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

Monitoring Times

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Volume 24, No. 12
December 2005

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The U.S.-Cuba Battle for the Airwaves

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Also in this issue:

DX Games for a Change of Pace
Monitoring Chattanooga
MT Reviews the Uniden BR-330T Wideband Scanner

AOR SR2000 Frequency Monitor

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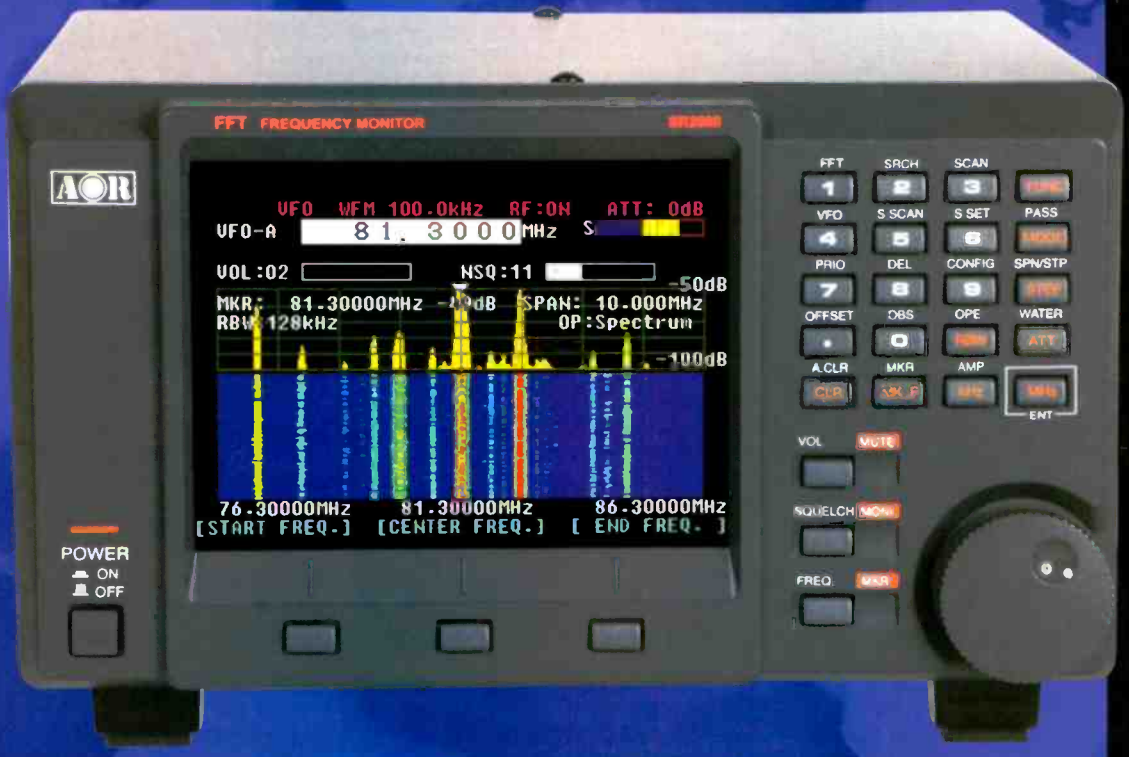

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Dear Santa,

Please bring me a SW radio with such sensitivity that other radios would pale in comparison. And it should have a great dynamic range, better than 95 dB. And it should have continuously variable bandwidth, from 1 Hz to 15 kHz, in 1 Hz steps!

And it must be very clean please, no spurii, surely less than -105 dBm of equivalent input. And it should have a real-time spectrum analyzer, so I can see even the weakest signals popping up. And notch filter, noise blanker, IF shift and passband tuning. And superb synchronous demodulator. And software-upgradable so I can add new demodulation and decoding modes, including digital such as DRM!

And it must have a calibrated S-meter with 1 dB resolution, to measure right down to -140 dBm noise floor. And also an audio spectrum analyzer, with a user-definable, graphically adjustable audio filter. And ~~1,000~~ 10,000 memories. And 1 Hz tuning with 0.5 ppm frequency stability.

And it must look great so I can show it to everyone.

Thanks,
Jack

P.S. And must be low cost so I can get it as my new toy for Christmas!

Monitoring Times

Vol. 24, No. 12 December 2005

Cover Story

Cuba's Battle of the Airwaves

By Gayle Van Horn

Ever since Castro declared Cuba to be a socialist state, the US and Cuba have been in conflict. Since the Bay of Pigs and the Cuban missile crisis, the conflict has largely been a cold war of words and economics. Both countries broadcast to each other in an effort to influence opinions and win minds, although only in Cuba are the broadcast signals jammed.

Located only 90 miles off the coast of Florida, Cuban signals are available to US listeners on shortwave, mediumwave, FM radio, and even television. But the real bonus would be reception of a Cuban provincial or municipal station -- you could wrap that log up in a bow and consider it a gift!

On our cover: A nearly empty street in front of Havana's Judicial Center in 1995 -- mute testimony to the effects of the gas shortage. Photo by Domingo Soto.

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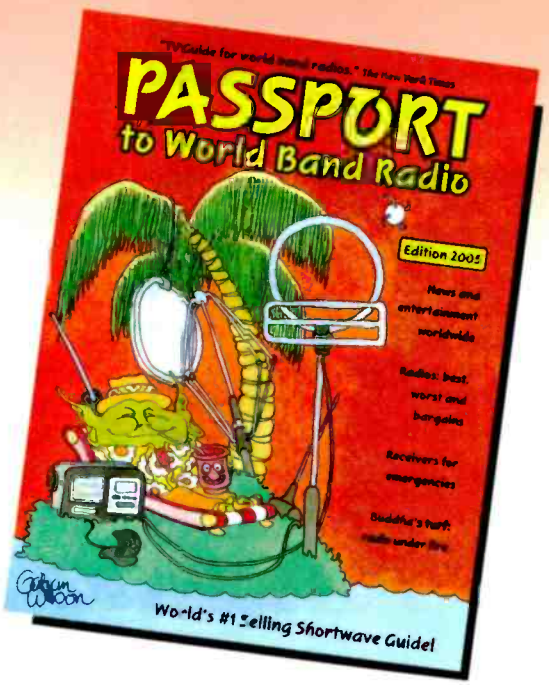

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"Thanks for a stunning document – still the best value for money" *Ed van den Heever, South Africa*

"This edition is the best one yet (I have been buying the book, off and on, since the 1960s) It really is indispensible" *Joe Analssandrini, USA*

"Again this year, I can recommend serious DX-ers to buy this 'DX-ers Bible'! It really is a MUST" *Anker Petersen, Danish SW Club International*

"*WRTH* is now at its peak again" *E Wyman, UK*

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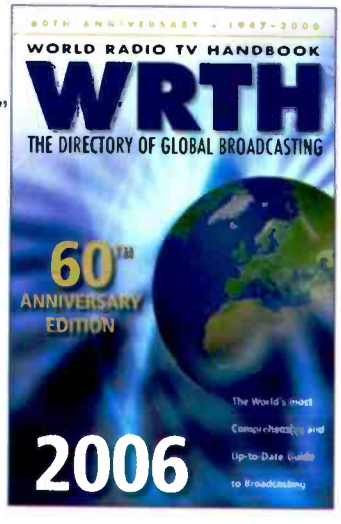

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LETTERS TO THE EDITOR

Year's End

Radio as a source of information dissemination and as a communications lifeline has rarely been as much in the forefront of our awareness as it has been over the past few months. We haven't had space to retell all the radio stories that have come out of the hurricanes, earthquakes, battlefields, and halls of Congress. But, rather than to make a futile attempt to recap those stories on one measly page, let's instead listen to our readers at the close of 2005.

Survivor or Victim?

"As I write this, the media coverage and the shock of Hurricanes Katrina and Rita (and now Wilma) are winding down for much of America. Not so along the Gulf Coast where the recovery and rebuilding process will go on for years. The pain of lives lost and families disrupted will take even longer to heal. This event is yet another wake-up call for emergency preparedness. Is your scanner pre-programmed with local government frequencies? What about FEMA, USAR, DMAT, National Guard, Red Cross (there is more than just 47.420), city and state emergency management, animal control, etc.?

"Do you have your amateur (ham) radio license? No? I can't believe you would let a simple pass/fail multi-choice test keep you from getting your ham license. After all, the questions and correct answers are in the public domain. Order your copy from MFJ **http://www.mfjenterprises.com/products.php?prodid=MFJ-3211** or (800) 647-1800 and start studying.

"Too tough, you say? Ask one of your kids to study, and they can earn their license. At least somebody in the family will have communications abilities. If you already have your license, I challenge you to get a friend, or family member licensed.

"Buy a handheld transceiver like the Yaesu FT-60. Besides the ham frequencies, it has wide band coverage to listen to public safety. In fact it has 1,000+ channels. You can be a passive listener, or you can get involved in the ham radio emergency communications programs like ARES and/or RACES. The ARRL Emergency Communicator courses can be taken on line at **http://www.arrl.org/cce/faq.html**. Don't forget all the *free* FEMA courses at **http://training.fema.gov/EMIWeb/IS/crslist.asp**.

"If my family was trapped in a building, or had been on our roof for days with no water or food, I would not hesitate to use my ham radio to call for help on the national Search and Rescue (SAR) frequency of 155.160. Of course, any time you take the extreme action of talking on a public safety frequency, it needs to be a truly life threatening situation. There were many tourists and travelers that were caught up and stranded by the hurricanes. Do you take your handheld radio when your travel in the US? So are you prepared? Is your 'Grab'n Go Bag' packed? Will you be a survivor, or a victim?"

– Gary Webbenhurst, Bright Ideas

Reader Richard Chabot KB3YRT sent this picture of the Cumberland County Emergency Communications Group (TN) mobile command center.

Dazylabs Alternative

The site for acquiring the Dazylabs PC Instruments, reviewed by John Catalano in the October *Computers & Radio* column, disappeared about the time the magazine came out. However, John found two sites which still have the Dazylabs PC Instruments for download. "The sites are in Czech but the programs download and work fine," says John.

http://www.elektroda.net/download/pafiledb.php?action=file&id=1135
http://chevees.hyperlink.cz/txt/download.html

Great Mexican Resource

"I just received my October 2005 issue of *MT* and read Gayle Van Horn's article titled 'Bienvenido a Mexico' (Welcome to Mexico).

"An excellent internet resource for identifying Mexican AM, FM, or TV stations is Fred Cantu's **http://www.mexicoradiotv.com** website. That's the source I use when looking up identities for Mexican satellite signals.

"There are a lot of Mexican radio and television stations available on C-band satellite using a digital receiver, presumably due to the rural countryside between significant cities in a lot of Mexican states. Some of the state radio/TV signals that can be found on satellite are from Veracruz, Campeche, Michoacan, Sonora, Tabasco, Quintana Roo, Chiapas, Yucatan, Coahuila, Jalisco, Estado de Mexico, Oaxaca, and Nuevo Leon."

– Robert Smathers

Thanks for website plug, Robert. Gayle agrees Cantu's site is an excellent resource and it was an oversight not to mention it in the article. Also check out IRCA's *Mexican Log* – contact info in this month's *What's New* column.

Closing Ideas

Here are a couple of closing ideas from Gary Webbenhurst we had to cut from a recent column.

"Anyone interested in monitoring the air bands should check these websites. Many have inexpensive maps or other aircraft related gifts.

http://www.airnav.com/airports/
http://www.naco.faa.gov/index.asp?xml=naco/prices
http://www.mypilotstore.com/MyPilotStore/chart/
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"Do you save your back issues of *MT*? Plastic molded magazine holders will help you keep them organized and safe from damage. They are available at **http://www.shophometrends.com/**. Search their site for item# 405103. You may also request a catalog listing many other nifty office/household products."

This month completes Gary's fifth and final year of editing the *Bright Ideas* column. We really appreciate the effort Gary has put in on this popular "think outside the box" approach to the radio hobby. Thanks, Gary; I think a lot of folks will remember your tips, especially when trying to organize frequency information!

Those of you who provided Gary with *your* bright ideas don't have to stop sending them: We can always use your bright ideas and slick tricks in the *On the Bench* or the *Letters* column. Just send to *MT* headquarters and I'll forward them to the appropriate department.

Rather than continue *Bright Ideas*, we'll keep the short, interactive concept in a new column entitled *The MT Help Desk*. This column will draw from the hundreds of emails handled by Assistant Editor Larry Van Horn during his years on the Grove Technical Line. Finding frequencies, equipment operation, troubleshooting – topics will cover the gamut as we focus on those "frequently asked questions" that habitually stump hobbyists.

Happy Holidays

From the entire staff at *Monitoring Times* and Grove Enterprises, may your holiday season be a signal success!

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Cuba's Battle of the Airwaves

Story and QSLs
By Gayle Van Horn W4GVH

Along a sparsely populated region situated about 100 miles southeast of Havana, sits an area that resembles the swamps of southern Florida. This area is connected to the mainland by a couple of two-lane asphalt roads, and is of historical value to the people of Cuba.

It is known as the Bay of Pigs.

On April 17-19, 1961, a 60 hour raging battle ensued at the Bay of Pigs, when Fidel Castro's revolutionaries defeated a band of 1,400 CIA trained Cuban exiles determined to repel the threats of socialism. The initial engagement commenced when planes, painted to resemble the Cuban Air Force, bombed airfields near Havana.

The Bay of Pigs was just one consequence of Fidel Castro overthrowing Cuban dictator Fulgencio Batista in 1959. During the next two years most of the island's industry and broadcast stations were nationalized, and the country aligned itself with the Soviet Union, alarming the United States.

Castro soon declared his government socialist, resulting in an abrupt break with the United States. The U.S. Bay of Pigs invasion was a failure and a profound embarrassment to President John F. Kennedy. While many blame the failure on Kennedy's reluctance to send in U.S. air power, Cubans proclaim it was their dominant fighting skill that resulted in victory.

The following year saw the Cuban missile crisis nearly plunge the world into war and sealed the inevitable continuation of the Cuban-United States standoff.

For Cubans, the Bay of Pigs conflict is one of immense pride. It ultimately led to the modern era of the Cuban-United States stalemate and the battle of the radio airwaves that has raged ever since.

The Battle Begins

In 1960, a small island off the coast of Honduras, known as Swan Island, was purchased by the Gibraltar Steamship Company from New York (a company which owned no steamships)! A 50,000 watt transmitter was quickly set up on Great Swan Island. As soon the transmitter became operational, it started blasting anti-Castro programs beamed to the nearby communist island.

By May of that year, shortwave listeners were riveted by the sounds of Radio Swan on 1160 and 6000 kHz. Originally planned as a clandestine, it was decided the station would instead broadcast as a commercial station. Programs were in Spanish with a predominant anti-Castro slant. Radio Swan announced it was transmitting from an island in the Caribbean that was claimed by Honduras and the United States. Antenna direction finding techniques showed the station to be originating from Swan Island. It was now obvious this was a front for the American CIA, operating off the coast of Honduras.

Radio Swan not only reached its target area of Cuba, but the entire Caribbean as well.

Shortly after the station's inauguration, Castro began intentional signal jamming, but was only successful in stopping signals into the capitol city of Havana. Hundreds of letters were received from all parts of Cuba and the United States. As Radio Swan progressed, it became the symbol of the anti-Castro movement.

Swan and the Bay of Pigs

In one sense, this island was even a part of the actual land battle during the Bay of Pigs invasion. Radio Swan was used in tactical support during the military action and transmitted coded messages to the invading beach forces. Programming was monitored by listeners and press services worldwide.

After the unsuccessful invasion, Radio Swan admitted the attack had been unsuccessful and returned to normal programming generally designed to avoid inciting the Cuban people; however, the anti-Castro format was evident in its selections of related news items. Near the end of 1961, the station changed its name to Radio Americas which remained on the air until it abruptly left the airwaves in May 1968.

Even so, anti-Castro voices have continued throughout the years to transmit propaganda and program to the island nation. At presstime there are six active clandestine broadcasters; five of them broadcasting from the transmitters of WRMI in Miami, Florida. These include: Conversando entre Cubanos, Entre Nosotros, Foro Militar Cubano, Radio Oriente Libre and Voz de la Junta Patriótica Cubana. It should be noted that transmissions from WRMI are routinely jammed by the Cuban government, so expect some nasty interference when you tune in their transmissions.

US Government Broadcasts to Cuba

Radio Martí, which is operated by the United States government, began broadcasting on May 20, 1985, using 1160 kHz (shades of Radio Swan/Americas!). Fourteen and a half hours of uncensored news reach Cuba from a studio in Washington, D.C., via Voice of America transmitters in Marathon Key, Florida.

José Martí, the Cuban intellectual and patriot after whom the station is named, once said that, "Others looked at radio and saw a gadget; his genius lay in his capacity to look at the same thing, but to see far more." With those insightful words as inspiration, Radio Martí has broken through Castro's propaganda machine and offered the Cuban people news, entertainment and discussion using Cuban journalists, thinkers, writers and entertainers.

Radio Martí proponents claim that in just a few short years it became the most listened to station in Cuba. In addition to Marathon Key transmitters (which now broadcast on 1180 kHz), broadcasts are also carried on shortwave transmitters out of Greenville, North Carolina, and Delano, California.

Although routinely jammed by Cuba, Radio Martí has proven to be a successful broadcaster that competes with Cuban domestic stations and networks. The current broadcast frequencies for Radio Marti Spanish programming are: 1180, 5745, 5980, 6030, 7365, 7405, 9565, 9805, 11775, 11930, 13820, 15330, and 17670 kHz. Correspondence for Radio Marti, in Spanish or English, may be directed to, Office of Cuba Broadcasting, 4201 N.W.77th Avenue, Miami, Florida 33166.

Lenin Park

During some recent Senate hearings in Washington, D.C., Radio Martí's importance was echoed by Senate Majority Leader, Bill Frist (R-TN). Frist said, "Whether as news or entertainment, these broadcasts help to spark the imaginations and aspirations of the Cuban people. They pierce the regime's imposed isolation and bring the aspirations of the Cuban people into world community, and the world community to the Cuban people."

TV Marti

In 1990, TV Martí was launched, bringing in a new wave of free media in the battle of the airwaves. Within 23 minutes of its sign on, Castro was up and jamming its transmissions. The Communist party of Cuba controls all formal means of mass communications on the island. All print and electronic media are considered state property under the control of the Party, including television.

The jamming was only temporarily successful. Similar to its radio companion, TV Martí offers political news and debate. It also airs soap operas, international events, cultural and sports programs.

Controversy and debate have consistently surrounded TV Marti since its sign on. Some in Congress say it is wasteful pork-barrel politics aimed at pleasing Miami's influential Cuban exiles. Supporters say TV Marti plays an important role in bringing democratic values to the island.

Until recently, TV Martí broadcast into Cuba via a U.S. Air Force remote-controlled blimp known as Fat Albert. When Hurricane Dennis passed near the Florida Keys on July 9, 2005, winds of 113mph shredded the blimp's fabric skin. Air Force spokesmen said it could take months to get TV Martí fully operational again. The loss of the blimp has drastically cut TV Martí's weekly broadcast, and for now their signal is broadcast by satellite four hours a day on the NSS 806 and HISPASAT 1C satellites.

The other side of the battle – Broadcasting from Cuba

Besides in newspapers, nowhere else in Cuba is the revolución more present than in their radio and television broadcasts.

Television was inaugurated in October 1950, and expanded rapidly throughout the island. Cuba's people are bombarded daily with a campaign of pro-government propaganda through the lens of the television cameras. All news sources are controlled by the state. One resident remarked, "The government uses what is convenient for them to show in the news and nothing else."

TV news is usually forty-five minutes long and focuses on the same topics as the state-controlled newspapers. Footage is often borrowed from BBC or CNN, voiced over by Cuban newscasters. That is followed by the government's interpretation of the news. Not surprisingly, the Hollywood movies broadcast on the Cuban TV networks tend to emphasize values such as social equality, solidarity and teamwork.

The two national TV networks from Cuba are Canal Tele Rebelde, also known as Cubavisión (sometimes listed by DXers as the Canal 2 network) 2300-0500 UTC, and TV Cubana (or the/Canal 6 network).

All of the known Cuban television stations broadcast on TV channels 2-13 using the same NTSC video/audio standards we use here in the United States. Channels 2-6 can be especially productive for the DXer early in the E-Skip season (as early as April in southern states).

Here is a list of TV DX targets to watch for on your TV screen.

CUBAN TELEVISION STATIONS

2 Canal Tele Rebele: Babiney (Pinar del Rio) CU
Canal Tele Rebele: La Habana (La Habana) CU
TV Cubana (Canal 6) - Santiago de Cuba (Santiago de Cuba) CU

3 TV Cubana (Canal 6): Holguin (Holguín) CU
TV Cubana (Canal 6): La Palma (Pinar del Rio) CU
TV Cubana (Canal 6) - Santa Clara (Villa Clara) CU

4 Canal Tele Rebele: Camagüey (Camagüey) CU

5 Canal Tele Rebele: La Palma (Pinar del Rio) CU
Canal Tele Rebele - Santiago de Cuba (Santiago de Cuba) CU
Canal Tele Rebele - Santa Clara (Villa Clara) CU

6 TV Cubana (Canal 6): Babiney (Pinar del Rio) CU
TV Cubana (Canal 6): Camagüey (Camagüey) CU
TV Cubana (Canal 6): La Habana (La Habana) CU

7 TV Cubana (Canal 6): Baracoa (Guantanamo) CU
TV Cubana (Canal 6): Cienfuegos (Cienfuegos) CU
TV Cubana (Canal 6): Salón (Pinar del Rio) CU

8 Canal Tele Rebele: Holguin (Holguín) CU
TV Cubana (Canal 6): Ciego de Avila (Ciego de Avila) CU
TV Cubana (Canal 6): Isla de la Juventud (Isla de la Juventud) CU

9 Canal Tele Rebele: Baracoa (Guantanamo) CU
TV Cubana (Canal 6): Pinar del Rio (Pinar del Rio) CU
TV Cubana (Canal 6): Provincial Matanzas (Matanzas) CU

10 Canal Tele Rebele: Isla de la Juventud (Isla de la Juventud) CU
TV Cubana (Canal 6): Provincial Granmá (Granmá) CU
TV Cubana (Canal 6) - Chivirico (Santiago de Cuba) CU

11 Canal Tele Rebele: Cienfuegos (Cienfuegos) CU
TV Cubana (Canal 6): Guantánamo (Guantánamo) CU
Canal Tele Rebele: Salón (Pinar del Rio) CU

12 Canal Tele Rebele: Ciego de Avila (Ciego de Avila) CU
Canal Tele Rebele: Prov.Granmá (Granmá) CU
Canal Tele Rebele - Chivirico (Santiago de Cuba) CU
CHTV: La Habana (La Habana) CU

13 Canal Tele Rebele: Guantánamo (Guantánamo) CU
Canal Tele Rebele: Pinar del Rio (Pinar del Rio) CU
Canal Tele Rebele: Provincial Matanzas (Matanzas) CU

Like its television counterpart, FM radio reception from Cuba will require a tropo opening into Florida or up the east coast, or E-skip conditions outside the normal tropo skip zones. DXing the TV and FM bands can be a challenge, but patience can be rewarded if you are lucky enough to snatch any of these broadcasters from the ether.

Here is a list of recently reported FM targets from Cuba to watch for if conditions are right in the VHF/UHF bands.

CUBAN FM STATION SAMPLER

(Frequencies MHz)

90.3 Radio Progreso, Havana
91.5 Radio Musical Nacional, Ciego de Avila
92.7 Radio Rebelde, Camagüey
93.3 Radio Taíno, Havana
93.5 Radio Cadena Agramonte, Camagüey
93.7 Radio Enciclopedia, Havana
95.9 Radio Güines, Güines and Radio Reloj, Havana
96.7 Radio Rebelde, Havana
97.5 Radio Musical Nacional, Camagüey
97.7 Radio COCO, Havana
98.7 Radio Ciudad de la Havana, Havana
99.1 Radio Musical Nacional, Havana
99.9 Radio Cadena Havana, Havana
102.1 Radio Metropolitana, Havana
103.5 Radio Nuevitas, Nuevitas
103.9 Radio Camoa, San Jose/Lajas
104.5 Radio Florida, Florida
106.9 Havana Radio, Havana
107.9 Radio Taino, Ciego de Avila

Cuba on Shortwave

Radio Havana Cuba, the first Cuban international shortwave station, was inaugurated on May 1, 1961. Despite its claim as a voice of undisputable integrity and honesty, most listeners agree this is another voice in the airwaves battle that promotes government propaganda. As one of the last socialist countries in the world, Radio Havana remains steadfast in its resolve against aggressors who do not support their revolución.

Programming is broadcast worldwide in English, Spanish, French, Portuguese, Creole,

Arabic, Quechua, Guarani, and in the Esperanto language on Sundays. Despite the slanted perspective, programming of interest includes international topics/commentary, and DX-related tips from Arnie Coro (C02KK) on the *DXers Unlimited* program.

For pure entertainment, try sampling some of the Radio Havana music programs. Styles and genres of Cuban music have a rich history of Spanish folk music and African rhythms, and have been influenced by the music from Europe, Latin America, and American pop and jazz. This cultural fusion creates an explosion of styles from the Bolero, Rumba, Mambo, Yoruba, Cha-Cha-Cha and Cuba's distinctive style of carnival music known as the Conga.

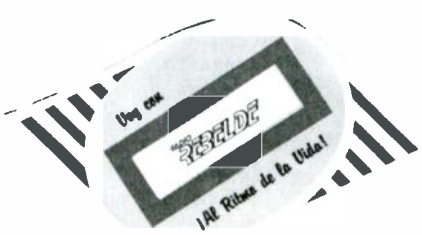
Despite its reputation as a slow verifier, Radio Havana does QSL, though it requires a bit of patience. Reception reports may be sent to: *rhc@radiohc.org* or the snail mail address in Table Two.

RADIO HAVANA CUBA, ENGLISH SERVICE

Frequencies (kHz) are subject to seasonal adjustments
Target areas: na - North America; va - Various

0000-0100	12000na
0100-0200	6000na 9820na 12000na
0200-0300	6000na 9820na 12000na
0300-0400	6000na 9820na
0400-0500	6000na 9820na
0500-0600	6000va 6060va 9550va 11760va
0600-0700	6000va 6060va 9550va 11760va
1330-1400 irreg	9550va 12000va 13680va
2030-2100	9505va 11760va
2100-2130	9505va 11760va
2300-0000	9550na 12000na 13680na

One alternative way to verify Cuba on shortwave is via China. The English service of China Radio International has an English service relay from Havana, targeted to North and Central America. Programming is subject to seasonal frequency adjustments and is currently being heard at: 0200-0300 UTC on 9580 kHz, 0300-0400 on 9790, 1400-1500 on 15220, 1500-1600 on 13740 and 2300-0000 on 5990 kHz. Letters may be sent to CRI's website



English email at: *crieng@cri.com.cn* or at the address in Table Two.

Havana's Radio Rebelde (Rebel Radio) is being heard on 5025, 9565, and 11655 kHz. Programming includes national and world news and political commentaries. There's no shortage of Cuban music from the station's shortwave and numerous medium wave outlets. A commonly heard slogan on the network is "following the rhythm of life."

Reception reports can be sent to the Havana address or emailed to Radio Havana's Arnie Coro at: *arnie@radiohc.org* for forwarding to Radio Rebelde.

Cuba on Medium Wave

Perhaps the most popular facet of listening to Cuba via broadcast frequencies is monitoring their stations on the AM medium wave band. Hundreds of AM stations are scattered throughout the island. Most originate from six national radio networks: Radio Enciclopedia, Radio Musical Nacional, Radio Reloj, Radio Progreso, Radio Rebelde, and Radio Taino (see Table Three).

One of the first rules you must learn in DXing Cuba on AM is not to put much stock in Cuban station callsigns (CMxx/COxx). They are hardly ever broadcast over the air, and you will find a strange mix of often-conflicting callsigns from a variety of sources.

The second and most important rule to remember is that the Cuban transmitter situation is in constant flux. Transmitter parts, hurricanes and even power generation on the island can affect what you may or may not hear from the island. Consequently, when you look over our list of networks and stations in table three, remember that what was heard just yesterday may not be on today, but could return to the air tomorrow.

The most widely heard network transmitting from Cuba is an all news and information network. Stations on the Radio Reloj (Clock Radio) network are extremely popular among medium wave hobbyists. All the Reloj network stations transmit a two letter Morse-code identifier (RR) every minute, which makes these stations easily identifiable even with the weakest of signals.

Radio Reloj says their station is "the oldest information channel in the world." Reloj stations have been logged recently on 570, 760, 790, 820, 830, 850, 860, 870, 920, 930 940, 950, 960, 1020, and 1180 kHz. They have also been monitored on 101.5 MHz in the FM band. To write Radio Reloj, send your letter via their website at **http://www.radioreloj.cu/** or the address in our list in Table Two.

Reception reports for any Reloj, Rebelde or other network station may be sent to their respective network's address. Spanish is preferred, though English is accepted. Enclosures are not recommended. For a current listing of Cuban stations logged within the past year, consult our Cuban AM Log in Table Four.

Just as popular as DXing the stations in the national networks is chasing signals from provincial stations or networks. The Radio Cadena Agramonte stations are the main broadcasting network in the Camagüey province. They broadcast twenty-four hours on 910, 1370, 1380, 1410, and 1580 kHz. For electronic mail from their English website write to: **cip240@cip.enet.cu or rcmg@caonao.cmw.inf.cu**. Letters should go to: Calle Cisneros # 310 entre Ignacio Agramonte y General Gómez, Camagüez, Cuba CP 70100.

The ultimate DX, however, is receiving a municipal station. If you have added one of these stations to your logbook, you can count yourself as one of the few lucky ones to do so.

In Closing

Today, Cuba is a land of stark contrast, a beautiful island paradise, but a land without freedom for its people.

While it sits a little over ninety miles from the southern shores of the greatest free country on earth, over 11.3 million people live under the regime of a Communist government. The wall may have fallen in Europe, but it has held on strong over the island nation of Cuba. That wall covers everything, including all broadcasts into and out of this island nation. The war that started many years ago at the Bay of Pigs, continues today as a war of words heard daily over the broadcast airwaves.

The future of Cuba is definitely one to watch and listen to, and history will be the judge who ultimately wins the "Battle of the Airwaves."

