	
2300	0000		Canada, CFVP Calgary AB	6030do	
2300	0000		Canada, CKZN St John's NF	6160do	
2300	0000		Canada, CKZU Vancouver BC	6160do	
2300	0000		China, China Radio Intl 6145na 7180as 13680no	5915as	5990om
2300	0000		Costa Rica, University Network	13750vo	
2300	0000		Cuba, Radio Havana 9550na	12000na	13680na
2300	0000		Egypt, Radio Cairo 11885na		
2300	0000		Germany, Deutsche Welle 15135as	5955as	9890as
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do
2300	0000		Guyana, Voice of 3291do		
2300	0000		India, All India Radio 9705as 11645as	9950os 13605as	11620as
2300	0000		Malaysia, Radio 7295as		
2300	0000	vl	Namibia, Namibian BC Corp 6060do 6175do	3270do	3290do
2300	0000		New Zealand, Radio NZ Intl	15720pa	
2300	0000		Papua New Guinea, Catholic Radio		4960do
2300	0000		Papua New Guinea, NBC	9675do	
2300	0000	vl	Papua New Guinea, Wantok Radio Light		7120va
2300	0000		Sierra Leone, Radio UNAMSIL	6137do	
2300	0000	irreg/ vl	Sierra Leone, SLBS 3316do		
2300	0000		Singapore, Mediacorp Radio	6150do	
2300	0000	vl	Solomon Islands, SIBC	5020do	9545do
2300	0000		UK, BBC World Service	5975am	
2300	0000		USA, AFRTS 4319usb 7590usb 7812usb 12133usb 12579usb	5446usb 12133usb 12579usb 13362usb	5765usb 12579usb 13855usb
2300	0000		USA, KAIJ Dallas TX 13815na		
2300	0000		USA, KTBN Salt Lake City UT	15590na	
2300	0000		USA, Voice of America	12140as	
2300	0000		USA, WBCQ Kennebunk ME 9330na	5105na	7415na
2300	0000		USA, WBOH Newport NC	5920am	
2300	0000		USA, WEWN Birmingham AL	9355va	9975vo
2300	0000		USA, WHRA Greenbush ME	7520na	
2300	0000	mtwhfa	USA, WHRI Noblesville IN	9495am	
2300	0000		USA, WINB Red Lion PA	9320am	
2300	0000		USA, WJIE Louisville KY	7490am	13595am
2300	0000	as	USA, WRMI Miami FL 7385am		
2300	0000		USA, WRMI Miami FL 9955am		
2300	0000		USA, WTJC Newport NC	9370na	
2300	0000		USA, WWCR Nashville TN 12160na 13845na	7465na	9985na
2300	0000		USA, WWRB Manchester TN 5085na 5745na 6890na	3185na	5050na
2300	0000		USA, WYFR Okeechobee FL 17750va	11740va	15255va
2300	0000		Zambia, Christian Voice	4965af	
2300	2315		Nigeria, Radio/Kaduna	4770do	6090do
2300	2315		Nigeria, Radio/Lagos 3326do		
2300	2330		Australia, Radio 9660as 13630pa	12080as 15230pa	13620as 15240pa
2300	2330		UK, BBC World Service 6195os 9605as 15280as	3915as 9740as	5965as 11945as
2300	2330		USA, Voice of America 15145va	9570va	11955as 13755va
2300	2356		Romania, Radio Romania Intl 9645eu 11940na	6140eu	7265eu
2330	0000		Australia, Radio 9660as 13630pa 17795pa	12080as 15230pa 21740pa	13620as 15415pa 17750pa
2330	0000		Burma, Dem Voice of Burma	9435eu	
2330	0000		Lithuania, Radio Vilnius	9875na	
2330	0000		UK, BBC World Service 11955as 15280as	9740as	11945as
2330	0000		USA, Voice of America	7260va	13725va
2330	2358		Vietnam, Voice of 9840os	12020va	

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Monitoring Hurricane Communications

As we start the month of August, we enter the peak of the Atlantic hurricane season. Few things will send radio hobbyists to their receivers faster than a hurricane. Listeners like to be as close to the action as they can, unless they are in the path of these one of these giant storms.

While hurricane related communications are not as commonly heard as they used to be, with patience and a bit of luck you can still catch occasional communications from the two organizations that fly into these monsters, the U.S. Air Force Reserve Hurricane Hunters and aircraft from the National Oceanographic and Atmospheric Administration (NOAA).

When you hear anyone talking about flying into a giant storm, the Air Force Hurricane Hunters are the ones most frequently discussed.

❖ A Bit of History

Believe it or not, it all started in 1943 as a barroom dare, when two Army Air Corps pilots challenged each other to fly through a tropical storm. On July 27, 1943, Maj. Joe Duckworth flew a propeller-driven, single-engine North American AT-6 "Texan" trainer into the eye of that storm twice that day, once with a navigator and again with a weather officer. These were generally considered to be the first airborne attempts to obtain data for use in plotting the position of a tropical cyclone as it approached land. Duckworth's pioneering efforts paved the way for further flights into tropical cyclones.

The 53rd Weather Reconnaissance Squadron (WRS) was originally activated in 1944 as the 30th Weather Reconnaissance Squadron at Gander, Newfoundland. Its original mission was to fly weather tracks between North America and Allied Western Europe. Since that time, the Hurricane Hunters have had many designations and have called many airfields home.

In June of 1991, the 53rd WRS was inactivated, and all weather reconnaissance responsibility fell to the Air Force Reserve's 815th Weather Squadron, which had existed concurrently with the 53rd since 1976. Then on Nov. 1, 1993, the 53rd WRS was reactivated and assigned to the Air Force Reserve, replacing the 815th WS.

The 53rd Weather Reconnaissance Squadron, a component of the 403rd Wing located at Keesler Air Force Base in Biloxi, Miss., is a one-of-a-kind organization. It is the only unit in the world flying hurricanes on a routine basis.

The mission of the Hurricane Hunters is to recruit, organize and train assigned personnel to perform aerial weather reconnaissance. During the hurricane season from June 1st to November 30th, they provide surveillance of tropical disturbances and hurricanes in the Atlantic (west of 55W), Caribbean, and Gulf of Mexico for the National Hurricane Center in Miami, Florida. They also may fly storms for the Central Pacific Hurricane Center in Honolulu, Hawaii.

From November 1st through April 15th, the unit also flies winter storms off both coasts of the United States in support of the National Center for Environmental Prediction. These missions are flown at high altitude (30,000 feet), and can be just as challenging as the hurricane missions, with turbulence, lightning and icing.

Aircraft

To perform their mission, the Hurricane Hunters have ten WC-130H aircraft. These 1965 model C-130 Hercules aircraft are adapted for the weather reconnaissance role from a search and rescue version HC-130. They are not specially reinforced, but are equipped with computerized meteorological data-gathering instruments. These aircraft are scheduled to be replaced by the new WC-130J over the next couple of years.

The aircraft is capable of staying aloft almost 15 hours at an optimum cruise speed of more than 300 miles per hour. An average weather reconnaissance mission might last 11 hours and cover almost 3,500 miles. The crew collects and reports weather data every 30 seconds.

The WC-130 normally carries a crew of six: pilot, co-pilot, navigator, flight engineer, aerial reconnaissance weather officer and dropsonde system operator. Additional crew members may be added as needed for special missions.

From the flight deck, the aerial reconnaissance weather officer operates the computerized weather reconnaissance equipment to measure outside free air temperature, dewpoint (humidity), altitude of the aircraft and barometric pressure at that height. The weather officer also evaluates other meteorological conditions such as turbulence, icing, visibility, cloud types and amounts, and ocean surface winds.

Other special equipment on board the WC-130 includes the dropsonde. This is a cylindrically-shaped instrument about 16 long

Table One: ARTCC Frequency List

Jacksonville ARTCC		
Albany, GA	125.750/226.800	Low Discrete: Approach/Departure Services
	134.450/381.550	Low
	359.000	Low (Moody 3 MOA)
Alma, GA	132.300/290.400	Low Discrete: Approach/Departure Services
	133.300/346.300	High
	135.975/282.300	Ultra High
Charleston, SC	124.075	High
	127.950/379.100	Low Discrete: Approach/Departure Services
	132.475/399.100	Ultra High
	133.625/370.950	High
	135.050/317.400	High/Oceanic Control-Atlantic/AR-202 ARCP/Exit
Columbia, SC	124.700/269.550	Low Discrete: Approach/Departure Services
	127.875/319.200	High AR-207 ARCP/AR-600 ARCP/Exit
	134.975	Ultra High
	298.900	Low Discrete: Approach/Departure Services
	335.500	Low
Crestview, FL	120.200/346.400	Low Discrete: Approach/Departure Services
	124.475	High/Oceanic Control-Gulf of Mexico
	134.150/338.300	Low Discrete
	323.050	High
	364.800	High: Special Use <Amber 03>
	371.900	Low
	374.800	Low
Daytona Beach, FL	134.000/357.100	Low Discrete: Approach/Departure Services
	273.550	ARTCC Discrete
	364.800	High: Special Use <Amber 03>
Dothan, AL	134.300/353.500	Low Discrete: Approach/Departure Services
	243.000	Military International Distress, Calling and Guard
	288.300	Low (Rose Hill MOA)
Eglin, FL	132.100/360.600	Low Discrete: Approach/Departure Services
Florence, SC	133.450/306.300	Low Discrete: Approach/Departure Services
	134.350/321.400	Low
Gainesville, FL	134.400/385.600	Low Discrete: Approach/Departure Services
	135.650/291.700	High
Glynco, GA	126.750/277.400	Low Discrete: Approach/Departure Services
Hilliard, FL	121.500/243.000	Civilian/Military International Distress, Calling and Guard
	269.200	High (Tactical use with US Navy)

Jacksanville, FL	134.850/327.100	Ulta High Discrete AR-202 ARCP/Exit
	286.600	Law
Lake City, FL	125.375/254.325	Law Discrete: Approach/Departure Services
Lawell, FL	125.175/360.700	High
	133.325/362.350	Law
	135.750/317.600	Law Discrete: Approach/Departure Services
Millen, GA	132.500/363.200	Law Discrete: Approach/Departure Services
Myrtle Beach, SC	128.700/343.600	Law Discrete: Approach/Departure Services
	135.050/319.850	Ultra High/Oceanic Contral-Atlantic
	381.400	Ultra High/Oceanic Contral-Atlantic AR-601 ARCP/Exit
Orlanda (Eustis), FL	360.600	Law Discrete: Approach/Departure Services
Panama City, FL	119.100/379.300	Law Discrete: Approach/Departure Services
	346.350	Ultra High/Oceanic Contral-Atlantic
Pensacala, FL	134.150	Law
Perry Foley, FL	127.800/352.000	Law Discrete: Approach/Departure Services AR-207 Exit/ARCP
Savannah, GA	120.850/322.500	Law Discrete: Approach/Departure Services
	126.125/285.650	High
	132.425/380.050	High Discrete
St. Augustine, FL	132.825	High Discrete
	126.350/307.250	High
	127.475/346.250	High
	134.575/236.700	Ultra High
	288.100	Law Discrete: Approach/Departure Services
Tallahassee, FL	135.525/343.800	Low Discrete: Approach/Departure Services
	125.050/307.200	High
	128.075	High
	364.800	High: Special Use <Amber 03>
Valdosta, GA	125.950/379.200	Law Discrete: Approach/Departure Services AR-627 ARCP/Exit
	133.700/399.600	Law Discrete: Approach/Departure Services
	281.400	Low
	348.300	Low (Live Oak/Maady MOA)
	363.000	High
Unknown RCAG	135.450 256.875 273.525 278.300 290.350 346.300 (AR-207 Exit)	

Miami ARTCC

Avon Park, FL	126.525/	High
	127.200/349.000	Law Discrete: Approach/Departure Services
	134.550/257.700	Low Discrete: Approach/Departure Services
	243.000	Military International Distress, Calling and Guard
	254.250	ARTCC Discrete
	256.700	Low Discrete (Miami Missians)
	256.875	ARTCC Discrete
	285.500	High
	322.450	Law
Brooksville, FL	323.200	High
Fort Myers, FL	133.275/335.500	Law
	134.750/322.500	Low Discrete: Approach/Departure Services
Grand Bahama Island	134.200/363.050	Low
Grand Turk	132.300/307.200	Low/Oceanic Atlantic: Northbound IFR flights into Miami ARTCC airspace
	135.200	High/Oceanic Atlantic
	327.000	Low
Key West, FL (Stock Is)	124.700/306.900	Law/High Oceanic
	133.500/323.100	Low Discrete: Approach/Departure Services
	132.200	Law/High Discrete
	281.400	Low/High
Lawell, FL	362.350	Low
Melbourne, FL	119.825	High
	128.650	High
	124.100/269.300	Law Discrete
	135.075/379.250	High/Oceanic Atlantic
	343.700	High (Miami Missians)
	348.700	High
Miami, FL	121.500/243.000	Civilian/Military International Distress, Calling and Guard
	132.400/281.500	Law Discrete
	124.700/363.200	Low/High/Oceanic Atlantic
	133.850/319.100	Low/Oceanic Atlantic
	135.225/381.450	High/Oceanic Atlantic
	127.700	Low
	132.950	Low
	133.200	Law
	269.050	Low
	296.700	Low/High <Amber 4>
	353.900	Low
Nassau, Bahamas	125.700/307.900	Low/Oceanic Atlantic
	134.800/298.900	High/Oceanic Atlantic
Orlanda, FL (Windemere RCAG)	322.550	Low
	296.700	Law/High <Amber 4>
Pahokee, FL	132.450/307.100	Low
	133.550/291.600	Low Discrete
Sarasota, FL	128.225	High
	132.350/377.100	Low Discrete
	133.900	High
	307.300	High
	363.100	High
	381.600	Low/High
Vero Beach, FL	125.075/319.000	High
	132.250/370.900	Low Discrete: Approach/Departure Services
	135.700/398.900	Low
West Palm Beach, FL	132.150/353.600	Low Discrete
	133.400	Low
	135.175	Low
	263.100	Low
	278.500	Low
Unknown RCAG	127.225 370.850	

and 3.25 inches in diameter. The dropsonde is equipped with a very high frequency radio and other sensing devices and is released from the rear of the aircraft about every 400 miles, and on each pass through the eye. As the instrument descends to the sea surface, it measures and relays to the aircraft a vertical atmospheric profile of the temperature, humidity and barometric pressure and wind data. The dropsonde is slowed and stabilized by a small parachute. The Dropsonde System Operator receives, analyzes and encodes the data for transmission by satellite.

The WC-130 provides vital tropical cyclone forecasting information. The WC-130 penetrates hurricanes or typhoons at an altitude of 10,000 feet to collect meteorological data in the vortex, or eye, of the storm. The aircraft normally flies a radius of about 100 miles from the vortex to collect detailed data about the structure of the tropical cyclone.

Where to listen

Most of the communications passed from the hurricane hunters is data via commercial or military satellite (e.g., AFSATCOM). But they do occasionally pass reports via HF (High Frequency) radio circuits. You will also hear members of the crew talking to various media outlets here in the U.S. via HF radio circuits.

When a new center was built to replace the old Miami Hurricane Center which was destroyed by hurricane Andrew several years ago, the HF antennas used by ground station "Miami Monitor" to receive the aircraft reports were not put back up. Consequently, all those old hurricane hunter frequencies used during that era are no longer in use.

So where do you look if you want to catch them on the air today? The best place to watch for them is on U.S. Air MARS radio frequencies, specifically: 13927.0 (Primary) 7635.0 11407.0 14392.0 14606.0 20190.0 27980.0 kHz

The aircraft also have a set of frequencies set aside for air-to-air use during a mission. These include: 123.050 MHz (Primary) 304.800 MHz (Secondary) 4701.0 kHz (Backup).

In addition to the frequencies mentioned above, there are a lot of additional frequencies that carry hurricane related traffic. The premier list of those frequencies is at MT's Ute World columnist Hugh Stegman's website. Point your browser toward **http://www.ominous-valve.com/uteworld.html**.