Table One: CUBAN PROVINCE ABBREVIATIONS

CA..... Ciego de Avila
CH .... Ciudad Havana
CI..... Cienfuegos
CM.... Camagüey
GR..... Granma
GU .... Guantánamo
HA .... La Havana
HO.... Holguín
IJ..... Isla de la Juventud
LT..... Las Tunas
MA.... Matanzas
PR ..... Pinar del Rio
SC..... Santiago de Cuba
SS ..... Sancti Spiritus
VC..... Villa Clara

Table Two: STATION ADDRESSES

Medium Wave National Networks
Radio Enciclopedia, Calle N.N 255 e/23 y 21, Vedado, La Havana 10400
Radio Musical Nacional, Infanta 105, La Havana 10300
Radio Progreso, Infanta 105, La Havana 10300
Radio Rebelde, Departamento de Relaciones Públicas, Apartado Postal 6277, La Havana 10600 Cuba
(or) Calle 23 No. 258 entre L y M, El Vedado, Havana, Cuba (Spanish reports preferred)
Radio Reloj, P y 23, Vedado, La Havana 10400
Radio Taino, Av 23 N 258, Vedado, La Havana 10400

Shortwave
China Radio Int'l- Cuban relay, 16A Shijingshan Street, 100040, China
(or) P.O. Box 4216, CRI-2 Beijing 100040 China, **http://www.cri.com.cn**
Radio Havana Cuba, P.O. Box 6240, Havana, Cuba 10600, **http://www.radiohc.cu**
Radio Rebelde (see above network address)

Table Three: CUBAN MEDIUM WAVE NETWORKS AND STATIONS

National Radio Networks
Radio Enciclopedia **http://www.radioenciclopedia.cu/** slogan: "Cuba's cultural radio" CMBQ
Radio Musical Nacional, Infanta 105, La Havana 10300 CMBF
Radio Progreso, slogan: "La Onda de la Alegría" **http://www.radioprogreso.cu/** CMBC
Radio Rebelde **http://www.radiorebelde.com.cu**
Radio Reloj **http://www.radioreloj.cu/**
Radio Taíno, slogans: "La tur emisora de Cuba"; "Cuba's touristic broadcasting station" **http://www.radiotaino.cubasi.cu/inicio.asp** CMBT

Provincial Radio Networks/Stations
CMHW, Villa Clara, slogan:"La Reina Radial del Centro de Cuba"
Havana Radio,106.9 FM, La Havana
Radio 26, Matanzas CMGW
Radio Angulo, Holguín **http://www.radioangula.cu** CMKO
Radio Bayamo, Granma, slogan: "Su emisora de siempre" CMKX
Radio Cadena Agramonte, Camagüey, slogan: "Camagüey's province radio" **http://www.cadenagramonte.cubaweb.cu/english/** CMFA/CMHA
Radio Cadena Havana, La Havana, slogan: "La Frequencia Popular" **http://www.cadenahabana.islagrande.cu** CMCH
Radio Ciudad de La Havana, slogan: "La emisora jóven de la capital" CMCA
Radio COCO, La Havana, slogan: "El Periódico del Aire" CMCK
Radio Guamá, Pinar del Rio, slogan: "La señal sonora de la familia pinareña"
Radio Metropolitana, La Havana, slogan: "La Havana en línea"
Radio Revolución, Santiago de Cuba, slogan: "La que siempre le acompaña" CMKC
Radio Sancti Spiritus, Sancti Spiritus **http://www.radiosanctispiritus.islagrande.cu** CMGL/CMHT
Radio Surco, Ciego de Avila
Radio Trinchera Antimperialista, Guantánamo CMKS
Radio Victoria, Las Tunas **http://www.tiempo21.islagrande.cu** CMKT
RCM Radio Ciudad del Mar, Cienfuegos **http://www/rcm.cu**

Municipal Stations
La Voz del Níquel, Moa, HO CMKR
La Voz del Toa, Baracoa, GU CMDX
La Voz de Yaguajau, Yaguajay, SS CMHA
Radio 8 Segundo Frente, Mayarí, SC
Radio Amanecer, Ciego de Avila
Radio Ariguanabo, San Antonio de los Baños, HA CMBS
Radio Artemisa, (Cadena Havana) Artemisa, HA, slogan: "Las alas de la información" CMAD
Radio Bahía Caimanera, Caimanera, GU
Radio Banes, Banes, HO
Radio Baraquá, Palma, SC CMKZ
Radio Caibarién, Caibarién, VC CMHS
Radio Camagüey, CM
Radio Camoa (Cadena Havana) San J. De las Lajas, HA CMBW
Radio Caribe, Juventud
Radio Ciudad Bandera, Cárdenas, MA
Radio Ciudad Monumento, Bayamo, GR
Radio Coral, Chivirico, SP
Radio Cruces, Cienfuegos
Radio Cubitas, Sierra de Cubitas, CM, slogan: "Emisora Estudiantil"
Radio Cumanayagua, Cumanayagua, CI
Radio Ecos de Sagua, Sagua de Tánamo, HO
Radio Florida, Florida, CM CMHR
Radio Gibara, Gibara, HO
Radio Granma, Manzanillo, GR CMDF
Radio Grito de Baire, Contramaestre, SC
Radio Guáimaro, Guámaro, CM, slogan: "Voz de la Constitución" CMHN
Radio Güines, Güines, HA, slogan: La Voz del Mayabeque" CMBU
Radio Holguín La Nueva, Holguín
Radio Jaruco (Cadena Havana), Jaruco, HA, slogan: "Su mejor compañía" CMBT
Radio Jiguaní, Jiganí, GR
Radio Juvenil, Calixto Garcia, HO
Radio Libertad, Puerto Padre, LT CMKY
Radio Llanuras de Colón, Colón, MA
Radio Maboas, Amancio, LT CMKO
Radio Majaguabo, San Luis, SC
Raido Manatí, Manati, LT CMLD
Radio Manbí, Santiago de Cuba CMKW
Radio Mayarí, HO CMKN
Radio Morón, Morón, CA
Radio Nuevitas, Nuevitas, CM CMHL/CMJQ
Radio Playitas, Imías, GU
Radio Portada de la Libertad, Niquero, GR CMNA
Radio Sagua, Clara CMES
Radio Santa Cruz, Santa Cruz del Sur, CM
Radio Siboney, Santiago de Cuba CMDV
Radio Sonida SM, La Maya, SC
Radio Sandino, Pinar del Rio
Radio Taíno Holguín 89.1 FM, Holguín
Radio Titán, Mella, SC
Radio Trinidad, Trinidad, SS
Radio Triple M. (III Frente), Baños, SC
Radio Victoria de Girón, Jagüey Grande, MA
Radio Vitral, Sancti Spíritus

Table Four: MT's CUBAN MEDIUM WAVE LOG

550	Radio Rebelde, Guantánamo GU
	Radio Rebelde, Pinar del Rio PR
	Radio Rebelde, Manzanillo GR
560	Radio Rebelde, Moa HO
570	Radio Reloj, Santa Clara VC
580	Radio Rebelde, Baracoa GU
	Radio Rebelde, Mantua PR
590	Radio Rebelde, Santa Clara VC
	Radio Musical, Santa Clara VC
600	Radio Rebelde, Urbano Noris HO
610	Radio Rebelde, Bahía Honda PR
620	Radio Rebelde, Colón MA
	Radio Rebelde, Moa HO
630	Radio Progreso, Pinar del Rio PR
640	Radio Progreso, Guanabacoa HA
	Radio Rebelde, Las Mercedes GR
650	Radio Rebelde, Media Luna GR
660	Radio Progreso, Santa Clara VC
	Radio Rebelde (multiple sites)
670	Radio Rebelde, Arroyo Arenas CH
680	Radio Rebelde, Ciego de Avila CA
	Radio Progreso, Cienfuegos CI
690	Radio Progreso, Jovellanos MA
700	Radio Enciclopedia, Guantánamo GU
710	Radio Rebelde, La Julia HA
	Radio Rebelde, Holguín HO
720	Radio Rebelde, Cienfuegos CI
730	Radio Progreso, Nueva Gerona IJ
740	Radio Progreso, Camagüey CM
750	Radio Progreso, Trinidad SS
760	Radio Reloj, Las Mercedes GR
770	Radio Rebelde
780	Radio Rebelde
790	Radio Reloj, Pinar del Rio PR
820	Radio Reloj
830	Radio Reloj, Holguín
840	Doblevé, Santa Clara VC
850	Radio Reloj, Nueva Gerona IJ
	Radio Progreso, Trinidad SS
860	Radio Reloj, Baracoa GU
	Radio Reloj, ArroyoArenas CH
870	Radio Reloj, Sancti Spírtus SS
880	Radio Progreso, Pinar del Rio PR
890	Radio Progreso, Chambas CA
	Radio Rebelde
910	Radio Cadena Agramonte, Camagüey CM
920	Radio Reloj, Moa HO
930	Radio Reloj , La Jaiba MA
	Radio Reloj, Ciego de Avila CA
940	Radio Progreso, Sancti Spírtus SS
	Radio Reloj, Holguín HO
950	Radio Reloj, La Havana HA
	Radio Reloj, Sancti Spíritus SS
960	Radio Reloj, Guantánamo GU
980	COCO Havana, La Havana CH
990	Radio Guamá, San Luis PR
1000	Radio Guamá, Los Palacios PR
1020	Radio Reloj
1030	Radio Musical
1040	Radio Victoria, Puerto Padre LT
1060	Radio Victoria, Amancio Rodríguez LT
1070	Radio Guamá, Pinar del Rio PR
1080	Radio Cadena Havana, Güines HA
1090	Radio Guamá, Santa Lucia PR
	Radio Cadena Havana, La Salud CH
1100	Radio Cadena Havana, La Havana
1120	Radio Cadena Havana, Artemisa HA
1140	Radio Cadena Havana, La Havana CH
	Radio Bayamo, Media Luna GR
1180	Radio Rebelde, Villa María CH
	Radio Reloj, Mayarí Arriba SC
1190	Radio Sancti Spíritus, Trinidad SS
1200	Radio Sancti Spíritus/LV de Yaguajay, Yaguajay SS
1210	Radio Sancti Spíritus SS
1250	Radio Caibarién, Caibarién VC
1260	Radio Enciclopedia, Arroyo Arenas CH
1270	Radio Enciclopeida, Varadero MA
1290	Doblevé, Rancho Veloz VC
1310	Doblevé, Sagua La Grande VC
1330	Radio Jaruco, Artemisa HA
1390	Radio Jaruco, Juraco HA
1400	Radio Musical, Matanzas MA
1450	Radio Güines, Güines HA
1470	Radio Ciudad Banderas, Cárdenas MA
1490	Radio Camoa, San José de las Lajas HA
1540	Radio Sagua, Sagua La Grande VC
1560	Radio Enciclopedia, Ciego de Avila CA
1570	CMBQ Radio Enciclopedia, Las Tunas LT

DX Games to Play
A New Way to Listen to Radio

By Jason R. Gardner

In a time when radio stations are more reluctant than ever to give out QSL cards, sometimes it takes a little creativity to keep things lively in the radio world. The idea for DX Games came when months would go by without any QSLs, and I really needed a way to keep interested in the hobby without relying on a QSL to make me content. Here are some ideas for you to jump start your own creativity in the hobby.

The games have been designed so that you may play them alone and try to beat your personal records or you can play against one or more radio friends. Of course, you can always modify these games as you see fit.

DX Games for AM Broadcast Listening

English vs. Spanish Stations

Keep track of how many English and Spanish language broadcasts you receive one night with the radio in one position. Turn the radio at a 45 degree angle, and use an educated guess of how many English and Spanish stations you will receive tonight. If you guess 15 English 17 Spanish, and it is off by 4 on English and 0 on Spanish, you get a +4, etc. If you receive 17 English and 19 Spanish, it is +2/-2= or Zero. The goal is to make par or zero.

Politically Correct Count:

We live in a time when talk personalities try to be very politically correct, and shock jocks try to do the opposite. While listening to a news/talk program, guess and then count how many PC statements are made versus how many stereotypical comments are made. Compare your guessed ratio with the show's ratio. For example, if you guess 10:1, and the show's ratio is 90:9, you win.

Example of scoring system for State Count DX Game

Call-In Civil War:

Listen to a nationally syndicated call-in show: Before the show starts, guess the ratio of Northern (above the Mason-Dixon line) to Western (Texas or further) to Southern (below Mason-Dixon) callers. Play same way as politically correct count game above. Call-Ins from Florida are wild cards in this game, and can count in any direction.

Fright Night:

Coast to Coast AM with George Noorey and Art Bell is a fascinating, but sometimes scary nighttime show. The goal of this game is to correctly guess the number of callers on *Coast to Coast* that seem a little disturbed by the programming that night.

Most Distance Received:

An obvious DX Game to play is to try for the most distant station signal that you can get on your receiver. You can play either a mini-version – trying to get a distant station every hour, or you can listen for a personal best.

State Count:

Count how many states you can receive on your AM receiver. In-state stations count as one point. Adjacent states count as 2 points, states after that radius count as 4 points, and the next radius counts for 8 pts. For example, if you are listening from Mississippi, neighboring states Alabama, Arkansas, Louisiana, and Tennessee would count as 2 pts; two states away – Florida, Georgia, Kentucky, and Texas, Oklahoma, etc... as 4 points. Three states away would be 8 points, and so on. Count the total number of points.

12-hour Countdown:

See how many stations you can receive in one night.

Thank God:

See how many religious stations you can receive on your AM or SW radio.

GOAL:

How many sports stations you can receive on AM.

DXER:

Try to log as many stations as you can with a D or X or E or R anywhere within the callsign. Compare scores with a friend.

Hour of Low Power:

For an hour receive as many stations as you can that transmit with lower power.

DX Games for Shortwave Broadcast Band Listening

Word War III:

Pick three languages other than English or Spanish. Guess which language will be more plentiful. Count them as you're tuning the shortwave dial. Whichever language has the most stations or frequencies wins. Use a copy of *Passport to World Band Radio*'s Blue Pages to identify language if necessary.

English vs. Spanish SW Version 1:

Same as Word War III, except guess which of these two languages will be more plentiful. Be sure to discern between Spanish and Portuguese languages.

English vs. Spanish SW Version 2:

Played same way as English vs. Spanish AM Version.

Risk Radio:

The game Risk is one we all probably enjoyed as children. To play Radio Risk: Get out a small map of the world. Throw one die (of dice), write down that number for Asia, and repeat the process for Africa and Europe. Throw two dice, write down that number for South America. Throw three dice for North America, and write down that number. Australia equals one.

Your goal is to receive the number of stations that you wrote down for each continent. If you do that, you win the Risk Radio Solitaire Version. (If game needs to be adjusted for difficulty, simply change the number of dice used).

Great Scott:

Dr. Gene Scott can be heard around the globe on several different shortwave stations. The goal in this game is to receive the most frequencies playing Dr. Scott's programs.

Country Count:

Shortwave version of state count for AM radio. Played basically the same way, but with countries in the radius rather than states.

Radio News Headlines:

Look up some news websites on the internet. Choose a couple of current stories in the geographical area of a particular station to which you listen for news. Then sit back, tune in to their news program, and see what they talk about –which stories do they suppress and what stories do they talk about that you didn't choose?

If you get them all right, you are a true newshound. If you get them half-right, you know you are on the same track as the station. If you get them all wrong, you may want to study up more on the political science of that region.

Where in the World?

After receiving a station's ID, try to guess where the station is located on a map. The scoring system would be based on approximately how many miles away you are from the correct location. The goal score would be zero miles.

For example, say you heard WEWN. You look the station up in *Passport to World Band Radio* or *World Radio TV Handbook*, which state that it is located in Vandiver, Alabama. You guess where you think it would be on a map. Then look it up on a map with a scale or on Yahoo! Maps. If you guessed that it was located on the eastern central boarder of Alabama, you would have a score of approximately 200 km. This game is a great way to learn geography. This game is suitable for both AM and Shortwave.

Globe Traveling:

If you have a dartboard, why not put a cheap map in front of it? Throw five darts. If any of them land in the ocean, throw those particular ones again. Your mission now is to receive shortwave stations as close as possible to those five areas on the map. (You could do an AM version of this with a map of the United States).

Radio Solitaire:

To play this game, get a deck of cards and shuffle them face down. Tune slowly through the shortwave bands. As you get to a station, determine what language it is in. If it is a Romantic language, such as French, Spanish, or Portuguese, draw cards until you get a heart or diamond card. If it is English or German or another language, draw cards until you get a club or spade. At the end of five tunings, count the face value of the cards you have drawn. Aces=1, Jacks through Kings= 10. Number cards are equal to their number. If your score is below 45 points, you win.

Most of these games don't require a receiver with a digital readout or single-side band capabilities.

Bubble Jammin':

See how many transmissions you can receive that are jammed frequently by Cuba. In order to win at this game, the player will need to be able to hear the station well enough to identify it, but still hear the bubble jammer in the background.

DX Games for HF Utility Monitoring

Guess a Number from 0 to 9:

Next time you run across that numbers station on HF, instead of trying to break a code that not even the National Security Agency could break, see if it can guess *your* numbers. WRITE DOWN A RANDOM BUNCH OF NUMBERS. If it "guesses" 10% of the numbers that you thought of, it's perfectly normal. If it guesses 0% of the numbers you thought of, you are off of the hook. If it "guesses" 90% of your numbers right, that is bizarre. If the numbers voice starts "guessing" your phone number, that's probably not a good sign.

Many Modes:

Try to get as many modes as you can in one night.

Ideas for DX Games on the Road

Non-Word Watch:

Rather than hear "Are we there yet?" every ten seconds in the car, turn on the radio and watch for non-existent words by the host or callers. Every time the host or callers say something hesitant like "um," "ah," or "er," the first person to say "Gotcha" wins a point.

Rivalry Radios:

This game can be played with two portable radios. Starting on the same frequency, move up the dial in 10 kHz spaces until the both of you get on the same station. After you get an idea of what the person is talking about (sports/politics), tune in another sports or politics show before the other person and you win.

Modifying Existing Awards Programs

DX games can be created by modifying an existing awards program (like NASWA Awards) to fit your daily goals. For instance, you could log as many religious broadcasters as possible for a couple of nights. Then you could go for the All-American DX Award other nights in the month. The next month, try to beat your personal bests for both the Ecclesiastical Award and the All-American DX Award.

DX Games to Help with Debating Skills

Dueling Ideas:

In order to be a well-rounded and open-minded person, we need to make sure we have all the facts behind a point of view before we start to criticize it. The idea of the dueling ideas game is to listen to a radio program with which you agree, and then find a program with an opposing view point. You do not have to agree with it; just listen and see what appeal it has for others.

After listening, take the idea and make it your own. Think about how you might defend the idea. After thinking about it for a while, switch back to your original view. Now, defend your original view against the opposing idea. An example of this could be, if you regularly listen to a liberal program, try listening to a more conservative one, or vice versa.

Some Final Thoughts

As a shortwave listener, I have been trying to receive an Ecclesiastical DX Award from the North American Shortwave Association. I have thirteen QSLs from religious broadcasters, but fifteen are required. However, I just can't seem to get any response from several stations that I have written.

Rather than feel down on my luck about all this, I know that I am an Ecclesiastical DXer, whether or not I have the QSLs to prove it, because I have received the stations. There is more to listening to shortwave than getting a QSL card, and if your obsession with them or with getting an award becomes too consuming, then some of the fun is lost. So, if you are close to getting an award, don't worry about it – just take it as it comes, and enjoy the process.

The above DX Games are merely suggestions to add more fun to the hobby. To my knowledge, there are very few awards just for listening without verifications, so make up your own. Celebrate each new listening accomplishment for the milestone that it is. Verification letters and postcards are a great thing to have, but in the long run it will be the memories you make while listening that last. Memories of the chase and the skills you acquired while playing DX Games will be your best reward.

Resources:

Passport to World Band Radio and *WRTH* are available from Grave Enterprises at **http://www.grove-ent.com**

More information on the North American Shortwave Association (NASWA) Awards program may be found at: **http://www.anarc.org/naswa/**

Yahoo! Maps may be found on the web at: **http://maps.yahoo.com**

Monitoring Chattanooga

By John Pless

Unlike many 800 MHz trunk systems in the country that were engineered, installed and put into use by multiple agencies in one big switch from traditional VHF/UHF spectrum, the Chattanooga Hamilton County Tennessee system has been evolving from day one. And it continues to slowly evolve.

What makes this nice for a monitoring enthusiast is that there is always something new to discover every few months or so. Now, the big deal is digital and expanding the system into neighboring counties.

The System's History

Public safety leaders from all across Hamilton County and several cities began the planning phase for the system in the mid 1980s, and Motorola was the selected vendor. Back in those days, radio coverage topographic maps showed that a county wide system would require six to eight sites, or towers, that are linked by microwave. The idea was to provide a seamless radio system that would allow all government agencies to communicate with each other if needed.

Hamilton County, geographically speaking, is huge. It's spread out hundreds of square miles across mountains, valleys, rivers and lakes. So the idea of 800 MHz working in an environment like this was mind boggling, to say the least. But 800 MHz was the hottest, latest, greatest whiz-bang technology that everybody was going to and we just had to have it, one way or another.

The problem in the early planning phase was money. How could the county, the City of Chattanooga, and other agencies afford up to eight full transmitter sites, mobile and portable radios? It would cost well over $10-million – big bucks at the time. The hodge-podge of repeaters and radios that were operating on low band, 154 MHz and 460 MHz were getting old and worn and just too expensive to fix. Some equipment could not be fixed or replaced, it was that old. But the money Motorola suggested was needed wasn't there. And in this predominantly conservative town, raising taxes wouldn't fly, especially for "walkie-talkies."

The solution turned out to be in the rugged terrain that surrounds Hamilton County. The highest points in the county are in the east, west, north and south ends. What if just four tower sites are built on these highest points? And what if the receive and transmit antennas are built with a few degrees of "down tilt" so that the signal penetrates downward from all angles into the valleys nestled behind all the ridges? Well, that's exactly what the powers-that-be decided.

The first site was built in 1994 on top of Lookout Mountain, Chattanooga's signature landmark that's the highest point in the area. The signal from the south end of Hamilton County covered much of Chattanooga rather well. Some of the first users were the public transit system called C.A.R.T.A., the Chattanooga Fire Department, Hamilton County Emergency Services supervisors, and the Metropolitan Airport Authority.

A few years later the second site was built on top of Signal Mountain on the west side. That helped with coverage in areas shielded by ridges. By 1998, the Chattanooga Police Department switched to the system from its 460 MHz real estate, providing more channels (talk groups) and the ability to encrypt their analog signals. They exclusively used MTS 2000 portables, and for the most part they worked well on the developing system

But, there was still a problem with coverage in the eastern shadows of Missionary Ridge, a long ridge that separates the west and east sides of Chattanooga. Some of the hottest crime zones are there. By 2000 a third transmitter site was built on top of White Oak Mountain to the east, to help penetrate the area with an 800 MHz signal. It helped, but it wasn't quite enough in some areas of the Brainerd and East Ridge communities.

A fourth site was later built on Flat Top Mountain in the northern end of Hamilton County known as Sale Creek. The signals flooded southward into areas where 800 MHz was "scratchy." That gave about 90% of Hamilton County a decent enough signal that it could support portable radios. The price tag for the SmartNet four-site system was just over $6-million, and the FCC calls it WPBY 937.

With four sites operating, more agencies came on-line in the last few years. The Hamilton County Sheriff's Department, Hamilton County EMS, volunteer fire departments, and the cities of East Ridge, Signal Mountain, Red Bank, Soddy Daisy and Collegedale became active on the system, as did all of the county's general government agencies.

In the summer of 2004, Motorola and Chattanooga radio shop technicians completed a $4-million dollar upgrade to the system that turned it into a SmartZone Astro system. It now supports analog and digital voice transmissions, data for field lap tops, and can be expanded to allow neighboring counties to join what is planned to be a regional system that crosses state lines.

The Frequencies

WPBY 937 is licensed to operate on many frequencies, but not all are used for the voice trunk system. Here's what you need for the main system:

860.2125	860.4625	860.7625
859.2125	859.4625	859.7625
858.2125	858.4625	858.7625
857.2125	857.4625	857.7625
856.2125	856.4625	860.9625*

*The primary control channel is 860.9625, and on occasions the system will cycle to alternate control channels on either 856.4625, 857.4625 or 858.4625 for a couple of minutes.

859.9625 is a non-trunk voice repeater on the southern end of White Oak Mountain in Collegedale. It's on the Tri Communities Volunteer Fire Department's VHF tower and offers that department and other county agencies communications on the eastern side of White Oak Mountain that are in the shadows of the main system.

858.9625 is used for the sewer system's telemetry from area pumping stations.

857.9625 and 856.9625 are used for Chattanooga Police mobile laptop data.

856.7625 is a non-trunk voice repeater used to provide a backup in case of main system failure.

855.2125 is called "Direct" and provides all public safety agencies with simplex communications off the main system.

855.2375, 855.4625, 855.7375 and 855.9875 are also used for mobile laptop computer data for police and in the future fire and EMS.

The Fifth Site

Recently Motorola and Chattanooga radio technicians installed a five-channel "fill-in" site on a ridge near I-75 in the East Brainerd area that provides enhanced coverage in main system gaps from that area west toward Missionary Ridge. It's linked to the main system and becomes active when a nearby radio affiliates with its control channel. You really don't need to monitor this site, since everything that's active on it is rebroadcast in real time over the main system. But in case you do:

868.8000*	Primary control channel
867.8000	
867.1000	
866.6000	
856.7125	

The Migration to Digital

It's happening slowly but surely. Fire departments in the various cities and volunteer agencies are being equipped with Motorola XTS 2500 portables. The Chattanooga Police Department has recently issued XTS 5000 portables with digital encryption capability to all SWAT team members and detectives in the fugitive and major crimes divisions. Supervisors with Hamilton County Emergency Services also have XTS 5000 portables.

While they still operate in analog mode most times, the radio shop has set up four new talk groups for current digital radio users to experiment with the new digital modes. They are 32784 Test-A, 32816 Test-B, 32848 Test C, and 32880 Test D. Chattanooga detectives and SWAT are actively using Test-D with encryption. Test A is mostly used for in-the-clear digital communications.

Other agencies equipped with new digital radios include Metropolitan Airport Authority Police and Memorial Hospital EMS.

The rumors have been that the Chattanooga Fire Department will be the first agency to switch to full-time digital communication and Chattanooga Police may make the switch within a year or two. Again, this is what's being rumored, so we'll see what happens.

The Expansion into Georgia

The Chattanooga-Hamilton County SmartZone system is engineered to allow surrounding counties to tie-in. The goal is to provide the back bone for a regional system. Within the last year, talks have been underway with Marion, Rhea, Meigs and Bradley Counties in Tennessee. In Georgia, talks have been underway with Catoosa, Walker and Dade counties.

The first county to tie-in will be Catoosa County, Georgia. This has been a goal of Sheriff Phil Summers for several years. He's managed to save money toward that goal using a portion of the local-option sales tax.

The plan is to build a system that will tie into Chattanooga's Lookout Mountain tower and will work with a second tower to be built on a ridge in the south end of Catoosa County. They will use E.F. Johnson digital radios that will work with the Motorola system for the Sheriff's Department, EMS and Catoosa County Fire-Rescue. The cities of Ringgold and Fort Oglethorpe will also be offered room on the system.

Currently, Catoosa County is waiting for approval from the FCC for frequencies, but that is on hold because of the 800 MHz rebanding issue that should be resolved in a few months.

Authorities in Walker County are also planning to tie into the Chattanooga system.

The Talk Groups

CHATTANOOGA POLICE

16432	Adam Dispatch
16464	Baker Dispatch
16816	Charlie Dispatch
16496	Info Channel
16560	Car to Car
16848	Detective
16880	SWAT
16656	Narcotics/Vice
16784	City Net 1 (traffic ops, special events, special operations)
16688	City Net 2 " " "

(Note: all Chattanooga agencies have City Nets for mutual comms)

CHATTANOOGA FIRE-RESCUE

16976	Main Dispatch
17040	MOSCAD Data (activates station vocals, lights, doors)
17200	Fireground 1
17232	Fireground 2

19472 Fireground 3
21264 Fireground 4
19504 First Responder
17008 Fire Inspectors
17072 Fire Supply
17104 Fire Admin

CHATTANOOGA CITY SERVICES

17392 Police/Fire Shop
17584 Traffic Engineering
17616 Animal Services
17712 Sewer Operations 1
17744 Sewer Operations 2/Moccasin Bend Treatment Plant
17904 Building Inspectors/Neighborhood Services
18192 Metro Airport Authority Police Main
18256 Metro Airport Authority Police Tac
18288 Metro Airport Authority Crash
17296 CARTA Buses
18320 CARTA Shop
18352 CARTA Electric Shuttles
18480 CARTA Supervisors
18512 CARTA Care-a-van
18544 CARTA Lookout Mnt. Incline
18384 Air Pollution Control Bureau
21008 Sanitation Services 1
21040 Sanitation Services 2
21072 Public Works/City Wide Services 1
21104 Public Works/City Wide Services 2
21360 Building Maintenance

HAMILTON COUNTY SHERIFF'S DEPARTMENT

19568 East Precinct, Collegedale PD Dispatch
19600 West Precinct, Signal Mountian PD Dispatch
19632 Detectives
19664 Narcotics
19728 SWAT 1
19760 Fugitive
19792 Civil Process
20912 County Net 1 (all county agencies)
20944 County Net 2 "
21168 Talk Channel
21200 Jail Operations
22320 Courthouse Security
23856 Info Channel
23888 SWAT 2

HAMILTON COUNTY FIRE-RESCUE DEPARTMENTS

19856 Fire Main
19888 Fire East
19920 Fire West
19952 Fireground 5
19984 Fireground 6
20016 Fireground 7
20048 Fireground 8
22960 Tri Community VFD Talk
23088 Hazmat/T.E.M.A.
23216 Highway 58 VFD Talk
23248 Sale Creek VFD Talk
23280 Dallas Bay VFD Talk
23312 Flat Top Mnt VFD Talk
23344 Mowbray Mnt VFD Talk
23376 Sequoyah VFD Talk
23408 Walden Ridge Emergency Svcs Talk
23440 Chattanooga-Hamilton County Rescue Talk
23472 Volunteer State Water Rescue Talk
23504 Special Tactics And Rescue Service Talk
18608 Emergency Management/Hazmat Team Operations
23792 First Responder East
23984 First Responder West

HAMILTON COUNTY EMERGENCY MEDICAL SERVICE

18640 EMS Main Dispatch
20112 EMS Tac-1
20176 EMS Tac-2
20208 EMS Tac-3
20240 EMS Admin
22224 Erlanger LifeForce Ground EMS 1
22256 Erlanger LifeForce Ground EMS 2
23024 Memorial Hospital EMS
18992 MedComm 1 (EMS routed to Hospitals)
20144 MedComm 2 (EMS to Med Control Physician)
19248 Erlanger Medical Center
19280 Erlanger North Hospital
19312 Memorial Hospital
19344 Memorial Northpark Hospital
19376 Parkridge Medical Center
19408 Parkridge East Hospital
19440 T.C. Thompson Childrens Hospital

HAMILTON COUNTY GENERAL GOVERNMENT

18000 Dept. Of Education Admin/Resource Officers
18032 Dept. Of Education Maintenance
18064 Dept. Of Education Transportation (Future)
18096 Dept. Of Education Couriers
20304 Building Maintenance 1
20336 Building Maintenance 2
20400 Highway Dept. Channel A
20432 Highway Dept. Channel B
21552 Highway Dept. Channel C
21584 Highway Dept. Channel D
21616 Highway Dept. Channel E
20496 Parks & Recreation Main
20528 Parks & Recreation 2
21712 Parks & Recreation 3
21392 Parks & Recreation Riverpark
21424 Parks & Recreation Riverpark Call Boxes
21456 Parks & Recreation Chester Frost Park
21488 Parks & Recreation Rangers
20592 Corrections/Roadside Trash Collection
20624 Rural Transportation
20656 Property Assessor
20720 Building Inspections
20848 Medical Examiner 1
20880 Medical Examiner 2
21232 Waste Water Treatment Authority
21520 Couriers
21648 Engineering 1
21680 Engineering 2
21776 Survey 1
21808 Survey 2
22288 Humane Educational Society
22992 R.A.C.E.S.

COMMON NETWORKS

16528 Police Mutual Aid 1
20752 Police Mutual Aid 2
20784 Police Mutual Aid 3
18704 Disaster 1 (All Agencies)
18736 Disaster 2 "
18768 Disaster 3 "
23120 Disaster 4 "
23152 Disaster 5 "
23536 Response 1 (Emergencies as Assigned)
23568 Response 2 "
23600 Response 3 "
23632 Response 4 "
23664 Response 5 "
23696 Response 6 "
23728 Response 7 "
23760 Response 8 "
17840 Radio Shop 1 Analog
17872 Radio Shop 2 Analog
32784 Digital Test A
32816 Digital Test B
32848 Digital Test C
32880 Digital Test D Encrypted

MUNICIPAL AGENCIES

17136 Signal Mountain PD Tac
22160 Signal Mountain Public Works
18832 Red Bank Public Works
18864 Red Bank Fire
18896 Red Bank Police Main
18928 Red Bank Police Talk
19056 East Ridge Police 1 Main
19152 East Ridge Police 2 Admin
19088 East Ridge Police 3 Talk
19152 East Ridge Police 4 Detectives
19216 East Ridge Fire
22928 East Ridge Public Works
22096 Lookout Mountian Police-Fire 1
22128 Lookout Mountain Police-Fire 2
21872 Soddy Daisy Police Main (Simulcasts 854.9625)
21904 Soddy Daisy Police Talk
21936 Soddy Daisy Police District
21968 Soddy Daisy Police Ops
22000 Soddy Daisy Police Detectives
21328 Collegedale Police Talk
22416 UTC Police Main
22448 UTC Police Arena
22480 UTC Police Talk
23056 US Park Service
22608 Erlanger Police Main
22640 Erlanger Police Talk
22672 Erlanger Engineering/Maintenance 1
22704 Erlanger Engineering/Maintenance 2
22736 Erlanger Disaster
22768 Siskin Hospital
22800 Erlanger Parking
22832 Erlanger Volunteers
22864 Erlanger East
22896 Erlanger Administration

Conventional Frequencies

854.9625 Soddy Daisy Police Dispatch
854.9875 Signal Mountain Police/Fire Back Up
856.4375 East Ridge Police/Fire Back Up
866.0125 Mutual Aid I-Call
866.5125 Mutual Aid ITAC-1
867.0125 Mutual Aid ITAC-2
867.5125 Mutual Aid ITAC-3
868.0125 Mutual Aid ITAC-3 & Sheriff SWAT 3
154.160 Hamilton County Fire/Rescue Tone Out
154.310 East Ridge Fire Tone Out
154.325 Red Bank Fire Tone Out
154.355 Tri Communities VFD Tone Out & Ops
154.415 Soddy Daisy Fire & Ops
154.445 Walden Ridge Emergency Services Tone Out
154.280 Tri State Mutual Aid
462.950 LifeForce 2 Dispatch (Sparta)
463.000 LifeForce 1 Dispatch/Ship to Physician
463.050 LifeForce Signal Mountain Repeater
123.050 LifeForce Unicom

For all areas surrounding Chattanooga, the best source for conventional frequencies is the Scan Chattanooga website, **http//www.scanchattanooga.com**. It has everything from public safety, aviation, railroads, and businesses to amateur communications.

There's plenty to listen to in the Chattanooga area, and what makes it more interesting is that the trunking system is always changing, now venturing across state lines and into the digital realm.

Radio and an Old Man

Md. Azizul Alam Al-Amin

There is much similarity between radio and a good novel, poem, or literature, because both can create a nice feeling and excitement to our minds. But the difference is, only a literate person can enjoy literature, whereas literate and illiterate alike are able to enjoy radio.

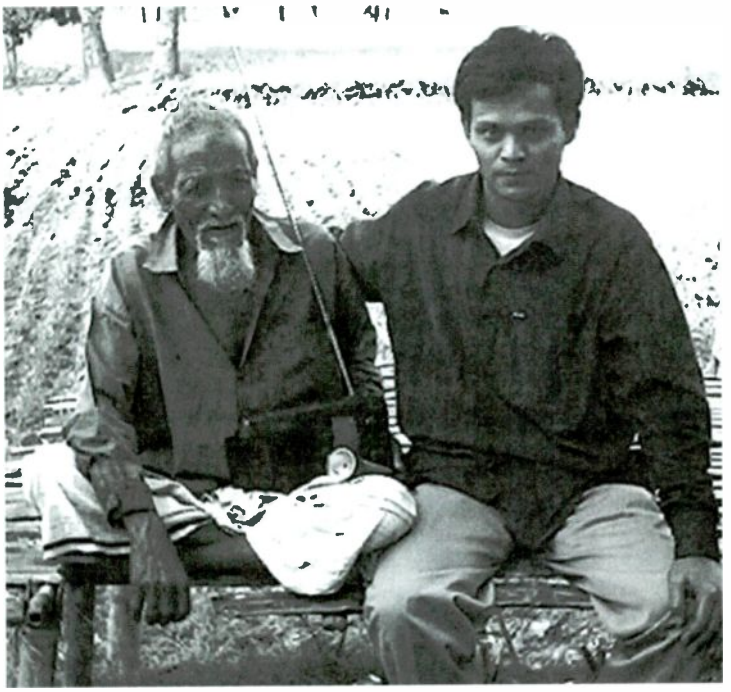
Recently I visited the village of a DX (shortwave hobbyist) friend. Chaumahany is about 12/15 kilometers from Rajshahi city. The village looked very charming and full of green crops.

It was 5 p.m. local time and I was going back home, when I saw an old man sitting on a bamboo platform with a 3-band radio receiver, listening in a very relaxed mood. I was quite impressed to see his creative technique of using the radio. He had made an output line from a flashlight to supply the power at almost no cost, because it was a rechargeable flashlight that required very little electricity to recharge.

I stayed a few moments and talked with him about radio listening. His name was Mr. Md. Abul Hossain and he was over 70 years old. He told me that he tuned in mostly local stations almost every day and he liked both educational and entertainment programs.

He cherishes the memory of tuning the radio when he was very young and there was no television in the village. At that time, radio was the main source of news and entertainment for their village. It became his daily routine, after working hard in the fields each day, to listen to the radio each evening.

Now at the age of over 70, radio is still his best companion.



Ken Reitz, KS4ZR
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Treat Yourself to These Holiday Picks

Let's face it: Nobody knows what you really need in your listening post or radio shack the way you do. And, unless your family has psychic powers or you've posted a list on the refrigerator door, they haven't got a clue. So, here's a short list of great shack and home accessories I think you'll enjoy year 'round!

❖ Weather Helpers

Fancy digital weather monitoring stations are great, but they're hopelessly overpriced and prone to failure. Decentralizing your weather station will allow you to build your system one instrument at a time and give you many more years of use. Here are some ideas to put together a serviceable home weather station for less which will last a lot longer.

This 6" diameter analog barometer with brass bezel is as accurate as any digital model and costs just $20. Choose gold or white dial background. (Courtesy: Klockit)

Analog barometers work just as well as digital ones. But, without batteries! Build your own beautiful analog barometer with a 6" insert from Klockit for just $20. Use any wood scrap you have or get new oak from a builder's supply house, cut a hole the size of the insert, pop it in and you have the basis of a home weather system.

A digital wind speed indicator doesn't have to be expensive, just accurate! This Vortex digital anemometer uses a small coin-style battery for up to two years of intermittent readings. It registers from 3 to 125 mph and comes with mounting bracket, 25 feet of exterior grade wire and the display panel. Price is $79. It's available from **http://www.inspeed.com**

Vortex digital wind speed indicator runs on a small coin-style battery and comes with mounting bracket and 25' of cable. (Courtesy: inspeed.com)

A digital indoor/outdoor thermometer with humidity gauge is essential for checking out the great outdoors, no matter what the season. This La Crosse unit from WeatherShack.com displays indoor and outdoor temperature and humidity from wireless transmitters. It reads minimum and maximum, temperature, and humidity and can store up to 3,000 sets of temperature and humidity data. It's just like the pros use and it's $68 in metallic blue or cherry finish. You can also use the included software to track the temperature/humidity highs and lows.