One final frequency I monitor closely during tropical storm conditions is non-military – the amateur radio Hurricane Watch Net. Their primary frequency is 14325 kHz USB. They also use an 80 meter band lower sideband frequency of 3950.0 kHz when conditions warrant. The Hurricane Watch Net has a very informative website you should visit at **http://www.hwn.org/**.

❖ Milcom ARTCC Frequency List

In this month's FAA Air Route Traffic Control Center report, we are going to take a look at Jacksonville and Miami Centers. For the background on the Air Route Traffic Control Centers, see the June edition of this column.

Until next month, 73 and good hunting.

Doug Smith
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State-by-State: DXing the Delta

Continuing our tour of the United States, the next four states should be relatively easy DX targets. Texas, especially, is one of a small handful of states that can be heard just about any night, on just about any radio, from just about anywhere in the U.S.! The DX targets:

Arkansas:

The powerhouse Arkansas signal is legendary KAAY-1090. This station's rock-and-roll blasted into Wisconsin in the 1970s. Unfortunately for the Eastern DXer, KAAY protects Baltimore's WBAL on the same frequency, making Arkansas difficult at night. Your best bet is to try 1090 around sunset, after WBAL goes directional but before the sun goes down in Little Rock and KAAY makes its switch.

Another Little Rock station that's been widely DXed in the past was KLRA-1010. This station was purchased by NYC's WINS back in the 1980s. They moved KLRA's news/talk programming to 103.7 FM, then returned the AM license for cancellation and changed WINS's directional pattern to stop protecting the no-longer-existant KLRA from interference.

There are some additional Arkansas stations that should be DXable from outside the state. At my location near Nashville, KARN-920 Little Rock (news/talk) is commonly heard at night. Three Arkansas daytimers also make the trip around sunrise and sunset: KPZA-590 Hot Springs (religious; known until recently as KBHS); KLCN-910 Blytheville (news/talk, though a format change is possible before you read this); and KXJK-950 Forrest City.

Louisiana:

This state, too, has a major powerhouse signal, and one that should be easier to hear than KAAY. New Orleans' WWL-870 is one of the two 50,000-watt "Class A" stations that uses a directional antenna for the purpose of concentrating its power onshore. (The other one is WBZ-1030, Boston.) Most stations use directional antennas to protect other stations from interference. WWL should be a relatively easy catch anywhere in North America where you don't have another nearby station on 870.

There are other powerful, frequently-DXed stations in Louisiana. KWKH-1130 Shreveport is heard every night here in Tennessee. KEEL-710 (news/talk) is another DXable Shreveport outlet. In the New Orleans area, WLNO-1060 (religious) and WFNO-830 (Spanish) are frequent sunrise/sunset targets. WSKR-1210, an all-sports station in Denham Springs near Baton Rouge, is also worth a try.

Oklahoma:

The situation in the Sooner State is similar to that in neighboring Arkansas: a 50,000-watt powerhouse that protects a powerful Eastern station at night. In this case, the powerhouse is KOKC-1520, Oklahoma City. KOKC is a news/talk station, after a recent change from simulcasting KOMA-FM oldies. The station protected is Buffalo, New York's WWKB. Here in Nashville, KOKC is usually the dominant signal on 1520 at night, but the situation will be different in the Northeast. Try for KOKC around sunrise and sunset.

Also in Oklahoma City is news/talk WKY-930. One of the country's oldest stations, WKY is fairly widely heard despite its crowded 930 channel. A second early – and DXable – station in the area is WWLS-640 Moore, an all-sports outlet. This station began as the University of Oklahoma's WNAD, justifying its W callsign well west of the Mississippi. Enid is home to Oklahoma's expanded-band station. KFXY-1640 is Fox Sports.

Texas:

Everything is BIG in Texas, and that includes the AM signals. The state is home to two 50,000-watt non-directional stations, a number of powerful directional signals, some expanded-band stations – and the occasional shouldn't-be-on-at-night "cheater"...

WBAP-820 Fort Worth is a news/talk station. Their 50,000-watt non-directional signal should be audible just about anywhere there isn't a closer 820 station. I've even heard WBAP here in the Nashville area at high noon! Down in San Antonio, WOAI-1200 also runs 50,000 watts non-directional. I've heard this station on the car radio on both coasts. A bit of trivia: WOAI is the first Clear Channel (the company) station.

Two more stations in the Lone Star State are 50,000 watts fulltime but directional at night. KTRH-740 Houston and KRLD-1080 Dallas are both news/talk outlets and DXable through much of North America. Slightly less powerful at night but still quite DXable are San Antonio's KKYX-680 (country) and KTKR-760 (sports); KVOZ-890 near McAllen (Spanish); KGOL-1180 near Houston (religious); and KGBT-1530 Harlingen. (Spanish) KCTA-1030 Corpus Christi is a religious 50,000-watt daytimer, widely heard around sunrise and sunset.

While it's not particularly DXable, one more Dallas station deserves mention. The twelve towers used by KFXR-1190's 5,000-watt nighttime signal are the most numerous of any U.S. station. To top it off, KFXR uses four additional towers at a different site during the day! There's a photo of the 12-tower array on **http://www.fybush.com/site-021107.html** – along with a shot of the rather large tower registration number sign... (I would imagine most DXers could spend a few hours exploring the rest of **http://www.fybush.com** as well...)

Texas is home to six expanded-band stations. Stations in College Station (WTAW-1620) and Brownsville (KVNS-1700) carry news/talk formats. The Sherman (KTBK-1700) and Waco (KRZX-1660) stations are all-sports. KKGM-1630 Fort Worth is a reli-

WEGI-94.3: Kentucky or Tennessee?

gious outlet, and KBIV-1650 out in El Paso is classic country.

Getting ahead of things a bit, two new stations are reported testing in the far west. KDJQ-890 is in Meridian, Idaho, near Boise. Their 50,000-watt non-directional daytime signal should be audible well to the east, if you aren't too close to WLS. The other new Western station we have to report is KUTR-820 Taylorville, Utah (Salt Lake City). KUTR is also 50,000 watts during the day. Unlike KDJQ, they're directional during the day, but their directional pattern favors the east. Neither stations' nighttime signal is likely to be audible in the East.

Obviously, Texas is not a particularly difficult state to log! Things will get considerably more difficult next month, at least for us Eastern DXers, as our tour proceeds to the west.

❖ And then there were none...

In the United States, thousands of AM stations have been licensed for daytime-only operation over the years. Most have since received permission for very low-power nighttime operation, but hundreds remain daytime-only outlets.

The Canadian government was far slower to authorize daytime-only operation. As of 1966 only eight such stations existed; today, only one remains. CKOT-1510 is located in Tillsonburg, Ontario, near London. CKOT has filed an application to move to 104.7 FM. If granted (and it probably will be), Canada will lose its last daytime-only station.

❖ IBOC news

Major new IBOC-AM stations reported recently include KRLD-1080 Dallas, KEX-1190 Portland, and KMKI-620 Plano, Texas. Here in Nashville, WLAC-1510's IBOC is back. A number of new FM installations are also reported.

There are a number of websites with more information on this mode. Barry McLarnon's site on **http://topazdesigns.com/iboc/AM-IBOC-Parameters.html** shows the IBOC-AM spectrum and compares it to the analog spectrum, and the FCC "spectrum mask."

Another useful site is on **http://www.dallas.net/~jvpoll/rfi/AM620_KMKI/AM620_KMKI_01.html** This site includes photographs of spectrum analyzer plots of KMKI-620's IBOC signal. It clearly shows why AM IBOC causes so much interference on adjacent channels! This latter site includes considerable additional IBOC information and links. Too bad the webmaster doesn't seem inclined to take credit – I can't find his name anywhere on the site!

DXers may also want to check out WOR-710's site on **http://www.wor710.com/Engineering/iboc/installation_pictures.htm** This also shows spectrum analyzer plots, along with photos of the IBOC equipment.

❖ Letters...

Stephen Malone NJ2SM disagrees with a recent column that listed WABC-770 as a New York station. He argues that, as the transmitter is in New Jersey, it should be considered a New Jersey station. Indeed, several other AM stations licensed to New York City also transmit from the Garden State and could arguably be counted as NJ, not NY.

However, it's traditional among AM DXers to count stations according to their city of license, not their transmitter location. I suspect the primary reason is that, in many cases, it's difficult to tell where a distant station's transmitter is. This was especially true in the days before the Internet, before you could look up a map of the station's transmitter site on **http://www.fcc.gov**

Even today, it can be difficult to know for sure. As Stephen mentions, WCBS-880 has a backup transmitter in New Jersey – when you hear WCBS, how do you know whether they're using the main transmitter in NY or the backup in NJ? One TV station in the Quad Cities has a main transmitter in Iowa and a backup in Illinois – a TV DXer once caught both transmitters operating at the same time. How do you count that?!

Maps show the transmitter site of WSBI-1210 Static, TN, as dead on the Kentucky/Tennessee state line. I have visited that site – and I still can't tell which state the transmitter is in! The WEGI-94.3 (Oak Grove, KY) transmitter is also right on the state line.

New Jersey shouldn't feel too slighted. Several New Jersey FM and TV stations – WPAT, WHTZ, WHBI, TV channels 13, 41, 47, and 68 – transmit from sites in New York City but are still commonly counted as NJ.

❖ Stations that aren't

Also writing from New Jersey is Roland Stiner, NK2U. He lives two miles from the WOR-710 transmitter and is hearing their 5th harmonic on 3550 kHz in the 80-meter ham band. Roland asks, "...by how much does an AM broadcaster have to suppress their harmonics?"

The answer is in FCC regulation 73.44(b). "...Emissions removed by more than 75 kHz must be attenuated at least 43 + 10 Log (Power in watts) or 80 dB below the unmodulated carrier level, whichever is the lesser attenuation..." For a 50,000-watt station like WOR, the formula yields 90 dB, so the 80 dB figure applies.

According to my calculations, 80dB below a 50,000-watt signal is 0.5mW. That's not much power. On the other hand, WOR has a pretty large antenna, which could possibly be far more efficient in the 80-meter ham band than most amateur antennas.

But another possibility is that the harmonic is not being transmitted by WOR. At a distance of only two miles, the WOR fundamental signal on 710 kHz is awfully strong at Roland's location. It is very possible that something far closer to the NK2U station is generating this harmonic. Offenders might include nearby telephones, TV sets, even rusty fences.

I highly doubt a major and well-engineered station like WOR is violating FCC spurious-emission regulations. However, many smaller AM stations are not nearly as well-run. DXers with general-coverage receivers should consider tuning the spectrum between 2 and 5 MHz in search of broadcast harmonics. I frequently hear 2nd harmonic signals in the area near 2MHz.

❖ Musical chairs

We have a game of "radio musical chairs" in Southern California, where the famed "Mighty 690" XETRA Tijuana has dropped their "Xtra Sports" format to go with adult standards. The sports programming moves to KLAC-570 Los Angeles. A second LA station, KXTA-1150, had simulcast XETRA; this station has switched to Air America liberal talk. Clear Channel has reportedly sold their right to provide programming on XETRA to the Spanish company Grupo Prisa. This company operates Spanish-language stations throughout Latin America, leading to rumors XETRA will switch formats again – and this time, will switch languages as well.

A second set of "musical chairs" has happened in Philadelphia, this time on FM. WPHI-103.9 has moved their hip-hop format to 100.3, replacing modern rock station WPLY. The 103.9 station, in turn, became WPPZ with gospel music. Further down the dial, and down the Delaware River, two major Trenton, New Jersey, stations have swapped frequencies. WPST goes from 97.5 to 94.5; WTHK from 94.5 to 97.5. The latter station plans to move its transmitter closer to Philadelphia and compete in the Philly market.

❖ 'Til next month

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

Best Bets

For logging Texas and the Delta

Arkansas: KAAY-1090, KARN-920
Louisiana: WWL-870, KWKH-1130, WLNO-1060
Oklahoma: KOKC-1520, WKY-930, KFXY-1640
Texas: WBAP-820, WOAI-1200, KRLD-1080, KTRH-740, KRZX-1660, WTAW-1620

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Altitudes, Altimeters, Settings, and More

A pilot will touch down on Runway 34L at Denver International Airport with a cockpit altimeter reading of over 5000 feet – but it makes perfect sense!

It is essential for pilots to know their altitudes and for Air Traffic Controllers to know the altitudes of the aircraft they are dealing with. The ground and mountains are unforgiving, and aircraft flying haphazardly in different directions at the same altitude would clearly pose a hazard. Though it may not be essential for those of us who listen to aircraft communications to know all about altitudes, it makes listening more enjoyable to understand something about the subject, since we hear references to aircraft altitude all the time as we listen.

AGL / MSL

The actual height above the terrain that an aircraft is flying is "Above Ground Level" (AGL). It is impractical, for air traffic control purposes, to use AGL since the height of the terrain varies along a course of flight. It is far more practical to use "Mean Sea Level" (MSL). As the name suggests, it is the height above sea level, even if the sea is a thousand miles away. Using Denver International Airport as an example, the altitude of Runway 34L (pronounced "three four left") is zero feet AGL and 5323.8 feet MSL.

Barometric Altimeters

Barometric altimeters, the most common, work by sensing air pressure. The higher an aircraft flies, the lower the outside air pressure. How does a pilot know his altitude? He looks at his altimeter. Well, no, it isn't that simple.

This altimeter reads just short of 2,125 feet MSL. The altimeter setting / barometric pressure is set for 29.86. The adjustment knob is at the bottom left corner.

If you park an aircraft and check its altimeter reading day after day, the altitude reading can change by a few hundred feet as the weather changes, even though the aircraft hasn't moved. Altimeters have a manual adjustment to accommodate for the natural fluctuations in local barometric pressure.

One of the many things you may hear on your scanner relates to providing pilots with the necessary information to calibrate their altimeters to the local area's current pressure. The information is provided by way of a four-digit number. If you hear a controller say "altimeter two niner eight six," that translates to 29.86 inches of mercury, a standard way to measure barometric pressure at ground level (in the U.S.). Upon hearing the current barometric pressure, the pilot will enter that number into his altimeter and his altimeter will then read the correct altitude and be consistent with other aircraft and geographical features in the area.

Altimeter Setting via Radio

There are several types of frequencies that provide altimeter setting information. One is the Automatic Terminal Information Service (ATIS), a pre-recorded, repeating, periodically updated broadcast that is available at many airports with control towers. It offers pertinent information for arriving aircraft and those about to depart.

Two more – the Automated Weather Observing System (AWOS) and the Automated Surface Observing System (ASOS) – are similar to each other, automatically measuring various types of weather information (including barometric pressure) on a minute-by-minute basis, and then broadcasting it using an automated computer voice.

ATIS, AWOS, and ASOS frequencies may be found in the 118-136 MHz band. To see if these are available at an airport near you, go to **http://www.faa.gov/asos/map/map.htm** and click on your state.

Air Traffic Controllers in different areas of responsibility, like Clearance Delivery, Ground Control, Tower, Approach and Departure Control, offer or are prepared to offer altimeter setting information, each on their own frequencies.

(For more info on these ATC functions, see the *Monitoring Times* November 2004 issue – "Air Traffic Control for the Hobby Listener." For *Monitoring Times Anthologies* on searchable CD-ROMs by year see: **http://www.grove-ent.com/SFT27.html**).

This is an example of how a data block might look on a radar screen. It shows AAL278 (American Airlines Flight 278), 330C (Mode C, Flight Level 330), 451 (Computer ID number), 500 (Ground speed). The horizontal line points to the aircraft on the right, a dot. The tapering lines indicate northbound travel / up on the screen. Courtesy: NASA Ames Education Division

FL180 / 18,000 Feet

Altitudes below 18,000 feet are given in thousands of feet and use the local altimeter settings as described. Altitudes above 18,000 feet (in the U.S.) are given as Flight Levels, where Flight Level three seven zero (written FL370), for example, is 37,000 feet – well...., sort of.