La Crosse indoor/outdoor, maximum/minimum, temperature/humidity gauge is available in blue metallic or cherry for $68. (Courtesy: WeatherShack.com)

❖ Revolutionary FM Radio

Join the digital FM radio wave of the future with this new product from Radiosophy. It's called the MultiStream HD Radio, and with it you can now tune in the digital channels being broadcast in your area in High Definition Radio. This beautiful unit not only looks good on your dresser, table, or desk, but the tuner part comes away from the speakers and can be hooked up to your stereo for a really big room-filling sound. Enjoy noise free, CD quality audio on the FM band and, if there are stations multicasting in your area, tune into extra channels, too!

But wait, there's more! It also tunes in HD radio signals on the AM band! Just think, you could be listening to your favorite talk shows in CD quality. Well, at least the music in the commercials will sound good. To find out which stations are transmitting an HD Radio signal in your area go to **http://www.ibiquity.com/hdradio/hdradio_hdstations.htm.** For more information about the Radiosophy MultiStream HD Radio go to **http://www.radiosophy.com** or call 877-443-7234. Price is $269. Watch for a full review in an upcoming issue of *MT*.

Radiosophy Multi-Stream HD Radio with loads of features tunes Hi-Def Radio sound and multicast audio from FM stations in your area. (Courtesy: Radiosophy)

❖ The Multi-mode Plunge

Hams and SWLers alike can scan the HF bands for all manner of digital action with the Tigertronics SignaLink Model SL-1+. This tiny interface plugs into the speaker jack of your SW receiver or ham transceiver and into the mic and speaker jacks of your computer. It comes with enough software to get you started monitoring the HF bands for RTTY, PSK31, MFSK, CW, SSTV, packet and much more. It's perfect for beginners, because it's so easy to use. SWLers can get a taste of the digital scene, and when you get your ticket, you'll be set to get on the air.

You get the interface, assorted digital software and an Icom or Kenwood accessory cable for $75. Last year at this time I had never made a RTTY contact in my 17 years as a ham. Talk about being a beginner! But in the first 9 months I worked 80 countries on RTTY and 90 on PSK31. All this, at a time when the bands were as dead as they have been in years. It's just that simple and that much fun! For more info: **http://www.tigertronics.com.**

Tigertronics SignaLink sound card radio interface brings you the world a digital HF communications for just $75. (Courtesy: Tigertronics)

❖ Digital TV Receiver

Treat yourself and your family with the HD350 off-air digital TV tuner from Pro Brand International and tune in to off-air TV multi-casting in your area. Each month more and more digital off-air TV stations with a multitude of multicasting channels are hitting the air waves. And, prices for add-on digital tuners are going down fast. To find out which stations in your area are multicasting go to: **http://www.nab.org/Newsroom/issues/digitaltv/DTVStations.asp**

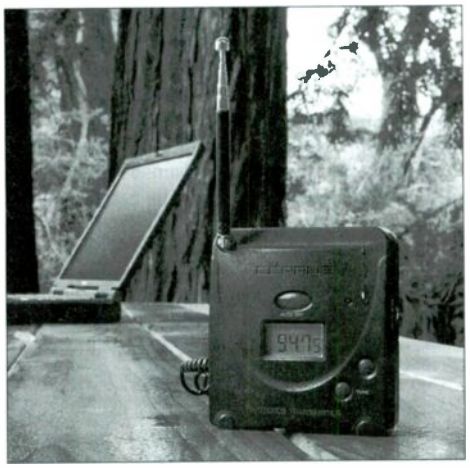
Digital TV can mean HDTV, but you don't need an HDTV capable set to enjoy digital TV multicasting. That's because most TV stations transmitting an HDTV digital signal are also transmitting a digital *standard definition* (SD) signal as well. All multicast channels transmitted on the same carrier are also in SD format. The Pro Brand International HD350 turns any TV set, no matter how old it is, into a digital TV receiver. Simply by going into the HD350's menu you can adjust the picture to match your TV set. Watch *and* record digital TV signals without having to buy a new TV set or a fancy digital recorder.

HD350 from Pro Brand International brings the new world of digital multicast TV to any TV set regardless of age. (Courtesy: Best Buy)

Of course, if you happen to have an HDTV capable set, you'll also enjoy spectacular HD quality images (and 5.1 Dolby surround sound audio) as well as the standard definition multicast channels. There's even a built-in on-screen TV guide. The HD350 digital off-air tuner is available at Circuit City for $230 or from Best Buy (on-line only) for the same price.

❖ DIY Radio Station

If you're into audio, any audio – shortwave broadcasts, satellite radio, HD Radio, CD's, MP3, on-line streaming, whatever – you need to be able to listen throughout your whole house and maybe your deck, patio, or just under a nice shade tree. That's where the C. Crane FM transmitter comes in handy.



C. Crane's powerful, frequency agile, FM transmitter delivers stereo signal to any corner of your house. (Courtesy: C. Crane)

This little gem sends a clean stereo FM signal to the far reaches of your home for your own personal entertainment. You can be listening to any audio source – your local 2 meter repeater, ham bands, scanner, I-pod, you name it! If you can plug the mini-stereo plug into it, you can rebroadcast it on the C. Crane FM transmitter. It's frequency agile (will tune the entire FM band with a digital readout), has automatic timers, is powerful enough to deliver a good. drift free signal 50 to 70 feet away, and the audio is excellent. It comes complete with wall transformer or you can run it on two optional "AA" batteries for mobile use.

This transmitter regularly sells for $70 with free shipping, but check out the "orphans" page at **http://www.ccrane.com** and you might find it at a deep discount. These units come in charcoal gray or silver. For more information, go to their web site or call 800-522-8863.

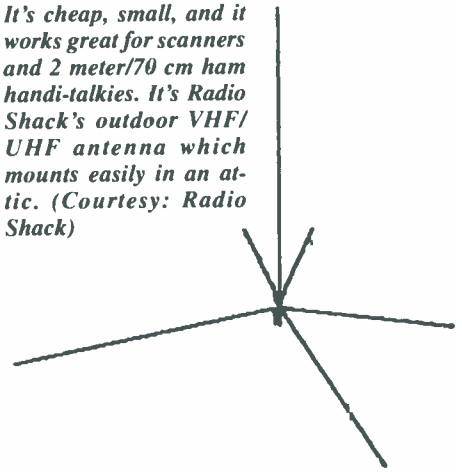
❖ All-purpose VHF/UHF Scanner Antenna

This is one of my favorite antennas. If you're having trouble monitoring your favorite scanner frequencies or hitting your local repeaters with full quieting, you need to consider getting the Radio Shack VHF/UHF scanner antenna. It's cheap, versatile, and easily mounts in the smallest places: attic, balcony, gable end just about anywhere.

But, it's not just for scanners. It tunes from 108 MHz to 1.3 GHz with peak performance from 152-470 MHz, making it a perfect antenna for 2 meter or 70 cm ham work. It's just 20" high and can take up to 25 watts of power input. And, at just $25 you can't find a better antenna! It's Radio Shack catalog number 20-176 and it's available at your local store. If you don't have a local store, you can order it by calling 800-843-7422.

You'll need a length of RG-8 cable to connect the antenna to your scanner or 2 meter rig. I recommend the catalog number 278-890, which is 50 feet of the heavy duty, low-loss feed line for $20. The antenna has a connector built-in for the RG-8 cable, but you may also need an antenna jack adaptor, depending on what radio you have. That will cost another $10-20. But, remember, if you buy $50 or more worth of merchandise from their toll free number, the shipping is free!

It's cheap, small, and it works great for scanners and 2 meter/70 cm ham handi-talkies. It's Radio Shack's outdoor VHF/UHF antenna which mounts easily in an attic. (Courtesy: Radio Shack)



Getting Started

Ask Bob

Bob Grove, W8JHD
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Q. *Will the GRE Super Amplifier work with a handheld scanner? I am trying to get a better signal in the 100-1000 MHz range, especially the 800 MHz spectrum. I am running 10 ft of LMR-400 cable from a discone in the attic to my scanner. (Daniel Cassidy)*

A. Yes, the GRE Super Amplifier works just as well with base and mobile scanners as with a hand-held. You have excellent cable, and a very short length. I would first consider getting a better antenna like the highly-respected ScanTenna which has more gain than a discone. It's quite possible that you won't even need the preamp, especially if you can get it outside the attic and up high.

Q. *Can the popular Uniden BC780XLT [or any other scanner...ed.] receive digital cordless telephones? (Drew Kelly)*

A. It may receive a digital signal, but it can't decode it. Since the passage of the 1986 Electronic Communications Privacy Act (ECPA '86), it has been unlawful in the United States to import, manufacture or even possess a scanner capable of demodulating scrambled communications.

Q: *What is an "RF scanner," and can they pick up 2.4 GHz and 5.8 GHz cordless phones? (Margaret Costner, email)*

A: RF simply means "radio frequency" as opposed to a page scanner used to copy images to a computer.

Although there are radio scanners that pick up these frequency ranges, all cordless phones in these frequency ranges are digital so that you would not be able to hear conversations. In the U.S. it is illegal to manufacture, import, sell or even own a descrambler capable of monitoring scrambled electronic communications.

Q. *Can an ignition key with a memory chip be safely stored in a magnetic box without erasing its memory? (Ed Bixby)*

A. Yes, it is an RF transponder system. The non-volatile memory chip in the key has a coiled antenna around it to receive a 125 kHz signal from another coil wrapped around the ignition switch when the key is inserted. That pulse provides enough power to enable the key's chip to send a return signal back to the computer to be recognized, thus allowing operation of the vehicle.

Q. *Why don't cable or TV stations broadcast international or even domestic radio services on their second audio program (SAP) channels? (Kevin Crouch, Los Angeles, CA)*

A. I would assume that it's a matter of economics; someone has to pay for the service. Domestic radio stations broadcast to anyone with a simple AM/FM radio, and international broadcasters already send their signals worldwide to recipients with shortwave radios, C-band satellite dishes, and the Internet.

Q. *Can you define two terms as used in logging shortwave stations? One is propagation as indicated in the SINPO code, and the other is heterodyne. (Joe Wood, Greenback, TN)*

A. Propagation (the "P" in SINPO) is sometimes called "band conditions"; it refers to the ionospheric and atmospheric capability of assisting or allowing a signal to reach its destination. Static from electrical storms, sunspots, solar flares, time of day (also a solar consideration), signal reflectivity, fading, and signal absorption are all considerations in assessing propagation.

But the bottom line is how well the station is being heard, given the variables cited above. If there is noticeable fading and static, and signals are generally weak, you might indicate it as a 2 or 3, while excellent conditions would merit a 5 (best).

A heterodyne is an audible tone produced when two radio signals are so close together in frequency that their carrier waves "beat," producing an audio pitch that is exactly the difference frequency between the signals. For example, if one signal is being received on 5950 kHz and another on 5951 kHz, a 1 kHz tone will be heard.

Q. *I work in a large manufacturing plant and there is a standing order that if there is a bomb threat, no one should use a two-way radio or cell phone. Couldn't the electrical fields produced by our equipment also set off such a sensitive device? (MB, Terre Haute, IN)*

A. I suspect that if a radio-activated device were sensitive to AC fields produced by your industrial mill equipment, then it would blow up when someone was bringing it in. Typically, remote-activated bombs operate on RF frequencies and are thus not sensitive to AC electromagnetic fields. Also, equipment have such unpredictable EM radiation levels that detonation of a device based upon environmental fields would be just as unpredictable.

Perhaps the concern is based upon the fact that most remotely-triggered bombs are set off by a radio-frequency signal; often a cell phone is used.

Historically, one concern goes back to the construction and mining companies that prohibit the use of two-way radios near blasting sites. The concept here is that the long leads to the blasting cap could act as an antenna and capture enough RF energy to detonate the device. It's my understanding that this has never happened.

Q. *If a nearby cellular telephone tower is causing interference to my scanner reception, how can it be reduced or eliminated? (Robert Neal, Courtright, Ont., CAN)*

A. First, try using the attenuator setting on your scanner; although it will reduce desirable signals' strengths, they should still come through (except for marginal signals), but the image and intermodulation will be reduced even more.

There are also helical filters to null out specific frequency ranges like cell phone towers (869-894 MHz), and you might be able to co-phase a simple cellular "sense" antenna to null out the interference from the cell tower.

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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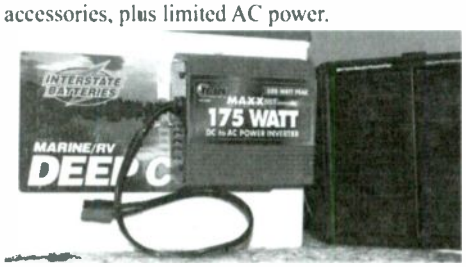
Last month I covered several ideas for improving your home listening post. There was no room for my picture of the DC to AC converter. I glued the converter to the side of my deep cycle battery. I just added a windowsill solar panel for a constant trickle charge into the battery. This setup is cheap and guarantees many hours of emergency DC power for my scanners, LED reading lamps, and other accessories, plus limited AC power.



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In years past, I used the December column for a long list of possible holiday gift ideas. This year my list is short, with a goal of getting something you really need. If you're trying to stop intermod or need to get a better signal, think about **notch filters** or **amplifiers**. The Grove catalog has several to choose from. With virtually all new scanners coming with built-in frequency finders, you might find you need a filter, especially for those powerful FM radio transmitters.

Of course the best gift is a **new radio**, and there are several new ones in the marketplace. If you can afford it, go with the RS Pro 96 or the Uniden 396T. If you don't need all those features, consider the less expensive RS Pro 83 or Pro 2051 (under $200), or the Uniden 246T or 330T (under $300). The best buy for your buck is the compact Icom R5 for under $200. SWLs should also be thrilled to hear that the Icom R75 is back for just $609.

Need a stocking stuffer for a radio friend? How about a **subscription** to *MT* for under $30?

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I am still planning to buy a Uniden 396T, so I downloaded the manual, all 156 pages! With highlight pen in hand, and colored sticky notes nearby, I am carefully checking for all the rich features and trying to comprehend a complicated state-of-the-art radio. This means I will be up to speed when the radio arrives, and I can keep the original manual in pristine condition.

❖ Chat Groups

I have often recommended Yahoo groups for those interested in a specific topic, such as a new radio like the Uniden 396T or RS Pro 2051. I now have some misgivings about those groups. Many have degenerated into places where people who just bought a radio join the membership group, and immediately send out a plea for help in understanding the radio. They usually identify themselves as "Newbie." They are often answered by some well-meaning but inane person whose response begins, "I have never owned that radio, but my cousin did and he took it back because it was too complicated."

Or, the newbie inquires what antenna is best. Again, there are many uninformed responses. It has reached the point where there is more poor or downright incorrect information than reliable information. Of course, there are some good and knowledgeable people in the group. They need to speak up more often to restore integrity and quality to the group.

Here is my advice when joining one of these groups. Don't call yourself a "newbie." Do your own research of the group's archives, read past messages, and wait for a couple of weeks to catch the tenor of the group. Remember, you are getting people's *opinions* which may or may not be on track. Read your radio's operating manual. Now read it again. Don't stay a newbie forever: be informed. Besides reading *MT* faithfully, make a habit of checking these websites at least every other month for new information: **http://www.grove-ent.com/radiorumors.html** and **http://www.strongsignals.net**.

❖ Refarming and Rebanding

Speaking of yahoo groups, there is much confusion and misinformation in the monitoring world about "refarming" and "rebanding." Here is some brief history: Back in 1995, the FCC began wrestling with the reality that there was simply more demand for frequencies than what was available. As new technology grew, radio manufacturers were able to produce radios that could operate in a much smaller bandwidth than earlier equipment. This narrowband technology seemed to be the best strategy to solve the challenge. This allowed the FCC to rework the spectrum landscape (*refarming*).

As part of the refarming effort, the FCC added a channel midway between the original 15 kHz channel centers making the newly refarmed VHF channel spacing 7.5 kHz. This in effect doubled the number of VHF channels available. All newly manufactured VHF radios must meet these narrow band specifications. All new VHF licenses would be the new 7.5 kHz frequencies. This took effect January 1, 2005. Most federal agencies have made the switch and now use new radios, and some of the new 7.5 kHz frequencies are being used.

Locally, the Spokane International Airport wanted a repeater and were the first in Spokane County to get a pair of the newly available frequencies. They now operate a repeater on 154.1075 and 158.8575. Unfortunately, I hear them "bleed over" on the other local frequencies of 154.100 and 154.115. The same is true for 158.8575 bleeding into the old channels 158.850 and 158.650. Agencies now using the old FM 15 kHz channels may keep their old frequencies, but they must solve any interference problems on their own. For most agencies, they may require new radios or the use of PL and DCS tones for both encode and decode.

On UHF, the band originally utilized 25 kHz spacing (with low power 12.5 kHz "splinter" frequencies). The FCC wanted to quadruple the number of channels, so three channels were added between the original channel centers, thus making post-refarming UHF channel spacing 6.25 kHz. This change becomes effective Jan 1, 2008. Refarming affects ONLY the VHF 150-174 MHz and 450-512 MHz bands. Low band VHF 30-50 MHz, aircraft, ham, and military bands are NOT affected.

Implications: As more new licenses are issued and new systems come on line, you will begin hearing these new channels because your old scanners/receivers were set for regular FM, not the narrow band technology. If the "bleed over" problem begins to affect your listening, you may need to upgrade to a new scanner with 6.5 kHz and 7.5 kHz steps. Receivers that allow you to set a specific PL or DCS tone for a frequency can help overcome this problem. (Hams take note: several ham radios in the market place today already have the new steps and/or "NFM." Check your manual or the menu settings.)

Do not confuse refarming with rebanding. They are in no way related. *Rebanding* is not an FCC term: I do not know where it came from. The FCC officially calls it "Band Reconfiguration and Relocation Planning." It is a plan to correct the problem of interference between cellular service and public safety systems in the 800 MHz band. It involves relocating some of the public safety frequencies away from the interference. It has nothing to do with refarming of the VHF or UHF bands. Please consult the websites below to become educated on these topics.

http://wireless.fcc.gov/publicsafety/800MHz/bandreconfiguration/index2.html
http://wireless.fcc.gov/services/plmrs/refarming/
http://wireless.fcc.gov/publicsafety/
http://www.dataradio.com/article_625khz.html
http://www.wpascanner.com/reband/reband.htm
http://www.grove-ent.com/radiorumors.html

❖ Lights Out

This is my last column. For health reasons, I have decided to give up writing a monthly column. I appreciate all the comments, support, and bright ideas that readers have submitted to me. I really appreciate the online friendships I enjoy with many of you. I hope all of you will remain active listeners, contributors, and subscribers to *MT*.

Best Holiday Wishes. 73.

Dan Veeneman
danveeneman@monitoringtimes.

Stretching the Communications Dollar

As with many things in life, operating a radio system takes money. Not just for the initial installation of equipment, but for on-going maintenance, repairs, and upgrades. This month we'll take a look at some ways agencies are finding to get more value for their radio dollar.

❖ Detroit, Michigan

Detroit is Michigan's largest city and the 11th most populated city in the United States, despite losing half its residents over the past 50 years. Some 900,000 people still call Detroit home, down from 1.8 million in 1950.

Detroit is probably most famous for two things – cars and crime. Despite the drop in population, Detroit is ranked the second most dangerous city in the U.S. (Camden, New Jersey, is first), although many of its suburbs, including Farmington Hills, Livonia, Sterling Heights, and Troy, are rated among the safest and most desirable places to live. Even pedestrians are in danger – in 2003 the National Highway Traffic Safety Administration reported that Detroit had the highest pedestrian fatality rate among large cities, producing twice as many deaths as New York City.

After a series of scandals, the Detroit Police Department underwent a court-ordered reorganization last year. They are also working to reduce expenditures, since the city budget is perpetually in the red.

One place to save money is with the public safety radio network. Rather than continue to operate and maintain their own system, Detroit Police and Fire Departments have moved to Zone 7 of the Michigan Public Safety Communications System (MPSCS). MPSCS is a $220 million, digital radio system with more than 180 repeater towers across the state. The state intends to spend another $19 million in 2006 to upgrade equipment, software, and microwave backbone links. About 16,000 mobile and portable radios access the system, more than half of those being operated by local agencies and departments.

This move, with a $130 million price tag, will replace decades-old equipment and give Detroit immediate interoperability with the Michigan State Police and nearby Monroe County. Wayne County is also expected to make the transition from their stand-alone system to MPSCS soon.

The MPSCS is a "pure APCO-25" system, meaning that both the audio and the control channels adhere to Project 25 specifications. You will need one of the following scanners in order to monitor the system: Radio Shack PRO-96 or PRO-2096, Uniden BC296D, BC796D, or BC396T.

While listening, keep in mind that as of September 1, 2005, the Detroit Police Department reorganized the old twelve precincts into six new districts:

New District	Old Precincts
Central	1, 13
Southwestern	2, 3
Northeastern	7, 11
Western	10, 12
Eastern	5, 9
Northwestern	6, 8

The new system is licensed for thirty frequencies across nine repeaters around the city, including towers at the Fire Training Academy, Recreation District Offices, and Northwestern District Headquarters.

The Federal Communications Commission (FCC) database shows the following frequencies licensed for Detroit: 866.6750, 866.7375, 867.0750, 867.0875, 867.1000, 867.1750, 867.3250, 867.3375, 867.3625, 867.4250, 867.4375, 867.6000, 867.7000, 867.7125, 868.2250, 868.2375, 868.3625, 868.4125, 868.4375, 868.5250, 868.5375, 868.6250, 868.6750, 868.6875, 868.7000, 868.7125, 868.7250, 868.8625, 868.9125 and 868.9375 MHz.

Based on reader reports, Detroit talkgroups appear to run from 8000 to at least 8400, although many are not yet identified. Here are a few to get you started:

Decimal	Hex	Description
8001	1F41	City-wide Public Safety (All Call)
8022	1F56	Common 1
8023	1F57	Common 2
8024	1F58	Common 3
8025	1F59	Common 4
8040	1F68	Central District (Dispatch)
8043	1F6B	Southwestern District (Dispatch)
8046	1F6E	Northeastern District (Dispatch)
8049	1F71	Western District (Dispatch)
8055	1F77	Northwestern District (Dispatch)
8058	1F7A	Eastern District (Dispatch)
8219	201B	Fire/EMS (Dispatch)
8234	202A	EMS
8235	202B	EMS
8239	202F	Fire Dispatch
8244	2034	Battalion 1 Fireground
8245	2035	Battalion 2 Fireground
8246	2036	Battalion 3 Fireground
8247	2037	Battalion 4 Fireground
8248	2038	Battalion 5 Fireground
8249	2039	Battalion 6 Fireground
8250	203A	Battalion 7 Fireground
8251	203B	Battalion 8 Fireground
8252	203C	Battalion 9 Fireground
8253	203D	Fireground
8274	2052	Parking Enforcement
8277	2055	Parking Enforcement (Dispatch)
8284	205C	Public Lighting (Dispatch)

❖ Grand Forks, Nebraska

Grand Forks, Nebraska, is a city of 50,000 residents located on the Red River, bordering Minnesota. It is home to the University of North Dakota (UND) with a student population of about 13,000. Grand Forks made the national news in April 1997 when the Red River overflowed and flooded the city.

This year the Grand Forks Police Department and the Grand Forks County Sheriff's Office received a $75,000 grant and will use it to purchase ten mobile radios for vehicle installation and four portable radios, all capable of operating in the VHF band. These new radios will have greater range in rural areas than their present 800 MHz equipment and will allow the departments to directly communicate with other law enforcement agencies in the state. Many of the 40,000 service calls each year handled by the Grand Forks Police take officers out of the city and into the outlying countryside.

In addition, South Dakota and Montana both operate VHF radio networks.

The existing 800 MHz service is provided by Stones Mobile Radio, a private company headquartered in Grand Forks that supplies Motorola equipment and service to public safety agencies across the state. The Motorola Type II analog system currently serving Grand Forks uses a repeater tower just south of town, at the northwest corner of 47th Avenue and Highway 81 South. Frequencies in use are 851.8625, 851.9375, 852.8625, 852.9375, 853.8625, 853.9375, 854.8625, 854.9375, 855.8625,

855.9375, 856.8625, 857.8625, 858.8625, 859.8625 and 860.8625 MHz.

Some talkgroups on the system:

Decimal	HEX	Description
10784	2A2	Grand Forks Fire
10800	2A3	Grand Forks Police (Car-to-Car)
58208	E36	Grand Forks Police (Dispatch)
57440	E06	Grand Forks Fire
57568	E0E	Grand Forks Fire
57584	E0F	Grand Forks Fire
57600	E10	Grand Forks Fire
58320	E3D	University of North Dakota Police
58336	E3E	University of North Dakota Police
58368	E40	Grand Forks Sheriff's Office (Car-to-Car)
58496	E48	Grand Forks international Airport

The County of Grand Forks also uses several VHF and UHF frequencies:

Frequency	Description
155.6850	Grand Forks Sheriff's Office (Dispatch)
155.9850	Grand Forks Sheriff's Office (East)
155.9850	Grand Forks Sheriff's Office (West)
154.1750	Grand Forks Fire
453.9000	County Fire Paging
462.9750	EMS Paging

The following are statewide frequencies licensed to North Dakota:

Frequency	Description
151.040	Department of Transportation 1
151.055	Department of Transportation 2
151.085	Department of Transportation 3
151.100	Department of Transportation 4
154.295	Fire Emergency
154.680	Special Use 2
154.695	Special Use 1 (paired with 159.210)
154.770	Special Use 3
154.860	Sheriff
155.370	Shared by local Police and Sheriff
155.430	Highway Patrol (Dispatch)
155.475	Police Emergency
155.505	Highway Patrol (Dispatch)
156.030	Highway Patrol (Car-to-Car)
156.045	Department of Transportation (Mobile-to-Mobile)
158.910	Special Use 4

❖ Prowers County, Colorado

Prowers County, in southeast Colorado, will purchase an 800 MHz Motorola SmartZone system to provide improved interoperability with neighboring counties and state authorities.

Colorado operates a statewide digital trunked radio network that began operation six years ago. The total cost for the project is about $79 million, with more than 60% of that figure having been appropriated and expended. Due to revenue shortfalls, the Colorado legislature has not provided funding since 2001, although work continues with existing monies and Federal grants. The project has seven phases (see chart below).

Although Prowers is part of Phase 4, officers are equipped with digital radios for mutual aid only. They currently use VHF radios for day-to-day operations but coverage is spotty in some of the more rural areas of the county. Check the following frequencies: 155.195, 156.165, 159.015 and 159.105 MHz. In addition, the State is licensed for 155.130 MHz from a tower in Carlton.

The new SmartZone system will have five channels and make use of existing towers. The FCC records show a tower in Carlton, close to the border with Kansas, licensed to the State of Colorado for the following frequencies: 866.0375, 866.4000, 867.2000, 867.4125 and 868.0625 MHz.

❖ Charles County, Maryland

Charles County, Maryland, is located just south of Washington, D.C., between the Potomac River and Chesapeake Bay. In October the County Sheriff finally switched over to a new 800 MHz trunked radio system that was three years in the making. Back in 2002 the county government signed a contract with Motorola to replace their aging VHF radios. New repeater

Phase	Colorado Counties	Status
1	Arapahoe, Denver, Douglas, Jefferson (Central Colorado)	Completed August 1999
2	Adams, Broomfield, Boulder, Clear Creek, Gilpin (Central Colorado)	Completed July 2000
3	Cheyenne, Elbert, Kit Carson, Larimer, Lincoln, Logan, Morgan, Phillips, Sedgwick, Washington, Weld, Yuma (Northeastern Colorado)	Completed July 2001
4	Baca, Bent, Chaffee, Crowley, Custer, El Paso, Fremont, Huerfano, Kiowa, Las Animas, Otero, Park, Prowers, Pueblo, Teller (Southeastern Colorado)	Completed July 2002
5	Eagle, Garfield, Grand, Jackson, Lake, Mesa, Moffat, Pitkin, Rio Blanco, Routt, Summit (Northwestern Colorado)	Underway
6	Archuleta, Delta, Dolores, Gunnison, Hinsdale, La Plata, Montezuma, Montrose, Ouray, San Juan, San Miguel (Southwestern Colorado)	Underway
7	Alamosa, Conejos, Costilla, Mineral, Rio Grande, Saguache (Southern Colorado)	Completed May 2005

sites were built and new radios were installed, and then the entire system underwent a period of testing. During this time transmissions were carried on both the old and the new system while the kinks were worked out. By October of this year the testing was complete and the old system was decommissioned.

Frederick Davis, the County Sheriff, is particularly enlightened about scanner listeners. "There is definitely a benefit to having citizens hear our radio transmissions," he said, "because those who monitor their scanners sometimes provide us with information based on the transmissions they are listening to. We encourage this kind of information sharing and we hope it will continue."

The new system is a Motorola Type II with mixed analog and digital APCO-25 voice. The system has a number of repeaters located around the county, including three in La Plata, two in Waldorf, one each in Hughesville, Dentsville, Nanjemoy, Marbury, and one at the Naval Surface Warfare Center in Indian Head. Frequencies are 866.0750, 866.3250, 866.5625, 867.0625, 868.2625, 868.3750, 868.6500 and 868.9000 MHz.

Decimal	Hex	Description
16464	405	Sheriff District 1
16480	406	Sheriff District 2
16496	407	Sheriff District 3 (East)
16512	408	Sheriff District 3 (West)
16528	409	Sheriff Tactical 1
16544	40A	Sheriff Tactical 2
16560	40B	Sheriff Tactical 3
16576	40C	Sheriff Tactical 4
16704	414	Animal Control
17040	429	Fire/EMS (Dispatch)
17056	42A	Fire/EMS Tactical 1
17072	42B	Fire/EMS Tactical 2
17088	42C	Fire/EMS Tactical 3
17104	42D	Fire/EMS Tactical 4
17120	42E	Fire/EMS Tactical 5
17136	42F	Fire/EMS (Training)
17152	430	Fire/EMS
17168	431	Fire/EMS
17184	432	Fire/EMS
17200	433	Fire/EMS

❖ New York

In September, the State of New York signed a $2 billion contract with M/A-COM for a statewide public safety radio network, making it the largest single wireless project in United States history. In addition to designing and installing the system, under the terms of the contract M/A-COM will also operate and maintain it for a period of 20 years. Build out and testing of the new system across the state is expected to take five years and eventually support as many as 65,000 users. Subcontractors on this enormous project include General Dynamics and Alcatel USA.

M/A-COM's successful bid included the use of their "VIDA" (Voice, Interoperability, Data and Access) platform, which is designed to integrate different technologies into a single system. The radio technology for urban and suburban areas will be based on their proprietary OpenSky, which is currently being fielded in Pennsylvania and Florida. These radios will operate in the 700 MHz and 800 MHz bands.

For rural and mountainous areas, VHF overlays using P25IP will provide wider coverage. P25IP is an Internet Protocol-based APCO Project 25 conventional system developed by M/A-COM a few years ago. The idea is to provide APCO-25 signals over the air between the radio and the repeater, but use Internet Protocol (IP) to connect repeaters to the rest of the network. With the explosion of the Internet over the past decade, IP equipment and services have become commonplace. M/A-COM will use their NetworkFirst product to provide IP connectivity between existing radio systems and these new technologies.

❖ Scanners and GPS

The Global Positioning System (GPS) has been providing accurate location and time information for more than a decade. The U.S. Department of Defense operates a constellation of 24 satellites that continuously circle the Earth transmitting precise time and navigation messages. Commercial GPS receivers provide very accurate time and position information using the civilian GPS signal from these satellites at 1575.42 MHz.

In September the scanner manufacturer Uniden announced the BCD996T, a "GPS-enabled" mobile scanner. This feature will allow the scanner to automatically select local radio systems to scan when connected to an external GPS receiver.

Many commercial GPS receivers provide what is known as *NMEA sentences* via a serial data port. NMEA is the National Marine Electronics Association, which developed the NMEA-0183 standard. GPS receivers that provide NMEA sentences can be connected to other devices, such as a laptop computer, to provide interactive mapping and driving directions.

Uniden intends to use the GPS information in these NMEA sentences to look up frequencies that are local to the geographic area in which the scanner is located. Each system in the scanner's memory will have associated latitude, longitude, and range settings. When the GPS receiver is connected and the unit comes within the defined range, the system can be programmed to automatically become active. Since this model is primarily intended for installation in an automobile, the vehicle operator will not have to worry about reprogramming the unit while driving. The BCD996T will automatically scan those frequencies that are appropriate for its present location.

Besides radio systems, Uniden intends to use the GPS information to provide the user with location alerts when the scanner gets close to a programmed latitude and longitude. For instance, the scanner can be set up to emit a tone when approaching a known speed trap. Other possibilities include displaying travel information based on present location.

As with other recent high-end Uniden models, the BCD996T will offer APCO Project 25 digital trunking and Close Call technology. Expected features include dynamic memory management for up to 6,000 channels, fire tone-out recognition, multi-site programming and a coverage range of 25 MHz up to 1.3 GHz.

Uniden also plans to incorporate a number of "wish list" requests received from current customers. These include "soft search keys" where search ranges are assigned to a single key on the front-panel; "tone search" to locate the tone-coded squelch or digital coded squelch of a transmission; automatic storage of the last 10 Close Call hits; and even selectable LCD and keypad backlight colors – red or green.

The initial press release from Uniden indicated it would be one of the most expensive consumer-level scanners on the market with an expected list price of $850. Availability is slated for the spring of 2006.

❖ Scanner Knob Tip

Several scanner users have complained about the shape and slipperiness of top-mounted volume and squelch knobs. The close quarters and smooth plastic often make it difficult for them to get a good grip on an individual knob without accidentally hitting the other one.

Ed Muro provided the accompanying photograph and reports that using the proper-sized automotive vacuum cap over each knob solved the problem nicely. Another user, also shopping in an auto parts store, suggested using a quarter-inch of windshield wiper hose or vacuum hose of the proper diameter slipped over each knob.

That's all for this month and this year. As always, send comments, corrections, new finds and tips to *danveeneman@monitoringtimes.com* and check my web site at **http://www.signalharbor.com** for more frequencies and scanner information. Until next month, have a Merry Christmas and a happy, peaceful New Year.

Big Savings on Radio Scanners

Uniden® SCANNERS

Bearcat® 796DGV Trunk Tracker IV with free scanner headset

Manufacturers suggested list price $799 95

CEI Special Price $519.95

1,000 Channels • 10 banks • CTCSS/DCS • S Meter

Size: 6 15/16" Wide x 6 9/16" Deep x 2 3/8" High

Frequency Coverage: 25 000-512 000 MHz , 806 000-956 000 MHz (excluding the cellular & UHF TV band) 1,240 000-1 300 000 MHz

When you buy your Bearcat 796DGV Trunktracker package deal from Communications Electronics, you get more The GV means "Great Value " With your BC796DGV scanner purchase, you also get a **free deluxe scanner headphone** designed for home or race track use Headset features independent volume controls and 3 5 mm gold right angle plug The 1,000 channel Bearcat 796DGV is packed with features to track Motorola Type I/II/IIi Hybrid, EDACS, LTR Analog Trunk Systems and Motorola APCO 25 Phase I digital scanner including 9,600 Baud C4FM and CQPSK Also features control channel only mode to allow you to automatically trunk many systems by simply programming the control channel, S A M E weather alert, full-frequency display and backlit controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory, PC Control and programming with RS232C 9 pin port (cable not supplied), Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more Our CEI package deal includes telescopic antenna, AC adapter, cigarette lighter cord, DC cord, mobile mounting bracket with screws, owner's manual trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, order magnetic mount antenna part number ANTMMBNC for $29 95. For complete details, download the owners manual from the www.usascan.com web site For fastest delivery, order on-line at www usascan com

Bearcat® BCT8 Trunk Tracker III

Manufacturer suggested list price $299 95

CEI Special Price $169.95

250 Channels • 5 banks • PC Programmable

Size: 7.06" Wide x 6.10" Deep x 2.44" High

Frequency Coverage: 25 0000-54 0000 MHz 108 0000-174, 0000 MHz 400 0000-512 000 MHz 806 0000-823 9950 MHz 849 0125-868 9950 MHz , 894 0125-956 0000 MHz

The Bearcat BCT8 scanner, licensed by NASCAR, is a superb preprogrammed 800 MHz trunked highway patrol system scanner Featuring TrunkTracker III, PC Programming, 250 Channels with unique BearTracker warning system to alert you to activity on highway patrol link frequencies Preprogrammed service searches makes finding interesting active frequencies even easier and include preprogrammed police, fire and emergency medical, news agency, weather, CB band, air band, railroad, marine band and department of transportation service searches The BCT8 also has preprogrammed highway patrol alert frequencies by state to help you quickly find frequencies likely to be active when you are driving The BCT8 includes AC adapter, DC power cable, cigarette lighter adapter plug, telescopic antenna, window mount antenna, owner's manual, one year limited Uniden warranty, frequency guide and free mobile mounting bracket For maximum scanning enjoyment, also order the following optional accessories External speaker **ESP20** with mounting bracket & 10 feet of cable with plug attached $19 95 Magnetic Mount mobile antenna **ANTMMBNC** for $29 95

Bearcat® BCD396T Trunk Tracker IV

Suggested list price $799 95/CEI price $519.95

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

Frequency Coverage:

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

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

More Radio Products

Save even more on radio scanners when purchased directly from CEI Price includes delivery in the continental USA excluding Alaska

Bearcat 898T 500 channel Trunktracker III base/mobile	$209 95
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Bearcat BCD396T APCO 25 Digital scanner with Fire Tone Out	$519 95
Bearcat 246T up to 2 500 ch Trunktracker III handheld scanner	$214 95
Bearcat Sportcat 230 alpha display handheld sports scanner	$184 95
Bearcat 278CLT 100 channel AM/FM/SAME WX alert scanner	$129 95
Bearcat 248CLT 50 channel base AM/FM/weather alert scanner	$104 95
Bearcat 92XLT 200 channel handheld scanner	$109 95
Bearcat 72XLT 100 channel handheld scanner	$99 95
Bearcat BR330T up to 2,500 ch Trunktracker III with Tone out	$274 95
Bearcat BCT8 250 channel information mobile scanner	$169 95
Bearcat 350C 50 channel desktop/mobile scanner	$104 95
AOR AR16BQ Wide Band scanner with quick charger	$199 95
AOR AR3000AB Wide Band base/mobile receiver	$1,079 95
AOR AR5000A+3B Wide Band 10 KHz to 3 GHz receiver	$2 599 95
AOR AR8200 Mark IIIB Wide Band handheld scanner	$594 95
AOR AR8600 Mark II Wide Band receiver	$899 95
AOR AR-ONE Goverment/Export sales only 10 KHz-3 GHz	$4 489 95
Scancat Gold For Windows Software	$99 95
Scancat Gold for Windows Surveillance Edition	$159 95

Bearcat® BC246T Trunk Tracker III

Suggested list price $399.95/CEI price $214.95

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

Frequency Coverage:

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

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www usascan com and download the free owner's manual. Popular features include Close Call Radio Frequency Capture – Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner Dynamically Allocated Channel Memory - Organize channels any way you want, using Uniden's exclusive dynamic memory management system 1,600 channels are typical but over 2,500 channels are possible depending on the scanner features used You can also easily determine how much memory is used Preprogrammed Service Search (10) - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio Amateur (ham) radio CB radio, Family Radio Service, special low power railroad, aircraft, marine racing and weather frequencies Quick Keys - allow you to select systems and groups by pressing a single key Text Tagging - Name each system, group, channel, talk group ID, custom search range, and S A M E group using 16 characters per name Memory Backup - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. Unique Data Skip - Allows the BC246T to skip over unwanted data transmissions and birdies Attenuator - You can set the BC246T attenuator to reduce the input strength of strong signals by abcut 18 dB Duplicate Frequency Alert - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner 22 Bands - with aircraft and 800 MHz The BC246T comes with AC adapter, 2 AA 1,800 mAH nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part #HF24RS for $29 95 Order now at www usascan com or call 1-800-USA-SCAN.

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Digital Modes Come of Age

When the first gaggle of new funny-sounding digital modes hit HF (high frequency, 3-30 megahertz), it was all a rather confusing exercise. What's that funny noise? Which computer program should I run? How can I get something besides garbage on the screen? Whatever happened to good old Morse code?

Things have sorted out in the past year or so. Sound card software has gotten better and more comprehensive, and plenty of recordings are available online to help people recognize all the different signals. More importantly, the digital modes are actually being used for something, making all this geek stuff worth it. Here are some highlights:

ALE:

ALE stands for Automatic Link Establishment. It's been around a while now, and it's standard on most military gear. There are hundreds of ALE frequencies. Any truly comprehensive listing would be a book, not a column. It would also be obsolete before anyone ever saw it.

By now most high-end software usually decodes ALE, but it's still hard to beat plain old PC-ALE, the original Charles Brain creation that started it all. It's a pretty advanced program to set up and use, but it controls a lot of different radios and does a great job. One of several versions making the rounds is at Charles' home page: **http://www.chbrain.dircon.co.uk/pcale.html**. If this is unavailable due to bandwidth limitations, try the search engines for other sites worldwide.

We're starting to see more cases of ALE actually being used for practical purposes. The US Air Force has been autodialing phone patches by passing the number in an ALE callup for a couple of years now, but this use has recently expanded from the usual 9025 kilohertz (kHz) to other frequencies used by the Scope Command radios.

Also, last month we talked about the use of ALE to initiate voice contacts. After awhile, one gets the hang of stopping the scan and waiting for voice. At this point, ALE is doing the frequency scanning for you, just as it does for its users.

DSC:

Digital Selective Calling has also been around for some time. It was incorporated into the overall Global Maritime Distress and Safety System (GMDSS) that was deployed worldwide after international laws required its use on most

Kyoritsu GMDSS terminal with HF DSC

large vessels. It sends a string of characters similar to the older Simplex Telex Over Radio (SITOR) mode, but these characters are evaluated in a different manner to produce the final message.

For various technical and training reasons, DSC got off to a rocky start and grew slowly. Hours would pass with nothing to decode. Now, however, it's busy enough to warrant serious attention by utility fans.

Again, the calls often set up voice contacts. Often the decoded message will include a channel (usually in kHz) and designator J3, which is the internationally recognized way of describing good old upper sideband (USB). No reason the listener can't tune to this channel the same way the users do.

DSC is in the big software packages, which do a good job on it, though usually without specialized GMDSS features such as automated distress alerts. Tune it like RTTY or SITOR-B, with 170 shift and 100-baud rate. Primary international DSC calling and distress frequencies are 2187.5, 4207.5, 6312.0, 8414.5, 12577.0, and 16804.5 kHz.

COAA, a company in the UK, has a rather slick little program called DSCdecoder. It's trickier to use than some of the big packages, but it has some nice features, such as online lookup of vessel callsigns (those long numbers) in the public online database at the International Telecommunications Union. This one isn't free (it's 25 Euros), but there's a 21-day trial. Download it at **http://www.coaa.co.uk/dscdecoder.htm**.

STANAG 4285:

STANAG means Standardization Agreement. It's what NATO (North Atlantic Treaty Organization) calls its standards for communications or just about anything else. STANAG 4285 is a single-tone radio modem with a bandwidth from about 500 to 3000 hertz, usually tuned in USB. Like most such systems, it sounds like a big whoosh. Selective propagation fading gives an effect not unlike the wind noises in movies. If you've been hearing a lot of wind on HF lately, now you know why.

Most of the same French Navy stations that run endless test loops in Baudot radioteletype (RTTY) are starting to deploy a system using STANAG 4285 and ALE for autocalling. They use the same markers we're used to from the RTTY, with the RY's and "Voyez le brick..." which is the French-language version of "The quick brown fox... ."

They even use the same character code as the RTTY, namely plain old 5-bit ITA2 with the figures and numbers cases. ITA stands for International Telegraph Alphabet. An Italian Navy station is also doing this, so perhaps it is a NATO convention.

Recently found frequencies include 6315.9, 6316.2, 6348.0, 8149.2, 8478.5, 8568.0, 12200.3, 12689.0, 13031.2, 13042.5, and 22447.0 kHz. Decoder parameters are usually 300 baud, long interleave, and 5N2 framing (5 data bits, no parity bit, two stop bits).

❖ Katrina Update

Most of the stations mentioned last month as being knocked off-air by hurricane Katrina seem to be back. WLO, Mobile Radio in Alabama, is once again being heard with its top-of-hour weather broadcasts and traffic lists. These still use the "female" synthesized voice.

Listener reports and the US Coast Guard web site both indicate that the New Orleans weather FAX is once again broadcasting its normal schedule. Boston, however, will continue to transmit extra charts. These Hurricane Danger/High Wind Warning Charts are transmitted at 0452, 1028, 1824 and 2228 UTC. The Coast Guard's complete FAX schedule is available online here: **http://weather.noaa.gov/pub/fax/hfmarsh.txt**.

At the end of September, there were still some problems with the medium wave band broadcasts from Coast Guard Sector, New Orleans. The capacity is still being shown as "reduced."

Hurricane Rita reflooded a few areas in and around New Orleans, and devastated coastal regions farther west in Louisiana. However, we know of no changes in high frequency (HF) services from Rita's area.

Utility World

Utility Logs

Hugh Stegman
hughstegman@monitoringtimes.com
www.ominous-valve.com/uteworld.html

ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
ARQ	Automatic Repeat Request teleprinting system
CAMSLANT	Communication Area Master Station, Atlantic
CAMSPAC	Communication Area Master Station, Pacific
CARB	Channel Availability Radio Bulletin
CBP	US Customs and Border Protection
COTHEN	Customs Over-The-Horizon Enforcement Net
CW	Morse code telegraphy ("Continuous Wave")
DEA	US Drug Enforcement Administration
DSC	Digital Selective Calling
EAM	Emergency Action Message
E10	Israeli English phonetic "numbers"
E22	Revived English phonetic "numbers" - India?
EOC	Emergency Operations Center
FAX	Radiofacsimile
FBI	US Federal Bureau of Investigation
FEC	Forward Error Correction teleprinting system
FEMA	US Federal Emergency Management Agency
HFDL	High-Frequency Data Link
HF-GCS	High-Frequency Global Communications System
ITA2	International Telegraph Alphabet #2 ("Baudot")
M8	Cuban CW "numbers" cut to ANDUWRIGMT
M21	Russian CW datagrams with local time stamp
MARS	US Military Affiliate Radio System
Meteo	Meteorological
MX	Russian single-letter beacons and markers
NATO	North Atlantic Treaty Organization
NAWS	Group call: Notice to Allied War Ships
Piccolo	British multitone teleprinting system
RSA	Republic of South Africa
RTTY	Radio Teletype
S28	Russian military "Buzzer" marker for UZB76
S32	Russian "Squeaky Wheel" marker
SECURE	State Emergency Capability Using Radio Effectively
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
STANAG	Standardization Agreement (NATO)
STANAG 4285	NATO single-tone modem teleprinting standard
UK	United Kingdom
Unid	Unidentified
US	United States
USCG	US Coast Guard
V2	Cuban "Atencion" station
VIP	Very Important Person

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 ( ).

518.0 ZSC-Capetown Radio, RSA, SITOR-B Navtex at 1625. (Bob Hall-RSA)

2749.0 VCO-Sydney Coast Guard Radio, Australia, weather at 0044. (Rick Baker-OH)

3137.0 250107-US Air Force C-17A, ALE sound, also on 4721 and 5708, at 0006. (Baker-OH)

3203.2 "L"-Russian Navy single-letter CW beacon (MX), St. Petersburg, sending "L" wrong, off-air at 1931. Back with normal CW "L" at 2038. (Ary Boender-Netherlands)

3455.0 Air France 095A-flight, position for New York at 0543. (Ron Perron-MD)

3640.0 MIW A2B20-Abnormal Israeli intelligence callup (E10a), parallel on 5339, at 2010. (Boender-Netherlands)

3658.0 "V"-Russian CW channel marker (MX), at 2038. (Boender-Netherlands)

3828.0 The Squeaky Wheel-Russian channel marker (S32), sounds just like the name, at 2051. (Boender-Netherlands)

4028.0 Cuban Spanish female AM "numbers" voice (V2), 5-figure groups in progress, at 0606. (Tom Sevart-KS)

4316.0 NMN-US Coast Guard CAMSLANT Chesapeake, VA, "Perfect Paul" weather at 0420. (Sevart-KS)

4557.7 "D"-Russian Navy, CW cluster beacon (MX), Odessa, also on 5153.7, 7038.7, 8494.7, and 10871.7, all at 2046. (Boender-Netherlands)

4557.9 "S"-Russian Navy CW cluster beacon (MX), Arkhangelsk, also on 5153.9, 7038.9, 8494.9, and 10871.9, all at 2046. (Boender-Netherlands)

4558.0 "C"-Russian Navy CW cluster beacon (MX), Moscow, also on 5154, 7039, 8495, and 10872, all at 2042. (Boender-Netherlands)

4610.0 GYA-UK Royal Navy, Northwood, FAX weather chart at 0430. (Sevart-KS)

4625.0 The Buzzer-Russian channel marker (S28), at 2040. (Boender-Netherlands)

4637.5 WDC3856-Tidewater Marine offshore oil service vessel *Farida Tide*, discussing Hurricane Rita with WDC3755, vessel *Deena Tide*, at 0430. (Sevart-KS)

4721.0 200171-US Air Force C-17A, ALE-dialed patch via OFF (Offutt AFB, NE), to Pope AFB, NC, at 0258. (Baker-OH)

4730.0 NOJ-USCG, Kodiak, AK, calling SKA, Sitka, ALE at 0519. (Baker-OH)

4780.0 KPA C58D5-Abnormal Israeli intelligence callup (E10a), parallel 7605, at 2005. (Boender-Netherlands)

4784.0 TXX1-Spanish Guardia Civil Northern Headquarters, calling TWCG2, ALE at 0632. (Day Watson-UK)

4991.0 SL1-FBI, St Louis, MO, calling HQ1, DC, ALE at 0411. IP1, Indianapolis, IN, calling LR1, Little Rock, AR, ALE at 0930. (Baker-OH)

5097.0 CFH-Canadian Forces, Halifax, NS, NAWS calling loop in RTTY, at 2103. (Watson-UK)

5103.0 GYA-UK Royal Navy, Northwood, CARBs in RTTY, at 0534. (Sevart-KS)

5103.7 MGJ-UK Royal Navy, Faslane, CARBs in RTTY, at 1057. (Watson-UK)

5135.0 WPFJ625-New Hampshire Emergency Management Agency, ALE sounding on state SECURE net, at 0246. (Baker-OH)

5195.0 DRA5-German propagation beacon, identifying in CW every 3 minutes, also periodic solar-terrestrial reports in CW, RTTY, and phase-shift keying, at 2108. (Watson-UK)

5201.0 Unid-Russian Air Defense, automated CW station with formatted messages (M21), also on 7913.5, at 2057. (Boender-Netherlands)

5211.0 WGY 912-FEMA Special VIP Relocation Facility, Mt. Weather, VA, taking net check-ins at 2317. (Mark Cleary-SC)

5276.5 GXQ-UK Royal Navy, London, VFT (Voice Frequency Telegraphy) with two Piccolo channels, one encrypted and other with a test loop, at 1109. (Watson-UK)

5320.0 USCG Group Galveston, TX, taking over radio guard with Coast Guard 2104 after it lost contact with Sector Corpus Christi, at 0500. (Baker-OH) Cutter *Tybee*, position for Sector Atlantic City, at 2326. (Cleary-SC)

5696.0 WLO-Mobile Radio (commercial coastal station, AL), taking ops-normal from Coast Guard 2118, at 0031. Coast Guard 1502-USCG, advising Mobile Air, AL, that they have radio guard with WLO, at 0251. (Baker-OH) Coast Guard 2127-USCG helicopter securing guard with CAMSLANT and landing in Baton Rouge, LA, at 1148. (Cleary-SC)

5708.0 180214-US Air Force C-5A, raising ICZ, Sigonella AB, Italy, in ALE, then patch to Dover Metro as Reach 313, at 0419. (Baker-OH) Sentry 22-US Air Force E-3, ALE-dialed patch to Raymond 24 (Tinker AFB, OK), at 2354. (Cleary-SC)

5732.0 Omaha 747-CBP helicopter, patch via Service Center (Rockwell/Collins contract station, IA) to Hammer (March Air Reserve Base, CA), on FEMA damage assessment during hurricane Ophelia, at 2116. (Cleary-SC) CAMSLANT-USCG, VA, ALE-initiated voice regarding post-Katrina rescue, at 0447. CAMSLANT, ops-normal from Juliet 38, probably Katrina, at 0451. (Sevart-KS)

5778.0 TXX1-Spanish Guardia Civil, calling TWCG2, ALE at 0755. (Watson-UK)

5820.0 YHF 1-Israeli intelligence callup (E10), parallel 9202, at 2000. (Boender-Netherlands)

5877.0 L28STATEHF-Unknown net, calling L15STATEHF, probably Louisiana Katrina ops, ALE at 1757. (Perron-MD)

5890.0 TXX2-Spanish Guardia Civil Central Headquarters, ALE sound at 2330. (Watson-UK)

6316.2 IDR-Italian Navy, Rome, ITA2 CARB in STANAG 4285 (300/L), also uses 6315.9, at 2225. (Watson-UK)

6474.0 KSM-New CW commercial station, Pt. Reyes, CA, with a calling marker, good signal at 2018. (Hugh Stegman-CA)

6501.0 NMN-USCG CAMSLANT, VA, "Perfect Paul" voice weather at 0623. (Sevart-KS) CAMSLANT asking Cutter Oak if they copied the weather, at 1846. (Cleary-SC)

6874.0 TWVB1-Spanish Guardia Civil, Burgos, calling TWCG2, ALE at 0722. (Watson-UK)

6981.0 673DVA-US Department of Veterans' Affairs, VA, ALE sound at 2202. (Perron-MD)

6985.0 P2Z10-US Army 2/10th Aviation, NY, ALE sound at 1431. (Perron-MD)

7038.9 "Ch"-Russian CW single-letter beacon (MX?), sending "---." in Cyrillic Morse, also 8494.9, 10871.9, and 13528.9, presumably a malfunction, at 1851. (Boender-Netherlands)

7348.0 FC8FEM-FEMA Region 8, CO, ALE sound, also on 9462, 10194, 10588, 11108, 12216, and 14776, at 2249. (Baker-OH)

7448.5 USACE1010-US Army Corps of Engineers, DC, ALE sound, also 6985 and 7510, at 1306. (Perron-MD)

7510.0 USAFC1250-US Army Forces Command, GA, calling USAIS1012, Intelligence and Security Command, VA, ALE at 1400. (Perron-MD)

7527.0 Coast Guard 1701-US Coast Guard in hurricane area, working CAMSPAC at 0142. (Cleary-SC)

7646.0 DDH7-Hamburg Meteo, RTTY weather observations in SYNOP (Synoptic) code, at 1305. (Watson-UK)

7650.0 4Z4CP2-US Army, possibly TX, ALE sound at 0042. T3Z238-US Army National Guard, MI, ALE sound at 0045. TZ501, 501st Aviation, ALE sound at 0136. (Perron-MD)

7722.5 FDI8-French Air Force, Nice, RTTY "Voyez le brick" test loop at 1717. (Watson-UK)

7903.5 ME1-FBI, Memphis, TN, calling AT1, Atlanta, GA, also on 10913.5, ALE at 2120. (Baker-OH)

7918.0 VLB2-Israeli intelligence callup (E10?), usually the null-message format but a message followed, at 1945. (Boender-Netherlands)

8010.0 Cuban Spanish female AM "numbers" voice (V2), 5-figure groups at 0630. (Sevart-KS)

8020.0 60-Unknown military, calling CHARLY46 in ALE, at 0225. (Perron-MD)

8171.5 LNKOPS-Nebraska National Guard, Lincoln, ALE sound, also 10797.5 and 14757, at 1850. (Perron-MD)

8297.7 VTP13/14-Indian Navy, Vishakhapatnam, RTTY message in 3-letter groups, also 6507, at 1640. (Hall-RSA)

8301.6 Sector San Juan-USCG, working Stingray 14, at 2236. (Cleary-SC)

8414.5 D6CU5-Vessel *SIS Quest*, DSC distress call at 1957. (Watson-UK)

8478.5 RFLIE-French Navy, Pointe-a-Pitre, Guadeloupe, with channel marker test loop in 5-bit ITA2 code, sent using STANAG 4285 (300/L), at 0340. (Stegman-CA)

8971.0 Goldenhawk-US Navy Tactical Support Center, Brunswick, ME, working P-3Cs Trident 44 and 60, at 1319. (Cleary-SC)

8980.0 Coast Guard 2129-USCG, patch via CAMSLANT to District 7 Ops, Miami, FL, getting position of a downed aircraft at 1412. (Cleary-SC)

8983.0 Coast Guard 2134-USCG helicopter working CAMSLANT in Rita operations, also working Coast Guard 6038 and 6040, at 1249. (Cleary-SC) WLO-Mobile Radio, AL, Katrina-related rescue traffic with Coast Guard 6038, at 2015. (Sevart-KS)

8992.0 LL 60-US Navy P-3C, patch to Duty Office via Offutt HF-GCS, NE, at 2124. (Cleary-SC)

9025.0 Coast Guard 1503-USCG HC-130, ALE-initiated patch to Elizabeth City Air, at 0007. (Cleary-SC)

9060.0 Camaleon-Mexican Army ("Chameleon") working Camaleon 3, ALE at 0141. (Baker-OH)

9323.0 Cuban Spanish female AM "numbers" (V2), started early at 0356 with the "Atencion" callup, cut off suddenly, then tried again at 0400. (Sevart-KS)

9414.5 TEMPLE-Texas Department of Public Health Net, Temple, possible pre-Rita activation, ALE sound at 1258. AUSTIN, ALE sound, also on 10202 and 13488, at 1339. TYLER, ALE sound at 1359. (Baker-OH)

10135.0 TRUENO-Mexican military ("Thunder"), calling TORBELLINO ("Eddy"), ALE at 0209. (Baker-OH)

10162.0 037RMRCAP-US Civil Air Patrol, Rocky Mountain Region, CO, ALE sound, also on 13415 and 14357, at 0049. (Baker-OH)

10242.0 CS1-COTHEN remote transmitter, Atlanta, GA, calling 504, USCG 1504, ALE at 2014. (Baker-OH) Coast Guard 1711-USCG HC-130, patch via Service Center (Rockwell/Collins contract station) to Elizabeth City Air regarding status of CG 2005, at 2334. (Cleary-SC)

10320.0 American Forces Network-US Navy, HI, rebroadcasting armed forces radio's Interruptible Voice Channel uplink, at 0425. (Sevart-KS)

10444.0 COBRE-Mexican Army ("Copper"), calling DILUVIO ("Deluge"), ALE at 0205. (Baker-OH)

10648.0 Adobe 51-US Air Force tanker, patch via Puerto Rico to Travis AFB, OK, at 2321. (Cleary-SC)

11034.5 DDH-Hamburg Meteo, Germany, RTTY weather at 1750. (Hall-RSA)

11175.0 Puerto Rico-US Air Force HF-GCS, patching an unknown aircraft for weather at several Colombian airports, at 1631. (Cleary-SC) Temporary-US military, with 28-character EAM simulcast on 15016, at 1707. (Jeff Haverlah-TX)

11205.0 Shark 43-USCG C-130, position for Smasher (Joint Task Force, Key West, FL), at 1247. (Cleary-SC)

11232.0 King 15-US Air Force 71st Rescue Squad, patch via Trenton Military to King Ops (Moody AFB, GA), at 2112. (Baker-OH)

11494.0 I37-CBP Cessna 550, calling WST, COTHEN Western Regional Node, ALE at 0139. (Baker-OH)

12689.0 FUX-French Navy, Reunion, ITA2 marker and "Voyez le brick" test loop in STANAG 4285 (300/L), at 1619. (Watson-UK)

12823.5 CTP-NATO Oeiras/Lisbon, Portugal, NAWS loop in RTTY, at 1817. (Ken Maltz-NY)

12993.0 KSM-New CW coastal station, Pt. Reyes, CA, calling marker at 2311. (Perron-MD)

13152.0 WLO-Mobile Radio, AL, back on-air with the synthesized weather and traffic list, at 1811. (Maltz-NY)

13257.0 Canforce 2301-Canadian Forces CC-130, patch via Trenton at 1932. (Cleary-SC)

13321.0 ZS-STK-South African Airways flight 245, working Johannesburg in HFDL, at 1444. (Hall-RSA)

13488.0 AUSTIN-Texas Dept. of Public Health, calling CDCATLANTA, US Centers for Disease Control, GA, at 2033. (Baker-OH)

13907.0 Coast Guard 1718-USCG C-130, leaving New Orleans and working CAMSLANT, at 2145. (Cleary-SC)

13927.1 Reach 0457-US Air Force, patch via MARS station AFA3HS, KS, to Hilda (Air Mobility Command ops, IL), diverting to Kelly Field with a problem at 1938 (Cleary-SC)

14569.0 SCLC512-Venezuelan Army, working SCLC514 in ALE at 2225. (Baker-OH)

14757.0 R23687-Nebraska Army National Guard helicopter, calling T24MED (air ambulance), ALE at 1445. (Perron-MD)

14761.5 WAROPS-US Army 1/228th "Winged Warriors," Honduras, ALE sound at 1949. (Perron-MD)

15034.0 Trenton Military-Canadian Forces, Trenton, Ontario, weather at 1949. (Sevart-KS)

15040.0 Unid-Live male AM "numbers" voice (E22), repeating "Hotel Sierra 5," also on 17385, at 1130. Similar broadcasts at 1230, 1330, and 1430. (Boender-Netherlands)

15867.0 Juliet 14-USCG, patch via Service Center to Elizabeth City Air during Ophelia, at 1558. (Cleary-SC)

16078.5 BA1-FBI, Baltimore, MD, calling BA2 (also Baltimore), also on 17458.5, ALE at 1411. (Perron-MD)

16316.0 Unid-NATO station with encrypted RTTY, heard daily, this hit at 1430. (Hall-RSA)

16840.5 RRR34-Moscow Radio, Russian, SITOR-A marker at 0659. (Hall-RSA)

16986.0 CTP-NATO Oeiras/Lisbon, Portugal, NAWS loop in RTTY, at 1937. (Sevart-KS)

17146.4 NMG-USCG, New Orleans, with restored FAX weather transmissions at 1255. (Watson-UK)

17441.5 5YE-Nairobi Meteo, coded RTTY weather observations, at 1625. (Hall-RSA)

22447.0 FUV-French Navy, Djibouti, ITA2 marker and "Voyez vous le brick" loop, in STANAG 4285 (300/L), at 0932. (Watson-UK)

23337.0 ICZ-US Air Force, Sigonella, Italy, ALE sound at 1336. (Hall-RSA)

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Morse Utility Signals

This month we take a look at the ancient art of Morse Code or CW (short for Carrier Wave) and its use in some interesting utility networks.

❖ Redux

CW is, of course, one of the oldest and one of the simplest of digital modes. Perhaps because of its age, the mode has fallen out of favor in many organizations over the recent years and has been dropped as the mode of choice for maritime stations and for distress purposes.

Radio amateurs, too, have marched with the times and, in most countries of the world, there is no longer a requirement for CW proficiency to be demonstrated before access to the wonders of the HF bands is granted.

But let's for a moment consider the merits of the mode. First, since it's made up of a single tone keyed on and off for varying lengths, it fits into a very narrow bandwidth. This also means that it can prevail in very difficult conditions, in crowded bands, and is quite resilient in the face of interfering signals. As CW is mostly decoded by the human ear, these characteristics also exploit some of the acoustic properties of our auditory system. According to most research, at optimum frequencies, the ear can discriminate between signals as closely spaced as 50Hz and with a dynamic range of about 90dB. That's a performance that is difficult for analog or digital filtering to match, and it's far cheaper to implement, too!

The downsides? It's slow, relies on the decoder (and sender) for error correction, and is difficult to decode by software means.

So what's out there using this venerable mode?

❖ Propagation Beacons

There are, of course, many beacons out there to advise us of prevailing HF conditions. A worldwide network of such beacons is operated by amateurs on 14100, 21100 and 28100 kHz, among other frequencies. Each beacon transmits a predefined message at very precise intervals. The beacon DK0WCY transmits propagation information and aurora warnings from Northern Germany on 3579, 3567, 3557.5 and 10144 kHz 24 hours/day.

❖ Military Markers

Israeli Navy

Perhaps I was a little premature in recently speculating as to the death of the Israeli Navy's CW transmissions. The station in Haifa continues to transmit regular messages and synoptic codes on 4331, 8103, 8437 and 12984 kHz.

French Air Force

The French Air Force is also a frequent user of CW for its network of markers. Most simply occupy a frequency with the following style of message: vvv vvv vvv de fdg fdg fdg ar

Here are some recently monitored frequencies: 5202, 5293, 5367, 6838, 6989, 7828, 7837, 7949, 8068, 8295, 9348, 10520, 13939 and 20705 kHz

The callsigns:

FDC	Metz
FDG	Bordeaux
FDI8	Nice
FDI22	Narbonne
FDY	Orleans

Russian Navy Nets

The Russian Navy still makes considerable use of CW in the HF spectrum for ship to shore communications. The headquarters stations tend to use three-letter ITU-conforming callsigns, with mobile stations using three-letter plus two-number callsigns, like RCJ48 for example.

Here are some recently monitored frequencies: 3192, 4055, 4776, 6873, 7467, 8345, 9145, 9373, 10102, 10659, 11000, 11155, 14556 and 17468 kHz

Some of the more commonly-heard base station callsigns:

RCC	Petropavlovsk
RCV	Sevastopol
RDL	Moscow
RIT	Severomorsk
RIW	Moscow
RMP	Kaliningrad

Chinese Army Net

This network has been a long-standing fixture across the HF spectrum, sometimes intruding into the amateur bands where they are usually swiftly rebuked.

The lead station in this network uses the famous fictitious callsign L9CC. Other stations use various combinations of four letters or digits, many of which have remained constant throughout the years. Some of those "control" station callsigns are L9CC, NH8T, 2SLC, 4XML and L4FC. The call-up style is always the same: V BFR7 BFR7 BFR7 DE 4XML 4XML

This station is often known by the designation M89, given to it by the Numbers Station monitoring group ENIGMA. Chinese sources point to a possible Naval source, because of bearings taken that indicate the transmissions originating from near Guangzhou, Qingdao and the Dalian/Lushan areas, all of which contain large naval facilities.

This net has been heard on the following frequencies at all times of day and night (which likely represents a fraction of the channels used): 3330, 3846, 4440, 4874, 4928, 5385, 5755, 5588, 5635, 6508, 7079, 7300, 7307, 7310, 8042, 9350, 10820 and 10822kHz

Note that the station inhabits frequencies below 11 MHz.

The network often works duplex, in other words, it uses two independent frequencies for outgoing traffic and the replies. Standard Q codes are used to inform net participants of number of messages (QTC), standby (QRX), message received (QSL), and change of frequency (QSY).

Czech Army Network

Another long-standing network is operated by the Czech Army. As with the Chinese Naval system, a number of net control station callsigns appear stable for long periods. Those most commonly heard orchestrating traffic are CH8N, S8BD and U4NP.

The network is very well run, with monitors reporting ruthless treatment of other transmissions occupying "their" frequencies, rapid changes of channel under deteriorating propagation conditions, and very clean transmissions. The ENIGMA group's designation for this station is M90.

Frequencies used by this network include: 2363, 2852, 4455, and 4668 kHz.

Typical encrypted traffic looks like the following excerpt:

tr2f tr2f tr2f de ch8n ch8n qtc 688 k
de ch8n qtc 35 20 30 1035 688 tr2f -
qardw hrhbw ykiuo otsfc tuac

The network has not been reported for some time but may still be around.

You can read more about many more interesting networks and follow them yourself by consulting the Resources section. Watch out: listening to these stations can be highly addictive!

❖ MMTTY and NAVTEX

Before we close for this month, a quick correction: Frank from Massachusetts kindly emailed that my mention of the MMTTY program supporting SITOR-B for NAVTEX listening was wrong. Frank is quite correct; MMTTY only supports regular RTTY. My apologies to any other MMTTY users like Frank who were wondering where NAVTEX appears on the menus!

73 and enjoy your digital DX.

Resources

DK0WCY Beacon:
http://www.dk0wcy.de
Numbers and Oddities:
http://home.luna.nl/~ary
Spooks Newsletter:
http://www.cvni.net/radio/nsnl/index0.html

Global Forum

Shortwave Broadcasting

Glenn Hauser
P.O. Box 1684-MT, Enid, OK 73702
glennhauser@monitoringtimes.com
www.worldofradio.com

New and Reactivated Shortwave Stations

Good news from Julián Santiago on the clubdiexistamexico yahoo group via Dario Monferini, playdx yg: IMER delivered a 10 kW transmitter and an omnidirectional antenna to Radio UNAM, México, on October 6, from the defunct XERMX. Ing. Eusebio Mejia says they began installing it at the Ticomán site north of Mexico City, planning to carry out the first tests by early November. So there is a new possibility for Mexican SW, on 9600, compensating for the unfortunate closure of XERMX. On the ConDig list **(http://www.dii.unisi.it/mailman/listinfo/condig)**, Santiago adds: It's a major cultural station, to simulcast MW 860.

That's great, but it looks like we have yet another Mexican SW station that does not understand it must be frequency flexible. Just because its ancient frequency was 9600 does not mean that is the best place for it now! 9600 has a few other occupants now, including China, Cuba, Vatican, Thailand and Guam, not to mention adjacents on 9595 and 9605. It looks like 9705, vacated by XERMX, would be better, but that transmitter put out distorted spurs hundreds of kHz away, and stronger than the fundamental. Sure hope it's fixed when XEYU starts using it.