At 18,000 feet, all ascending aircraft reset their altimeters to two niner niner two (29.92) and leave them there until they descend back down through 18,000 feet, whereupon they reset them back to the current local barometric pressure.

The problem of running into the ground or mountains isn't the concern above 18,000 feet that it is for those flying much lower. High and fast-flying airliners, corporate jets, and military aircraft, all use 29.92, called "pressure altitude." No matter where they are on flights above 18,000 feet, all their altimeters will be coordinated with each other and don't require resetting during long flights. Even if the barometric pressure changes during the day or from one geographical area to another, it doesn't matter. If FL270, for example, isn't exactly 27,000 feet MSL, it doesn't matter, since all aircraft at FL270 will be at the same altitude, no matter what the real altitude is, and aircraft flying at FL260 will be 1000 feet lower.

References to Altitude

Besides altimeter settings, pilots and controllers have frequent radio exchanges relating to altitude. If you are new to aircraft listening or are considering it, the following different examples may be helpful. Each of these statements will be preceded by the aircraft's call sign.

Spoken by controllers: "...roger, radar contact ten miles West of the Auburn Airport, Beale altimeter is two niner eight niner, say altitude," "...turn ten degrees right, climb and maintain Flight Level three four zero," "...descend and maintain five thousand, expect Runway one six right," "...be advised Flight Level two eight zero continuous light chop, two six zero is reported to be a smooth ride," "...traffic is two o'clock, four miles, maneuvering, indicates five thousand," "...traffic ten to eleven o'clock, five miles, southwest-bound, 747 heavy, Flight Level three niner zero and descending," "...traffic is a Cardinal, three o'clock, four miles, below you at three thousand five hundred."

Spoken by pilots: "...checking in with you at Flight Level three six zero, we'd like to request three eight zero right over BEBOP," "...is with you at three eight zero, direct Williams," "...checking in, descending through eighteen for twelve thousand with Juliet."

The last one above included the phrase, "...with Juliet." This aircraft is descending from an altitude higher than 18,000 feet where the pilot was using 29.92. Below 18,000 feet, the pilot must use the current barometric pressure for the area he is in. In this case, he tuned in the ATIS for the nearby destination airport. He received "Information Juliet." Each updated ATIS broadcast uses the succeeding phonetic alphabet letter. The next one will be Information Kilo. "With Juliet," tells the controller that the pilot has the altimeter setting and other information and thus the controller need not spend the air time to repeat it.

Transponder Mode C

Air Traffic Control (ATC) surveillance radar does not measure the altitude of aircraft. It can only determine where aircraft are in two dimensions – as if looking down upon them from above. How does the controller acquire altitude information from aircraft without asking?

As an ATC radar antenna rotates, another often smaller antenna rotates with it on the same structure. This second antenna is part of a system called the Air Traffic Control Radar Beacon System (ATCRBS) or "Secondary Radar."

This system sends out interrogating pulses in the same direction as the "Primary Radar" antenna. Most aircraft have a piece of electronic equipment called a transponder. It is a specialized transmitter-receiver. When an aircraft's transponder receives these interrogating pulses, it responds by sending an information packet that is used by the ATC computer, combined with the primary radar return, and ends up as an enhanced "target" on the controller's radar display accompanied by a "data block." When that data block contains altitude information from the aircraft, that component is called "Mode C" which is in hundred foot increments.

The aircraft's altitude input to the transponder is preset to the standard pressure altitude of 29.92 and is not affected by the manual adjustments that the pilot makes to the cockpit altimeter. The ATC equipment on the ground corrects for differences between 29.92 and the current local barometric pressure for altitudes below 18,000 feet, as does the pilot for the altimeter readout in the cockpit. Thus, the cockpit altitude readout and the Mode C readout on the controller's screen are the same when all is set and working properly.

If there is a problem, Mode C can send an incorrect altitude reading or none at all. When the controller wants to see if the cockpit altimeter is the same as his readout on the screen, he may say "verify altitude" or "say altitude." He might even say, "Not receiving your Mode C." A pilot may have concerns too, and say, "What altitude are you showing us at?"

This is the LANDO intersection on the IFR ENROUTE HIGH ALTITUDE H-2 Chart. Note the Jet Routes J5, J6, J50, and J65 passing through this intersection.

❖ Intersections in the Sky

There are intersections in the sky, though you can't see them – or can you?

Air Traffic Controllers routinely direct aircraft toward various intersections, sometimes called Airspace Fixes, on their way to their final destinations. The intersections are defined by latitude and longitude, not altitude, and are shown on aeronautical charts where certain defined routes cross. Envision each like a point on the ground from which a vertical line projects into the sky and through which the planes navigate.

Intersections have unusual-sounding names composed of five letters like PINNI, TIOGA, SONNY, and TILTS. They can be found on aeronautical charts, with the correct spelling, which you can confirm here: **http://www.airnav.com/airspace/fix/**

Controllers also direct aircraft toward VHF Omnidirectional Range (VOR) navigational stations. VOR names are far less cryptic and are often named for nearby communities. These too, are shown on charts and can be looked up here: **http://www.airnav.com/navaids/** The general subject can be found here: **http://www.answers.com/topic/vhf-omnidirectional-range** VORs operate within the 108.0 to 117.95 MHz range.

This is likely the LANDO intersection marked by the crossing contrails. Photo by author.

Some have voice transmissions and some don't. They give their IDs in Morse Code. In the above example, under *Spoken by pilots*, "BEBOP" is an intersection and "Williams" is a VOR (VORTAC, actually – VOR plus TACAN, Tactical Air Navigation).

For obvious reasons, aircraft pass through intersections and over VORs at different assigned altitudes in thousands of feet or at different Flight Levels. On a good day, they don't crash into one another, so, not seeing midair explosions and falling debris, is there another way to "see" where intersections and VORs might be?

Jet aircraft leave contrails (condensation trails) as a byproduct of jet fuel combustion when certain atmospheric conditions prevail. We have all seen these and they show, for a period of time, where aircraft have traversed. A single contrail could indeed be passing through an intersection or over a VOR station, but two contrails crossing is more likely to be an intersection or VOR. When three cross, circumstantially, it is more of a sure thing.

The contrails in the photo are most likely the consequence of aircraft passing through the LANDO intersection, **http://www.airnav.com/cgi-bin/fix-info/LANDO** For the adventuresome who have some willingness to drive and see new countryside, an aero chart and a GPS receiver used on the ground could help identify intersections or VORs associated with crossing contrails.

Air temperature decreases considerably with increasing altitude and needs to be at or below about minus 40 degrees Fahrenheit for contrails to form. Therefore, Enroute High Altitude Charts would be the best ones to use for this purpose. For chart info, see: **http://avn.faa.gov/index.asp?xml=naco/catalog/charts/ifr/enrt_high**

Until we meet again, see what you can discover in the aircraft band, and don't forget to look up!

Kevin Carey, WB2QMY
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Tune-in to NAVTEX

With the boating season in full swing, August is an excellent time to listen for NAVTEX teleprinter transmissions at 518 kHz (and 490 kHz in some locations). NAVTEX is an internationally standardized method of sending bulletins to ships equipped with low cost digital receiving gear. While many small boaters use NAVTEX, it is *required* equipment for large vessels as part of the Safety of Life at Sea (SOLAS) convention, amended in 1988.

NAVTEX bulletins are primarily intended for waters 0 - 200 miles from shore and contain information about radionavigation status, search and rescue operations, weather forecasts, mine sweeping exercises, and other items of interest to mariners. NAVTEX provides a nice change of pace from the beacon game, and you are likely to see some interesting traffic come across the air.

Equipment Required

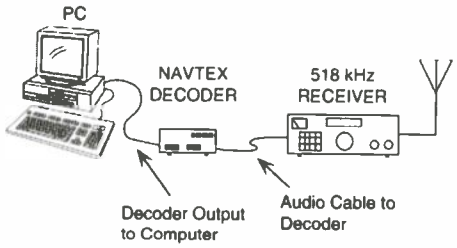
NAVTEX bulletins can be read with simple equipment. The first consideration is your receiver itself. It's best if it has an RTTY mode to optimize the bandwidth for NAVTEX data tones. However, any stable receiver with an SSB/CW setting or a BFO (Beat Frequency Oscillator) should provide satisfactory results.

Today, there are at least three ways to display NAVTEX signals. In addition to your 518/490 kHz receiver, you can use any of the following methods to view the messages:

- An outboard decoder linked to your PC
- A self-contained decoder/printer unit
- Specialized software working in conjunction with your PC's sound card

A still popular approach to NAVTEX reception is to feed the audio from your receiver to an outboard decoder module, which in turn connects to a personal computer (see Figure 1) for display. The text may be saved or printed as desired. Decoders for this operation are becoming harder to find, however, and your best bet may be to look for used equipment.

NAVTEX is transmitted in SITOR Mode B (FEC Mode), which is very similar to the AMTOR protocol used by ham radio operators. The difference is that it is intended for one-way broadcast as opposed to the "chirp-chirp" two-way exchanges commonly heard on the amateur bands. Nevertheless, most ham-grade RTTY decoders can receive NAVTEX by placing them in the "AMTOR B" (broadcast) mode.



Typical NAVTEX Setup (hardware-based)

Another approach is to use a self-contained NAVTEX decoder that displays messages on a built-in screen or printer. These units typically contain features for managing the received text and are often found in higher-end, dedicated installations, such as aboard ships. Accordingly, the cost for such units can be quite high. Hobby-level units of this type have become harder to find in recent years.

Perhaps the most convenient way to receive NAVTEX is to use your computer's built-in sound card along with specialized software. No additional hardware is required in this arrangement, making it one of the most popular ways to work digital modes today. You simply connect the audio from your receiver into your PC's audio input, and launch the software to display the messages. Many hams have adopted this software-only approach to digital communication.

NAVTEX software is available from a number of online sources, including **http://www.dxsoft.com** which offers the popular SeaTTY program, currently at version 1.6. They offer other programs for digital reception as well, including ham radio modes. As mentioned above, if you have software or a decoder intended for AMTOR, you can use it for NAVTEX by running it in AMTOR Mode B (broadcast) mode. Additional sources for NAVTEX software can be found by entering "NAVTEX Software" into your favorite search engine.

Timetable for NAVTEX

Table 1 shows some selected NAVTEX stations. If you are close to one of these sites, you should be able to copy transmissions even during daylight hours. At night, it's likely that you will receive signals from several stations. Happy listening (and printing).

Selected U.S. NAVTEX Stations (518 kHz)

Location	Starting Time (UTC)
Miami, FL	0000
San Juan, PR	0200
New Orleans, LA	0300
Astoria, OR	0130
Kodiak, AK	0300, 0340
Honolulu, HI	0040
Guam	0100

❖ Web Tips

Want to identify that strange digital signal you've been hearing? For sound samples and identifications, surf over to: **http://people.mainz.netsurf.de/~signals/DIG_intro.htm**

Is Natural Radio is your thing? You may want to check out this interesting site by LF experimenter Larry Kramer: **http://home.pon.net/785/**.

❖ Out of Range

I know that our major focus here is on frequencies below the broadcast band, but if beacons are your thing, it might be worth an occasional trip above 50 MHz. The amateur 6-meter band (50-54 MHz) is a potential goldmine of DXing opportunities for beacon hunters. Dozens of hams operate low power beacons for propagation studies on this band.

You won't hear signals there every time you tune in, but when you catch an "opening" it's an experience you won't soon forget. We are on the tail end of the peak Sporadic-E season now, but openings can occur at any time, and other propagation modes such as Aurora and meteor scatter keep things interesting in the "off season." If 10 meters (28 MHz) becomes very active with ham signals, it might be worth a check of the 6-meter band.

❖ End Notes

This month marks 14 years for me writing the *Below 500 kHz* column in *Monitoring Times*! I want to thank each of you who have supported the column over these years with your contributions and words of encouragement. A lot has changed since 1991, but the steady flow of reader input has helped keep the column going strong. I look forward to your continued support in the coming year. 73, and best LW DX.

OUTER LIMITS

THE CLANDESTINE, THE UNUSUAL, THE UNLICENSED

George Zeller
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Holidays Spark Pirate Activity

August is a month with no major holidays in the United States, so it may seem strange to think about holiday listening during the summer thunderstorm static season. But, it always pays to plan ahead when trying to chase down unlicensed broadcasters on shortwave radio. As soon as August ends, the major US Labor Day holiday comes in early September. That is quickly followed by Columbus Day in October, Thanksgiving in November, and then Christmas and New Years Eve at the end of December.

Further, it is a little known fact that the first Monday in August is a holiday in most Canadian provinces, not counting Quebec or the Yukon Territories. The holiday has different names in various provinces, but it is celebrated across virtually all of Canada. If you want to check this out, **http://www.craigmarlatt.com/canada/symbols_facts&lists/august_holiday.html** is the internet URL for Canadian information about the August holiday. Since some pirates operate from Canada, it is worth checking out the pirate radio bands on the first Monday in August.

It has long been known that North American pirate radio broadcasts increase in number considerably during major holiday periods. For pirate radio purposes, Halloween at the end of October is considered a *major* holiday. Groundhog Day and Valentine's Day are also considered major pirate holidays. You should add the Canadian August holiday to this list.

❖ Still No Insurgente Logs

No North American DXers have reported hearing the alleged shortwave transmissions on 6000 kHz from **Radio Insurgente**, the clandestine radio voice of the Ejército Zapatista de Liberación Nacional (EZLN) Mexican rebels. However, rumors still surface that they are rarely being heard in South America on frequencies such as 5880, 6000 and 6120 around 2300 UTC.

The station definitely produces programs about once a week, which can be heard via Quicktime audio after download from **http://www.radioinsurgente.org/** The programs begin with a mandolin instrumental tune, and are followed by a bilingual station identification by a woman in Spanish and a man in English. Since this is one of the few surviving clandestine "radio" stations in the western hemisphere that is not associated with Cuba, it is interesting. You may want to check out the programming on your internet dial. But the shortwave transmissions still appear to be mythical in terms of their ability to put out a signal to North America.

❖ Rare Photo of WMPR QSL

This month we actually have a photo of your editor George Zeller as he appeared at the 2005 Winter Shortwave Listeners Festival in Kulpsville, PA. He is just a prop for the quite rare **WMPR** QSL that he is holding in his hand. These QSLs have materialized in a mysterious fashion only at the Fest, and from no other source. It remains one of the intriguing mysteries of pirate radio on shortwave.

❖ Denver TV Covers Numbers

Several DXers, including our own ace internet sleuth Artie Bigley, noticed mainstream press coverage of shortwave numbers stations on May 16 from **KCNC-TV**, channel 4, the CBS affiliate in Denver, CO. According to the report by the Denver television station, shortwave numbers stations are used for communications with spies, by countries such as Cuba, the United States, and Israel. Of course, that theory has long been in circulation within the DX hobby, but it was interesting to see a licensed TV station covering the story.

❖ What We Are Hearing

Monitoring Times readers heard only a little over a dozen different North American pirates this month, perhaps cut down by the beginning of the summer lightning static season. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regular announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. You sometimes have to tune your dial up and down through the pirate radio band to find the stations, but the primary North American pirate frequency of 6925 kHz, plus or minus 30 or 40 kHz, remains the best place to scan for 90% of all North American shortwave pirates. More than broadcasts are heard on or near 6925 kHz.