From early October, a new Peruvian appeared on 4965.829 with IDs for R. Nacional del Perú, Lima, but Björn Malm, Ecuador, suspected another station relaying, such as R. Santa Mónica which had been on this frequency before. It has a morning news program, *Enfoque Internacional* from 1100 to fade-out at 1115. Next day started at 1050 in Quechua; many mentions of Cusco. He phoned Santa Mónica and they knew of no such relay. By mid-October it was identified as R. Santa Ana, in Cusco Dept. on 4965 and FM 93.3, relaying R. Nacional, M-F.

Henrik Klemetz, on the ConDig list, says he listened to Malm's clip and called the phone number mentioned. The person who answered barely spoke Spanish. It is not in Cusco city, but at Avenida San Martín 636. Santa Ana, La Convención province, Cusco department. They put him on the air to greet listeners.

On 4299.68 another new station was heard by Malm at 2345-0110* with nonstop Peruvian music of good sound quality interrupted just twice by short IDs with low modulation, Radio... Internacional(?) Via Arnaldo Slaen, dxing.info, Alfredo Cañote, in Chaclacayo, Perú thinks it's Radio Bella(?), in Tingo María, at 0120 with local songs and folk music from the "sierras," inexperienced announcers; also at 1030.

A new target broadcast started via Taiwan on 9795, Sat/Sun at 1500-1600, name and producer not yet established, says Bernd Trutenau, Lithuania, in *DX LISTENING DIGEST*. Takahito Akabayashi tried for it, but told *BCDX* all he could hear in Japan was KLNS in Russian. Trutenau, however, got confirmation that it was heard in Vietnam but with lots of QRM.

In Oklahoma on Sunday Oct 16 at 2045 we found a good signal on 9530 with choral music, closing in English at 2055 as *Voice of Joy*, with websites in Norway, but not in any schedule. A reply from the e-mail address announced says: "The program is broadcast out of Canada. It will be on at the same time next Saturday. The Voice of Joy Music Hour is producing International Christian Gospel music on Shortwave. We hope you listen again! Dean Phillips." See **http://www.voiceofjoy.net**

Radio Station E-Mail Address List, PDF or ZIP

You can download the new email-list by HF. Dumrese: **http://www.email.dxer.info** says Klaus-Dieter Scholz, or **http://www.dxer.info** via José Miguel Romero2; it includes some obsolete stations.

Han Hardonk's DX Page Now in English

BDXC reports that this Dutch DXer has gone to the trouble to present his page also in English, including a number of neat mp3 recordings, MW and SW: **http://home.wanadoo.nl/hanhardonk/indexengels.html**

AFGHANISTAN On 9365, Peace R., Bagram, heard in Sept and Oct 0900-1500, a bit better around 1400. Much weaker than the 9133 CMF station (Mauno Ritola, Finland, *DSWCI DX Window*) *WRTH 2005* has it both in frequency list and in Afghan national radio entry. It's the ex-8700/7000(/9000?) station which we had before the international relays. I later heard a definite ID in English, Dari & Pashto (Mauno Ritola, Finland, *DXLD*) I do not recall any previous reports of Bagram actually being heard on 9365; do you? (gh) No previous reports probably because it is a 1 kW transmitter on an in-band frequency and it took a long time to catch a readable signal (Mauno Ritola, ibid.) So the only genuine Afghan SWBC outlet, as the new 100 kW supplied by India was still not going, overdue, making 9365 quite a catch! (gh)

[non] R. Solh was a source of very enjoyable music this fall between 1300 and 1600 on 17700 via UK, a lot more music than talk. Last winter was on 15265/17710 (gh, OK)

ALASKA KNLS initial B-05 English hours: 08, 10 and 12 on 9615, 12 also on 7355; 14 on 9655 (via Alokesh Gupta, *DXLD*) May change monthly (gh)

ALBANIA R. Tirana finally evacuates 40m hamband to NAm in English for B-05: 0245-0300 & 0330-0400 on new 7455, and 6115; also on 7455 in Albanian at 0000-0130. English to Eu on new 7530, 1945-2000, plus 6225; 2230-2300 on 7110 (*BCDX*) 7455 used to have RTTY QRM (gh)

AUSTRALIA The ABC WA relay on 7875-USB reported in last month's column lasted only about a week until Sept 26, but was heard worldwide (gh) From an Australian Defence Force transmitter in Exmouth, North West Cape, Western Australia. Communications Adviser Michael Weaver says it was specifically for the Australian rules football grand final. Programming originated with 6WF Perth on 720 kHz (Mika Mäkeläinen, *DXing.info*)

ABC is in the process of upgrading its Alice Springs, Katherine and Tennant Creek SW services to provide greater reliability. Each will be switched off for approximately four to six weeks while replacement transmitters are installed. Tennant Creek will be turned off first, 10 October (**http://www.abc.net.au/reception/news/051006_shortwave_radio_services.htm** via Dan Srebnick, NJ, *DXLD*) The site went on to tell T.C. listeners to tune in Alice Springs instead, and during daytime would also be on 11880. The inactive T.C. frequencies were 4910 and 2325; What kind of upgrading? More than 50 kW? DRM? By now T.C. should be back and one of the others down: Alice on 4835, 2310; or Katherine on 5025, 2485 (gh) Nigel Holmes, Transmission Manager of R. Australia says the temporary VL8 services on 11880 between 2330 and 0900 are transmitted from Shepparton. Reports to ABC NT HF Service, Box 9994 Darwin, Australia 0820 (Ian Johnson, Australian Radio DX Club)

BOLIVIA Rogildo Aragão tells me that R. Municipal on 4845.18 has been renamed Radio Norteño (Björn Malm, Ecuador, *DXLD*)

Varying 4679.6 to 4679.2, Radio Virgen del Remedio, Tupiza, at 2240-2400. Six days later it was on 4682.91, at 2320-2355 relaying Radio Cotólica Mundial (Nicolás Eramo, Argentina, *DXLD*)

On 6134.80, R. Santa Cruz, at 0932-1022, unusually good signal, best ever heard with nice Bolivian music, 0955 ID and played a distinctive song "Viva Santa Cruz"; 1007 Spanish language lesson (Ron Howard, CA, *DXLD*) Also better here, 1015-1035 peak, improved antenna or transmitter? (Chuck Bolland, FL, *ibid.*)

BRAZIL Director of Rádio Brás radio service, Márcia Detoni, formerly with the BBC, spoke at a university of São Poulo event, reports Flávio Archangelo. She said RB is no longer broadcasting on SW to Africa, due to technical problems and is unlikely to resume, but are trying to place

*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; B-05=winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

programming directly on African stations. Also said government plans to transform RB from a state outlet to a public station like RCI (*Encontro DX*, Radio Aparecida via Cassiano Alves Macedo, *DXLD*)

CANADA The CBC lockout ended October 11 after two months, during which RCI also had to air mostly repeat programs, delaying the introduction of a new fall season. The SW site at Sackville was also negatively affected, with frequencies missing unpredictably, presumably as the regular staff could not maintain the transmitters.

For B-05, RCI morning broadcasts are daily at 14-17 on 9515, 13655, 17820; some other Sackville transmissions we may hear: 18-19 for Africa on 17740 (also try German relay 11875); 21-22 Europe on 9770; the afternoon service to NAm shrinks to two hours at 21 on 15180 (*Roundup* on weekdays, *DNTO* on Sat, *Checkup* on Sun); to SAm at 22-2230 on 11990; for *World at Six* and *As It Happens*, there is one earlier hour to NE USA at 23 on 6100, which it is hoped will propagate better than last winter, as well as the entire two hours from 0000 on 9755 (gh) Just that one frequency instead of three (Will Martin, *DXLD*)

Maple Leaf Mailbag: Tue 1830, 2130, Sun 1805, 2105, 2205, 2330, Mon 0030 (via Ricky Leong, *ibid.*)

COLOMBIA R. Lider, Bogotá, remained off the air from its previous appearance on Sept. 2, until Sept. 28; then it was widely reported for several nights varying slightly around 6139.78, all-night (gh) Such as at 0821-0907 with ballads, many short IDs (Ron Howard, CA, *DXLD*) At 1030 with news, *Cundinamarca al día* (Fernando Viloria, Venezuela, *DXLD*)

A complete ID at 0558 said, "*Radio Lider llega a los diferentes países del mundo. Escúchenos en la frecuencia de 730 kilociclos, onda larga y en 6140 kilociclos, onda corta, banda de 49 metros. Escríbanos a nuestro correo electrónico radiolider@cadenamelodia.com o al apartado aéreo 19823, Bogotá, Colombia. Indíquenos la hora, la ciudad donde escucha a Radio Líder y a vuelta de correo reciba un fabuloso premio. Radio Líder, siempre líder en el mundo.*" (José Bueno, Spain, *Noticias DX*) Well heard until DW blocked at 0600 (Manuel Méndez, Spain, *DXLD*) I have sent them several reports and numerous reminders since 8 months ago and no wonderful prize received despite their promises (Adán González, Venezuela, *ibid.*) Rudolf Grimm, Brasil, and José Elías, Venezuela, make the same complaint (*Conexión Digital*)

Any volunteers in Bogotá to deliver our reports in person and collect our prizes? (González, *DXLD*)

CUBA Re RHC on 5055: Arnie Coro wrote that they were testing a 35 kW transmitter, but didn't have a 6 MHz antenna available so put it on 5055 instead, with just an humble Nadenenko dipole. Did not really plan to make it a permanent frequency, but how was the interference? (via Dino Bloise FL, *DXLD*) Several DXers lamented that this would harm the recently reactivated TIFC, Costa Rica, on 5054.6. Also, I was surprised to find R. Rebelde on a new split frequency with hum, 11682.5, at 1305 (gh)

CZECH REPUBLIC R. Prague English once again this winter, despite the sun-spot trough, resumes 21745 to NAm at 1400-1430; the several evening repeats are on 5930, 6200 and/or 7345, per B-05 schedule (via Ashik Eqbal Tokon, Bangladesh, *DXLD*) Also shows relay via WRMI 7385 resumed, but only in Spanish at 1300; actually started in Oct, continuing at least thru Dec (Jeff White, WRMI)

DJIBOUTI Note for next Ramadan, Sept/Oct 2006: RTD, 4780, normally closing at 2000, was staying on until 2306*. Strong-very good (Brian Alexander, PA, *DXLD*)

DOMINICAN REPUBLIC Station on 2280 at 0230; ID at 0300 as 1140, so harmonic of R. Anacaona from San Juan de la Maguana (John Sgrulletta, NY, via *Radio Nuevo Mundo*)

EL SALVADOR [non] What might have been the sought-after R. Imperial around 17839v turned out to be a spur from Greece via Delano on 17705! But that should not be a problem in the B-season (gh)

GERMANY DW's reformatted German program from B-05 results in a morning service to NAm on 15445, 1400-1500 via Bonaire and 1500-1600 via Sackville. There will be different versions of DW German for individual target areas, i.e. no longer all frequencies always in parallel (Kai Ludwig, Germany, *DXLD*) Two-hour blocks instead of four, but two of them in morning and evening, besides the above, also at 12-14 on 12035, 15320, 17710; 00-02 on 6135, 9545, 9655; 02-04 on 6100, 6145, 9875. Some of these close 1, 3 or 5 minutes before the hour (Martin Gallas, IL, *ibid.*)

Tho none intended for NAm, selected DW English hours we may be able to hear: 16 on 11695; 19 on 11865, 12025, 15470; 20 on 9735, 9830, 12025; 21 on 7280, 11690; 23 on 9555; 00 on 7290; 04 on 6180, 9710; 05 on 7285, 9565, 12035 (via Marcelo Cornachioni, *Conexión Digital*)

GREENLAND Kalaallit Nunaata Radioa, 3815: finally QSLed in October my DXpedition reception last winter, using contact info via **http://knr.gl** and again heard really well at 2100 in mid-October even here in southern Finland. Actually comes from coastal station, Ammassalik Radio (OZL), in Tasiilaq on the Eastern coast of Greenland, aimed at fishermen out at sea; winter schedule 1600-1715 and 2200-2315 (Mika Mäkeläinen, *dxing.info*)

GUYANA On 3291.13, Voice of Guyana, good signal just as the early-October grayline was passing, at 0937-0947, with Bollywood and Stateside MOR (Chuck Bolland, FL, *DXLD*) Two services from National Communications Network are now streamed live online for US$6 per month via **http://www.homeviewguyana.com** VOG commences its own programming between 0805 and 0830, following the overnight relay of BBCWS, fair to poor on 3291.2 kHz via a DX Tuners.Com receiver near Caracas; were also moving to new studios (Dave Kernick, UK, *DXLD*)

HUNGARY [and non] Not sure what this was doing here but R. Budapest over WWV on 10000, at 2250-2258* (Scott R. Barbour Jr., NH, *DXLD*) Also here on 10000.0 kHz, at *2200-2258* three days in a row. Punch-up error? Spur? Strong, mixing with WWV. Talk in Hungarian // 9850 and 12030; listed // 6025 not heard (Brian Alexander, PA, *ibid.*) This could be 3975+6025. But I guess 3975 is not listed at time Brian was listening. BTW, 3975 has a strong harmonic on 7950 (Jari Savolainen, Finland, *ibid.*) I'll bet carriers at least were on both 3975 and 6025 at that time to produce the mix (gh)

B-05 English: Eu 1600-1628 Sun 6025 9565; rest daily: Eu 2000-2028 3975 6025*, 2200-2228 6025*; SAf 2200-2228 9735; NAm 0200-0228 9515, 0330-0358 9775. * = still relays via Rimavska Sobota, Slovakia, as are several other broadcasts on 6025, but not all of them, as well as some on 7285, 9580, 11675 (*Observer*, Bulgaria)

INDIA Contrary to last month's info, final AIR frequency changes are: Bhopal 4810, Gangtok 4870, Shimla 4980 (*DXAsia.info*) See also SIKKIM (gh) AIR is now accepting online reception reports: **http://www.allindiaradio.org/recepfdk.html** (Jose Jacob, *dx_india*)

INDONESIA It's unusual to hear anything in English on an RRI domestic service, so the Kang Guru Radio English lessons mentioned last month attracted a lot of attention; some DXers thought of KGRE as a station rather than a program (gh) See **http://www.kangguru.org/** which also has info about some RRI stations. Exchanged e-mail with Rachel Pearson, ELT Media and Training Specialist in Bali. The Wed & Sun 1000-1020 schedule on 9680 was pre-empted in October by Ramadan programming, but then KGRE was found an hour earlier (Ron Howard, CA, *DXLD*) Unfortunately, for B-05 WYFR collides with 9680 from 0145 to 1100. KGRE is on a number of other more difficult-to-hear low-power RRI stations (gh)

INTERNATIONAL WATERS In Sept and Oct, on 6125 USB only, Information Radio (R Maluumaati), via Naval Ships of Coalition Maritime Forces in waters around Sa'udi Arabia, was being heard around 0100, in Arabic, Farsi, Dari and Pashto, various Middle East music, not audible every night! (Bjarke Vestesen, Denmark, DSWCI *DX Window*) Drowned from 0159 by REE via Costa Rica (Anker Petersen, *ibid.*) Monitoring from 2335, popped on the air at 2352, till 0200, continuous mid-eastern flutes/vocals, brief talk occasionally by M, seemingly in Dari/Pashto. This cannot be 250-watts, how about 5 kW+! See **http://www.me.navy.mil/marlo/default.htm** (Terry L Krueger, FL, *DXLD*)

9133-USB good strength at 1730, Arabic music and announcements (Mike Barraclough, UK, World DX Club *Contact*) Later on 9133-USB at 2352-0025 (Scott Barbour, NH, *DXLD*) What's the Arab on 18727 at 1600? (Francesco Cecconi, Italy, via Dario Monferini, *ibid.*) Listened to his clip, and reminded me of Information Radio. Heard 18727 myself around 1655, mentioning Al-zarqawi a lot and giving phone numbers in Iraq; 1825 with Iraqi frequencies 756 kHz and 846 kHz. Next day loud and clear on 18727 around 1700. I think this is the feed for Information Radio (Radio al-Malumaat) (Tarek Zeidan, Egypt, *DXLD*) In a band suitable for military fixed (Bernd Trutenau, Lithuania, *ibid.*) Heard on 18727 AM at 1742, fair on clear channel (Mike Barraclough, UK, ibid.) During B season, 6125 is probably blocked by Spain from 2300 or earlier (gh)

IRAN [non] On 13800, Kurdish workers station? at 1650-1700* (Finn Krone, Denmark, *BCDX*) Radio International, in Farsi via Moldova, 1630-1700 daily, extended to 1715 on Tue/Thu/Sat. It is possible to listen to the daily audio files on **http://www.radio-international.org** One of them was only in Farsi. They had a telephone interview with a worker from the Shohut Sock Company in Iranian Kurdistan who was criticizing factory officials for firing half of the factory workers. The workers were on strike and struggling. The Worker-communist Party of Iran (which is producing the Radio International programs) is supporting worker's actions in Iranian Kurdistan; see **http://www.kargaran.org** (Bernd Trutenau, Lithuania, *BCDX*)

ISRAEL Kol Israel B-05 English to NAm/WEu, u.o.s.:

-0445 @15640 17600 @6280 9345 7545
1030-1045 15640 17535
1830-1845 9345 7545 11590
2000-2025 @6280 11590 7545; SAf 15640

@ = *alternative frequencies* from 15.12.05 to 28.2.06 [presumably replacing the highest frequency]. Hebrew to NAm: 2100-0430 & 0500-0600 7545; also the main evening TV newscast audio, *Mabat* at 1900-1945 on 7545 (Bezeq, via Doni Rosenzweig, *DXLD*)

JAPAN Because of reliable satellites and landlines, NHK terminated its domestic SW relays at the end of May, after almost 60 years. They were on 3259, 3373.75, 3607.5, 3970, 5428, 6005, 6130, 6175, 9181, 9535, 9550. Powers ranged from 300 to 900 watts (Toshimichi Ohtake and Satoshi Wakisaka, JSWC via DSWCI *DX Window*)

KURDISTAN [non] On 4400 at 1500-1600 and 0200-0300 I hear "*Aira Dengi Khabati Kurdistani Irana,*" Voice of the Struggle of Iranian Kurdistan; now seems to broadcast 50/50 in Persian as well as in Kurdish. Had only heard them in Kurdish with occasional ID in Persian, "*Seda-ye Khabati Kurdistan-e Iran.*" See **http://www.khabat.org/** run by "The Revolutionary Khabat Organization of Iranian Kurdistan" which says it started broadcasting in April 1985 (Dave Kernick, UK, *DXLD*)

V. of the People of Kurdistan, Al-Sulaymaniyah, northern Iraq, closed its SW 4025v in Sept, for MW 1206 only (Mauno Ritola via Gabriel Ivan Barrera, RN *Radio Enlace*) See also IRAN [non]

LIBYA [non] It's fascinating to observe how "localized" openings on the 13m band can be. Libya's only full hour in English, at 13-14 on 21675 and 21695 via France, was often inaudible or barely audible when other signals are coming through, such as Sa'udi Arabia; but on certain days

during the October peak, V. of Africa was well heard. Programming ranges from the most boring imaginable, a lecture on the structure of the Jamahiriyah government, to a listing of the longest rivers in Africa, with km, to interviews with Pan-African visitors impressed with Libya. Both frequencies cut off abruptly at 1400* with talk in progress, as the studios in Tripoli don't understand the need to adhere to accurate timings (Glenn Hauser, OK, *DXLD*)

MALAYSIA RTM Radio 4 had been a regular on 7295 at 1300-1400, but was missing from late September (Ron Howard, CA, *DXLD*) RTM renamed its networks: Radio 4 on 7295 is now called Traxx FM. The other renamed networks on SW are Nasional FM (ex-Radio 1) in Malay on 5965v; Asyik FM (ex-Radio 7) in Malay and Orang Asli languages on 6025. RTM renamings: The Sabah network on 5980v has been renamed as Sabah V FM, but have not heard SW frequency for some time. Wai FM in Iban/Bidayuh etc. on Kuching-7270; Sarawak FM in Malay on Kuching-5030 and 7130 (Alan Davies, Indonesia via Howard, *ibid.*)

MÉXICO Andrés Cruz of XERTA informs us that they have started broadcasting every day, not just weekends, on 4810, from 2000 to 1200, 1 kW (Julián Santiago, DF, condig list)

MONGOLIA MRT B05 English, daily: 1000-1030 on 12085, 250 kW, 178 degrees; 1500-1530 & 2000-2030 12015, 50 kW, 315 degrees (via Alokesh Gupta, *DXLD*)

NETHERLANDS RNI's Spanish DX program in which gh participates, *Radio Enlace*, as scheduled for B-05, in addition to satellite and internet: Fri 2331 B15310. Sat 0130 M9895 A11900; 0331 M9895 B6165. Mon 0011 M9895 A11900; 0211 B6165 M9895. A=Ascension, B=Bonaire, M=Madagascar (Jaime Báguena, RN, *DXLD*)

NEW ZEALAND RNZI B05, azimuth north u.o.s.: 0400-0759 15720, 0800-1059 9885, 1100-1259 15530 325°; 1300-1650 9870; 1651-1750 9870 35°; 1751-1850 11980 35°; 1851-2235 15720; 2236-0359 17675 (via Alokesh Gupta, *DXLD*)

RNZI says that over coming months there will be additional shutdown periods on SW at 2135-0400 to allow antenna work and installation of a new DRM transmitter. Audio stream continues 24 hours via **http://www.rnzi.com/index.php** (Andy Sennitt, *Media Network* blog) So 15720 or 17675 will be missing, but how often, actually? (gh, *WORLD OF RADIO*) Some days during local daylight depending on how the work progresses, local weather. I think website will mention in advance when a shutdown is planned, wherever possible (Andy Sennitt, *DXLD*)

NIGERIA [non] Salama Radio International in Hausa/English to Nigeria via VT Comms, 1930-2030 Wed/Sun on 11885 via Woofferton UK, was cancelled from Sep. 14 (*Observer*, Bulgaria) Was religious, not clandestine (Bernd Trutenau, *DXLD*)

PAPUA NEW GUINEA Visiting Port Douglas, northern Queensland, I checked out Wantok Radio Light on 7120, easily heard in local morning and evening, 2100-2300 and 0900-1100. Lots of inspirational music and talk in English and Tok Pisin that I found hard to listen to. PNG has just celebrated 30 years of independence. (Barry Hartley, *BCDX*)

PERÚ On 5678.00, Radio Ilucán, Cutervo reactivated in early October, after being off air at least one year; audio matched 3rd MW harmonic on 4260.40 (Björn Malm, Ecuador, *DXLD*)

Station on 6895.412 is now La Voz del Campesino, heard with earthquake reports (Björn Malm, Ecuador, *ibid.*) This had been on 6957v, from Huarmaca, while 6895 was R. San Miguel (gh) Yes, in April 2004, I had Campesino on 6956.90. Now I have a definite ID at close-down 0235 for Campesino on 6895.412 (Malm, *ibid.*)

SÉNÉGAL [non] West Africa Democracy Radio, which tested for a week in August, did not start regular service the last week in September as planned, but from October 10, according to a notice from Abdou Kahdre Lô of WADR, expanded to 0700-0900 in English, 0900-1100 in French, on 17555 (Jean-Michel Aubier, France, *DXLD*) Also heard with shorter tests again a few days earlier, presumably still via Rampisham UK (Björn Fransson, Sweden, Jari Savolainen, Finland, Noel Green, UK, *ibid.*)

SERBIA & MONTENEGRO [non] Re "cancelled" language services of RSCG (formerly known as R. Yugoslavia): This concerns only the SW transmissions. On the RSCG website these language departments still publish current stuff, just as the whole station did when the Bijeljina transmitters were entirely off (Kai Ludwig, Germany, *DXLD*)

SIKKIM On 3390, AIR Gangtok, at 1325, Oct 1, English program about Sikkim culture. Seems a regular English slot 1300-1400 (Victor Goonetilleke, Sri Lanka, DSWCI *DX Window*) See INDIA, now moved to 4870

SINGAPORE According to **http://www.938live.sg** 938Live! (formerly NewsRadio 938) was launched on 13 June 2005 "and is Singapore's only English news and talk station." Presumably the ID we will hear on 6150 between 2300-1100 and 1400-1600 will now be "938 Live" (Tony Rogers, BDXC-UK) With RSI external service in between, // 6080 (gh)

SOMALIA [non] For B-05 R. Waaberi changes from 17550 to 17660 (Jeff White, RMI, *DXLD*) Presumably same time, Fri 1330-1400 via Jülich

SOUTH AFRICA Channel Africa B-05 English, all to Africa only: 03-04 7390, 03-05 3345, 05-06 11875, 05-07 7240, 06-07 15255, 10-12 & 14-16 11825, 15-16 17770, 17-18 15285, 20-22 3345 (SENTECH via Alokesh Gupta, *DXLD*)

UGANDA [non] R. Rhino International Africa's godfather is dead -- exiled former Ugandan President Milton Obote died Oct 10 in South Africa. R. Rhino strongly promoted his cause and so its future may be less certain without him (Chris Greenway, UK, *DXLD*) Listened to entire broadcast Oct 14, with a eulogy to Obote, "our papa" by RRIA head Godfrey Ayoo, but Obote was not such a saint. The entire text was also at **http://www.radiorhino.org/** Schedule was Wed & Fri only at 1500-1530 on 17870 via Germany, fortunately, since Ayoo blasted BBC (gh)

UKRAINE RUI could not wait until Oct 30 to go to lower frequencies; from Sept 27 all changed, including English at 21 on 5830, 00 and 03 on 5910, 11 on 9925 (Alex Yegorov, RUI via *BCDX*) A month before timeshift, so perhaps now on the same but one UT hour later. Check **http://www.nrcu.gov.ua/index.php?id=162** (gh)

U K BBCWS plans to drop several east European languages, and long-running programmes in English, including *Everywoman*, *Pick of the World*, *White Label*, *In Concert*, *Top of the Pops*, *Music Review*, and even *Outlook*, the weekday 45-minute magazine -- the latter to be replaced by an as yet unnamed one-hour news show, as part of an increasingly all-news format (Paul Donovan, *The Times* via Mike Terry) These shows are still on the B05 schedule, so when will these changes happen? (Rich Cuff, *swprograms*)

DRM tests in London are to start early in 2006 on 26 MHz, on initiative of UK regulator Ofcom. WRN already announced plans to do this, and so has Radio London. One other station is also expected (*Media Network* blog) Precise frequencies unknown; these are low power intended for groundwave, but DXable when E- or F- openings occur (gh)

U S A My monthly appearance on VOA's *Talk to America* has officially, permanently ended. Thanks to all of you who made the effort to tune in every first Friday of the month, and who contributed with your phone calls and e-mails. I tried to line up interesting audio and guests to keep you coming back every four weeks (**http://www.kimandrewelliott.com/**)

Working around that pesky BBG bipartisan rule? President Bush has nominated Mark McKinnon to the Broadcasting Board of Governors. But would McKinnon occupy a Republican or Democratic seat on BBG, required to be bipartisan by the International Broadcasting Act of 1994? McKinnon was a Democrat, and might still be enrolled as such, but more recently he has been a Bush media advisor and strategist in the president's 2004 campaign. I asked the BBG spokesman if the McKinnon seat would be Republican or Democratic, and if McKinnon would replace Norm Pattiz, whose (Democratic) seat is overdue for renewal or replacement. But the BBG spokesman replied, "You'll have to get your information elsewhere." If the administration is trying pack the BBG, this might be the logic: 1) Gitcherself a BBG that is pro administration policy. 2) This ensures that the output of U.S. international broadcasting will be pro administration policy. 3) After a few weeks, public opinion around the world will be pro administration policy. Yee-ha (**kimandrewelliott.com**)

VOA now offering podcasts: **http://www.voanews.com/english/podcasts.cfm** (Richard Cuff, *swprograms*)

WWCR had a lot of turnover in personnel, in Aug and Sept (gh) I have retired as GM and am only doing the engineering. I now have time to enjoy a wide range of interests that my demanding job did not permit (George McClintock, *DXLD*) I have also resigned (Adam Lock, Operations Manager) Consequently the future of *Ask WWCR* was in doubt, but continued, hosted by Dr Jerry Plummer. Our best wishes to George and Adam! Zach Harper is the new Ops Mgr (gh) Supposedly the owner's son has taken over as manager of WWCR (Jeff White, *DXLD*) *WORLD OF RADIO* schedule as expected in winter timings: Thu 2130 on 9975, Fri 1030 on 9985, Sun 0330 on 5070, 0730 on 3210, Wed 1030 on 9985. *MUNDO RADIAL*: Fri & Mon 2215 on 9975 (gh)

The Church of the Subgenius Hour of Slack premièred on WBCQ 7415 Sunday at 2100, sponsored by "The Bowling League." More info at **http://www.subgenius.com/ts/hos.html** (Larry Will, *WBCQ Program Guide*) From Oct 3, WBCQ moved from 5105 to 5110, away from all the RTTY traffic on 5102. Also FEMA complained we are too close to some of their frequencies (Allan Weiner via Larry Will, *DXLD*) *WORLD OF RADIO* after timeshifts: Wed 2300 7415, 2400 17495; Sun & Mon 0400 9330, Mon 0515 7415 (gh)

On WRMI, with the departure of Brother Stair in October, and a reduction in Christian Media Network, a lot of time was again filled by World Radio Network, thus relaying numerous other stations (gh) Hours for WRN after the time change (if airtime not sold in the meantime): 0500-1000 daily; 1330-1555 M-F, 1330-1600 Sat; 21-22 M-F, all on 7385 (Jeff White) *WORLD OF RADIO* as expected: Sat 2200, Sun 0930, on 1500 7385; *MUNDO RADIAL*, Sun 1130 on 9955 (gh) See also CZECH REPUBLIC

The WWL/URBONO relays on SW continued sporadically on WHRI, but were last heard on Sunday, October 9; the multi-station URBONO co-op programming was to continue indefinitely, via WWL 870, webcasts. Nothing similar developed for Hurricane Rita (gh)

KWMO, 1350, Washington MO, heard on 3rd harmonic, 4049.91 at 1100, and also at 0100, when night power is listed as 84 watts (Brett Saylor, Central PA, *ABDX*) That could be a problem for R. Verdad, Guatemala on 4052.5v (gh)

VANUATU An engineering source says only one of three R. Vanuatu SW transmitters is working at the moment, rated 10 but runs around 8 kW: 3945 1900-2100, 0500-1100; 7260 2100-0500. Switch-over times approximate as there is no remote control and tech has to go to the transmitter site 10 km from town and manually change frequency and antenna. Audio might be a bit undermodulated due to audiofeed link problems (Jari Savolainen, Finland, *DXLD*)

ZIMBABWE [and non] Voice of the People, VOP, (from Madagascar), 7120, 1700-1800 daily is still severely jammed from within Zimbabwe by one of the same Chinese jamming transmitters sent to Zimbabwe early this year (March) and previously used by the State to block SW Radio Africa (David Pringle-Wood, Harare, *DXLD*)

Global Forum

Broadcast Logs

Gayle Van Horn, W4GVH
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0115 UTC on 11780
BRAZIL: Radio Nacional Amazonia. Portuguese text between lively Braz pops. Station identification at 0145 followed by music block. (Joe Wood, Greenback, TN) Brazilian's heard in Portuguese; **Radio Aparecida** 6134.9, 2253-2302+ (Harold Frodge, Midland, MI) **Radio Cancao** 9625, 0740-0803. (Rich D'Angelo, Wyomissing, PA/NASWA Flash Sheet)

0117 UTC on 6854
USA-PIRATE: The Crystal Ship. Nicely produced program with mentions of "Blue States Republic" and parody on political Blue vs Red states. Audio clips from Civil Defense films, Richard Nixon and others. Several IDs and maildrop as P.O. Box 1, Belfast, NY 14711. **WMPR** 6925, 2300-2319 with techno music and promo for "WMPR Dance Party." **Radio Free Euphoria** 6925 USB 2303-2309*, including reggae music and A *Pirate's Life For Me* tune plus maildrop given as, P.O. Box 452, Wellsville, NY 14865. (Wood, TN)

0159 UTC on 7260
EGYPT: Radio Cairo. Time pips and ID at 0200 for English service to North America, plus program preview. Music reminiscent of tracks from desert epics. Fair-good signal quality. (Wood, TN) 9990.1, 2113-2137. (D'Angelo, PA; Tom Banks, Dallas, TX)

0220 UTC on 9805
MOROCCO: Radio Farda. Arabic vocals at tune-in, followed by identifications at 0230 and 0240. Morocco's **RTV Marocaine** 15345, Arabic 1825-1845. (Brian Bagwell, St. Louis, MO) Arabic also 15345 at 1940.(Wood, TN)

0312 UTC on 3240
SWAZILAND: Trans World Radio. Shona language to lively African vocals. Identification at 0327 followed by Ndau language program at 0330 for fair signal. (D'Angelo, PA) German 4775 at 0417. (Slaen, ARG)

0345 UTC on 7290
SAO TOMÉ: VOA relay. Fair signal at tune-in to world news updates. Station ID at 0400, continuing news.(Banks, TX) 4930, 0500-0507+ English *VOA News* (Frodge, MI) 11975, 1943-1951. (Wood, TN).

0402 UTC on 4052
GUATEMALA: Radio Verdad. Poor-fair Spanish programming notes to marimba instrumentals and station ID.(Duane Hadley, Bristol, TN) Guatemalan's in Spanish; **Radio Buenas Nuevas** 4799, 0118-0128 (Wood, TN) **Radio Armistad** 4052.51, 2345; **Radio Cultural Coatán** 4780, 0220-0230*. (D'Angelo, PA)

0420 UTC on 4890
GABON: Radio France Int'l relay. French news program // 9790 and talk on Iraq. (Arnaldo Slaen, Buenos Aires, Argentina) Gabon's **Africa # 1** in French, 9580, 2258-2302*. (Frodge, MI)

0420 UTC on 15720
NEW ZEALAND: Radio NZ Int'l. Liz Barry with *Home Grown* music program for young adults. Several identifications as "National Radio." Mention of New Zealand's *Fashion Week* and schedule of bands. Great signal. (Wood, TN)

0437 UTC on 6210
ETHIOPIA: Radio Fana. Vernacular text from male announcer. (Amharic?) Radio Ethiopia 9704.2, 0441+ with vernacular news and text from male/female duo // 7110 kHz. (Slaen, ARG)

0449 UTC on 4910
ZAMBIA: Radio Zambia. Pop music to male's ID at 0500, followed by news and mention of Zambian President. Identification repeated at 0507 with fair-good signal. (Wood, TN; Slaen, ARG)

0525 UTC on 4930
BOTSWANA: VOA Relay. Jazz America program with ID. Listeners' letters amid heavy static. (Wood, TN; Slaen, ARG)

0530 UTC on 9686
SOUTH AFRICA: Channel Africa (tent) *Meet Me at the River* and *Children of Babylon* tunes amid mix of Afro pops. Poor-fair signal. (Wood, TN) *0257-0318 on 3345 and South Africa's **Radio Okapi** via Meyerton 11690, 0422-0445. (D'Angelo, PA) **Radio Sonder Grese** 3320, 0305-0318. (Van Horn, NC)

0636 UTC on 5039.27
PERU: Radio Melodia. Spanish news program *Melodia en la Noticia*, SINPO 24432. Peru's **Radio Victoria** 9720, 0640-0650 with religious programming and local time check. (Slaen, ARG; M.R. Phillips, Charlotte, NC).

0949 UTC on 4605.03
INDONESIA (Papua) RRI Serui. Instrumental music at tune-in to Indonesian text and mentions of "Kalimantan." Music ballads at 1000 for poor-fair signal quality. Scott Barbour, Intervale, NH) **RRI Fak Fak** (Irian Jaya) 4789.98 at 1004-1036. (Van Horn, NC)

1232 UTC on 15735
SWEDEN: Radio Sweden. News and features from male/female duo. Good signal despite fading. My first log from this Hörby site. (Jim Evans, Germantown, TN/NASWA Flash Sheet) 15240 at 1345. (Bob Fraser, Belfast, ME)

1431 UTC on 5985.83
MYANMAR: Myanmar Radio. Commentary about cultural understanding and mentions national development and different nationalities. Signal poor at times with heavy interference from 5985 kHz. ID at 1440, "you are listening to Myanmar Radio from Yangon." (Ron Howard, Monterey, CA/NASWA Flash Sheet)

1542 UTC on 17780
ITALY: RAI. Italian service during soccer match and promotional for RAI. Noted on 11800 at 0125. (Howard Moser, Lincolnshire, IL)

1552 UTC on 17640
UK: BBC WS. Soccer game match for Manchester United vs Westhaven, from an unidentified transmitter site. (Moser, IL) *Isn't Manchester vs Westhaven a continuing rivalry ? - ed.*

1600 UTC on 11690
JORDAN: Radio Jordan. English service world newscast. Pop music relay from FM 96.3 including ID and promos. Programming monitored to 1630. (Moser, IL)

2017 UTC on 6165
CHAD: Radio Diffussion Nationale Tchadienne. French announcements to Afro pops and full ID at 2020. Very nice signal on top of Croatian Radio. (Mark Veldhuis, Borne, Netherlands/*DX Window*)

2044 UTC on 13830
CROATIA: Croatian Radio. Phone-in program with local music between segments. Time pips and ID at 2100 into Croatian news script. Weak despite steady signal and utility interference on 13828 kHz. (Barbour, NH) 9925 at 2228-2231 in English and Spanish. (Frodge, MI)

2052 UTC on 9624.83
BOLIVIA: Radio Fides. Spanish talk segments for breaks during Bolivia vs Ecuador soccer game from Hernando Siles Stadium. (Slaen, ARG) Bolivian's monitored in Spanish; **Radio Yura** 4716, 0027-0046; **Radio Mosoj Chaski** 3310, 0030-0050 (Gayle Van Horn, NC) **Radio Mallku** 4796.5, 2337-2350. (Barbour, NH) **Radio Municipal** 4845, 0040-0058. (Van Horn, NC)

2215 UTC on 5005
EQUATORIAL GUINEA: (Bata) Radio Nacional. Vocals to Spanish ID at 2236 prior to lively vocals resumption. Closing ID with announcements, followed by lengthy national anthem from 2257. Fair-good signal. (D'Angelo, PA) Logged in Spanish at 0532. (Slaen, ARG)

2253 UTC on 6070
CANADA: CFRX. "News-Talk 10-10 CFRB" identification to "Six O' Clock News Hour" with call-in about Canada vs China relations. (Frodge, MI) **Radio Japan's Canadian** relay 6145 at 0025. (Fraser, ME)

2310 UTC on 6005
GERMANY: Deutschland Radio Berlin (tent) Lady in special German text and mentions of "Deutschland." Male resumes normal speed German at 2323 for call-in routine. Signal cleanest to monitor in LSB despite excessive interferences. (Frodge, MI)

Thanks to our contributors – Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times
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English broadcast unless otherwise noted.

John Figliozzi
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How to Hear the BBCWS in North America

Whatever controversy may exist in listener circles about recent World Service policies and attitudes, the consensus remains that the BBC is the "Big Kahuna" in international broadcasting. And contrary to popular belief, it still broadcasts to North America on shortwave! (Just not in ANALOG shortwave.)

That is not to say that it can no longer be heard the "old fashioned" way; because it can. So stay tuned.

❖ Perpetual Transformation

Still, that doesn't mean it's easy, either – or at least not as easy as those running the BBC would have us believe. For the last decade and then some, the World Service has been almost constantly remaking and reforming itself. What once was a hallmark of consistency has become hard to pin down, both in terms of "where" as well as "what" you'll hear. Yes, the Beeb was staid and in some ways static, and some updating and housecleaning was no doubt called for. However, one has to wonder if what we have at this point is the result that was intended.

If you're a longtime listener like me, you can recall an international service that at one time was like the Roman Catholic Church before Vatican II – the same no matter where you traveled around the globe. Then in the late eighties, management decided that different regions of the world deserved their own individual World Service with program timings (and in some cases their own individual programs) presumably more suited to their cultures and lifestyles.

These "streams" had their own names and their own shortwave frequencies – but only on paper. Curiously, the Beeb refused (and does to this day) to identify "which" World Service the listener is hearing. At the time this approach was first implemented, *Write On* – the BBC listener response program – explained that management wanted to maintain the "unitary identity" of the World Service.

It's an odd incongruity that has mostly proven inscrutable. Without a scorecard, listeners can't possibly know what they will hear when. It requires detective work of a sort piecing together information, some of it unintentionally contradictory, from a number of sources, both on air and online. (The BBC decided to end publication of a printed program guide last year.)

It remains that way today, only, if anything, the challenge for the listener is greater. Apart from the seven "streams" of World Service available via shortwave, others have been added. The internet has two of its own – three if you count a largely unpublicized feed of the Americas stream. Partner networks and stations around the world that rebroadcast the BBC, such as PRI in the U.S., have contracted for proprietary World Service feeds. At one time all World Service programs could be heard on every such stream (albeit at different times deemed more convenient or suitable to local tastes), but today some streams do not carry the entirety of the schedule.

New distribution platforms also are a part of this perpetual transformation. Whereas once upon a time it was almost entirely on shortwave as well as terrestrial analog radio, the BBC distribution strategy has embraced the internet, satellite (in both direct-to-consumer and feed to local partners forms), local placement on MW and FM, **Digital Radio Mondiale** (DRM or digital terrestrial shortwave) and, now, podcasting.

Again, this embrace is natural and necessary – even laudable; but the confusion it introduces for the listener is problematic. For example, on the PRI and all news streams (our characterization, not the BBC's, as streams are not identified on air, as we said), there are often "teaser" messages describing a program not carried on all feeds. In these cases, the listener is sometimes directed to the internet to hear the program via download; but in others a time is given, even when the program won't be scheduled for the stream to which the listener is tuned. Another example involves the carriage of only small parts of the schedule on shortwave or on local MW and FM partner stations. The "teaser" might direct the listener to tune in at a time when the partner or the shortwave schedule is not even relaying the World Service.

Another feature of the transitioning World Service is its overt decision to emphasize its news "products" at the expense of much of the feature or focused topic programming like drama, music, comedy, special interest and culture that used to occupy a more prominent role in the overall schedule. Hard news and analysis, documentaries, and magazine style programs have proliferated. It is good stuff as far as it goes and might respond to a valid perception that a majority of consumers use radio differently than they once did; but one can't help feeling that something important has been and is being lost.

The BBC also seems much less interested than it once was about communicating British culture and perspectives to the world at large. Instead, it seems content to be the world's source for news, a global radio station. Nothing to sneeze at certainly; but still less than it could be – at least in my humble opinion.

❖ Still the One

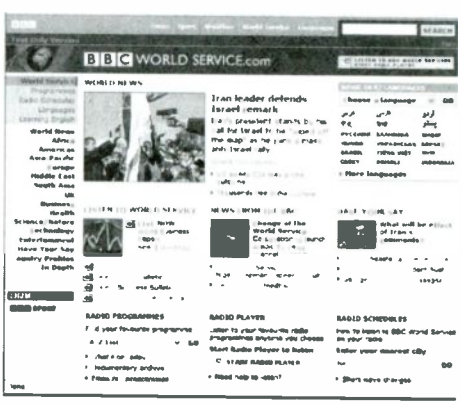
Having said all this, the question I still get most often is, "Where can I hear the BBC?" And despite all the criticism I heap on old Auntie, I must add, "deservedly so." Whether because of its august reputation through the decades or because it still remains the most trusted source for consistently accurate news and intelligent analysis, we all should want to hear the BBC. So how does one do this in North America today?

1. The Internet

The BBC strongly emphasizes the internet as its preferred delivery vehicle for North American listeners. In its reports to the Foreign Office, publicity releases, and arguments defending its decision to discontinue analog shortwave to North America, the BBC points out that the number of North Americans with access to high speed internet is high and growing. It claims that the number of people using the internet to hear the BBC and access information is already reaching numbers higher than those listening on shortwave ever did.

The World Service provides three channels of programming in internet audio. The **Europe** "full spectrum" stream and an **all news** stream are available direct from the World Service's award winning web site, ***bbc.co.uk/worldservice***. The **Americas stream** that was available through the now defunct Yahoo! Broadcast remains active. The best way to access it is through ***publicradiofan.com***

The World Service also provides nearly all of its programs, including its most recent newscasts, on demand on the internet with some limited archiving of previous editions of some programs.



2. Satellite Radio

XM and **Sirius** also each carry the BBC World Service 24 hours a day, seven days a week – **XM** on channel 131 and **Sirius** on channel 141. The **Americas stream** is on **XM**. **Sirius** carries a stream customized for **Public Radio International (PRI)** that offers primarily news and analysis, but includes a limited amount of non-news programming on weekends. Both are subscription services (about $13 a month) and require the purchase of proprietary receivers ($50 and up depending on sophistication and features) that can be used in cars, at home, and in more portable applications.

(Sirius also has contracts to provide other BBC-produced programming not originating with the World Service specifically. These include a package of Barclay's Premier League soccer matches and the Wimbledon Tennis Championships that are heard in Britain on **BBC Radio Five Live**, as well as a full relay of **Radio One**, the BBC's youth and pop music network.)

3. Partner Stations

In the U.S. as noted, **Public Radio International** has contracted for a proprietary full time stream of World Service programming that it makes available to public radio stations nationwide. While a large number of such stations covering much of the geographical area of the nation take some World Service content, most confine their rebroadcasts to overnight hours and occasional daytime newscasts. However, there has been a trend – especially in some larger cities with multiple public radio stations – toward increasing the amount of BBC content during "more accessible" hours.

The effort to enlist partner stations has been demonstrably less successful in Canada. The recent introduction of (or soon to be launched) subscription satellite radio service there will provide an added avenue of access for listeners beyond the one provided by the internet.

4. Analog Shortwave

As noted, the World Service has stopped targeting North America with analog shortwave services. However, the nature of the shortwave medium is such that some broadcasts do make it to radios on these shores (and inland, of course), albeit perhaps less reliably on a daily basis than they once did. The Americas stream is still broadcast on a limited basis to Central and South America and the Caribbean, and can be heard usually quite well on most of the North American continent. In addition, the transmitter trajectories of some analog shortwave broadcasts targeting other regions of the world with their regional streams make North

America a de-facto secondary target during some parts of the day.

For now, refer to the excellent and comprehensive hour by hour *Shortwave Guide* section of *MT* and key on all the frequencies listed for the BBC. By trying each such frequency, you will be able to determine for yourself which frequencies at which time of day work best for your particular location and listening circumstances.

Next month's column will provide a compendium of these broadcasts reflecting actual listening experience over a protracted period of time, as well as a program and stream guide for your convenience. *If you share with me by e-mail your experiences in this regard, you also will enhance this column's ability to help other listeners hear the World Service in this way.* As is common knowledge, with reception of shortwave, your listening location, receiver and antenna will have major influences on whether and how well you receive these broadcasts.

5. Podcasting

This newest delivery vehicle is, to me at least, the most intriguing in its potential to have a profound influence on the medium of radio. Podcasting makes individual programs automatically available for download to a portable digital player, such as an MP3, iPod or other similar device. The level of convenience, portability and degree of personal choice, both in terms of content and time of use, afforded the user by podcasting are key advantages. From the provider's point of view, the popularity of a given program or service can be easily and accurately determined with further potential for direct interaction with listeners.

Interestingly, BBC management, which in the past has very quickly and fully embraced new platforms, seems to be approaching podcasting in a more cautious, incremental way. Consequently at this point, podcasting (in contrast to "on demand" listening) can only be regarded as a supplementary way of listening to the World Service. To learn which programs are part of the BBC's podcasting trial, go to ***bbcworldservice.com*** and click on "Programming" and then "Podcasting trial." In order to use podcasts, a computer with internet access (preferably high speed) is required, along with iTunes 6 (free and available in PC and Mac versions) or other "aggregator" software. A portable player – iPod, MP3 or other – is also required if portability is desired.

6. Digital Radio Mondiale (DRM)

The World Service has been providing experimental DRM (digital shortwave) broadcasts to North America for at least the last two years using the RCI transmitter site at Sackville, New Brunswick. While free to air, reception of DRM broadcasts requires the use of new receivers not yet on the market here. The only way to DRM reception now is through use of a receiver connected to or hosted by a computer which, in turn, uses specialty software purchased from DRM to decode the signal and produce audio and text. Therefore, at this time at least, reception of the World Service in DRM is a much less practical alternative than the other methods described here this month.

❖ In a Nutshell

Full Access

So, to recap, full "24/7" carriage of the World Service **Americas stream**, the **all news stream** and the **PRI contract stream** are on offer **via the internet and/or as part of the continent's two subscription satellite radio services.** For these, you will need a subscription of some sort – either a computer with internet access, preferably high speed service; or a satellite receiver.

In addition, the most recent newscasts and news programs as well as nearly all current editions of World Service programs can be heard **"on demand"** with some limited archiving of past editions. For this, **a computer with internet access**, again preferably with high speed service, will be necessary. Listeners who want more useful portability will need to purchase an **MP3 player, iPod or other device** to which recordings can be transferred for on-the-go listening. Where programs are not provided as downloads, additional third party software may be required in order to record the programs rather than simply listen to them.

Supplementary Coverage

What might be termed partial or "supplementary coverage" can be obtained through many "free," over the air **local U.S. public radio stations**, via **other regional World Service streams carried on analog shortwave**, via direct broadcasts to North America on **DRM (Digital Radio Mondiale** or digital shortwave) and – just now introduced – podcasting.

❖ Seasons' Greetings!

Given the BBC's continuing interest and importance to listeners, we're book-ending this topic around the old and new year. Next month, lots of lists and directions for turning what we've learned this month into actual listening experience. Until then, please accept my warmest best wishes for the Holiday Season and for a safe, healthy and happy New Year. Cheers!

Gayle Van Horn, W4GVH
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December's Old-Fashion DXing

With the hustle of the holiday season upon us, don't forget to save some time at your receiver for band scanning in December. United Arab Emirates celebrates their Independence Day December 2, followed by Thailand on the 5th. Look for special programming from Cuba on the 10th as they note their independence from Spain, and Burkina Faso's Republic Day on December 11.

In Latin America, the *Posadas* religious commemoration begins December 14. During this and ensuing evenings, many radio stations disregard regular scheduling and extend programming a few hours, while a few have all night broadcasting. Many stations rely on network relays which are activated for the season. You may discover stations that reactivate for a few days, because "it's the season." That's an excellent opportunity to add to your logbook or database.

Since midnight occurs at different time zones around the world, why not consider a round the globe DX party on New Years Eve? Begin with Radio New Zealand International at 1100 UTC, and you can celebrate midnight twenty-four times as you traverse the globe! However, if you're toasting each midnight, you might not make it through twenty-four hours! Pirates are likely to be active on New Year's Eve and Day with the usual parodies and oddities of the year's close.

Take time for some old-fashioned holiday band scanning and you may find some special QSLs to commemorate the season.

ALBANIA

TWR-Europe 6235 kHz. Full data Albanian transmitter site card, signed with illegible signature, plus stickers and program schedule. Received in seven months for an English report and one US dollar. Website: **http://rtsh.sil.**at Station address: External Service, Rruga Ismail Qemali Nr. 11, Tirana, Albania. (Frank Hillton, Charleston, SC)

AMATEUR RADIO

El Salvador YS1/HB9KNA, 10 meters SSB. Beautiful scenery card via ARRL bureau. Received in four months. (Larry Van Horn, N5FPW, NC)

Kaliningrad UA2FCC, 10 meters SSB. Full data bi-color card via ARRL bureau. Received in four months. (Van Horn, NC)

Marshall Islands V73UX Kwajalein, 20 meters SSB. Two full data color cards. Received in two and a half years, two request and a SASE.to: Dave Forin V73UX, P.O. Box 66, APO AP 96555 USA. (Van Horn, NC)

ASCENSION ISLAND

Star Radio 11965 kHz. Full data Star Radio card signed by Darcy Christen, plus information letter. Received in 14 days for follow up letter to Hirondelle Foundation after no response from their email address. Station address: 3, rue Traversiere 1018, Lusanne, Switzerland. Website: **http://www.hirondelle.org/** (Edward Kusalik, Alberta, Canada)

CANADA

Radio Japan relay 17875 kHz. Full data 55th Anniversary Special BCB card via Sackville, with illegible signature, plus calender. Received in 56 days for an English report and one IRC. Station address: NHK World, Nippon Hoso Kyokai, Tokyo 150-80001, Japan. Website: **http://www.radiojapan.com/** (Duane Hadley, Bristol, TN)

CLANDESTINE

Radio Hoa-Mai via WHRI Hawaii, 11555 kHz. Full data map card signed by Trinh Ngoc Anh. Received in 33 days for an English report and one US dollar. QSL address: P.O. Box 4175, Garden Grove, CA 92842. (Bill Wilkins, Springfield, MO) Returned two prepared QSL cards, signed by veri signer in 20 days. (Kusalik, CAN) caulacbo@hoamai.org

Eritrean-Voice of Delina 12130 kHz. Full data prepared QSL cards with illegible signature. Received in 12 days for an English report. QSL address: Tesfa Delina Foundation, 17326 Road, A-230 Cerritos, CA 90703 USA. (Kusalik, CAN)

FM

WUCP LP Radio, 106.1 MHz. Full data verification letter signed by Dave Garner-Station Manager, including invitation to visit the station. Station is a 100 watt, operated by Union Cumberland Presbyterian Church in Farragut, Tennessee. Received in seven days for an English report and one US dollar. Station address: 106.1 Christian Road, 400 Everett Road, Farragut, TN 37922 USA. (Joe Wood, Greenback, TN)

MEDIUM WAVE

KINF 1020 kHz AM. Verification letter signed by Chris Johnson-News Director, plus sticker and patch. Received in 91 days for an AM report. Website: **http://roswellradio.org/kinf/** Station address: P.O. Box 670, Roswell, NM 88202. (Patrick Martin, Seaside, OR)

KSJB 600 kHz AM. Reception confirmed as written on a color coverage map and signed by Steve Malone. Received in 197 days for an AM report. Website: **http://www.ksjbam.com/** Station address: 2400 Eighth Avenue Southwest, Jamestown, ND 58402-5180. (Patrick Griffith, Westminster, CO)

KWHG 750 kHz AM. Handwritten letter signed by Donna Gregory-Sales Rep., plus bumper sticker and business card. Received in 35 days for an AM report. Station address: 1050 Williams, Fallon, NV 89406. MW QSL # 2914. (Martin, OR)

PAPUA NEW GUINEA

Wantok Radio Light 7120 kHz. Full data Grass Hut and Locals card signed by David Olson-Chief Engineer P29CQ/KL7K, plus information letter. Received in four days after my follow up to the station. Station address: P.O. Box 1273, Port Moresby NLD, Papua New Guinea. Website: **http://www.wantokradio.net/** Email: info@wantokradio.net USA address: Life Radio Ministries Inc., P.O. Box 2020, Griffin, GA 30224 (or) 100 S. Hill Street-Suite 100, Griffin, GA 30224. (Kusalik, CAN)

RWANDA

Deutsche Welle 15205 kHz. Two full data cards of Berlin's night view and Russian language map of Europe, signed by Horst Scholz-Transmission Management. Received in 45 days for an English report. Website: **http://www.dw-world.de** Station address: English Service, Kurt-Schmacher-Str 3, D-53113, Bonn, Germany. (Joe Wood, Greenback, TN)

USA

WBCQ 7415 kHz. Full data The Planet card signed by Allan H. Weiner. Received in nine days for an English report and one US dollar. Website: **http://www.wbcq.com/** Station address: WBCQ,-The Planet, 97 High Street, Kennebunk, ME 04043 USA. (Wood, TN)

UTILITY

BASRA Weather Net, 4003 kHz USB. Full data prepared QSL and amateur card, signed by Carolyn Wardle, C6AGG. Received in twelve and a half months for a utility report and one US dollar. Station address: Bahamas Air-Sea Rescue Association, East Bay Street, P.O. Box 55-6247, Nassau, Bahamas. (R.C. Watts, Louisville, KY)

KPH, 6477.5 kHz USB /KSM 6474 kHz USB. Full data verification for dual frequencies verified on one RCA Marine Radiogram, signed by D.A. Stoops. Received in three weeks for a utility report, one US dollar and a return address label (used for reply). Station address: P.O. Box 381, Bolinas, CA 94924-0381. (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 meridion 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

0000 UTC - 7PM EST / 6PM CST / 4PM PST

0000	0015	vl	Cambodia, National Radio	11940as		
0000	0015		Japan, Radio	6145na	13650as	17810as
			17825na			
0000	0030		Australia, HCJB	15530as		
0000	0030		Australia, Radio	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	9755am	9800as	
0000	0059		Spain, Radio 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		Bulgaria, Radio	7400na	9700na	
0000	0100		Canada, CFRX Toronto ON	6070do		
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		China, China Broadcast Network			6020na
			7180as	9570na	13600eu	
0000	0100		Costa Rica, University Network	5030va		6150va
			7375va	9725va		
0000	0100		Cuba, Radio Havana	12000na		
0000	0100		Germany, Deutsche Welle	6030as	7290as	
0000	0100		Guyana, Voice of	3290do		
0000	0100		Malaysia, Radio	7295as		
0000	0100	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060do	6175do		
0000	0100		Netherlands, Radio	9845na		
0000	0100		New Zealand, Radio NZ Intl	17675pa		
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	5910na		
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	5110na	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	
			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		Lithuania, Radio Vilnius	11690na		
0030	0100		Thailand, Radio	5890na		
0030	0100		UK, BBC World Service	5970as	6195as	
			9410as	9740as	11955as	15280as
			15310as	15360as	17790as	
0030	0100		USA, Voice of America	7215va	9780va	
			11760va	15185va	15290va	17740va
			17820va			
0035	0100	sm	Austria, Radio Austria Intl	9870sa		
0043	0058	twhfa	Austria, Radio Austria Intl	9870sa		
0045	0100		Pakistan, Radio	9340as	11565as	
0055	0100		Italy, RAI Intl	11800na		

0100 UTC - 8PM EST/ 7PM CST / 5PM PST

0100	0115	m	Australia, HCJB	15405as		
0100	0115		Italy, RAI Intl	11800na		
0100	0115		Pakistan, Radio	9340as	11565as	
0100	0127		Czech Rep, Radio Prague Intl	6200na	7345na	
0100	0128		Vietnam, Voice of	6175na		
0100	0130		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	17715as	17750pa
			17775as			
0100	0130	mwfa	Belarus, Radio	5970eu	7210eu	
0100	0130	s	Germany, Universal Life	9485as		
0100	0130		Slovakia, Radio Slovakia Intl	7230na	9440sa	
0100	0130		Uzbekistan, Radio Tashkent	7190as	9715as	
0100	0156		Romania, Radio Romania Intl	6040na	9690na	
			11820na	15430na		
0100	0157		Netherlands, Radio	9845na		
0100	0159		Canada, Radio Canada Intl	9755am		
0100	0200		Anguilla, Caribbean Beacon	6090am		
0100	0200		Australia, ABC NT Katherine	5025do		
0100	0200		Australia, ABC NT Tennant Creek			4910do
0100	0200		Australia, Voice Intl	7355as		
0100	0200		Canada, CFRX Toronto ON	6070do		
0100	0200		Canada, CFVP Calgary AB	6030do		
0100	0200		Canada, CKZN St John's NF	6160do		
0100	0200		Canada, CKZU Vancouver BC	6160do		
0100	0200		China, China Broadcast Network			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	
			6060do	6175do		
0100	0200		New Zealand, Radio NZ Intl	17675pa		
0100	0200		North Korea, Voice of	7140as	9345as	
			9730am	11735am	13760as	15180as
0100	0200	vl	Papua New Guinea, Wantok Radio Light			7120va
0100	0200		Russia, Voice of	7180na	7250na	15545na na
0100	0200		Sierra Leone, Radio UNAMSIL	6137do		
0100	0200		Singapore, Mediacorp Radio	6150do		
0100	0200		UK, BBC World Service	6195as	9410as	
			11955as	15280as	15310as	17790as
0100	0200		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0100	0200		USA, KAIJ Dallas TX	5755na		
0100	0200		USA, KTBN Salt Lake City UT	7505na		
0100	0200		USA, KWHR Naalehu HI	17510as		
0100	0200		USA, Voice of America	7115va	9885va	
			11705va	11725va		
0100	0200		USA, WBCQ Kennebunk ME	5110na	7415na	
			9330na			
0100	0200		USA, WBOH Newport NC	5920am		
0100	0200		USA, WEWN Birmingham AL	5810va	7425va	
			13615va			
0100	0200		USA, WHRA Greenbush ME	5850na		
0100	0200	mtwhf	USA, WHRI Noblesville IN	7490am	9515am	
0100	0200	as	USA, WHRI Noblesville IN	7315am		
0100	0200		USA, WINB Red Lion PA	9320am		
0100	0200		USA, WJIE Louisville KY	13595am		
0100	0200	twhfa	USA, WMLK Bethel PA	7385am		
0100	0200	sm	USA, WMLK Bethel PA	9955am		
0100	0200		USA, WTJC Newport NC	9370na		
0100	0200		USA, WWCR Nashville TN	3210na	5070na	
			5935na			
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		
0105	0130	sm	Austria, Radio Austria Intl	9870am		
0110	0200		Libya, Voice of Africa	7230af		
0113	0130	twhfa	Austria, Radio Austria Intl	9870am		
0115	0130	a	Austria, Radio Austria Intl	9870sa		
0130	0200		Australia, HCJB	15405as		
0130	0200		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	17715as	17750pa
0130	0200	s	Belarus, Radio	5970eu	7210eu	
0130	0200		Iran, Voice of the Islamic Rep	9495am	11875am	
0130	0200		Sweden, Radio	6010na	9435va	
0130	0200	twhfa	USA, Voice of 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		

0200 UTC - 9PM EST / 8PM CST / 6PM PST

0200	0227		Czech Rep, Radio Prague Intl	6200na	7345na	
0200	0227		Iran, Voice of the Islamic Rep	9495am	11875am	
0200	0228		Hungary, Radio Budapest	9515na		

0200	0230	s	Australia, HCJB	15405as		
0200	0230		Austria, AWR Europe	9895as		
0200	0230	mtwfa	Belarus, Radio	5970eu	7210eu	
0200	0230	vl	Croatia, Croatian Radio	9925sa		
0200	0300		Anguilla, Caribbean Beacon	6090am		
0200	0300	twhfa	Argentina, RAE	11710am		
0200	0300		Australia, ABC NT Alice Springs 4835do			2310irr
0200	0300		Australia, ABC NT Katherine	5025do		
0200	0300		Australia, ABC NT Tennant Creek			4910do
0200	0300		Australia, Radio 15240pa	9660as 15415pa	12080as 15515as	13630pa 17750pa 21725pa
0200	0300		Australia, Voice Intl	7355as		
0200	0300		Canada, CFRX Toronto ON	6070do		
0200	0300		Canada, CFVP Calgary AB	6030do		
0200	0300		Canada, CKZN St John's NF	6160do		
0200	0300		Canada, CKZU Vancouver BC	6160do		
0200	0300		China, China Broadcast Network			9580na
0200	0300		Costa Rica, University Network 7375va	5030va 9725va		6150va
0200	0300		Cuba, Radio Havana 12000na		6000na	9820na
0200	0300		Egypt, Radio Cairo	7260na		
0200	0300		Guyana, Voice of	3291do		
0200	0300		Malaysia, Radio	7295as		
0200	0300	vl	Namibia, Namibian BC Corp 6060do		3270do 6175do	3290do
0200	0300		New Zealand, Radio NZ Intl	17675pa		
0200	0300		North Korea, Voice of 15100as		4405as	13650as
0200	0300	vl	Papua New Guinea, Wantok Radio Light			7120va
0200	0300		Philippines, Radio Pilipinas 17665va		11885va	15120va
0200	0300		Russia, Voice of 15545na	5945me 15555na	7180na 15595na	9860na 17660na
0200	0300		Sierra Leone, Radio UNAMSIL	6137do		
0200	0300		Singapore, Mediacorp Radio	6150do		
0200	0300		South Korea, Radio Korea Intl 15575va		9560va	11810sa
0200	0300		Taiwan, Radio Taiwan Intl 11875as	15465as	5950na	9680na
0200	0300		UK, BBC World Service 9825am	11760me	5975am 11955as	9750af 12095am
			15280as	15310as	15360as	17790as
0200	0300		USA, AFRTS 7590usb	4319usb 7812usb	5446usb 12133usb	5765usb 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 11705va	11725va	7115va	9885va
0200	0300		USA, WBCQ Kennebunk ME 9330na		5110na	7415na
0200	0300		USA, WBOH Newport NC		5920am	
0200	0300		USA, WEWN Birmingham AL 13615va		5810va	7425va
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 5935na		3210na	5070na
0200	0300		USA, WWRB Manchester TN 5085na	5745na	3185na 6890na	5050na
0200	0300		USA, WYFR Okeechobee FL 9505na	11835na	5985na 11855na	6065na
0200	0300		Zambia, Christian Voice		4965af	
0215	0230		Nepal, Radio 7165as	3230as	5005as	6100os
0225	0235		Libya, Voice of Africa		7230af	
0230	0258		Vietnam, Voice of	6175na		
0230	0300	s	Belarus, Radio	5970eu	7210eu	
0230	0300		Sweden, Radio	6010na		
0245	0300	stwhfa	Albania, Radio Tirana		6115eu	7455eu
0245	0300		Myanmar, Radio	9730do		
0250	0300		Vatican City, Vatican Radio		7305am	9605am
0256	0300		Turkey, Voice of	6140va	7270va	

0300 UTC - 10PM EST / 9PM CST / 7PM PST

0300	0320		Vatican City, Vatican Radio		7305am	9605am
0300	0330		Egypt, Radio Cairo	7260na		
0300	0330		Myanmar, Radia	9730do		
0300	0330		Philippines, Radio Pilipinas		11885va	17665va
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	0358		New Zealand, Radio NZ Intl		17675pa	
0300	0400		Anguilla, Caribbean Beacon	6090am		
0300	0400		Australia, ABC NT Alice Springs 4835do			2310irr
0300	0400		Australia, ABC NT Katherine	5025do		
0300	0400		Australia, ABC NT Tennant Creek			4910do
0300	0400		Australia, Radio 15240pa	9660as 15415pa	12080as 15515as	13630pa 17750pa 21725pa
0300	0400		Australia, Voice Intl		13685as	
0300	0400		Bulgaria, Radio	7400na	9700na	
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 Broadcast Network 9790am	11870as	15110as	9690am
0300	0400		Costa Rica, University Network 7375va	5030va 9725va		6150va
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 6060do		3270do 6175do	3290do
0300	0400		North Korea, Voice of 9345as	9730as	3560as	7140as
0300	0400	vl	Papua New Guinea, Wantok Radio Light			7120va
0300	0400		Russia, Voice of 15545na	5900na 15555na	7180na 15595na	9860na 17660na
0300	0400	vl	Rwanda, Radio	6055do		
0300	0400		Sierra Leone, Radio UNAMSIL	6137do		
0300	0400		Singapore, Mediacorp Radio	6150do		
0300	0400		South Africa, Channel Africa	3345af	7390af	
0300	0400		Taiwan, Radio Taiwan Intl 15320va		5950na	15215va
0300	0400	vl	Uganda, Radio	4976do	5026do	7196do
0300	0400		UK, BBC World Service 6005af	6190af	3255af 6195eu	5975am 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		5910na	
0300	0400		USA, AFRTS 7590usb	4319usb 7812usb	5446usb 12133usb	5765usb 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		17510as	
0300	0400		USA, WBCQ Kennebunk ME 9330na		5110na	7415na
0300	0400		USA, WBOH Newport NC		5920am	
0300	0400		USA, WEWN Birmingham AL 13615va		5810va	7425va
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		9370na	
0300	0400		USA, WWCR Nashville TN 5765na	5935na	3210na	5070na
0300	0400		USA, WWRB Manchester TN 5085na	5745na	3185na 6890na	5050na
0300	0400		USA, WYFR Okeechobee FL 11740na	15255na	6065na	9505na
0300	0400		Zambia, Christian Voice		4965af	
0300	0400	vl	Zimbabwe, ZBC Corp		5975da	
0330	0358		Hungary, Radio Budapest		9775eu	
0330	0358		Vietnam, Voice of	6175am		
0330	0400	stwhfa	Albania, Radio Tirana		6115eu	7455eu
0330	0400		UAE, Emirates Radio 15400na		12005na	13675na
0330	0400	mtwhf	USA, Voice of America 17895af		7290af	12080af
0330	0400		USA, Voice of America 9885af		4930af	6080af

0400 UTC - 11PM EST / 10PM CST / 8PM PST

0400	0427		Czech Rep, Radio Prague Intl		6200na	7345na
0400	0430		Australia, Radio 15240pa	9660as 15515pa	12080as 17750pa	13630pa 21725pa
0400	0430		France, Radio France Intl		9805af	11700af
0400	0430		USA, Voice of America		4930af	4960af