America World Break- This one is a new station this month. They feature far right wing commentary about the conspiracy being caused by immigrants to the United States. (None yet)

Ground Zero Radio- Dave Gunn claims to broadcast from an abandoned nuclear missile silo. But, the programming from the missiles is generally rock music. (Elkhorn)

Pirate Radio Boston- This rock music pirate sometimes adds local groups from the Boson area to its playlist along with comments from Charlie Laudenboomer, thus distinguishing itself from ather rock music pirates. (Uses *pirateradioboston@yahoo.com* e-mail)

Radio Free Euphoria- Captain Ganja is best known for his marijuana advocacy, but he often mixes funny comedy into his pirate radio shows. (Belfast)

Radio Mercury- Don Piazza heard what is apparently this new rock music station on 6955 kHz. Has anybody else been hearing them? (None known)

Radio Piraña Internacional- Recent QSLs from Jorge R. Garcia at the leading South American shortwave pirate say that their transmitter uses 15 watts into a dipole antenna! (Santiago)

The Crystal Ship- The Poet still shows up with rock and political commentary on unpredictable frequencies including 6925, 4071, 4510, 4700, 6854, and 7545 kHz. (Belfast and uses *tcsshortwave@yahoo.com* e-mail)

Undercover Radio- Dr. Benway says that his rock music is transmitted "from the middle of nowhere." (Merlin and uses *undercoverradio@mail.com* e-mail)

Voice of Laryngitis- The Huxley Family Singers are back with reruns of hilarious old camedy shows, mixed with a new interval signal of "Farty the Seal" barking "Smoke on the Water." (Belfast)

WHGW- They have expanded their focus from rock music and old time radio show rebroadcasts. Now they sometimes broadcast in digital modes with Morse code IDs. (Uses *whgw6925@myway.com* e-mail)

WHYP- The James Brownyard's old airchecks of Lake Erie temperatures from North East, PA, still inspires pirate comedy from this very active pirate radio station. (Providence and uses *whypradio@gmail.com* e-mail)

WMPR- The mysterious "Dance Party" rock music pirate is still active. Since they do not maintain correspondence, we still know little about them, despite the photo that we see here this month. (None, has QSLed only at the Winter SWL Festival)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign locations, especially in Europe where the value of the US dollar is plunging rapidly. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14895; PO Box 69, Elkhorn, NE 68022; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; and PO Box 293, Merlin, Ontario N0P 1W0, and Box 159, Santiago 14, Chile.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for submitting pirate loggings with a hope that pirates might QSL the logs remain *The ACE* ($2 US for sample copies via the Belfast address above) and the e-mailed Free Radio Weekly newsletter, still free to contributors via *niel@ican.net*. The Free

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Dead Repeaters a Live Issue

I've more or less lost track of how many columns I have written for *MT*, first as editor for the "Beginner's Corner" in 1988 and then at the helm of the ham radio column since 2000. And, while every column may not have been an "A-Plus," I'd like to think they at least deserved a hard-earned "B". Each month would bring a few letters or e-mails. Some would say something on the order of "Thanks for the column Uncle Skip, I learned something new this month." Or, "Uncle Skip you may not know what you're talking about but you sure can sling it with the best of them."

But, the recent May 2005 column ("Waking the Dead and Unruding the Rude"), which related my experience with some repeater systems during a trip, apparently struck quite a chord throughout ham radio land. I've had lots of kind words and support over the years, but this particular column generated dozens of responses coupled with requests to republish my prose in any number of local ham club newsletters. Sometimes, all you can say is WOW!

The prop wash related to this column kept *MT* and Old Uncle Skip fairly busy for a while. We posted the column on the *MT* Web site **http://www.monitoringtimes.com/html/mtham.pdf** and I will keep it up on my personal Web Site **http://www.tjarey.com/radio/mt.html** into the future. *MT* and I have agreed that this column can be in the public domain. The column can be republished by anyone if they don't doctor it up and so long as they give *MT* (and your humble ham radio scribe N2EI) credit where credit is due.

❖ Building on the Positive

Perhaps the most gratifying thing of all is that, in addition to some folks expressing their resonance with the ideas and commiseration with the situation, still more folks took the time to share their ideas about how we might break free from the negatives and build a great new future on the many repeaters out there. It is this spirit that keeps me in the hobby and gives me the assurance that ham radio will keep going for many years to come!

Remember that ham radio is based upon the principles underlying sound engineering practices. It this case that means, when you discover something isn't working or working as it should, you analyze the problem, come up with new ideas and test them against the original model. You get rid of what doesn't work in favor of what does.

So let me step back from the podium here for a change and let some of these fine folks tell you their ideas in their own words.

❖ Allow Enough Time

Richard KC0FHY had this great idea to share for scaring up some good conversation on a repeater while traveling:

"Here's my strategy I've tried around the country as an Eighteen Wheel truck driver. Instead of saying 'KC0FHY mobile and monitoring', I say, 'Calling any station for conversation this is KC0FHY on 14694' [or whichever frequency you're using]. It's deliberately long to last through an average receiver scan cycle. And since not everyone is glued to the readout, they can hear what frequency you're on; also they might complete a CTCSS tone scan if they're not from the area. Wait a minute [so they can put aside what they're doing, and come talk to you, the total stranger] then try your call again. A number of times people have come back saying 'I did not hear the beginning of that, can I help you ?'

Keep 146.52 and 446.00 simplex in your radio. I may see your mobile antenna as you pass me on the road and I'll give you a call."

I've tried Richard's idea and I'll be darned if it doesn't work a treat! I received responses on machines that never broke squelch for me before. Give it a try.

❖ Provide an Object Lesson

Judy W1ORO wrote about a great way her significant other **Greg W2ORO** shook things up a bit. Judy and Greg have also taken up Old Uncle Skip's challenge to reach out to strangers and sojourners on the air:

"I wanted to tell you about an experiment my husband Greg was able to pull off when he had just obtained his new vanity call sign. Greg has a great talent of performing character voices, so disguising his voice is very effective. He was in a conversation with a group of close-knit guys on a two meter repeater – the type of guys that stay on for hours every night. During a lull, I called him over to the computer and showed him that his new call sign had just been posted! He thought about it for a couple of moments, and then went back to the radio, eager to use his new call sign for the first time.

But he disguised his voice! He called, 'W2ORO, listening.' No response. Just silence! Since these guys had just been talking, he started calling them individually by their call signs. Still: silence! They would not speak to this new ham! When I grabbed the mic, they came right back to me, telling me there is some new guy on the air. After three minutes, one of them had looked Greg's new call sign up on the Web, and figured out who he was. Then everyone talked to him, and complimented him on his skill at disguising his voice.

I feel this was an excellent example of exactly what you wrote about in your article, how some folks don't want to key up with a newbie. Greg is retired, and actually sets our two meter rig to scan during the day, always listening for a new call sign on our two local repeaters, and also on 146.52.

He keeps busy with other hobbies, so he won't grab the mic for every local guy that jumps into his car for a commute. But when he hears a new call sign, whether it be a new ham or a traveler from out-of-town, he drops what he is doing for a few minutes to greet them. Since we are very close to interstate 75, we both try to be radio ambassadors for those just passing through."

Whenever I begin to despair over the future of amateur radio, I remember that there are a lot of folks like Greg and Judy out there fighting the good fight against the negativity that sometimes crops up in the greatest hobby in the world.

❖ Raise Awareness

Walt N6HNS jumped in with these comments:

"Though I've been licensed for over 20 years, I haven't spent much time on the air. Probably 90 percent of my contacts are with the same friend who got me your magazine. I've been somewhat active on a regular basis the last few months, but that's only because I 'got volunteered' to take the VP position in the local amateur radio club – the Nevada County Amateur Radio Club (NCARC), here in California.

One of the jobs of the VP is net control for a weekly evening 2 meter net. So, after getting hooked into reading all of your article I had two thoughts – (1) this is a very good,

thought-provoking article and (2) this would be an excellent topic for Tuesday night's net. The net usually only has between 5 and 10 check-ins and most of them regulars. When I used your article for the topic of discussion, all the check-ins definitely felt that repeater usage was down almost everywhere they travel as well as locally. We were all especially concerned with the obvious (that is, obvious after you pointed it out) fact that new hams are mostly technicians and repeater usage is key to getting them more involved in amateur radio. I've added the topic of 'improving our repeater usage and encouraging new hams to get on the air' to the agendas of both the next NCARC meeting and the NCARC board of directors meeting."

Well done, Walt! The key to effecting change is to get folks talking about it. Don't be too surprised if NCARC starts experiencing growth as you put your ham radio heads together to find ways to make 2 meters a friendlier place for new folks in our hobby.

❖ Renew the Hand of Friendship

Luigi NP4FW sent along these comments from Puerto Rico:

"I went thought a similar situation once while attending to my son's graduation at MIT. I took my handy talkie to the Boston area and did my best to make new friends. No way. Just the cold feeling of being left alone. I also had some "elbowing treatment" and a few vague Hi's.

But to make you happy, it is not the same here in Puerto Rico.

Very often cruises full of visitors arrive to our shores. Among those who come, there is always a ham around. When these folks hit our repeaters and put their call on the air, there is people showing up to greet them, to invite them to local ham reunions, to say hi, to chat and make them feel like at home. I can guarantee that.

I don't know of any trustee or any repeater here in PR that still collects any dues. What we do is this, when any repeater goes out of service by any reason, the whole bunch passes a 'hat' around to pick up a few bucks and put the machine back into service.

On a frequent basis, I use 145.45 whose trustee is Oscar KP4RF. This is a very good one. Feel free to use it if by any chance you have come to Puerto Rico any time (I hope you do.)"

Many thanks for the offer, Luigi. I always knew I could trust in island hospitality, especially among the ham population. And don't be surprised to hear me on that machine one day. You never know which way the wind will blow Old Uncle Skip. But I am sure your hospitality would extend to any ham who showed up on your shores. Muchas Gracias Mi Amigo!

❖ Revive the Fun!

Mark N8QIK shares one of the most original ideas for waking up a dead repeater that I have ever come across:

"I wanted to tell you what a local repeater owner did to wake the dead in my town. The repeater is probably the most used in the area, but just for fun SHE assigned any ham who cared to participate a cartoon character name – Mr McGoo, Daffy Duck, etc. Then she held a QSO contest and the ham that worked most toonies (WAT?) received a gift from her business, an electronics/ham store. It was a lot of fun and did generate a lot of activity on the machine."

I issue an Old Uncle Skip Challenge to all you repeater system trustees out there. You need to have a Toon QSO Contest as soon as you can set one up. Don't make me turn this into a New Year's Resolution! Mark didn't include the trustee's callsign, but next time I am in the Cincinnati area I plan to look her up and congratulate her on an innovative plan to bring some fun back into 2 meters.

And again, I can't say anything but WOW!! I am gratified that my humble ham radio rants have not only touched a nerve or two, but more importantly, generated these positive efforts that live up to the name of the original column "Waking the Dead and Unruding the Rude."

So, next time you are together with a couple of folks from your local repeater, why not toss a few of these ideas around? Or better yet, come up with some even better ways to help extend the hand of friendship across the ether to all those folks trying to join in the fun. I'll see you on the bottom end of 40 meters, or maybe on .52.

UNCLE SKIP'S CONTEST CALENDAR

10-10 Int. Summer SSB Contest
August 6 0000 UTC – August 7 2359 UTC

European HF Championship
August 6 1200 UTC - August 6 2359 UTC

North American QSO Party (CW)
August 6 1800 UTC - August 7 0600 UTC

ARRL UHF Contest
August 6 1800 UTC - August 7 1800 UTC

Maryland-DC QSO Party
August 13 1600 UTC – August 14 0400 UTC
&
August 14 1600 UTC – August 14 2400 UTC

North American QSO Party (SSB)
August 20 1800 UTC - August 21 0600 UTC

New Jersey QSO Party
August 20 2000 UTC – August 21 0700 UTC
&
August 21 1300 UTC – August 22 0200 UTC

Ohio QSO Party
August 27 1600 UTC – August 28 0400 UTC

Hawaii QSO Party
August 27 0700UTC - August 28 2200UTC

Kentucky QSO Party
August 28 1600UTC - August 29 0400 UTC

Outer Limits continued from Page 59

Radio Network web site, another outstanding source of content about pirate radio, is found at **http://www.frn.net** on the internet, and a few pirates will occasionally QSL a web site report left on the FRN.

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: John T. Arthur, Belfast, NY; Artie Bigley, Columbus, OH; Jerry Coatsworth, Merlin, Ontario; Ross Comeau, Andover, MA; Wendel Craighead, Prairie Village, KS; Gerry Dexter, Lake Geneva, WI; Bill Finn, Hatboro, PA; Harold Frodge, Midland, MI; William T. Hassig, Mt. Prospect, IL; Harry Helms, Wimberly, TX; Chris Lobdell, Stoneham, MA; Leonard Longwire, Chicago, IL; Greg Majewski, Oakdale, CT; Larry Magne, Penn's Park, PA; Kevin Mikell, Chicago, IL; Dan Piazza, Syracuse, NY; John Poet, QTH Unknown; Lee Reynolds, Lempster, NH; Martin Schoech, Eisenach, Germany; John Sedlacek, Omaha, NE; Arnaldo Slaen, Argentina; Niel Wolfish, Toronto, Ontario, Mike Wolfson, Ashland, OH; and Joe Wood, Greenback, TN.

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Virtues of Directional Antennas

We know that directional antennas can be of great help in weak signal work, but why? And is that reason the same, regardless of the band of operation? We'll look at these factors and then build a directional antenna for high HF frequencies and above.

❖ HF and Lower

Received noise and received interference from undesired stations are arch-enemies of good reception. Reducing the strength of these two factors in relation to the strength of the desired signal can be a great asset to successful reception of weak signals. Although most directional antennas for HF or lower frequencies offer increased gain over less directional antennas, this increase in gain, by itself, is often irrelevant to obtaining better reception. In terms of antenna performance, improved HF reception is usually the result of the directional *selectivity* offered by the antenna's reception pattern. This selectivity improves reception by reducing or eliminating noise and interference coming from directions other than that of the desired signal. Increased HF antenna gain alone won't accomplish this, because gain by itself will strengthen the noise and interference along with the desired signal.

Such directional selectivity explains the effectiveness of antennas like table-top loop antennas and the Beverage antenna. These antennas, although possessed of relatively low gain levels, have very directional reception patterns. These patterns allow them to be oriented for improved signal-to-noise (S/N) as compared to less directional antennas. This noise and interference reduction is often important on the HF band and is particularly important at MF and lower frequencies, where received noise can be a very serious problem.

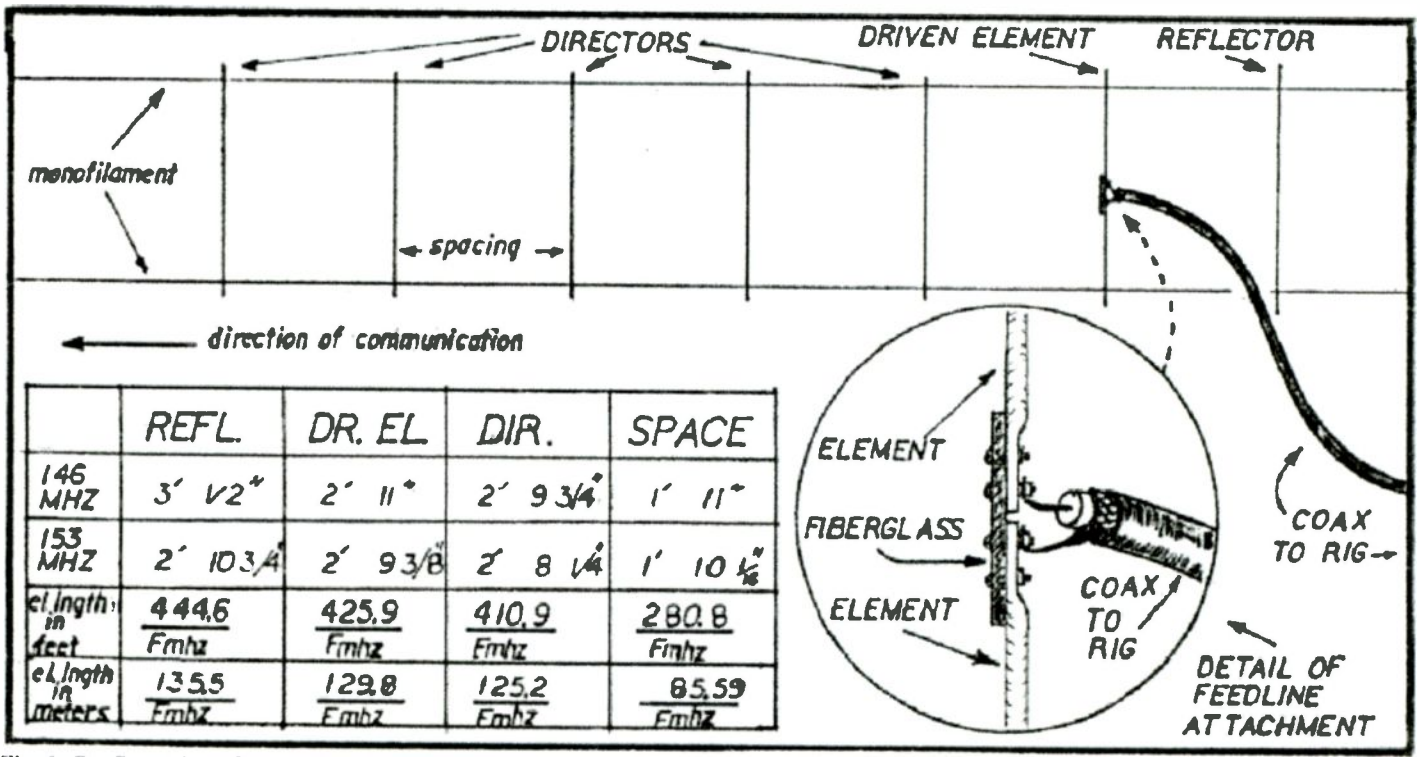
❖ VHF and Higher

Received noise levels at the higher frequencies of the HF band, and particularly at VHF and higher, are usually much lower than noise levels at lower frequencies. At these higher frequencies, typically there is more noise generated in the circuits of the receiver itself than is received from the antenna. Thus, at these higher frequencies, the increased signal strength from an increase in antenna gain *does* result in a better S/N. This is because the received signal is now stronger in relation to the receiver's internally-generated noise with which it must compete. And, of course, as mentioned earlier, the reduction of interference from undesired signals that arrive from off-beam directions can be helpful at these frequencies, too.

❖ Let's Build a Directional Antenna

The Yagi-Uda beam-antenna (fig. 1) is popular on the higher frequencies of the HF band, and also on the VHF and microwave bands. Directivity and gain of the Yagi-Uda increase as more elements are added, and fairly high levels of both gain and directivity are possible.

This antenna's popularity is partly due to its relatively small size, and the fact that it needs no ground connection unlike some fixed-position beams. These characteristics allow fairly easy rotation of the antenna.



	REFL.	DR. EL.	DIR.	SPACE
146 MHZ	3' 1/2"	2' 11"	2' 9 3/4"	1' 11"
153 MHZ	2' 10 3/4"	2' 9 3/8"	2' 8 1/4"	1' 10 1/16"
el length in feet	444.6 / Fmhz	425.9 / Fmhz	410.9 / Fmhz	280.8 / Fmhz
el length in meters	135.5 / Fmhz	129.8 / Fmhz	125.2 / Fmhz	85.59 / Fmhz

Fig. 1. Configuration of a 7-element Yagi-Uda beam antenna. Examples and equations for length and spacing of the elements are given in the included table.

This Month's Interesting Antenna-Related Web site:

This site actually offers a free downloadable handbook of radio, "Crystal Sets to Sideband," with many chapters covering such things as the history of radio, building an antenna, how electrical components work, setting up your radio-electronics workbench, how to become an amateur radio operator, how to make receivers and transmitters, and much more. Hats off to Frank W. Harris, KØIYE for writing and sharing such a gift to radio enthusiasts around the world.

http://www.qsl.net/k3pd/book.html

This next site is on QRZ.COM and has lots of antenna-relevant downloads:

http://www.qrz.com/download/antennas/index.html

Rotation makes it possible to quickly change orientation of the antenna's radiation-reception pattern as desired in order to maximize strength of desired signals, or to minimize strength of noise and other interference. It is quite common to find Yagi-Uda antennas equipped with remotely-controlled, motorized rotators.

The antenna in fig. 1 is quite directional and has a gain of about 10 dB as compared to a dipole antenna. Its elements can be made of anything from wire to metal tubing. The 7-element model described below was constructed from 8-gauge aluminum ground wire and mounted in an attic using heavy, monofilament fishing line. When using this antenna to talk to friends who live in a town about 30 miles away, I received impressive signal-strength reports. Judging by the strength of my signal, my friends' initial reaction was to think that I was there in town, when in fact I was 30 miles away on a handheld!

Using the kind of mounting shown, but with stronger elements and heavy cord or light rope for support, this beam is a useful portable antenna. A more permanent mounting can be made with a boom of varnished wood or of metal tubing. When using metal tubing as a boom, the only element that needs insulating from the boom is the driven element.

All elements except the driven element are one continuous length. The driven element is composed of two identical, shorter lengths which together equal the length given in the table of fig. 1. As shown in the inset, the inside ends of the driven element are flattened, holes are drilled in them, and the element ends are then attached with small screws and nuts to a piece of insulation such as fiberglass board or plastic. The two element ends on the fiberglass should be separated by about .25 in, or .5 cm. The coax feed line is attached to the driven element at this insulator as shown. The end of the coax should be sealed against weather with something like coax sealant. Such sealant is available from Radio Shack™ and other electronics supply houses.

Actually, the antenna and the environment in which it is sited interact electrically. And so the exact length of elements needed for resonance will vary with each different installation. That means that, for optimum performance, the element length should be adjusted with the antenna already mounted in place ready for operation. However, that is impractical for most of us, and experience has shown the lengths derived from the equations in fig. 1 have worked well in the models I or my friends have built. Two of these models were on the two-meter ham band, one was for the 162.4 MHz and 162.55 MHz weather stations, and the fourth was on the 20 meter HF band. That HF antenna proved quite good for DX, even though it was mounted only 15 ft or so off the ground!

The method shown in fig. 1 for connecting the feedline is not an ideal textbook method: the preferred practice would include matching circuitry and a balun. On the other hand, the connection technique shown is much simpler, and – more importantly – it has given good results. Please note that it is important that good-quality feed line be used. Particularly at VHF and higher frequencies, low-loss feed line is essential or much of the gain of this antenna may be lost in the line.

Since with this type of mounting the antenna is fixed in place, you must be careful to orient it to point in the direction of the signals you wish to receive. A map and compass may be useful for this. If you use a compass, remember to account for magnetic declination in your area. If you don't want to worry about magnetic declination, true north can be determined by the north star. Local maps should work fine for VHF and higher where communication usually ends a bit beyond the visual horizon. For working the skip propagation on HF, however, use great circle headings rather than the apparent (but usually incorrect) directions taken from a flat map. One great-circle program online is at **http://gc.kls2.com/**

As a general rule, the higher you put this antenna the better your communication effectiveness. If you've never used a beam with this degree of directivity and gain, you are in for a pleasant surprise.

RADIO RIDDLES

Last Month:

Last month we said: "OK, so EM waves and antennas are polarized. Is this of theoretical interest only, or is there some practical value in knowing about polarization?"

Well, actually, polarization is often of considerable importance. Considering linear polarization, which we discussed last month, maximum signal strength is induced in a receiving antenna when that antenna's polarization and the polarization of the received wave are the same. On the other hand, cross-polarization – when signal and antenna have contrasting polarization, such as one with vertical polarization and the other with horizontal – causes dramatic loss of signal strength. Some HF signal fading is caused by shifting of the signal's polarization as it interacts with the ionosphere.

However, a circularly-polarized antenna, also discussed last month, can be used to receive linearly-polarized signals of polarization at any orientation with only a relatively small loss of signal strength.

Circular polarization has two modes: right-handed, and left-handed. To receive circularly-polarized signals with a circularly-polarized antenna, the handedness of the signals must match that of the antenna. Otherwise very significant signal loss may occur. So, "yes," antenna polarization and wave polarization are of practical importance.

This Month:

Obviously, beam antennas, such as the Yagi-Uda discussed above, often have much to offer for improving your reception. On the other hand, their use can actually be a handicap at times. Why is this so?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

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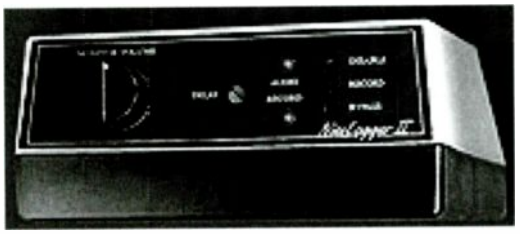
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Marc Ellis
marcellis@monitoringtimes.com

Decisions, Decisions, Decisions!

At the end of last month's column, I outlined my strategy for the about-to-begin HQ-120-X restoration. You'll recall that I have two of these sets on the workbench: my original purchase plus a "parts set" I picked up later when I discovered that the 10-meter r.f. coil on the original was open. But I was beginning to think that I might like to reverse the roles of the two radios, using the original as the parts set.

Original radio with cabinet and panel removed. Note warped section of bandspread dial (to right of panel top corner) and resistors wired into dial lamp circuit.

❖ Problems with the Original Set

For one thing, I was put off by the very crude parts substitution job that had been done in the power supply – apparently as a replacement for the original multi-section electrolytic capacitor. It wasn't that it would have been difficult to restore the wiring properly using new parts. But I felt that anyone capable of creating such a mess might have been at work elsewhere in the receiver – perhaps in places not so easy to spot.

As further evidence, resistors had been soldered into the pilot light wiring – apparently so lamps of a different voltage could be used. (Why?!). There were also some homemade brackets attached to the back of the "S" meter to hold something that was no longer there. Perhaps more serious was a wire – now clipped – that wasn't supposed to be emerging from the top of the large shield can covering the tuned circuits.

Maybe the wire had been connected to whatever was once mounted on those homemade brackets. Last month I wondered why the tube grid cap connectors on the wires emerging from the side of the shield can had been disturbed. Now I see why. They would have had to have been taken off so that the wires could pass back through their holes as the can was removed.

I think I also mentioned, last time, that the plastic bandspread dial had become warped enough so that would no longer turn throughout its entire range.

On the other hand, the "parts set" had no obvious wiring atrocities, a good set of r.f. coils, and unwarped tuning dials. It also was a newer model whose circuitry (unlike that of my original set) was covered in the documentation I had at hand.

❖ Problems with the "Parts Set"

Disadvantages were that the cabinet had several non-original holes, was crudely repainted, and the factory lifting handles had been removed. I also didn't care for the fact that the front panel had been drilled to take a switch for an added crystal calibrator, most of the knobs had been changed, and the "S" meter scale was badly yellowed.

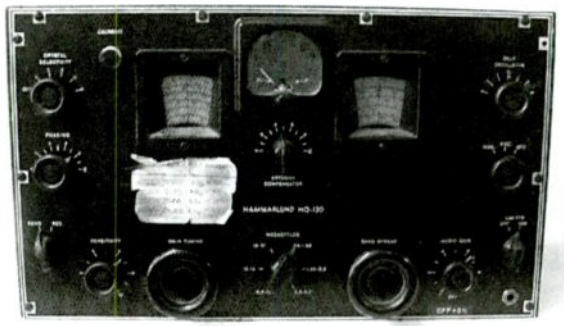
And so I was tempted to put together a composite using the panel, cabinet and knobs of the original set and the chassis of the "parts set." The original set would now become the parts set, to be used as a source for whatever other components would be needed.

But once I got started cleaning up the chassis of the "parts set," I began to have doubts about using it. Judging from the heavy layer of grime and occasional rust spots found on the chassis of the former parts set, this radio had been stored for a long time under not exactly optimal conditions – maybe in a garage. Compared to it, my original chassis (which certainly also has its share of grime) suddenly looked pretty good. Maybe it had been stored in a better place, such as a dry basement. And, except for the dead 10-meter band, I knew it had been working when last powered up.

Not only that, but as I removed the tubes of the originally-intended parts set for testing and chassis cleaning, I noted that two of the 6S7 sockets were now occupied by 6K7s. The latter are an adequate replacement for the former, though the 6S7 was a later, "hotter" design. This was a change that could easily be reversed, but I was concerned that a couple of tubes had needed replacing – a fairly rare event that might signal some past trauma to the plate or bias voltage circuits.

Original radio before removal of cabinet and panel.

Cobbled-up replacement of multisection filter cap in original radio. Factory capacitor, abandoned in place, is large cylindrical unit at right.



Front view of parts set. Round knobs are not original. Note added "calibrate" switch to left of main tuning dial.

I was also concerned that the previous owner had not cared enough about the set to obtain exact replacements. By the way, I was beginning to think of him as "the gorilla," since the cabinet screws, as well as the screws for some shield covers he had obviously been into, had been fastened down so tightly that I could barely break them loose.

If this was the same owner who had made the many capacitor substitutions seen throughout the set, I had some reason to worry. The work seemed neatly done, but could I trust him to have used the correct parts values and to have installed the capacitors correctly? I wasn't sure.

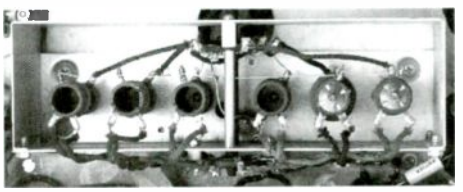
If I had begun to worry about weak tubes, the worries were just beginning. The 6K8 pentagrid converter showed shorts on all elements; the one remaining 6S7 i.f. amplifier and the 6Z7 noise limiter were weak; the 6V6 audio output tube had an open filament; an improper tube had been substituted for the 5V4 rectifier and there were parts of elements rattling around inside its envelope. Oh, and the 1.5-ampere line fuse – which had obviously let go at some point – had been replaced with a 10 ampere unit.

Now I was beginning to feel that I'd like to go ahead with the chassis of the original set, replacing its tuning and bandspread dials and burned out 10-meter r.f. coil with replacements from the parts set. The only problem is that making the coil switch looks like it might be a tricky job.

The r.f. coils are all installed from below on a subassembly deck that would have to be completely removed from the receiver in order to make any changes. One thing that would simplify the procedure is that the wafer bandswitch sections for the r.f. coils are part of the subassembly.

That means that only a few leads would have to be disconnected to remove the subassembly from the chassis. In fact, if it could be removed with no problem, the easiest and least intrusive approach to replacing the blown coil would be to replace the entire coil deck with the one from the parts set.

So I'm gong to table the decision about which chassis to use until next time. By then I will have tried to switch the decks – and if the process goes smoothly I'll consider going with the original chassis as the foundation for my restored set.

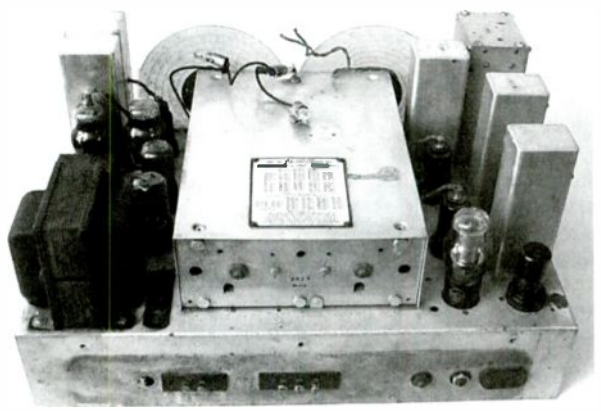


The HQ-120-X r.f. coil deck. Note bandswitch wafers at top and bottom center.

❖ Restoration to Date

So far we've done more plotting and planning than actual physical restoration – unless you want to count the removal of the cabinet and front panel of each set and the testing of the tubes. And while the tubes were removed for testing, I scrubbed away most of the thick sticky grime from the "parts set" chassis surfaces. A rag dampened with kitchen spray-cleansing liquid did a pretty good job.

Of course I'll have to repeat the job on the original chassis should I decide to use that one. I'll also clean up the front panel from my original radio and reinstall it on whatever chassis I decide to use. Then the recapping can begin.



Chassis of parts set. At this stage I had cleaned off the surface grime with an eye toward using it to replace the original set.

❖ A Couple of Reader Finds

Mike Cobbeldick, KB4CVN/C6AMC (*kb4cvn@yahoo.com*), likes to collect old AM marine band (2 MHz) radio equipment. He has converted some pieces for use on the 160- or 75-meter ham bands.