			6080af	7290af	9575af	9885af
			11835af	12080af	17895af	
0400	0456		Ramania, Radia Ramania Intl		9780va	11820va
			15140va	17860va		
0400	0457		Netherlands, Radio		6165na	9590na
0400	0500		Anguilla, Caribbean Beacon		6090am	
0400	0500		Australia, ABC NT Alice Springs			2310irr
			4835da			
0400	0500		Australia, ABC NT Katherine		5025da	
0400	0500		Australia, ABC NT Tennant Creek			4910da
0400	0500		Australia, Voice Intl		13685as	
0400	0500	twhfas	Canada, CBC NQ SW Service		9625na	
0400	0500		Canada, CFRX Taronta ON		6070da	
0400	0500		Canada, CKZN St Jahn's NF		6160da	
0400	0500		Canada, CKZU Vancauver BC		6160da	
0400	0500		China, China Braadcast Network			9590na
			9690na	9755na		
0400	0500		Casta Rica, University Network		5030va	6150va
			7375va	9725va		
0400	0500		Cuba, Radia Havana		6000na	9820na
0400	0500		Germany, Deutsche Welle		6180af	9710af
			15445af			
0400	0500		Guyana, Vaice af	3291da		
0400	0500		Malaysia, Radia	7295as		
0400	0500		Malaysia, Vaice af	6175as	9750as	15295as
0400	0500	vl	Namibia, Namibian BC Carp		3270da	3290da
			6060do	6175do		
0400	0500		New Zealand, Radio NZ Intl		15720pa	
0400	0500		Nigeria, Radio/Kaduna		6090do	
0400	0500	vl	Papua New Guinea, Wantok Radio Light			7120va
0400	0500		Russia, Vaice of	5900na	7180na	15545na
			15555na	15595na	17660na	
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		7390af	
0400	0500	vl	Uganda, Radio	4976da	5026do	7196do
0400	0500		UK, BBC World Service		3255af	6005af
			6195eu	7160af	9410va	11760eu
			9410va	11760me	11765af	12035af
			15310as	15280as	15360as	15420af
			15575me	17760as	17790as	21660as
0400	0500	vl/ mtwhf	UK, Sudan Radio Service		9625va	
0400	0500		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0400	0500		USA, KAIJ Dallas TX		5755na	
0400	0500		USA, KTBN Salt Lake City UT		7505na	
0400	0500		USA, KWHR Naalehu HI		17510as	
0400	0500		USA, WBCQ Kennebunk ME		5110na	7415na
			9330na			
0400	0500		USA, WBOH Newport NC		5920am	
0400	0500		USA, WEWN Birmingham AL		5810va	7425va
			13615va			
0400	0500		USA, WHRA Greenbush ME		5850na	
0400	0500	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		3210na	5070na
			5765na	5935na		
0400	0500		USA, WWRB Manchester TN		3185na	5050na
			5085na	5745na	6890na	
0400	0500		USA, WYFR Okeechobee FL		6065na	6855eu
			7355eu	9505eu	9715eu	
0400	0500		Zambia, Christian Voice		4965af	
0400	0500	vl	Zimbabwe, ZBC Corp		5975do	
0430	0445		Israel, Kol Israel	6280va	7545va	15640va
			17600va			
0430	0500		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	15515va	17750pa
			21725pa			
0430	0500		Czech Rep, Radio Prague Intl		9885va	11600va
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		4930af	4960af
			7290af	9575af	11835af	12080af
			17895af			
0445	0500		Italy, RAI Intl	5965af	6120af	7170af
0455	0500		Vatican City, Vatican Radio		11625af	13765af

0500 UTC - 12AM EST / 11PM CST / 9PM PST

0500	0507	twhfas	Canada, CBC NQ SW Service		9625na	
0500	0520		Vatican City, Vatican Radio		4005eu	5885eu
			7250eu			
0500	0530		Australia, Radio	9660as	12080as	13630pa
			15160pa	15240pa	15515va	17750pa
0500	0530		France, Radio France Intl		11995af	13680af
0500	0530	vl	Rwanda, Radio	6055da		
0500	0530		UK, BBC World Service		6005af	6190af
			7160af	11765af	11940af	11955me
			11765af	12035af	12095va	15280as
			15310as	15420af	15575me	17760as
			17790as	21660as		
0500	0530		UK, BBC World Service		6005af	6195af
			7160af	9410va	11765af	11940af
			11955as	15280as	15310as	15360as
			17640af	17760as	17790as	17885af
			21660as			
0500	0530		Vatican City, Vatican Radio		9660af	
0500	0600		Anguilla, Caribbean Beacon		6090am	
0500	0600		Australia, ABC NT Alice Springs			2310irr
			4835da			
0500	0600		Australia, ABC NT Katherine		5025da	
0500	0600		Australia, ABC NT Tennant Creek			4910da
0500	0600		Australia, Voice Intl		13685as	
0500	0600		Bhuthan, BBS	6035as		
0500	0600		Canada, CFRX Taronta ON		6070da	
0500	0600		Canada, CKZN St Jahn's NF		6160da	
0500	0600		Canada, CKZU Vancauver BC		6160da	
0500	0600		China, China Braadcast Network			6190na
			9560na	9590af	11710af	11880as
			15350as	15465as	17505af	17540as
0500	0600		Casta Rica, University Network		5030va	6150va
			7375va	9725va		
0500	0600		Cuba, Radio Havana		6000va	6060va
			9550va	11760va		
0500	0600		France, Radio France Intl		13680va	
0500	0600		Germany, Deutsche Welle		7285af	9565af
			12035af	15410af		
0500	0600	vl	Greece, Voice af	5865eu	7475eu	9420eu
0500	0600		Guyana, Voice of	3291do		
0500	0600		Japan, Radio	5975eu	6110na	7230eu
			15195as	17810as	21755pa	
0500	0600		Malaysia, Radio	7295as		
0500	0600		Malaysia, Voice of	6175as	9750as	15295as
0500	0600	vl	Namibia, Namibian BC Corp		3270do	3290do
			6060do	6175do		
0500	0600		New Zealand, Radia NZ Intl		15720pa	
0500	0600		Nigeria, Radio/Ibadan		6050do	
0500	0600		Nigeria, Radio/Kaduna		4770do	6090do
0500	0600		Nigeria, Radio/Lagos		3326do	4990do
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, Radia UNAMSIL		6137do	
0500	0600		Singapore, Mediacorp Radio		6150do	
0500	0600		South Africa, Channel Africa		7240af	11875af
0500	0600		Swaziland, TWR	3200af	4775af	9500af
0500	0600	vl	Uganda, Radia	4976do	5026do	7196do
0500	0600		UK, BBC World Service		6195eu	11760me
			12095eu	15565eu	15575me	
0500	0600		UK, CVC International		9430af	
0500	0600	vl/ mtwhf	UK, Sudan Radio Service		11795va	
0500	0600		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	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		4930af	6080af
			6180af	7290af	12080af	13645af
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		3210na	5070na
			5765na	5935na		
0500	0600		USA, WWRB Manchester TN		3185na	5050na
			5085na	5745na		
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, Radia Austria Intl		17870me	
0515	0600		Zambia, Christian Voice		9555af	
0525	0600	vl	Ghana, Ghana BC Corp		3366do	4915do
0530	0600		Australia, Radio	9660as	12080as	13630as
			15160pa	15240va	15415as	15515pa
			17750as			
0530	0600		Thailand, Radio	17690va		
0530	0600		UK, BBC World Service		6005af	6190af
			7160af	9410af	11765af	11940af
			11955as	15310as	15360as	15420af
			17640af	17760as	17790as	21660as
0530	0600	mtwhf	UK, BBC World Service		17885af	
0545	0600	twh	Austria, Radio Austria Intl		17870me	
0545	0600	vl	Rwanda, Radio	6055do		

0600 UTC - 1AM EST / 12AM CST / 10PM PST

0600	0605	vl	Croatia, Croatian Radio	13820na		
0600	0615as		South Africa, TWR	11640af		
0600	0630		France, Radio France Intl	11665af	15160af	17800af
0600	0645	mtwhf	South Africa, TWR	11640af		
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	9660as	12080as	13630as 15160pa 15240va 15415as 15515pa 17750va
0600	0700		Australia, Voice Intl	15335as		
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 Broadcast Network			9590af 11710af 11870me 11880as 13620me 15350as 15465as 17490eu 17505af 17540as
0600	0700		Costa Rica, University Network	5030va	6150va	7375va 9725va 11870va
0600	0700		Cuba, Radio Havana	6000va	6060va	9550va 11760va
0600	0700		Germany, Deutsche Welle	6140eu	7225af	11785af 15440af
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do	
0600	0700	vl	Greece, Voice of	5865eu	9420eu	9420eu
0600	0700		Guyana, Voice of	3291do		
0600	0700		Japan, Radio	7230eu	11715as	11740as 11760as 13630va 15195as 17870pa 21755pa
0600	0700		Liberia, ELWA	4760do		
0600	0700		Malaysia, Radio	7295as		
0600	0700		Malaysia, Voice of	6175as	9750as	15295as
0600	0700	vl	Namibia, Namibian BC Corp	3270do	3290do	6060do 6175do
0600	0700		New Zealand, Radio NZ Intl	15720pa		
0600	0700		Nigeria, Radio/Ibadan	6050do		
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do	
0600	0700		Nigeria, Radio/Lagos	3326do	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		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	15255af	
0600	0700		Swaziland, TWR	4775af	6120af	9500af
0600	0700		UK, BBC World Service	6190af	7160af	9410va 11765as 11940af 11955as 12095as 15310as 15360as 15400af 15565as 15575me 17640af 17790as 21660as
0600	0700	as	UK, BBC World Service	17885af		
0600	0700		UK, CVC International	9430af		
0600	0700		USA, AFRTS	4319usb	5446usb	5765usb 7590usb 7812usb 12133usb 12579usb 12133usb 12579usb 13362usb 13855usb
0600	0700		USA, KAIJ Dallas TX	5755na		
0600	0700		USA, KTBN Salt Lake City UT	7505na		
0600	0700		USA, KWHR Naalehu HI	9510as	13700as	
0600	0700		USA, Voice of America	6080af	6180af	7290af 12080af 13645af
0600	0700		USA, WBCQ Kennebunk ME	7415na		
0600	0700		USA, WBOH Newport NC	5920am		
0600	0700		USA, WEWN Birmingham AL	5850va	7425va	7570va
0600	0700		USA, WHRA Greenbush ME	7490na		
0600	0700		USA, WHRI Noblesville IN	7315am	7465am	
0600	0700		USA, WJIE Louisville KY	13595am		
0600	0700		USA, WMLK Bethel PA	9265eu	9955eu	
0600	0700		USA, WRMI Miami FL	7385am		
0600	0700		USA, WTJC Newport NC	9370na		
0600	0700		USA, WWCR Nashville TN	3210na	5070na	5765na 5935na
0600	0700		USA, WWRB Manchester TN	3185na		
0600	0700		USA, WYFR Okeechobee FL	5810eu	7355eu	9680eu 11530eu 11580eu
0600	0700	vl	Vanuatu, Radio	4960do		
0600	0700		Yemen, Rep of Yemen Radio	9780me		
0600	0700		Zambio, Christian Voice	9555af		
0600	0700	vl	Zimbabwe, ZBC Corp	5975do		
0630	0645		Vatican City, Vatican Radio	4005af	5885af	7250af 9645eu 11740ca 15595ca
0630	0656		Romania, Radio Romania Intl	9655eu	11830eu	
0630	0700	as	Germany, Bible Voice Broadcasting		5945eu	
0630	0700		Vatican City, Vatican Radio	11625af	13765ca	15570va

0700 UTC - 2AM EST / 1AM CST / 11PM PST

0700	0730		Slovakia, Radio Slovakia Intl	13715pa	15460pa	
0700	0730		UK, BBC World Service	11760me	15575me	
0700	0759		New Zealand, Radio NZ Intl	15720pa		
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	11750pa		
0700	0800		Australia, Radio	9660as	12080as	13630as 15160pa 15240va 15415as 17750pa
0700	0800		Australia, Voice Intl	15335as		
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 Broadcast Network			11880as 13710eu 15350as 15465as 17490eu
0700	0800		Costa Rica, University Network	5030va	6150va	7375va 9725va 11870va
0700	0800		Eqt Guinea, Radio Africa	15190af		
0700	0800		France, Radio France Intl	15605af		
0700	0800	as	Germany, Bible Voice Broadcasting		5945eu	
0700	0800		Germany, Deutsche Welle	6140eu		
0700	0800	vl	Ghana, Ghana BC Corp	3366do	4915do	
0700	0800	vl	Greece, Voice of	9420eu	11645eu	15630eu
0700	0800		Guyana, Voice of	3291do	5950do	
0700	0800		Liberia, ELWA	4760do		
0700	0800		Liberia, Star Radio	9525af		
0700	0800		Malaysia, Radio	7295as		
0700	0800		Malaysia, Voice of	6175as	9750as	15295as
0700	0800		Myanmar, Radio	9730do		
0700	0800	vl	Namibia, Namibian BC Corp	3270do	3290do	6060do 6175do
0700	0800		Nigeria, Radio/Ibadan	6050do		
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do	
0700	0800		Nigeria, Radio/Lagos	3326da	4990do	
0700	0800	vl	Papua New Guinea, Wantok Radio Light			7120va
0700	0800		Russia, Voice of	17495pa	17635pa	21790pa
0700	0800		Sierra Leone, Radio UNAMSIL	6137da		
0700	0800	irreg/ vl	Sierra Leone, SLBS	3316do		
0700	0800		Singapore, Mediacorp Radio	6150do		
0700	0800	vl	Solomon Islands, SIBC	5020da	9545do	
0700	0800	vl	South Africa, Channel Africa	11825af		
0700	0800	DRM	Sri Lanka, Deutsche Welle	21675as		
0700	0800		Swaziland, TWR	4775af	6120af	9500af
0700	0800		Swaziland, TWR	4775af	6120af	9500af
0700	0800		Taiwan, Radio Taiwan Intl	5950nc		
0700	0800		UK, BBC World Service	6005af	6190af	11940af 11765af 11955as 12095af 15310as 15360as 15400af 15485af 17760as 17790as 17830af 21660as
0700	0800		UK, CVC International	15640af		
0700	0800		USA, AFRTS	4319usb	5446usb	5765usb 7590usb 7812usb 12133usb 12579usb 12133usb 12579usb 13362usb 13855usb
0700	0800		USA, KAIJ Dallas TX	5755na		
0700	0800		USA, KTBN Salt Lake City UT	7505na		
0700	0800		USA, KWHR Naalehu HI	9510as	13700as	
0700	0800		USA, Voice of Americo	6080af	7290af	13645af
0700	0800		USA, WBOH Newport NC	5920am		
0700	0800		USA, WEWN Birmingham AL	5850va	7475va	7570va
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	3210na	5070na	5765na 5935na
0700	0800		USA, WWRB Manchester TN	3185na		
0700	0800		USA, WYFR Okeechobee FL	5985va	6855va	7355va 9505va 9715va 9930va
0700	0800	vl	Vanuatu, Radio	4960do		
0700	0800		Zambia, Christian Voice	9555af		
0730	0800		Bulgoria, Radio	9500eu	11500eu	
0730	0800		Georgia, Radio Georgia	11805eu		
0730	0800	as	Guam, TWR/KTWR	15255as		
0730	0800	as	UK, BBC World Service	15575me	17885af	
0740	0800	mtwhf	Guom, TWR/KTWR	15225as		
0745	0800	s	Albania, TWR	11865eu		
0745	0800	s	Albania, TWR	11865eu		
0745	0800	s	Monaco, TWR	9800eu		

0800 UTC - 3AM EST / 2AM CST / 12AM PST

0800	0815	a	Germany, Bible Voice Broadcosting		5945eu
0800	0827		Czech Rep, Radio Prague Intl	7345eu	9860eu
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, Radia	15415va			
0800	0830	s	Germany, Bible Voice Broadcasting			5945eu	
0800	0830		Liberia, ELWA	4760da			
0800	0830		Malaysia, Voice of	6175as	9750as		
0800	0830		Myanmar, Radia	9730da			
0800	0830		Swaziland, TWR	4775af	6120af	9500af	
0800	0900	mtwhf	Albania, TWR	11865eu			
0800	0900		Anguilla, Caribbean Beacon	6090am			
0800	0900		Australia, ABC NT Alice Springs			2310irr	
			4835da				
0800	0900		Australia, HCJB	11750pa			
0800	0900		Australia, Voice Intl	15335as			
0800	0900		Bhuthan, BBS	6035as			
0800	0900		Canada, CFRX Taranta ON	6070da			
0800	0900		Canada, CFVP Calgary AB	6030da			
0800	0900		Canada, CKZN St Jahn's NF	6160da			
0800	0900		Canada, CKZU Vancauver BC	6160da			
0800	0900		China, China Braadcast Network			11880as	
			13710eu	15350as	15465as	17490eu	
			17540as				
0800	0900		Casta Rica, University Network	5030va		6150va	
			7375va	9725va	11870va		
0800	0900		Eqt Guinea, Radia Africa	15190af			
0800	0900		Germany, Deutsche Welle	6140eu			
0800	0900	DRM	Germany, Deutsche Welle	21675af			
0800	0900	vl	Ghana, Ghana BC Carp	3366da	4915da		
0800	0900	mtwhf	Guam, TWR/KTWR	11840as	15225as		
0800	0900		Guyana, Vaice af	3291da	5950da		
0800	0900		Indanesia, Vaice af	9525as	11785pa		
			15150al				
0800	0900	vl/as	Italy, IRRS	13840va			
0800	0900		Liberia, Star Radia	9525af			
0800	0900		Malaysia, Radia	7295as			
0800	0900		Malaysia, Vaice af	15295as			
0800	0900	mtwhf	Manaca, TWR	9800eu			
0800	0900		New Zealand, Radia NZ Intl	9885pa			
0800	0900		New Zealand, Radia NZ Intl	9885pa			
0800	0900		Nigeria, Radia/Ibadan	6050da			
0800	0900		Nigeria, Radia/Kaduna	4770da	6090da		
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, Vaice of	17495pa	17635pa	21790pa	
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	17700af		
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		UK, CVC International	15640af			
0800	0900		USA, AFRTS	4319usb	5446usb	5765usb	
			7590usb	7812usb	12133usb	12579usb	
			12133usb	12579usb	13362usb	13855usb	
0800	0900		USA, KAIJ Dallas TX	5755na			
0800	0900		USA, KNLS Anchor Point AK	9615as			
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	4960do			
0800	0900		Zambia, Christian Voice	9555af			
0815	0850	a	Albania, TWR	11865eu			
0815	0850	a	Monaco, TWR	9800eu			
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 - 4AM EST / 3AM CST / 1AM PST

0900	0915	vl	Ghana, Ghana BC Carp	3366da	4915da		
0900	0920	mtwhf	Albania, TWR	11865eu			
0900	0920	s	Albania, TWR	11865eu			
0900	0920	s	Monaca, TWR	9800eu			
0900	0930		Australia, Radio	9580as	9590as	15240as	
0900	0930	as	Australia, Radia	15415va			
0900	0930	mtwhf	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, Voice Intl	11955as			
0900	1000		Canada, CFRX Taranta ON	6070da			
0900	1000		Canada, CFVP Calgary AB	6030da			
0900	1000		Canada, CKZN St Jahn's NF	6160da			
0900	1000		Canada, CKZU Vancauver BC	6160da			
0900	1000		China, China Braadcast Network			15210pa	
			17490eu	17690pa			
0900	1000		Casta Rica, University Network	5030va		6150va	
			7375va	9725va	11870va	13750va	
0900	1000		Eqt Guinea, Radia Africa	15190af			
0900	1000		Germany, Deutsche Welle	6140eu			
0900	1000	DRM	Germany, Deutsche Welle	21675af			
0900	1000		Guyana, Vaice af	3291do	5950da		
0900	1000	vl/a	Italy, IRRS	15725va			
0900	1000	vl/s	Italy, IRRS	13840va			
0900	1000		Malaysia, Radia	7295as			
0900	1000	vl	Namibia, Namibian BC Corp	3270da	3290da		
			6060da	6175da			
0900	1000		New Zealand, Radia NZ Intl	9885pa			
0900	1000		Nigeria, Radio/Ibadan	6050da			
0900	1000		Nigeria, Radio/Kaduna	4770da	6090da		
0900	1000		Nigeria, Radio/Lagas	3326da	4990da		
0900	1000	vl	Pakistan, Radia	15100eu	17835eu		
0900	1000		Papua New Guinea, Cathalic Radia			4960da	
0900	1000		Papua New Guinea, NBC	4890da			
0900	1000	vl	Papua New Guinea, Wantok Radia Light			7120va	
0900	1000	DRM	Russia, Vaice af	12060eu			
0900	1000	vl	Rwanda, Radio	6055do			
0900	1000		Sierra Leone, Radio UNAMSIL	6137do			
0900	1000	irreg/ vl	Sierra Leone, SLBS	3316do			
0900	1000		Singapare, 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	3210na	5070na		
			5765na	5935na			
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			
0930	1000		Australia, Radio	9580as	9590as	15240as	
			15415pa				
0930	1000	s	UAE, Radio UNMEE	21460af			
0930	1000		Vatican City, Vatican Radio	5885eu			

1000 UTC - 5AM EST / 4AM CST / 2AM PST

1000	1029		Czech Rep, Radio Prague Intl	21745va			
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, Radia 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, Radio	9580as	9590as	15240as	15415pa
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 Broadcast Network			15210pa	17490eu 17690pa
1000	1100		Costa Rica, University Network	5030va	6150va	7375va	9725va 11870va 13750va
1000	1100	s	Germany, Bible Voice Broadcasting			5910eu	
1000	1100		Guyana, Voice of	3291da	5950da		
1000	1100		India, All India Radio		13695as	15020as	15410as 17800as 17895as
1000	1100	va/a	Italy, IRRS	15725va			
1000	1100	vl/s	Italy, IRRS	13840va	15725al		
1000	1100		Japan, Radio	6120na	9695as	11730as	17585eu 17720va 21755pa
1000	1100	DRM	Luxembourg, Radio		7145eu		
1000	1100		Malaysia, Radio	7295as			
1000	1100		Malaysia, Voice of	6175as	15295as		
1000	1100		Nigeria, Voice of	15120af			
1000	1100		North Korea, Voice of		3560as	11710as	11735as 13650ca 15180ca
1000	1100		Papua New Guinea, Catholic Radio			4960do	
1000	1100		Papua New Guinea, NBC	4890do			
1000	1100	vl	Papua New Guinea, Wantok Radio Light			7120va	
1000	1100		Singapore, Mediacorp Radio	6150do			
1000	1100	vl	Solomon Islands, SIBC	5020do	9545do		
1000	1100	vl	South Africa, Channel Africa	11825af			
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	9615as			
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	5985na		6855na 9755na
1000	1100		Zambia, Christian Voice	9555af			
1030	1045	mtwhf	Ethiopia, Radio	5990af	7110af	9704af	
1030	1045		Israel, Kol Israel	15640va	17535va		
1030	1058		Vietnam, Voice of	7285as			
1030	1100		Australia, HCJB	15400as			
1030	1100		Iran, Voice of the Islamic Rep	15660as	17660as		

1100 UTC - 6AM EST / 5AM CST / 3AM PST

1100	1104	vl	Pakistan, Radio	15100eu	15190eu	17835eu	
1100	1127		Iran, Voice of the Islamic Rep	15660as	17660as		
1100	1128		Vietnam, Voice of	9840as	7220as	7285as	
1100	1130		Australia, HCJB	15400as			
1100	1130		Australia, Radio	5995as	6020as	9475as	9560as 9580as 9590as 12080as 15240pa
1100	1130		UK, BBC World Service		6190af	11940af	15400af 15485af 17830af 17885af 21470af
1100	1157		Netherlands, Radio		11675na		
1100	1159	a	Germany, Universal Life		6055me		
1100	1200		Anguilla, Caribbean Beacon		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, Voice Intl		13685as		
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 Broadcast Network			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/a	Italy, IRRS	15725va			
1100	1200		Japan, Radio	6120na	9695as	11730as	
1100	1200	DRM	Luxembourg, Radio		7145eu		
1100	1200		Malaysia, Radio	7295as			
1100	1200		Malaysia, Voice of	6175as	15295as		
1100	1200		New Zealand, Radio NZ Intl	15530pa			
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	vl	South Africa, Channel Africa	11825af			
1100	1200		Taiwan, Radio Taiwan Intl	7445as			
1100	1200		UK, BBC World Service		6195as	9740as	11760me 11865am 15310as 15575me 17640va 17760as 17790as
1100	1200		Ukraine, Radio Ukraine Intl		5910eu		
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	5765na		5935na 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	1157		Czech Rep, Radio Prague Intl	11640eu	21745va		
1130	1159	a	Germany, Universal Life		6055me		
1130	1200		Australia, HCJB	15425as			
1130	1200		Australia, Radio	5995as	6020as	9475as	9560as 9580as 9590as 12080as
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 - 7AM EST / 6AM CST / 4AM PST

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	1259		Canada, Radio Canada Intl	7105as	9665as		
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, Radio	5995as	6020as	9475as	9560as 9580as 9590as
1200	1300		Australia, Voice Intl		13685as		
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		China, China Broadcast Network			9730as	9760pa 11760pa 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	va/s	Italy, IRRS	13840va	15725al		
1200	1300	DRM	Luxembourg, Radio		7145eu		
1200	1300		Malaysia, Radio	7295as			
1200	1300		Malaysia, Voice of	6175as			
1200	1300		New Zealand, Radio NZ Intl	15530pa			
1200	1300		Nigeria, Voice of	15120af			
1200	1300		Papua New Guinea, Catholic Radio			4960do	
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		Sauth Korea, Radia Korea Intl	9650va		
1200	1300		Taiwan, Radia Taiwan Intl	7130as		
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 Anchar Paint AK	7355as	9615as	
1200	1300		USA, KTBN Salt Lake City UT	7505na		
1200	1300		USA, KWHR Naalehu HI	11555as		
1200	1300		USA, Vaice af America	6160va	9645va	
			9760va	15240va		
1200	1300		USA, WBCQ Kennebunk ME	17495na		
1200	1300		USA, WBOH Newport NC	5920am		
1200	1300		USA, WEWN Birmingham AL	5745na	11530na	
			13615na			
1200	1300		USA, WHRA Greenbush ME	15310na		
1200	1300	as	USA, WHRI Noblesville IN	9840am	11785am	
1200	1300		USA, WINB Red Lian PA	9320am		
1200	1300		USA, WJIE Lauisville 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 Okeechabee FL	5950na	5985na	
			17505na	17750na		
1200	1300		Uzbekistan, Radia Tashkent	7285as	11905as	
			15295as	17775as		
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	1258		Vietnam, Voice of	9840as	12020as	
1230	1300		Bangladesh, Bangla Betar	7185as		
1230	1300		Bulgaria, Radio	11700eu	15700eu	
1230	1300		Sweden, Radio	13580va	15240na	15735va
1230	1300		Thailand, Radio	9600va		
1230	1300		Turkey, Voice of	15225eu	15535va	
1235	1300	as	Austria, Radio Austria Intl	17715va		
1245	1300	twhf	Austria, Radio Austrio Intl	6155eu	13730eu	
			17715va			

1300 UTC - 8AM EST / 7AM CST / 5AM PST

1300	1329		Canada, Radio Canada Intl	9665as	9725as	
1300	1330		Ecuador, HCJB	12005am	21455om	
1300	1330		Egypt, Rodio Coiro	17835as		
1300	1330		Uzbekistan, Radio Tashkent	11905as		
1300	1335		Turkey, Voice of	15225eu	15535va	
1300	1356		Romania, Radio Romonio Intl	11830eu	15105eu	
1300	1357	DRM	China, Chino Broadcast Network		7250va	
			11810va			
1300	1400		Anguilla, Caribbean Beacon	11775am		
1300	1400		Australia, Radio	5995as	6020as	9560pa
			9580pa	9590pa		
1300	1400		Australia, Voice Intl	13685os		
1300	1400	as	Canada, CBC NQ SW Service	9625na		
1300	1400		Canado, CFRX Toronto ON	6070do		
1300	1400		Canada, CFVP Colgary AB	6030do		
1300	1400		Canada, CKZN St John's NF	6160do		
1300	1400		Canada, CKZU Vancouver BC	6160do		
1300	1400		China, China Broadcast Network		9650am	
			11760pa	11900pa	11980as	13790eu
			15260am	17490eu	17625ca	
1300	1400		Costa Rica, University Network	9725va	11870vo	
			13750va			
1300	1400		Germany, Deutsche Welle	6140eu		
1300	1400		Jordan, Radio	11690na		
1300	1400	DRM	Luxembourg, Radio	7145eu		
1300	1400		Moloysio, Radio	7295as		
1300	1400		Malaysia, Voice of	6175as		
1300	1400		New Zealand, Radio NZ Intl	9870pa		
1300	1400		Nigeria, Voice of	15120af		
1300	1400		North Korea, Voice of	4405eu	9335eu	
			11710no	13760na	15245eu	
1300	1400		Papua New Guineo, Catholic Radio		4960do	
1300	1400		Papua New Guinea, NBC	4890do		
1300	1400	vl	Papua New Guinea, Wantok Radio Light		7120va	
1300	1400		Singapore, Radio Singapore Intl		6080as	
			6150as			
1300	1400		South Korea, Radio Korea Intl	9570as	9770as	
1300	1400		UK, BBC World Service	6190af	6195as	
			9740as	11760me	11940af	15190am
			15310as	15420af	15485af	15565va
			15575me	17640vo	17760as	17790as
			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, Vaice af 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 Lian PA	13570am		
1300	1400		USA, WJIE Lauisville KY	7490am		
1300	1400		USA, WRMI Miami FL	7385am		
1300	1400		USA, WTJC Newport NC	9370na		
1300	1400		USA, WWCR Nashville TN	7465na	13845na	
			9985na	15825na		
1300	1400		USA, WYFR Okeechobee FL	11830va	11865va	
			11910va	17750va		
1300	1400		Zambia, Christian Vaice	9555af		
1330	1400	s	Australia, HCJB	15405as		
1330	1400	irreg	Cuba, Radia Havana	9550va	12000va	
			13680va			
1330	1400		Guam, AWR/KSDA	11980as		
1330	1400	mwhfa	Guam, AWR/KSDA	15275as		
1330	1400		Guam, TWR/KTWR	9585as		
1330	1400		India, All India Radia	9690as	11620as	
			13710as			
1330	1400		Laas, National Radia	7145as		
1330	1400		Sweden, Radia	15240na	15735va	
1330	1400		Uzbekistan, Radia Tashkent	7285as	15295as	
			17775as			

1400 UTC - 9AM EST / 8AM CST / 6AM PST

1400	1415		Russia, FEBA	9500as		
1400	1429		Czech Rep, Radio Prague Intl	11600as	21745na	
1400	1430		Australia, Radio	5995as	6080os	7240as
			9590as	9625pa		
1400	1430	DRM	Canada, Radio Canada Intl	7240eu		
1400	1430		Oman, Radio Oman	15140as		
1400	1430		Thailand, Radio	9830va		
1400	1500		Anguilla, Caribbean Beacon	11775am		
1400	1500		Australia, HCJB	15390as		
1400	1500		Australia, Voice Intl	15205as		
1400	1500	as	Canada, CBC NQ SW Service	9625na		
1400	1500		Canada, CFRX Toronto ON	6070do		
1400	1500		Canada, CFVP Calgary AB	6030do		
1400	1500		Canada, CKZN St John's NF	6160do		
1400	1500		Canada, CKZU Vancouver BC	6160do		
1400	1500		Canada, Radio Canada Intl	9515am	13655am	
			17820am			
1400	1500		China, China Broadcast Network		9590as	
			11675as	11765as	11775as	13685af
			13740na	13790eu	17630af	17650eu
1400	1500	DRM	China, China Broadcast Network		9610vo	
1400	1500		Costa Rica, University Network	9725va	11870va	
			13750va			
1400	1500		France, Radio France Intl	7180va	15615va	
1400	1500		Germany, Deutsche Welle	6140eu		
1400	1500		Germany, Overcomer Ministries		6110eu	
			13810me			
1400	1500	vl	Greece, Voice of	7430va		
1400	1500		Guam, TWR/KTWR	9975as		
1400	1500		Indio, All Indio Radio	9690as	11620as	
			13710as			
1400	1500		Japan, Radio	7200as	11730as	11840pa
1400	1500		Jordon, Radio	11690na		
1400	1500	DRM	Luxembaurg, Radio	7145eu		
1400	1500		Malaysia, Radio	7295as		
1400	1500		Malaysia, Voice of	6175as		
1400	1500		Netherlands, Radio	9345va	9890vo	
			11835va			
1400	1500		New Zealand, Radio NZ Intl	9870pa		
1400	1500		Nigeria, Voice of	15120af		
1400	1500	vl	Papua New Guinea, Wantok Radia Light		7120va	
1400	1500		Russia, Voice af	6205as	7390as	9745as
			11755as	15605as	17645as	
1400	1500		Singapare, Mediacorp Radia	6150do		
1400	1500	vl	South Africa, Channel Africa	11825af		
1400	1500		Taiwan, Radio Taiwon Intl	15265as		
1400	1500		UK, BBC World Service	6190af	6195as	
			7105as	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 Dallos TX	13815na		
1400	1500		USA, KJES Vado NM	11715no		
1400	1500		USA, KNLS Anchor Paint AK	9655as		
1400	1500		USA, KTBN Salt Lake City UT	7505na	15590na	
1400	1500		USA, KWHR Naalehu HI	11555as		
1400	1500		USA, Voice of America	6160va	7125va	

			9760va	15185va		
1400	1500		USA, WBCQ Kennebunk ME		17495na	
1400	1500		USA, WBOH Newport NC		5920am	
1400	1500		USA, WEWN Birmingham AL		9955na	11530na
			15745na			
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		9985na	12160na
			13845na	15825na		
1400	1500		USA, WYFR Okeechobee FL		11830va	11910va
			13695va	17750va		
1400	1500		Zambia, Christian Voice		9555af	
1415	1430		Nepal, Radio	3230as	5005as	6100as
			7165as			
1430	1500		Australia, Radio	5995as	6080as	7240as
			9475as	9590pa	9625pa	
1430	1500	a	Germany, Pan American BC		15650as	