Mike was understandably intrigued when the little item pictured here turned up. It's a rare AM-auto-radio-to-AM-marine-band converter.

Made by Pearce-Simpson, a major manufacturer of marine

Reader Cobbeldick's interesting find: a rare Pearce-Simpson AM marine band converter for auto radios.

AM communications equipment in the 1960s, it is painted in their standard color scheme.

The converter runs from an internal 9-volt battery and is connected between the auto antenna and the antenna input of the auto radio. When it's turned off, the auto radio operates normally; when it's turned on, the radio tunes to the 2-3 MHz receiver. The dual scale on the panel indicates which marine-band frequencies correspond to the various settings of the radio dial.

Arnal C. Cook, N9ACC (*Arnal.C.Cook@delphi.com*), decided to start a small collection of tube gear that would illustrate the development of early Monitor radios from manual tuning to scanning. His first purchase, won on e-Bay, was a Regency MR-33. He thinks it's about 1960 vintage. Arnal replaced a missing tube, but so far the set has no audio output. Anyone have experience with this radio? Would there be interest in including the restoration of manually tuned monitor radios among the possible projects for this column? Let us know!

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Toss That Cheap Earphone Away!

Quality Earphones Take Monitoring to the Next Level

By Joseph Pasquini

When it comes to the topic of earpieces, radio enthusiasts have traditionally used the standard earphone typically found at many discount and electronics stores. You know the kind I'm referring to – the earphones are usually molded in white or beige plastic and are designed to sit on the edge of the ear canal. However, they also unfortunately feature mediocre audio performance, they are constantly falling out of the ear, and the cheap cables usually break the first time they are tugged on a little too harshly.

This antiquated design dates back to the days of the AM transistor radios and even earlier than that. Sure, these simple designs have their place – they normally cost a couple of dollars or so and therefore we don't have to worry about them too much – but they simply do not feature the same kind of quality that we demand in our portable radios. After all, if we're going to spend $200, $500 or even more on a radio that meets our needs, shouldn't we at least consider spending a few more dollars on an earpiece which offers enough audio clarity to actually hear what's happening on that same radio?

As it turns out, scanner and shortwave listening (SWL) enthusiasts like us are not the only ones interested in monitoring radio communications to the best of our abilities. Security firms, governmental agencies, amateur radio operators and other communications professionals also have comparable requirements. To answer this demand, several manufacturers have produced earpieces that are capable of being used by these types of users and hobby listeners alike. Let's discuss a few of the models.

❖ The "Covert" Look

Who says you have to be a secret agent in order to use a high quality earphone? Several manufacturers produce earphones which use an acoustical tube terminating with a soft plastic insert. The insert is intended to actually rest inside the ear canal. The tube funnels the output from a tiny earphone-sized speaker located at the end of the cable connected to the radio.

As a norm, the speaker is attached to an acoustic tube quick connect/disconnect adapter. The adapter, which normally features a spring-loaded clothing clip, allows the user to detach and replace the acoustic tube if needed. This is especially handy in situations in which one earphone may be utilized by multiple users with each user having his own acoustic tube. These listen-only earphones are similar in construction and styling to the two-way units commonly

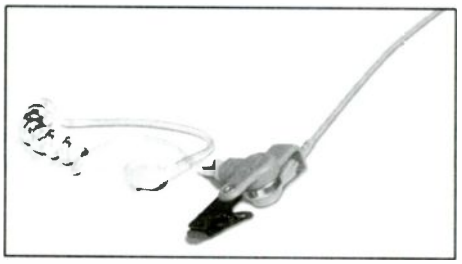


Figure 1: The V1-10437 Beige Earphone Kit w/48" cable and straight 3.5mm plug from OTTO Communications

seen used in tactical situations (governmental agents, SWAT, etc). Most vendors also provide replacements parts and different kinds of ear tips – rubber or foam.

One well known manufacturer of acoustical earphones is OTTO Communications. They produce several listen-only models including the V1-10252 1-Wire Earphone Kit. This model, which features a 48-inch straight cable terminated with a 3.5mm plug, is detailed in black using high-grade, commercial quality components. It is available directly from OTTO for a price of $46.56 and is also available from resellers at a comparable price point.

OTTO also offers a similar model, the V1-10305, which features a 30-inch extended length coiled cord which is especially handy for two-way communications using a speaker microphone. If you are an amateur radio operator, you may want to consider the coiled version, since it can serve double duty for both your scanner listening and your two-way radio activities. It is just a little taut in reaching directly to a belt-attached radio, but it does indeed work.

OTTO offers both models in straight or right angle plugs. A beige model is available, but only with a 48-inch straight cable and a straight plug (Figure 1). The 1-Wire Earphone Kits are additionally available with a number of different types of plug connectors for use with virtually any type of communications device.

Another acoustic earphone manufacturer is Easy To Get Wireless. Their product, the Agent Listen Only Earpiece, is not constructed quite as durably as OTTO's and does not include a quick connect/disconnect feature, but the "Agent" is also less expensive, retailing at $39.00. Keep in mind that it is only available with a short 18-inch straight cable with either a 2.5mm or 3.5mm plug. With such a short cable, it will be difficult to use with a scanner attached to your belt. But, it will function perfectly with a speaker mic. And with that thought in mind, it features not one but two clothing clips: one at the adapter and the other for the cable itself. If you are looking for a light-duty acoustic earphone, this one is worth a look.

❖ Over The Ear

If you're not really into the idea of using an acoustical earphone, but still want to experience an acceptable degree of audio fidelity, you have another interesting option. While not as common as acoustical or standard earphones, a few vendors manufacture small speakers designed to be worn directly over one ear. One such model is the Extended Wear Listen Only Earpiece (D-Ring) from Easy To Get Wireless.

The uniquely designed D-Ring, which sells for $19.00, features a miniature speaker mounted within a plastic housing that's intended to fit comfortably over the ear (Figure 2). This design lends itself to noisy environments thanks to the size of the speaker itself. Since nothing is placed inside the ear, it also offers additional safety as well as improved hygiene. It also comes with a small plastic clip which can be used to attach the medium-grade cord to your collar.

The D-Ring is available with either a 58-inch cord that plugs directly into your radio or a short 14-inch cord that plugs directly into a speaker microphone equipped with an earphone jack.

Figure 2: Extended Wear Listen Only Earpiece (D-Ring) w/58" cable and straight 3.5mm plug from Easy To Get Wireless.

The D-Ring, which provides surprisingly crisp audio for such an inexpensive unit, is an excellent choice for casual, semi-private listening. The longer cord is especially nice for use around the listening post.

❖ Check Your Connector

One note about all of these earpieces: when ordering any earpiece, make sure that you order it with the correct connector attached! Check with your radio's specifications, but virtually all earphone ports will accept an earpiece with a 3.5mm plug.

❖ Audio Output

When using any earphone, you will most likely notice that you need to turn up the volume more than you may expect. This is the case for most of the consumer scanners and other similar communications equipment on the market today. Commercial radios normally have balanced output stages, and therefore produce higher output voltages than a typical consumer product. In addition, the headphone jack output on some consumer products is intentionally limited in order to avoid any potential damage to a user's hearing.

If you are using an acoustical tube-based earphone and still have some difficulties with the volume (especially in environments with lots of ambient noise), you may want to consider the use of the molded ear tips or foam ear canal inserts which will provide you with the highest audio levels. Naturally, before you attach any earphone to any radio, ALWAYS make sure that the volume control on the receiver is turned down first. Once the earphone is plugged in, then slowly increase the audio output to a comfortable listening level.

❖ Conclusion

Now you may be asking yourself, "Do I really need a new earphone? My old simple plastic one is working just fine." Well, before you pose that question, consider how well your old plastic earpiece really functions. Is there a short in the wiring? Probably. Does the earpiece or connector look like it's been stepped on a few times? Perhaps. How does the audio sound? Adequate. Like anything else, the decision is yours to make. But no one ever said that this hobby was going to be cheap!

If you occasionally find yourself reaching for an earphone, then you owe it to yourself to invest in an earpiece that is worthy of your radio and that doesn't give you a headache in the process.

Further Reading

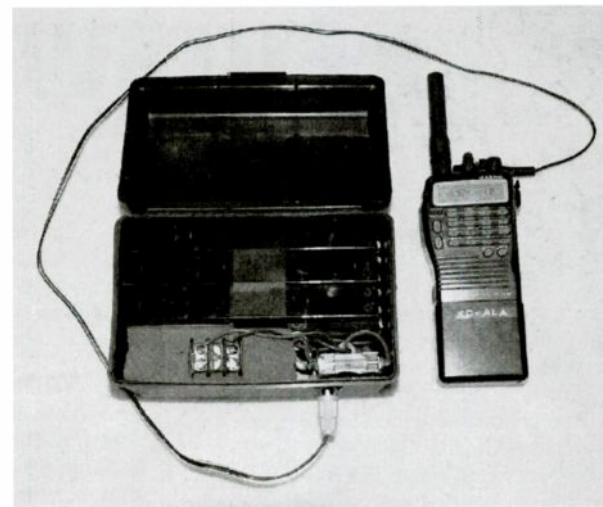
Easy To Get Wireless: http://www.easytogetwireless.com/
OTTO Communications: http://www.ottoeng.com/

This is your equipment page. Monitoring Times pays for projects, reviews, radio theory and hardware topics. Contact Rachel Baughn, 7540 Hwy 64 West, Brasstown, NC 28902; email editor@monitoringtimes.com.

Packing More Punch in Public Service

By Alan Bosch/KO4ALA

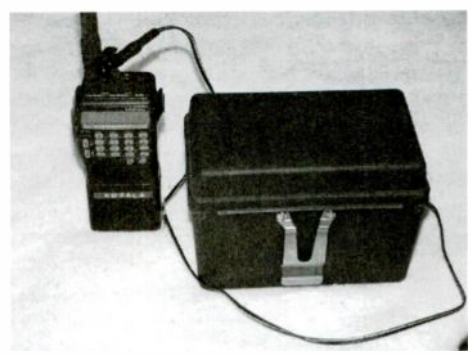
This project – a fanny-pack auxiliary battery for HTs – was first conceived in the Amateur Radio Emergency Service context. But it can also run a Tivoli Model One radio more than twice around the clock at room listening level.



The packaging is a sturdy plastic box for recipe cards about 6.5 inches long by 4.0 inches wide by 4.5 inches high with a big belt clip on the back.

The innards are three flat 12vdc x 2Ah sealed lead acid packs wired in parallel to yield 6Ah capacity (Yuasa NP2-12). Given that the typical handie-talkie draws something more than 1 amp on transmit, the three packs provide more than enough talk time for an all-day exercise like a fundraising bike ride.

(There is actually room in my box for a fourth Yuasa, but then the fuse-holder and the contact block would have to be configured atop the cells or attached to the lid – and would likely entail adding a second belt clip to handle any more weight. The unit's pretty heavy as it is.)



I used an RCA phono jack for the output because it is so compact compared with other fittings. The power cord shown is one half of a 6' Radio Shack Adapta-Plug extension (273-1740). I used that approach because those little plugs are available for almost any radio jack you may encounter – and polarity-reversible to boot.

Fusing the package with a 5A fast-blow gives protection. The fuse-holder is attached with Velcro so it's removable for changing. The contact block to its left was made from a cut-down barrier strip and is fastened to the polyfoam stuffer with, of all things, 2" wood screws. They hold well, and the block lets you test and charge the fanny-pack easily.

If you are careful with your meter probes, you can check the battery packs individually because their terminals line up along the right wall of the recipe box. The jumpers are clipped, not soldered, to the terminal tabs so you can replace packs singly if needed.

This simple project will give you and your HT plenty of what the Air Force calls "loitering time."

MT REVIEW

Eton/Grundig G4000A

By Jim Clarke NR2G
jimclarke@monitoringtimes.com

If the newly-released Eton/Grundig G4000A looks suspiciously like a Yacht Boy 400PE (YB400PE), it should. A sales representative from Eton reassured me that it was different, but couldn't tell me how. An Eton technician, however, said the two were identical with the exception of the case. It looks like this review will be a re-review of the YB400PE, now known as the Eton/Grundig G4000A.

I personally own a YB400 (not the PE version) to which I will occasionally refer in perspective.

❖ First Glance

I must admit, the silver-toned case adds a bit more "professional" finish to the G4000A, and is probably more durable than the black – my YB400 shows the accumulation of years of use and minute dust particles quite visibly. The G4000A's footprint is about 8"W X 5"H X 1.5"D, which makes it a handy size for taking with you wherever your recreational activities lead you.

The LCD multi-function display is about 2" X 1" and displays all of the necessary information including mode, frequency, time, selected clock, memory channel, signal strength and stereo signal detection. There is a button on the top of the radio to turn on a green backlight for ten seconds, unless switched off sooner by another button press.

The G4000A covers longwave from 144 kHz to 353 kHz, AM broadcast from 520 kHz to 1710 kHz, short wave from 1711 kHz to 30 MHz, and FM broadcast from 87.5 MHz to 108 MHz. It receives AM, FM, and SSB modes, and has provision for FM stereo reception through the headphone jack located on the left side of the radio.

❖ Ergonomics

Being a simple portable, the controls on the G4000A are spaced conveniently for use by the right thumb when the radio is held using two hands.

There is a LOCK button on the front panel to prevent accidentally changing a setting by pressing a front panel button. While the radio is off and locked, power cannot be turned on until it's unlocked; however, if the radio is on and locked, pressing "power" will shut the radio off. I personally like the lock function, mainly for the power-on protection while carrying the radio in its case; it's possible otherwise to turn on power accidentally and kill your batteries without realizing it.

The speaker looks to be about 3" in diameter and is located on the left half of the front panel. Either of two clock functions is selected by a button on the front panel.

❖ Warning Sign?

I usually lower my expectations whenever I see a "reset" button on a communications product, and on the G4000A it's on the front panel. In my experience, this typically indicates marginal operating software that occasionally "locks up" the radio. I'm happy to report, however, that in the eleven years I've used my YB400, I have never had to use the reset button.

❖ Changing Frequency

Frequency change is accomplished by any of four ways: a twelve-key keypad, up/down tuning buttons, selection of a memory channel, or Auto Tuning. There is no tuning knob on the G4000A – which is one thing I like to have – but there is a fine-tuning knob on the radio's upper right side for clarifying single-sideband (SSB) signals.

Keypad entry is as simple as entering a frequency using the numeric keys and pressing the Frequ./Meter button. Meter-bands can be immediately accessed by entering the band number and once again pressing the Frequ./Meter button.

Step sizes for the up/down tuning buttons are selected using a button on the front panel, with two step sizes available for each frequency range: 1 or 10 kHz for the longwave and AM broadcast ranges, and 1 or 5 kHz for shortwave. Those who are outside the US can select 9 kHz longwave and AM step sizes instead of the U.S. 10 kHz. The step size for FM broadcast is fixed at 50 kHz.

Memory channel selection can be done by either entering the memory channel number and pressing one of the up/down Memo buttons, or by pressing one of the Memo buttons until it scrolls to the channel you desire. If you hold one of the up/down Memo buttons longer, the radio will begin scanning through the memory channels, stopping at each one for about five seconds, then proceeding to the next. Frequency storage to a memory channel is as easy as entering a number from 1 to 40 and pressing the Store button.

I equate the Auto Tuning feature to more of a "Seek" function. Depending on the duration of the Auto-Tuning key press, the radio will tune up or down in frequency (with the receive audio muted) until it finds a station. There is no "dwell then resume" capability for this feature. While listening to shortwave, the Auto Tuning feature is confined to the shortwave broadcast bands. There is a list of these bands and their associated frequency ranges printed on the back of the radio.

❖ Sleep and Auto-On

For those of us who like to fall asleep to our favorite radio station, there is a sleep button on the front panel that provides play time in ten-minute increments; with each press, starting at the maximum of sixty minutes, it counts down to "off."

If you like to be awakened by your radio, you can set the alarm time and select either a beeping tone or a radio station for your greeting. And yes, there is a "Snooze" button on the top of the radio for you to squeak out a few more winks.

❖ Antennas

The G4000A comes with three antennas. For AM broadcast, there is an internal ferrite-core antenna that provides bi-directional reception when the radio is turned clockwise or counter-clockwise. A 36-inch swiveling telescopic whip antenna is used for FM and shortwave, and a 23-foot external wire reel-antenna is provided with the radio for shortwave. The reel-antenna plugs into the left side of the G4000A, and could be replaced with any other antenna, provided it can plug into the 3.5 mm (1/8") mono antenna jack.

❖ Other Jacks and Controls

For those who like the ability to reduce the sensitivity of the radio, there is a Local/DX switch. I have not measured the attenuation, but would guess it to be somewhere between 10 and 20 dB.

There are also switches provided for wide/narrow bandwidth, high/low tone, and SSB on/off. Audio volume is controlled by a knob on the lower right side, and there is a jack for connecting an external 9 VDC power source.

❖ What's in the Box?

Eton ships the G4000A with an AC wall adapter, stereo earphones, a 23-ft reel-antenna, and a carrying case that doubles as a radio-stand.

❖ How Does It Play?

I took the radio out on the porch to enjoy a nice sunny day and do a little listening.

Using the whip antenna, I decided to start by tuning the 20-meter amateur band to hear how SSB reception was. The tuning seems, at least to me, to be a little coarse at 1 kHz per step. Granted, the fine-tuning will cover the entire 1 kHz range, but it's cumbersome having to bounce back and forth trying to cover a 1 kHz window. Clearly, 100 Hz steps would go a long way toward improving the situation, but would probably add to the cost. The audio was rather poor for SSB voice, but was acceptable for Morse code reception.

In FM, the audio was very nice, and there was no problem tuning in the local broadcasters.

Tuning around on shortwave in the AM mode revealed more noise than I would expect, just as with my YB400, even with a moderately strong signal. The selectivity was acceptable, about the same as some low-end tabletop radios.

Here in the US, we don't have broadcasters on longwave, but we do have aeronautical beacons in that range; performing a quick scan of the beacon portion of the longwave band, I was able to receive a couple of regional beacons with acceptable signal quality.

❖ Final Thoughts

The audio is acceptable on FM, but was fatiguing on AM and SSB, just as with my YB400. While I wouldn't recommend it for serious shortwave DXing, it might be "just the ticket" for someone who is just getting started in the radio hobby and wants to "test the waters" before spending a significant amount of money.

The Eton website, at **http://www.etoncorp.com**, lists the G4000A's price at $150 US dollars. Grove Enterprises offers the Eton G4000A as Rcv23, for $149.95. For more information, visit their website at **http://www.grove-ent.com** or call 1-800-38-8155.

Table 1. Receive Sensitivity (10 dB (S+N)/N)

Input at the external antenna jack

Freq. (MHz)	Level (uV)
1.8	2.8
5.0	1.0
11.0	1.3
16.0	1.8
22.0	1.8
28.0	1.8

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WiNRADiO's External G303e

By Lee Reynolds KD1SQ
leereynolds@monitoringtimes.com

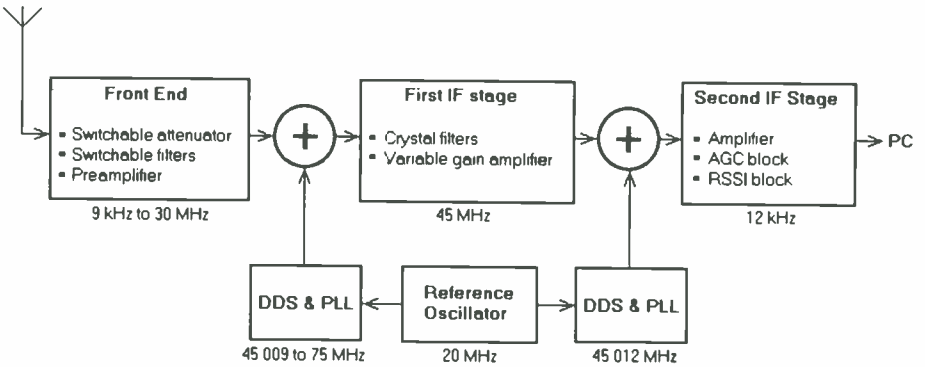
"Speak softly and carry a big stick"

Teddy Roosevelt quoted that proverb many years ago as a brief statement of his approach to foreign policy, and the phrase "Big Stick" diplomacy became a part of the political lexicon thereafter. One possible paraphrasing of that proverb is "Be able and ready to do big things but don't make a big show about it!"

When I looked at one of WiNRADiO's latest offerings, it went through my head that it looked as if the people at WiNRADiO had taken a page right out of Teddy's book. The unassuming WiNRADiO G303e looks like mild-mannered Clark Kent, but makes like Superman for its user. In my opinion, it qualifies as one of the best designed and implemented SDRs (Software Defined Radios) that can be used portably (with a laptop) or in a vehicle. I'll tell you why I like it so much at the end of this article – let's get the review details out of the way first.

❖ What is it?

The G303e is the externally cased, connected, and powered version of the WiNRADiO G303i PCI-card-based shortwave receiver. This has made the G303i into a receiver that can be used in the home, portably with a laptop, or in a vehicle – again, with a laptop. (That's the important thing to note, people: The receiver needs a computer with a USB port in order to be used. It's **not** a standalone receiver!)



The table below shows the (simplified) specifications for the radio; they're essentially the same as for its brother, the G303i.

The specs are pretty good, flexibility in terms of modes and selectivity is excellent, and sensitivity is good across HF from 2-30 MHz.

Physically, the G303e is a compact metal box shrouded in a protective plastic cover that's a little bigger than a man's hand – it's slightly smaller than a 600-page paperback book. This compactness means that it can be readily installed just about anywhere. For connections, all it needs is 12vdc (power supply included for home use), a USB cable (again, supplied) and an antenna (a simple one is provided.)

Control software for the receiver is provided on CD-ROM, free updates are available for it from the WiNRADiO web site. The G303e needs a computer with a 500 MHz Pentium-class CPU running Windows, sound card/speakers and a USB port as the host system. You can use a serial port if you don't have a USB port in your system, but the optional serial port adapter needs to be purchased in that case.

Testing indicates that a slower (300MHz) computer can be used with the G303e, but the system's operation can become a little choppy under the load. Setup is easy and is the same as adding any other USB device to your computer; plug in the USB cable, connect the antenna, power the device on, install the drivers/GUI and you're up and running!

Table 1: Specifications

Receiver Type	Direct digital synthesis dual conversion superhet with software defined last IF stage and demodulator.
Frequency Range	9 kHz – 30 MHz
Tuning Resolution	1 Hz
Modes	AM, AM Narrow, Synchronous AM, LSB, USB, CW, FM3, FM6, FMN, DSB and ISB
Selectivity (-6dB)	Continuously variable from 1Hz – 15kHz in 1Hz steps.
Sensitivity	
	AM.....0.9uV ..... (10dB SINAD)
	LSB/USB .....0.3uV ..... (10dB SINAD)
	CW .....0.1uV ..... (10dB SINAD)
	FMN/3/6.....0.2uV ..... (12dB SINAD)
Intermediate Frequencies	IF1: 45MHz
	IF2: 12kHz
Frequency Stability	10 ppm (0-60°C)
Image/Spurious Rejection	60 dB
	IP3 .....+5 dBm @ 20kHz
	MDS.....-135 dBm
Phase Noise	-146 dBc/Hz @ 100 kHz
Output	12kHz IF2 signal
Interface	USB (1.0 & 2.0 compatible) *(Serial interface optional)*
Antenna Connector	50 Ohm SMA
Size	Length: 6.46"
	Width: 3.78"
	Height: 1.61"
	Weight .....16.40 oz

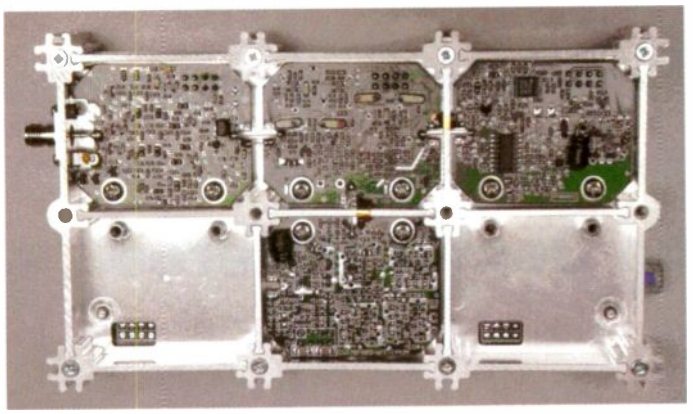
❖ A Peek Inside

I've always been a little curious as to just what's inside the G3 series of receivers, so I did a little investigating and question-asking this time around. The results follow, starting with a simple block diagram of the receiver's various stages.

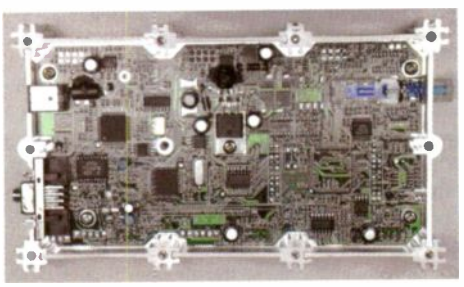
And what's actually *inside* that mysterious box?

Open the plastic cover, remove the (polished stainless steel) lids from both sides of the aluminum extruded box, and you'll see the following –

1. The top left compartment contains the RF module. It contains switchable front-end filters and an MMIC preamplifier.
2. The top center compartment holds the IF1 module. You can see the four crystal filters there which provide the 15 kHz wide roofing filtration. It also contains IF1 amplification, S-meter and AGC circuitry.



3. The bottom center compartment is the DDS/PLL for the first LO (local oscillator). It contains a DDS (direct digital synthesizer) and PLL (phase locked loop) which runs at 45 MHz above the received signal.
4. The top right compartment contains the IF2 module. It contains DDS/PLL for the second IF, which runs at a fixed 45.012 MHz, resulting in the final 12 kHz IF output.
5. The 12 kHz IF is then taken to the control board (below) on the other side of the box, where it is digitized by an analog-to-digital converter at a 64 kHz sampling rate. This board also contains the USB control chip, serial interface chip, a PIC controller for the modules, and power supply circuitry.



The G303e Control Board

If you use the serial interface, the analog 12 kHz IF goes out of the combined 15-way connector (which also contains the USB and serial control signals), to be connected to the line input of a sound card.

All four RF modules are double-sided and densely populated; the control board is single-sided. The layout of the modules follows that of the block diagram, so figuring out what's what isn't too difficult. Construction looks to be very solid, so I suspect you'd have to try very hard to damage this radio before it breaks.

I didn't include a picture of the assembled radio or the software GUI, as high resolution full color versions of each can be found at –

http://www.winradio.com/home/g303e.htm

http://www.winradio.com/home/g303-gui.htm

– or in almost any of WiNRADiO's advertisements in the hobbyist press.

❖ How Does It Play?

Exactly like its brother G303i. As far as I can tell, there is no difference between them in terms of operation or performance. Tests were carried out using a common antenna and multicoupler, comparisons were made between the G303i and G303e initially with no discernible differences in performance between them. Subsequent tests against an ICOM R-75 and JRC NRD-525 indicated that the G303e offers performance that is quite close to that of the higher-end JRC product.

So if they are identical, how do you know which model is preferable for your purposes, you may ask? First of all, the G303e is an externally housed and powered device that connects to the hosting computer via either a USB port or serial port. This enables you to combine the abilities of the G303 receiver line with the portability of laptop computers for the first time.

This new model also enables you to add the G303 receiver to desktop computers that don't have available PCI device slots. The compact design permits you to quickly and easily switch the receiver between different systems and lends itself to easy use when traveling or staying at remote locations.

(For further reviews and comparisons, see *MT*'s review of the WR303i, March 2003, and online at **http://www.monitoringtimes.com**; WR G313i review November 2004, online; August 2003 "On the Bench," WR303i vs Ten-Tec RX320.)

❖ Bottom Line

I like this radio a lot. WiNRADiO gave the implementation of this receiver some careful thought and it shows in the sturdy, go-anywhere package that is the G303e. The tailoring of the device's power requirements so that it comfortably uses 12vdc; its small size, and comparatively simple interconnections have made it a pleasure to travel with and to use in the field. If you take into account the extra functionality that the various add-in software packages for this series of receivers offers – digital modes decoding, seamless DRM reception, different visualization tools for tuning, memory management and station reception – you have a high performance radio that takes some beating and can easily be carried with one hand along with its controlling laptop.

WiNRADiO has even produced a small wall mount/clip for the G303e that can be used to install the radio just about anywhere you can think of. (I can't help but speculate about three or four of these devices hanging off one PC – might WiNRADiO ever come up with consumer-level code that would enable us to use such a setup productively?)

As far as I am aware, there are no "Gotcha"s with this radio. Everything seems solid, everything performs nicely. About the only thing that could improve on the G303e would be to modify the design further so that it could be powered via the USB port as so many other USB devices are.

If you want a radio that can be used anywhere, and for almost any conceivable shortwave listening task, this is the one for you.

(Oh, don't forget to make sure you purchase the Professional Demodulator software, whether you buy this radio or the G303i. If you don't get this package you'll be missing some very useful functions and abilities!)

The WinRadio G303e is available from Grove Enterprises (1-800-438-8155; http://www.grove-ent.com) for $599.95, or for $699.95 with the Professional Demodulator which includes DRM decoding.

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John Catalano, PhD
johncatalano@monitoringtimes.com

RxPlus – Just What the Doctor Ordered

When I first started this column over a decade ago I had to hunt long and hard to find any programs what were made for the general radio monitoring community. I sent lots of telephone calls, letters and postcards requesting information on monitoring software from people and companies. Most were just rumors and not many were answered. Unfortunately, most of the resulting programs were really not that good, but it was a start.

With the advent of the Internet, finding new monitoring programs became a bit easier. At least my telephone and postage costs went way down. However, quality-monitoring programs were still at a premium.

Now in the 21st century, the quantity of everything, including monitoring programs, seems to have exploded … but quality is still elusive. There are many programs that do bits of the *total monitoring environment* – a phrase coined in this column around 1993. We defined it as a software package that does all the monitoring functions – no manual anything! This includes tuning, scanning, logging, decoding of digital signals and every other monitoring function.

A number of companies tried modifying their existing DOS and early Windows programs to create a total monitoring environment. In most cases the results were slow, hard to use, and buggy, to say the least. Times have changed, but some of these old timers are still trying to flog out-of-date code.

❖ RxPlus

This month we'll try a program called RxPlus version 1.76, from Tele Data Inc. This program has been around about a year, but is still making a great impression with the monitoring community. Does it provide a total monitoring environment? Is it worth its rapidly gaining popularity?

The free 30 day trial version is available from their website at **http://www.cam.org/~noelbou/RxPlus/index.php**. The file weighs in at around 7 Meg, not quick for dial-up users. Is it worth the wait? Let's give it a try and answer some questions.

❖ PC Requirements

We're not going to get by on a Pentium I with this program. RxPlus recommends that the minimum system be a Pentium III 800 MHz with 128M RAM and at least 1024 X 768 screen resolution. RxPlus ran great on a Pentium III 1GHz with 256M RAM under Windows XP with a screen resolution of 1024 x 768 and 32 bit color. If you intend to use the first-rate audio processor features of RxPlus, a full duplex soundcard is required. We used the Turtle Beach, Santa Cruz soundcard.

❖ Lots of Supported Receivers

Currently, RxPlus version 1.76 supports a number of popular receivers. ICOM support includes R75, R7100, R8500, R9000, IC-756Pro and PCR-1000. For Drake users it's Drake R8, R8A and R8B. Ten-Tec users will be happy to see the RX-320 and RX-350. The two JRC receivers supported are NRD-535 and NRD-545. And finally, the Kenwood R5000 can be controlled by RxPlus v1.76. The list of supported radios is growing and contains some interfaces that are still in beta testing.

Each radio has its own unique and special features implemented in RxPLus. We tried it with a few receivers including an ICOM R75, a Ten-Tec RX-320, and the ICOM PCR-1000. This article was written based on results with the ICOM IC-R75 via the RS-232 serial port connection. Most of the R75's operational commands for tuning, mode, filter, scanning and memory manipulation are available via RxPlus. Even its twin passband tuning is controllable via RxPlus.

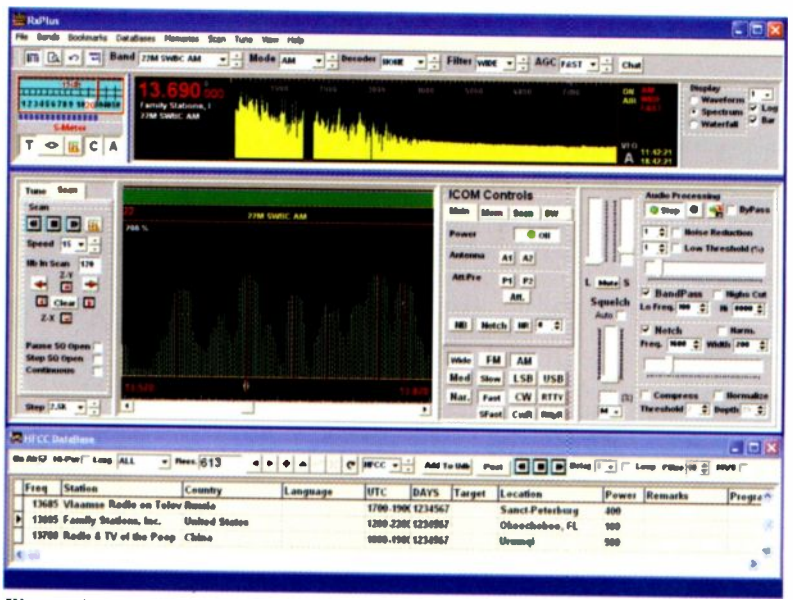


Figure 1 – RxPlus' Display – Actually, three separate displays both in reduced display mode.

❖ Not Just Receiver Control

RxPlus gives its user more than twelve different, easy to use methods of tuning. How's that for choice? Its database(s) can be imported from a number of Internet sites, manually updated by the user, or a combination of both. RxPlus contains a signal decoder for RTTY, HF Fax, PSK31, PSK63 and Slow Scan TV.

Audio Processing

The program digitizes the audio from the receiver, via the PC's soundcard, and manipulates it using DSP (Digital Signal Processing) routines. These include notch and bandpass filters, noise reduction filters, and an audio spectrum compressor/expander. Each filter's parameters are user definable. Just about anything you care to do to the audio is available in RxPlus. For example, if your receiver doesn't have tone controls, never fear: A six band graphic equalizer is included for fine-tuning of the audio spectrum.

Never Miss a "Hit"

How many times have you wished your tape recorder was hooked-up and recording when you tuned to an unexpected and rare signal intercept? (For me, that would be many times.) RxPlus has a Memorize feature which stores the last 64 seconds of audio for instant playback.

Uniqueness

Among the unique features of RxPlus is its ability to demodulate the 12 kHz IF signal of receivers with this output. Using a Quadrature detector, the AM, USB and LSB signals have greater audio fidelity. In some cases, the difference in audio quality was startling.

And talking about unique, RxPlus' Chat System, which

Figure 2 – Receiver control, database look-up, logging, DSP audio filtering AND decoding. RxPlus has it all.

enables the instant exchange of frequencies and comments over the Internet via a dedicated chat room is a real winner. It opens up a whole new dimension of radio monitoring.

❖ So Much to Cover

Clearly, RxPlus provides so many important monitoring functions (as a total monitoring environment should!) that we cannot cover all of them in this column. Many of RxPlus' features are intuitive, and a very easy to use and comprehensive pop-up Help File is included.

Instead of waiting to the end of the column for my humble opinion, let me just say here that after using RxPlus it has become my standard shortwave monitoring program against which all else will be judged. That said, let's look at some selected features of RxPLus version 1.76.

From the Top

RxPlus' main display is really three separate screens in reduced mode, as seen in Figure 1. In the top section are two lines of RxPlus Commands, S-Meter, and audio graphing display. Here we are monitoring the 22 meter shortwave broadcast band, as can be seen at the top right of the screen in the BAND window. For me, the BAND drop-down menu is the most convenient method of tuning. It provides instant access to over seventy (70!) frequency bands from 0.1 to 59.999 MHz.

JFC Tuning Method

When I am in the mood to "tune around the SW band" I use RxPlus in the following manner. First, I select the Memories menu at the top where I have stored standard time stations from around the world. By listening to each of these, I can get an idea of propagation conditions and the optimum frequencies to tune for my desired stations. Then, I go to the BAND menu and click on the appropriate frequency bands. Finally, clicking the third icon from the right under the S-Meter will make my receiver scan that band for active frequencies.

The result of the scan is displayed in the middle section of Figure 1. Here we can see that in the 22 meter shortwave band, 13.570 to 13.870 MHz, six major signals, indicated by peaks and darker lines in the graph, have been detected. Tuning is accomplished by clicking under a peak. In this case we have clicked on 13.690 000 MHz.

Single Click IDing

A number of databases, including the user's own logs, are available for identifying a signal in the bottom section of Figure 1. The HFCC database is easily obtainable from the Internet at their website at **http://www.hfcc.org/**. RxPlus also supports the ILG database that can be downloaded at **http://www.ilgradio.de/**. Check the RxPlus Help file for importing details. Here we have selected the HFCC database, as indicated by the HFCC in the top center of the bottom section of Figure 1.

Pressing "Control-K" searches the selected database(s) for a "match" to the currently tuned station in frequency and time. In the bottom section we can see that an arrowhead has been placed next to Family Stations, Inc. Also note that this is not an exact match in frequency, since we are tuned to 13.690 and Family is listed at 13.695. Careful re-tuning confirms that the signal is actually 13.695 MHz. *Very impressive!*

Now Hear This

In the middle display, seen in Figure 1, are the audio processor controls. When the audio processor is started, a graph of the received audio is displayed in the top section, see Figure 1. Purely as a demonstration, we have chosen, among other filters, a Notch filter centered at 1600 Hz and 200 Hz wide. These parameters are set in the middle section at the right side. Interestingly, the filter's effect can be seen as a blank region in the graph in the top section.

Look between the 1000 and 2000 marks for the blank region being "notched" out. Had there been annoying, interfering whistles at 1600 Hz, they would be gone. The audio processor feature of RxPlus works very well and is well behaved. I did not experience any program crash, a common problem with other DSP programs.

A Decoder Too!

Figure 2 says it all. Here you see RxPlus decoding RTTY. The decode mode (in this case, RTTY) is chosen in the top section of Figure 2. Detailed decoder parameters are set in the middle section above the display region.

The source of this RTTY signal, as seen by the "Look-Up" database arrow in the bottom section, is CFH Canadian Forces Halifax at 10.5341 MHz. The actual tone at around 1000 Hz is visible in the audio graph in the top section. You can also see that my choice of filtering has cut off the audio above 1300 Hz.

And, as if we need more verification of the signal, the display in the middle section displays the decoded data, "Canadian Forces Metoc Ventre, Halifax ....." This decoded text is filed to disk by clicking the very small icon next to the "UoS" box located above the decoded text display.

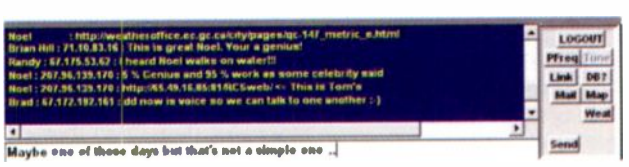


Figure 3 – An example of the chat mode screen – a very unique feature.

Chatting Up DX

Starting with Version 1.76, RxPlus opens a new dimension of communication to radio monitors. Instantly sharing your DX "finds" with other enthusiasts can bring you rewards that greatly multiply your efforts. Collective computing, strength in numbers, community spirit, the whole being greater that the sum of its parts – Whatever you want call it, the feature has the potential of providing up-to-the-minute station and propagation data from all over the world.

An example of what you can expect when you click the Chat button (situated in the top sections' right side) is shown in Figure 3. Here, in this example from RxPlus' website, we can see that the user, Noel, has downloaded data from the weather office which is now available to all RxPlus users. And now discussion is taking place on the subject. The Chat feature of RxPlus could take an entire column ... and it may in the future. Suffice it to say that it opens up all sorts of real-time possibilities for the radio monitoring community.

❖ My Wish List

Never being totally satisfied, there are a few additions I would like to see in the next revision of RxPlus. An automatic signal parameter determining routine in the digital signal decoder would be nice. Setting the shift and rate manually is tedious, even with the audio display.

RxPlus' list of supported receivers is good sized and growing. However, it would be nice to create a universal interface selection, which allows users with minimal programming experience to add their non-list receiver or transceiver. For most ICOM radios, this could be as simple as filling in the ICOM address of the desired radio. Clearly this option could not support all radio functions and would have a simplified universal display.

And finally, a minor point, but one I feel is important: The revision number or date of creation of each database should be prominently displayed when in use to avoid confusion. I know – picky, picky, picky.

❖ A Real Total Monitoring Environment

RxPlus is very well behaved and never crashed no matter how I abused it. Each time I run RxPlus I discover more of its capabilities. We have just touched the surface, leaving out such features as its automatic ECSS tuning.

Technically and operationally, the feature-rich RxPlus has a lot going for it. Add to this the fast, helpful customer support and a Yahoo Group dedicated to RxPlus and you have monitoring software that's hard to beat. As I said at the beginning, RxPlus has become my standard shortwave monitoring program against which all will be judged.

The fully registered RxPlus v1.76 costs $79.99 – in my opinion well worth it for this Total Monitoring Environment.

What's NEW

Tell them you saw it in Monitoring Times

Atlanta Frequency Directory

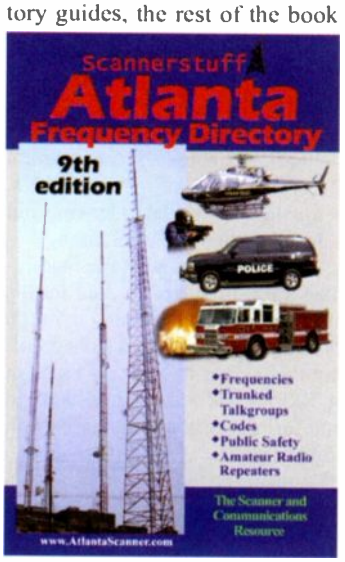
Edited by Dan Rollman

Whenever we receive a Scannerstuff Frequency Guide for review in the pages of *What's New*, we are never disappointed. Dan Rollman's newest missive – *Atlanta Frequency Directory* (AFD) 9th edition – follows along this same path and picks up where a lot of other scanner frequency directories leave off.

In thumbing through the contents of this 288 page, 4-1/4 by 7-inch book, it's clear that scanner enthusiasts living in the 31 county area covered by the book will find a lot of listening information to keep their scanners buzzing with activity.

The opening sections include a scanner users guide and detailed information on Motorola trunk systems, which go beyond "where to tune" and provide information about what you are hearing. In addition to listener guides dedicated to scanners, trunking and aircraft monitoring, there are other sections on terms and abbreviations, fire, Sky Warn, NOAA weather radio, public safety aircraft, and Georgia state and the federal government. There is also a special section at the end of the book devoted to railroad system frequencies operating in the North Georgia area.

Following these introductory guides, the rest of the book is laid out in alphabetical order by county. The Atlanta guide includes information on amateur radio, police, fire, medical, aircraft, schools, hotels, utilities, malls, media, government (local, county, state and federal), recreation and much more, with frequencies, channel numbers and usage, and PL (CTCSS) tones. *AFD* also gives detailed background information on many agencies, includes public safety terminology, codes and unit designators/call signs.



Also included are trunk radio frequencies, talkgroups and system information, as well as maps of police precincts, districts, or beats. For those who regularly

monitor fire departments, *AFD* includes information on fire station locations and apparatus.

Georgia counties featured in the book include: Barrow, Bartow, Carroll, Cherokee, Clarke, Clayton, Cobb, Coweta, Dawson, DeKalb, Douglas, Fayette, Floyd, Forsyth, Fulton, Gordon, Gwinnett, Hall, Haralson, Heard, Henry, Jackson, Newton, Oconee, Paulding, Pickens, Polk, Rockdale, Spalding, Troup, and Walton.

What separates this book from the rest of the area scanner guides are the narratives in the listener guides and the details on each of the radio systems covered in the book. Whether you are new to scanning or an old timer monitoring systems in the Atlanta/North Georgia area, there is a lot of meat here to chew on.

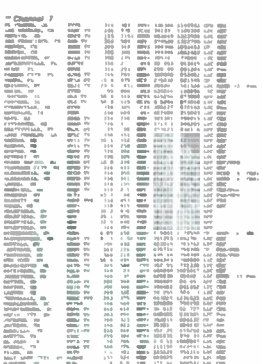
The Scannerstuff *Atlanta Frequency Directory* is priced at $19.99 plus shipping, and it can be ordered on their website: **http://www.scannerstuff.com/**

– Larry Van Horn, N5FPW

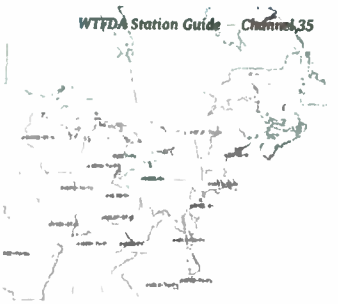
WTFDA TV Station Guide, 2005 Edition

As I write this column, I keep an eye on the television set I keep in my office parked on US TV channel 2. It is E-skip season and I see the telltale signs of that mode on the screen right now – rolling wide bars. Fortunately, I am going to be able to do a good bit more of TV DXing now that the new 2005 edition of the *WFTDA TV Station Guide*, written by *MT* columnist Doug Smith, W9WI, has arrived in the mail.

I have used every edition of this guide since its debut in 2000 and the new 2005 edition is by far the best yet. Published by the World TV-FM DX Association, this 8-1/2 by 11-inch publication has over 400 pages and is punched for use in a three ring binder. In addition to the introductory material presented in front of the book, this publication has two major sections: TV channel maps (with station locations marked on a map of North America) and individual station listings in channel order.



In the section on individual station listings, the following information is available for each station: location, call letters, radiated power in kilowatts, antenna height above average



terrain, directional antenna (yes/no), horizontal/vertical antenna, antenna beam tilt and offset, geographic coordinates, station status (license/construction permit/application pending), and programming source (network, etc).

This is a "must" purchase for the TV DX fan and amateur radio operators that prowl the six meter band for distant signals. In addition to regular full time TV station listings for the U.S., Canada and Mexico, there are also listings for U.S. digital TV stations and channel change requests, U.S. Class A, low-powered TV and translator stations, and low-powered TV stations in Mexico and Canada.

The price for the *2005 WTFDA TV Station Guide* is US$25 (US Dollars only). Make all checks and money orders payable to the WTFDA. You can order the guide from: John Ebeling, 9209 Vincent Avenue South, Bloomington, MN 55431-2157. They do accept PayPal and you can email them at *mbuga46@gmail.com* for instructions.

This is the most complete DX guide to television broadcasting ever published, and if you are interested in long range television reception you need this guide in your monitor station toolkit.

– Larry Van Horn, N5FPW

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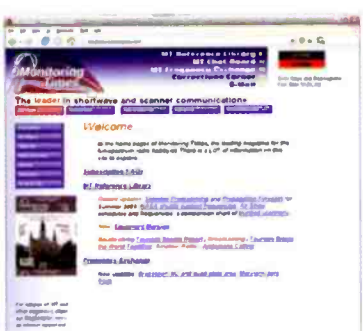

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