1500 UTC - 10AM EST / 9AM CST / 7AM PST

1500	1515		Russia, FEBA	7320as		
1500	1528		Vietnam, Voice of	9550va	9840va	12020va
			13860va			
1500	1530		Australia, HCJB	15425as		
1500	1530		Mongolia, Voice of	12015eu		
1500	1530		UK, BBC World Service		6190af	6195as
			7105as	11690af	11860af	11940af
			12095af	15310as	15400af	15420af
			15485af	17790as	17790as	21470af
			21490af	21660af		
1500	1545		Zambia, Christian Voice		9555af	
1500	1557		Canada, Radio Canada Intl		9635as	11975as
1500	1557		Netherlands, Radio		9345va	9890va
			11835va			
1500	1600		Anguilla, Caribbean Beacon		11775am	
1500	1600		Australia, Radio	5995as	6080as	7240as
			9475as	9590pa	9625pa	
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		9515am	13655am
			17820 qm			
1500	1600		China, China Broadcast Network			6100af
			7160as	11775as	11965eu	13640eu
			13685af	13740na	17490eu	17630af
1500	1600	DRM	China, China Broadcast Network			9610va
1500	1600		Costa Rica, University Network		9725va	11870va
			13750va			
1500	1600	a	Germany, Bible Voice Broadcasting			17510as
1500	1600		Germany, Deutsche Welle		6140eu	
1500	1600		Germany, Overcomer Ministries			6110eu
			13810me			
1500	1600	vl	Greece, Voice of	7430va		
1500	1600		Japan, Radio	6190as	7200as	9505va
			11730as			
1500	1600		Jordan, Radio	11690na		
1500	1600	DRM	Luxembourg, Radio		7145eu	
1500	1600		Malaysia, Radio	7295as		
1500	1600		Malaysia, Voice of	6175as		
1500	1600		New Zealand, Radio NZ Intl		9870pa	
1500	1600		North Korea, Voice of		3560af	4405eu
			9335eu	11710na	13760va	15245va
1500	1600	vl	Papua New Guinea, Wantok Radio Light			7120va
1500	1600		Russia, Voice of	4965me	4975me	7315af
			7325me	9810eu	11980eu	11985me
1500	1600	DRM	Russia, Voice of	5810eu		
1500	1600		Singapore, Mediacorp Radio		6150do	
1500	1600	vl	South Africa, Channel Africa		17770af	
1500	1600		UK, BBC World Service		15565eu	15575me
1500	1600		UK, CVC International		15680af	
1500	1600	vl/ mtwhf	UK, Sudan Radio Service		15530va	
1500	1600		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1500	1600		USA, KAIJ Dallas TX		13815na	
1500	1600		USA, KJES Vado NM		11715na	
1500	1600		USA, KTBN Salt Lake City UT		15590na	
1500	1600		USA, KWHR Naalehu HI		11555as	
1500	1600		USA, Voice of America		7125va	9825va
			9850af	15195va	15445va	15580af
			17715va			
1500	1600	mtwhf	USA, Voice of America		9645va	13690va
			15105va			
1500	1600		USA, WBCQ Kennebunk ME		17495na	
1500	1600		USA, WBOH Newport NC		5920am	
1500	1600		USA, WEWN Birmingham AL		9955na	11530na
			15745na			
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		9985na	12160na
			13845na	15825na		
1500	1600		USA, WYFR Okeechobee FL		11830va	11910va
			15520va	15770va	17750va	
1505	1520	m	Austria, Radio Austria Intl		13775na	
1505	1530	as	Austria, Radio Austria Intl		13775na	
1515	1530	twhf	Austria, Radio Austria Intl		13775na	
1515	1600		Russia, FEBA	7320as		
1530	1600	mwh	Germany, Bible Voice Broadcasting			17510as
1530	1600		Iran, Voice of the Islamic Rep		9635as	11650as
1530	1600	mtwhf	South Korea, Radio Korea Intl		15725na	
1530	1600		UAE, AWR Africa	15225as		
1530	1600		UK, BBC World Service		6190af	11940af
			12095af	15400af	15485af	21470af
			21660af			
1530	1600		USA, Voice of America		6160va	9590va
			9760va	9845va	12040va	15550va
1530	1600		Vatican City, Vatican Radio		12065as	13765as
			15235as			
1535	1300	as	Austria, Radio Austria Intl		13775na	
1540	1600	mtwhf	Germany, Bible Voice Broadcasting			13590me
1545	1600	m	Austria, Radio Austria Intl		13775na	
1545	1600	twhf	Austria, Radio Austria Intl		13775na	
1545	1600	as	Germany, Bible Voice Broadcasting			13590me

1600 UTC - 11AM EST / 10AM CST / 8AM PST

1600	1615	mtwhf	Germany, Bible Voice Broadcasting			13590me
1600	1615		Pakistan, Radio	4790va	5027af	5080va
			11570va	15100va		
1600	1627		Iran, Voice of the Islamic Rep		9635as	11650as
1600	1628	s	Hungary, Radio Budapest		6025eu	9565eu
1600	1628		Vietnam, Voice of	7280va	9550va	9730va
			11630va	13860va		
1600	1630	a	Germany, Pan American BC		13820me	
1600	1630		Guam, AWR/KSDA	11640as	11680as	12015as
1600	1630		Jordan, Radio	11690na		
1600	1630		Myanmar, Radio	9730do		
1600	1650		New Zealand, Radio NZ Intl		9870pa	
1600	1659		Canada, Radio Canada Intl		9515am	13655am
			17870am			
1600	1700		Anguilla, Caribbean Beacon		11775am	
1600	1700		Australia, Radio	5995as	6080as	7240as
			9475as	9710as		
1600	1700		Australia, Voice Intl		11840as	13635as
			15205as			
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 Broadcast Network			6100af
			9570af	11900af	11940eu	11965eu
			13760eu	17490eu		
1600	1700	DRM	China, China Broadcast Network			17510va
1600	1700		Costa Rica, University Network		11870va	13750va
1600	1700		Ethiopia, Radio	5990af	7110af	7165af
			9560af	9704af	11800af	
1600	1700		France, Radio France Intl		7170af	9730af
			15160af	15605af	17605af	17850af
1600	1700	as	Germany, Bible Voice Broadcasting			13590me
1600	1700		Germany, Deutsche Welle		6170as	9795as
			11695as			
1600	1700		Germany, Overcomer Ministries			9845eu
1600	1700	DRM	Luxembourg, Radio		7145eu	
1600	1700		Malaysia, Radio	7295as		
1600	1700		Malaysia, Voice of	6175as		
1600	1700		North Korea, Voice of		3560va	9990me
			11545va			
1600	1700	vl	Papua New Guinea, Wantok Radio Light			7120va
1600	1700		Russia, Voice of	6070va	9405as	11640as
			11985af	12055va	12115va	15540va
1600	1700		South Korea, Radio Korea Intl		5975va	9870va
1600	1700		Taiwan, Radio Taiwan Intl		11815as	
1600	1700	DRM	Taiwan, Radio Taiwan Intl		9770as	
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		UK, CVC International		15680af	
1600	1700	vl/ mtwhf	UK, Sudan Radio Service		15530va	
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	mtwhfa	USA, WMLK Bethel PA	9265eu		
1600	1700		USA, WRMI Miami FL	7385am		
1600	1700		USA, WTJC Newport NC	9370na		
1600	1700		USA, WWCR Nashville TN	9985na	12160na	
			13845na	15825na		
1600	1700		USA, WWRB Manchester TN	9320na	12170na	
1600	1700	mtwhf	USA, WWRB Manchester TN	15250na		
1600	1700		USA, WYFR Okeechobee FL	6085va	11830va	
			11865va	13695va	15520va	17750va
			18980va	21455va	21525va	
1600	1700		Zambia, Christian Voice	4965af		
1615	1630		Vatican City, Vatican Radio	4005eu	5885eu	
			7250eu	9645me	15595me	
1615	1700	as	UK, BBC World Service	11690af		
1630	1645	h	Germany, Bible Voice Broadcasting		13590me	
1630	1700		Egypt, Radio Cairo 11880af			
1630	1700	t	Germany, Bible Voice Broadcasting		13590me	
1630	1700		Guam, AWR/KSDA 11975as			
1651	1700		New Zealand, Radio NZ Intl	9870pa		

1700 UTC - 12PM EST / 11AM CST / 9AM PST

1700	1710	mtwh	Moldova, Radio PMR	5960eu		
1700	1720	f	Moldova, Radio PMR	5960eu		
1700	1727		Czech Rep, Radio Prague Intl	5930eu	15710af	
1700	1728		Vietnam, Voice of 9725eu			
1700	1730		France, Radio France Intl	15605af	17605af	
1700	1730		Swaziland, TWR 3200af			
1700	1745		UK, BBC World Service	3255af	6005af	
			6190af	9630af	12095af	15105af
			15400af	15420af	17820af	17830af
			21470af			
1700	1750		New Zealand, Radio NZ Intl	9870pa		
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 Broadcast Network		9695eu	
			11940eu	13760eu		
1700	1800	DRM	China, China Broadcast Network		12080va	
1700	1800		Costa Rica, University Network	11870va	13750va	
1700	1800		Egypt, Radio Cairo 11880af			
1700	1800		Eqt Guinea, Radio Africa	15190af		
1700	1800	wf	Germany, Bible Voice Broadcasting		13590me	
1700	1800	as	Germany, Bible Voice Broadcasting		9430me	
1700	1800		Germany, Overcomer Ministries		9845eu	
1700	1800		Japan, Radio	9535va	11970eu	15355af
1700	1800	DRM	Luxembourg, Radio	7145eu		
1700	1800		Malaysia, Radio 7295as			
1700	1800		Malaysia, Voice of 6175as			
1700	1800		Nigeria, Voice of 15120va			
1700	1800	vl	Papua New Guinea, Wantok Radio Light		7120va	
1700	1800		Russia, Voice of	7390eu	9405os	9820eu
			9890eu	11510af	11985af	
1700	1800		South Africa, Channel Africa	15285af		
1700	1800		UK, BBC World Service	3915as	5975as	
			6195eu	7160as	9510as	12095va
			15310as	15565va		
1700	1800		UK, CVC International	15680af		
1700	1800	vl/ mtwhf	UK, Sudan Radio Service	11715va		
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	mtwhf	USA, WINB Red Lion PA	13570am		
1700	1800		USA, WJIE Louisville KY	7490am		
1700	1800	mtwhfa	USA, WMLK Bethel PA	9265eu		
1700	1800		USA, WMLK Bethel PA	15265eu		
1700	1800		USA, WRMI Miami FL	7385am		
1700	1800		USA, WTJC Newport NC	9370na		
1700	1800		USA, WWCR Nashville TN	9985na	12160na	
			13845na	15825na		
1700	1800		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		
1730	1745	vl	Libya, Voice of Africa	11860af		
1730	1745	f	Russia, FEBA	7345as		
1730	1745	mtwhf	UK, United Nations Radio	7170af	15495me	
			17810af			
1730	1800		Guam, AWR/KSDA 9385me			
1730	1800		Liberia, ELWA 4760do			
1730	1800		Philippines, Radio Pilipinas	11720va	15190va	
			17720va			
1730	1800		Slovakia, Radio Slovakia Intl	5915eu	6055eu	
1730	1800		Swaziland, TWR 3200af	9500af		
1730	1800		Sweden, Radio	6065va		
1730	1800	mtwhf	USA, Voice of America	4930af	11975af	
			17895af			
1730	1800		Vatican City, Vatican Radio	11625af	13765af	
			15570af			
1740	1800	as	USA, Voice of America	4930af	11975af	
			17895af			
1745	1800		Bangladesh, Bangla Betar	7185eu		
1745	1800		India, All India Radio	7410eu	9445af	
			9950eu	11620eu	11935af	13605af
			15075af	15155af	17670af	
1745	1800	vl	Libya, Voice of Africa	15220af	15615af	
			15660af	17695af		
1745	1800		UK, BBC World Service	3255af	6190af	
			12095af	15105af	15400af	15420af
			17820af	17830af	21470af	
1751	1800		New Zealand, Radio NZ Intl	11980pa		

1800 UTC - 1PM EST / 12PM CST / 10AM PST

1800	1810		Zanzibar, Radio Tanzania	11735af		
1800	1815	a	Germany, Bible Voice Broadcasting		11965as	
1800	1827		Czech Rep, Radio Prague Intl	5930eu	9400va	
1800	1828		Vietnam, Voice of 7280va	9730va		
1800	1830	w f	Austria, AWR Europe	15280af		
1800	1830		Egypt, Radio Cairo 11880af			
1800	1830	as	Germany, Bible Voice Broadcasting		6015eu	
1800	1830	s	Germany, Universal Life	15675af		
1800	1830		South Africa, AWR Africa	3215af	3345af	
			11925af			
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	11980pa		
1800	1856		Romania, Radio Romania Intl	9635eu	11830eu	
1800	1857		Netherlands, Radio	6020af	9895af	
			11655af			
1800	1859		Canada, Radio Canada Intl	7185af	9770af	
			11875af	17740af		
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		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 Broadcast Network		9695eu	
			11940eu	13760eu		
1800	1900	DRM	Chino, China Broadcast Network		12080va	
1800	1900		Costa Rica, University Network	11870va	13750va	
1800	1900		Eqt Guinea, Radio Africa	15190af		
1800	1900	a	Germany, Bible Voice Broadcasting		9430me	
1800	1900		Germany, Overcomer Ministries		13810me	
1800	1900		India, All India Radio	7410eu	9445af	
			9950eu	11620eu	11935af	13605af
			15075af	15155af	17670af	
1800	1900		Liberia, ELWA 4760do			
1800	1900		Malaysia, Radio 7295as			
1800	1900		Malaysia, Voice of 6175as			
1800	1900		Nigeria, Voice of 15120va			
1800	1900		North Korea, Voice of	4405eu	13760eu	
			15245eu			
1800	1900	vl	Papua New Guinea, Wantok Radio Light		7120va	

1800	1900		Philippines, Radio Pilipinas 17720va	11720va	15190va	
1800	1900		Russia, Voice of 9890eu	9480eu	9745af	9820eu 11510af
1800	1900		Taiwan, Radio Taiwan Intl	3965eu		
1800	1900		UK, BBC World Service 12095me	6195eu	9410eu	15310me
1800	1900		UK, CVC International	9765af		
1800	1900		USA, AFRTS 7590usb 12133usb	4319usb	5446usb	5765usb 7812usb 12579usb 12579usb 13362usb 13855usb
1800	1900		USA, KAIJ Dallas TX	13815na		
1800	1900		USA, KTBN Salt Loke City UT	15590na		
1800	1900		USA, Voice of America 11975af	4930af	9850af	15410af 15580af 17895af
1800	1900		USA, WBCQ Kennebunk ME 17495no	7415na	9330na	
1800	1900		USA, WBOH Newport NC	5920am		
1800	1900		USA, WEWN Birmingham AL 15685va	11530va	13615va	15745va
1800	1900		USA, WHRA Greenbush ME	17640na		
1800	1900		USA, WHRI Nablesville IN	15285am	15785om	
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 13845na	9975na	12160na	15825na
1800	1900		USA, WWRB Manchester TN 12170na	9320na	11920na	
1800	1900	mtwhf	USA, WWRB Manchester TN	15250na		
1800	1900		USA, WYFR Okeechobee FL 13800eu	13695eu	13780eu 17525eu	17795eu 18980va
1800	1900		Yemen, Rep of Yemen Radio	9780me		
1800	1900		Zambia, Christian Voice	4965of		
1815	1830	vl	Libya, Voice of Africa 11715af	9485af	11635af	11860af 15660of 17695af
1815	1900		Bangladesh, Banglo Betar	7185as		
1830	1845		Israel, Kol Israel 7545va	9345vo	11590va	
1830	1845		Sweden, IBRA Radio	9485eu		
1830	1900		Bulgaria, Radio 5800eu	7500eu		
1830	1900		Serbia & Montenegro, Intl Radio		6100eu	
1830	1900		Turkey, Voice of 9785eu			
1830	1900		UK, BBC World Service 6005af 12095af 21470af	3255af	3915as	6190af 9410af 9630af 15400af 15420af 17830af
1845	1900		Congo, RTV Congolaise	4765af	5985af	
1851	1900		New Zealand, Radio NZ Intl	15720pa		

1900 UTC - 2PM EST / 1PM CST / 11AM PST

1900	1915		Congo, RTV Congolaise	4765af	5985af	
1900	1920		Turkey, Voice of 9785eu			
1900	1928		Vietnam, Voice of 7280va	9730va		
1900	1930	s	Germany, Bible Voice Broadcasting		6015me	
1900	1930	a	Germany, Bible Voice Broadcasting		9430af	
1900	1930	s	Germany, Universal Life	13820me		
1900	1930		Lithuanio, Radio Vilnius	9710eu		
1900	1930		Philippines, Rodio Pilipinas 17720va	11720va	15190va	
1900	1945		India, All India Radio 9950eu 15075af	7410eu	9445af 11620eu	11935af 13605af 15155af 17670af
1900	2000		Anguillo, Caribbean Beacon	11775am		
1900	2000		Australia, Radio 9580as	6080as	7240as	9500as 9710as
1900	2000		Australio, Voice Intl	11685as		
1900	2000		Canada, CFRX Toronto ON	6070do		
1900	2000		Canada, CFVP Calgary AB	6030do		
1900	2000		Canada, CKZN St John's NF	6160do		
1900	2000		Canada, CKZU Vancouver BC	6160do		
1900	2000		China, China Broadcast Network 9440af		7295vo	11940eu
1900	2000	DRM	China, China Broadcast Network		12080va	
1900	2000		Costa Rica, University Network	11870va	13750va	
1900	2000		Eqt Guinea, Radio Africa	15190af		
1900	2000		Germany, Deutsche Welle	12025af	15470af	
1900	2000		Germany, Overcomer Ministries		13810me	
1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do	
1900	2000	vl	Greece, Voice of 7430vo			
1900	2000		Liberia, ELWA 4760do			
1900	2000		Malaysia, Radio 7295os			
1900	2000	vl	Namibia, Namibian BC Corp 6060do	3270do	3290do	6175do
1900	2000		Netherlands, Radio 11655af	7120af	9895af	17810af
1900	2000	as	Netherlands, Radio 17735na	15315na	17660na	
1900	2000		New Zealand, Radio NZ Intl	15720pa		
1900	2000		Nigeria, Rodio/Ibadon	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 11910eu	4405eu	9975eu	11535eu
1900	2000		Papua New Guinea, Cotholic Radio		4960do	
1900	2000		Papua New Guinea, NBC	4890do		
1900	2000	vl	Papua New Guinea, Wantok Radio Light		7120va	
1900	2000		Russia, Voice of 7380eu	9890eu		
1900	2000	vl/DRM	Russia, Voice of 5820eu			
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	vl	South Africa, Channel Africa	3345af		
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 6190af 12095af	6195eu	9410vo	3255af 6005af 9630af 15310me 15400af 17830af
1900	2000		UK, CVC International	9765af		
1900	2000		USA, AFRTS 7590usb 12133usb	4319usb	5446usb	5765usb 7812usb 12579usb 12579usb 13362usb 13855usb
1900	2000		USA, KAIJ Dallas TX	13815na		
1900	2000		USA, KJES Vodo NM	15385na		
1900	2000		USA, KTBN Salt Lake City UT	15590no		
1900	2000		USA, Voice of America 9670va 13760af	4930af	9850af	6040af 11975af 13635va 15410af 15445af 15580af
1900	2000		USA, WBCQ Kennebunk ME 17495na	7415na	9330na	
1900	2000		USA, WBOH Newport NC	5920am		
1900	2000		USA, WEWN Birmingham AL 15685va	11530va	13615va	15745va
1900	2000		USA, WHRA Greenbush ME	15665na		
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 13845na	9975na	12160na	15825na
1900	2000		USA, WWRB Manchester TN 12170na	9320na	11920na	
1900	2000	mtwhf	USA, WWRB Manchester TN	15250no		
1900	2000		USA, WYFR Okeechobee FL 13695af 18930af	3230af	6085af	13800af 17795af 17845af 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 9925af	7205eu	9800eu	11860af
1930	2000		Slovakia, Radio Slovakio Intl	5915eu	7345eu	
1930	2000		Sweden, Radio 6065va			
1930	2000	ws	UK, Solama Rodio 11885va			
1935	1955		Italy, RAI Intl 6035eu	9760eu		
1945	2000	mtwhfo	Albania, Rodio Tirana	6225eu	7530eu	
1945	2000	vl	Rwanda, Rodio 6055do			
1950	2000		Vatican City, Vatican Radio 7250eu	4005eu	5885eu	9645eu

2000 UTC - 3PM EST / 2PM CST / 12PM PST

2000	2015	s	Germony, Pan American BC	9430af		
2000	2025		Israel, Kol Israel 15640af	6280va	7545va	11590va
2000	2027		Iron, Voice of the Islamic Rep 9925af	7205eu	9800eu	11860af
2000	2028		Hungary, Radio Budapest	3975eu	6025eu	
2000	2030		Australia, Voice Intl	11685as		
2000	2030		Mongolia, Voice of	12015eu		
2000	2030		South Africa, AWR Africa	9655af		
2000	2030		Swaziland, TWR 3200of			
2000	2030	ws	UK, Saloma Radio	11885va		
2000	2030		USA, Voice of America 9850af 15445af	4930af	4940cf	11975af 13670af 15410af
2000	2030		Vatican City, Vatican Radio 13765af	9755af	11625of	
2000	2057	as	Netherlands, Radio 17735na	15315na	17660no	
2000	2059	mtwhf	Spain, Rodio Exterior Espana	9570af	15290eu	

2000	2100		Anguilla, Caribbean Beacon	11775am		
2000	2100		Australia, ABC NT Alice Springs 4835irr			2310da
2000	2100		Australia, ABC NT Katherine	2485da		
2000	2100		Australia, ABC NT Tennant Creek			2325da
2000	2100		Australia, Radia 12080as	9500pa	11650as	11660as
2000	2100		Canada, CFRX Taranta ON	6070da		
2000	2100		Canada, CFVP Calgary AB	6030do		
2000	2100		Canada, CKZN St Jahn's NF	6160da		
2000	2100		Canada, CKZU Vancauver BC	6160da		
2000	2100		China, China Broadcast Network 7285eu	7295va	9600eu	5960eu 9855eu
			11640af	11790eu	13630af	
2000	2100	DRM	China, China Broadcast Network			12080va
2000	2100		Casta Rica, University Network	13750va		
2000	2100		Eqt Guinea, Radio Africa	15190af		
2000	2100		Germany, Deutsche Welle 12025af	9735af	15410af	9830af
2000	2100		Germany, Overcamer Ministries			13810me
2000	2100	vl	Ghana, Ghana BC Carp	3366da		4915da
2000	2100		Indonesia, Vaice af 15150al	9525as		11785pa
2000	2100	vl	Italy, IRRS	5775va		
2000	2100		Liberia, ELWA	4760da		
2000	2100		Malaysia, Radia	7295as		
2000	2100	vl	Namibia, Namibian BC Carp 6060da	3270da	6175da	3290da
2000	2100		New Zealand, Radia NZ Intl	15720pa		
2000	2100		Nigeria, Radio/Ibadan	6050da		
2000	2100		Nigeria, Radio/Kaduna	4770da		6090da
2000	2100		Nigeria, Radia/Lagas	3326da		4990da
2000	2100		Nigeria, Vaice af	7255va		
2000	2100		Papua New Guinea, Cathalic Radia			4960da
2000	2100		Papua New Guinea, NBC	4890da		
2000	2100	vl	Papua New Guinea, Wantak Radio Light			7120va
2000	2100		Russia, Voice of	7310eu	7330eu	
2000	2100	vl/DRM	Russia, Voice of	5820eu		
2000	2100		Sierra Leone, Radio UNAMSIL	6137da		
2000	2100	vl	Solomon Islands, SIBC	5020do		9545do
2000	2100	vl	South Africa, Channel Africa	3345af		
2000	2100	vl	Uganda, Radio	4976do	5026do	7196do
2000	2100		UK, BBC World Service 6195af	3255af	6005af	
			15400af	9410af	9630af	12095af
				17830af		
2000	2100		UK, CVC International		7285af	
2000	2100		USA, AFRTS 7590usb	4319usb	5446usb	5765usb
			12133usb	7812usb	12133usb	12579usb
				12579usb	13362usb	13855usb
2000	2100		USA, KAIJ Dallas TX		13815na	
2000	2100		USA, KJES Vado NM		15385na	
2000	2100		USA, KTBN Salt Lake City UT		15590na	
2000	2100		USA, Vaice of America 13635va		6040va	9670va
2000	2100		USA, WBCQ Kennebunk ME 17495na		7415na	9330na
2000	2100		USA, WBOH Newport NC		5920am	
2000	2100		USA, WEWN Birmingham AL 15745va		11530va	13615va
				17595va		
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 Lauisville 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		9975na	12160na
				15825na		
2000	2100		USA, WWRB Manchester TN 12170na		9320na	11920na
2000	2100	mtwhf	USA, WWRB Manchester TN		15250na	
2000	2100		USA, WYFR Okeechobee FL 15195va		3230va	13800va
			17845va	17725af	17750va	17795va
				18980va		
2000	2100		Zambia, Christian Voice		4965af	
2000	2100	vl	Zimbabwe, ZBC Corp		5975do	
2005	2100		Syria, Radio Damascus 13610al		9330eu	12085eu
2025	2045		Italy, RAI Intl	6020af		
2030	2045	vl	Libya, Voice of Africa		11635af	
2030	2045		Thailand, Radio	9680eu		
2030	2058		Vietnam, Voice of 9550va	7280va	9550va	7280va
				11630va		
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		5060eu	9715eu
2045	2100		India, All India Radio 9910pa	9950eu	7410eu	9445eu
					11620pa	11715pa

2100 UTC - 4PM EST / 3PM CST / 1PM PST

2100	2120		Turkey, Voice af	9730as		
2100	2127		Czech Rep, Radia Prague Intl	5930va		9430va
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	9625na		
2100	2130		China, China Broadcast Network 13630af			11640af
2100	2130		Cuba, Radia Havana	9505va		11760va
2100	2130	vl	Italy, IRRS	5775va		
2100	2130		Serbia & Mantenegra, Intl Radia			6100eu
2100	2130	mtwhf	UK, BBC Warld Service	11675am		
2100	2145		Nigeria, Radia/Ibadan	6050da		
2100	2157	DRM	China, China Broadcast Network			12080va
2100	2159		Canada, Radia Canada Intl 15180am	5850eu		9770eu
2100	2159	as	Spain, Radia Exteriar Espana	9570va		9840va
2100	2200		Anguilla, Caribbean Beacon	11775am		
2100	2200		Australia, ABC NT Alice Springs 4835irr			2310da
2100	2200		Australia, Radia 12080pa	9660as	11650as	11660as
				13630pa	15515pa	
2100	2200		Austria, AWR Europe		9715af	
2100	2200		Canada, CFRX Taranta ON	6070da		
2100	2200		Canada, CFVP Calgary AB	6030da		
2100	2200		Canada, CKZN St Jahn's NF	6160do		
2100	2200		Canada, CKZU Vancauver BC	6160da		
2100	2200		Casta Rica, University Network	13750va		
2100	2200		Egypt, Radia Caira	15375af		
2100	2200		Eqt Guinea, Radio Africa	15190af		
2100	2200		Germany, Deutsche Welle	9615af		11690af
2100	2200		Germany, Overcamer Ministries			13810me
2100	2200	vl	Ghana, Ghana BC Corp	3366do		4915do
2100	2200		Guyana, Voice of	3291do		5950do
2100	2200		India, All India Radio 9910pa	7410eu	9950eu	9445eu
					11620pa	11715pa
2100	2200		Japan, Radio 11855af	6035pa	6055eu	6180eu
				17825na	21670pa	
2100	2200		Liberia, ELWA	4760do		
2100	2200		Liberia, Star Radio	11965af		
2100	2200		Malaysia, Radia	7295as		
2100	2200	vl	Namibia, Namibian BC Corp 6060do	3270do	6175do	3290do
2100	2200		New Zealand, Radia NZ Intl	15720pa		
2100	2200		Nigeria, Radio/Kaduna	4770do		6090do
2100	2200		Nigeria, Radia/Lagos	3326do		4990do
2100	2200		North Korea, Vaice of 15245eu	4405eu		13760eu
2100	2200		Papua New Guinea, Catholic Radio			4960do
2100	2200		Papua New Guinea, NBC	4890do		
2100	2200	vl	Papua New Guinea, Wantok Radio Light			7120va
2100	2200	vl/DRM	Russia, Voice af	5820eu		
2100	2200	vl	Rwanda, Radio	6055do		
2100	2200		Sierra Leone, Radio UNAMSIL	6137do		
2100	2200	irreg/ vl	Sierra Leone, SLBS	3316do		
2100	2200	vl	South Africa, Channel Africa	3345af		
2100	2200		South Korea, Radio Korea Intl	3955eu		
2100	2200		Syria, Radio Damascus 13610al		9330eu	12085eu
2100	2200		UK, BBC World Service 5965as	3255af	3915as	
			6195as	6005af	6110as	6190af
			15400af	9410af	9605af	15390am
2100	2200		Ukraine, Radio Ukraine Intl	5830eu		
2100	2200		USA, AFRTS 7590usb	4319usb	5446usb	5765usb
			12133usb	7812usb	12133usb	12579usb
				12579usb	13362usb	13855usb
2100	2200		USA, KAIJ Dallas TX		13815na	
2100	2200		USA, KTBN Salt Lake City UT		15590na	
2100	2200		USA, Voice of America 12140as	15410af	4930af	11975af
					15445af	
2100	2200		USA, WBCQ Kennebunk ME 17495na		7415na	9330na
2100	2200		USA, WBOH Newport NC		5920am	
2100	2200		USA, WEWN Birmingham AL 15745va		11530va	13615va
				17595va		
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 Nashville TN 13845na		9975na	12160na
				15825na		
2100	2200		USA, WWRB Manchester TN 12170na		9320na	11920na
2100	2200	mtwhf	USA, WWRB Manchester TN		15250na	
2100	2200		USA, WYFR Okeechobee FL 17725va		11565va	13800va
				17795va	17845va	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	7165eu	9535eu	
			9645eu 11940na			
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	5060eu	9715eu	
			11905eu			

2200 UTC - 5PM EST / 4PM CST / 2PM PST

2200	2205		Syria, Radio Damascus	9330eu	12085eu	
2200	2228		Hungary, Radio Budapest	6025eu	9735eu	
2200	2229		Canada, Radio Canada Intl	11990sa		
2200	2230		India, All India Radio	7410eu	9445eu	
			9910pa 9950eu	11620pa	11715pa	
2200	2230		Papua New Guinea, NBC	9675do		
2200	2230	mtwhfs	Serbia & Montenegro, Intl Radio		7230pa	
2200	2235		New Zealand, Radio NZ Intl	15720pa		
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	13630as	15230as	
			15240pa 15515pa	21740pa		
2200	2300		Bulgaria, Radio 5800eu	7500eu		
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	DRM	Canada, Radio Canada Intl	9800na		
2200	2300		China, China Broadcast Network		7175eu	
2200	2300		Costa Rica, University Network	13750va		
2200	2300		Eqt Guinea, Radio Africa	15190af		
2200	2300		Germany, Deutsche Welle	6180as	6225as	
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do	
2200	2300		Guyana, Voice of 3291do			
2200	2300	vl/fs	Italy, IRRS 5775vo			
2200	2300		Malaysia, Radio 7295as			
2200	2300	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060do 6175do			
2200	2300		Nigeria, Radio/Ibadon	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	vl/DRM	Russia, Voice of 5820eu			
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	5965as	5975am	
			6195as 7105as	9605va	9740as	
			11955as 15400af			
2200	2300		USA, AFRTS 4319usb	5446usb	5765usb	
			7590usb 7812usb	12133usb	12579usb	
			12133usb 12579usb	13362usb	13855usb	
2200	2300		USA, KAIJ Dallas TX	13815na		
2200	2300		USA, KTBN Salt Lake City UT	15590na		
2200	2300		USA, Voice of Americo	7215va	12140as	
			15185va 15290va	15305va	17740va	
			17820va			
2200	2300		USA, WBCQ Kennebunk ME	5110na	7415na	
			9330na 17495no			
2200	2300		USA, WBOH Newport NC	5920am		
2200	2300		USA, WEWN Birmingham AL	9355va	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	7465na	9985na	
			12160na 13845na			
2200	2300		USA, WWRB Monchester TN	6890na	11920na	
2200	2300		USA, WYFR Okeechobee FL	11740va	15770va	
2200	2300		Zambia, Christion Voice	4965af		
2205	2230		Itoly, RAI Intl 6090as			
2215	2230	vl	Croatia, Croatian Radio	9925na		
2223	2228		Libya, Voice of Africa	7320af		
2230	2257		Czech Rep, Radio Prague Intl	5930no	7345af	
2230	2259		Canada, Rodio Canada Intl	6160as	7195as	
			9730as			
2230	2300	mtwhfa	Albania, Radio Tirana	7110eu		
2230	2300	as	Australia, HCJB 15530as			
2230	2300		Guam, AWR/KSDA	11850as	15320as	
2230	2300		USA, Voice of America	9570va	13755va	
			15145va			
2236	2300		New Zealand, Radio NZ Intl	17675pa		
2245	2300		India, All India Radio	9705as	9950as	
			11620as 11645as	13605as		

2300 UTC - 6PM EST / 5PM CST / 3PM PST

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	smtwhf	Canada, CBC NQ SW Service	9625na		
2300	0000		Canada, CFRX Toronto ON	6070do		
2300	0000		Canada, CFVP Calgary AB	6030do		
2300	0000		Canada, CKZN St John's NF	6160do		
2300	0000		Canada, CKZU Vancouver BC	6160do		
2300	0000		China, China Broadcast Network		5915as	
			5990am 6145na	7180as	13680na	
2300	0000		Costa Rica, University Network	13750va		
2300	0000		Cuba, Radio Havana	9550na	12000na	
			13680na			
2300	0000		Egypt, Radio Cairo	11885na		
2300	0000		Germany, Deutsche Welle	6070as	9555af	
			9815as			
2300	0000	DRM	Germany, Deutsche Welle	9800na		
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do	
2300	0000		Guyana, Voice of 3291do			
2300	0000		India, All India Radio	9705as	9950as	
			11620as 11645as	13605as		
2300	0000		Malaysia, Radio 7295as			
2300	0000	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060do 6175do			
2300	0000		New Zealand, Radio NZ Intl	17675pa		
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	5446usb	5765usb	
			7590usb 7812usb	12133usb	12579usb	
			12133usb 12579usb	13362usb	13855usb	
2300	0000		USA, KAIJ Dallas TX	13815na		
2300	0000		USA, KTBN Salt Lake City UT	15590na		
2300	0000		USA, Voice of America	12140as		
2300	0000		USA, WBCQ Kennebunk ME	5110na	7415na	
			9330na			
2300	0000		USA, WBOH Newport NC	5920am		
2300	0000		USA, WEWN Birmingham AL	9355va	9975va	
2300	0000		USA, WHRA Greenbush ME	7520na		
2300	0000	mtwhfa	USA, WHRI Noblesville IN	9495am		
2300	0000		USA, WINB Red Lion PA	9320am		
2300	0000		USA, WJIE Louisville KY	7490am	13595am	
2300	0000	as	USA, WRMI Miami FL	7385am		
2300	0000		USA, WRMI Miami FL	9955am		
2300	0000		USA, WTJC Newport NC	9370na		
2300	0000		USA, WWCR Nashville TN	5070na	7465na	
			9985na 12160na			
2300	0000		USA, WWRB Manchester TN	3185na	5050na	
			5085no 5745na	6890na		
2300	0000		USA, WYFR Okeechobee FL	11740va	15255vo	
			17750va			
2300	0000		Zambia, Christian Voice	4965af		
2300	2315		Nigeria, Radio/Kaduna	4770do	6090do	
2300	2315		Nigeria, Radio/Lagos	3326do		
2300	2330		Australia, Radio 9660as	12080as	13620as	
			13630pa 15230pa	15240pa	21740pa	
2300	2330		UK, BBC World Service	3915as	5965as	
			6195as 9605as	9740as	11945as	
			11955as 15280as			
2300	2330		USA, Voice of America	9570va	13755va	
			15145va			
2300	2356		Romania, Radio Romania Intl	6140eu	7265eu	
			9645eu 11940na			
2300	2359		Canada, Radio Canada Intl	6100am		
2330	0000		Australia, Radio 9660as	12080as	13620as	
			13630pa 15230pa	15415pa	17750pa	
			17795pa 21740pa			
2330	0000		Burma, Dem Voice of Burmo	9435eu		
2330	0000		Lithuania, Radio Vilnius	9875na		
2330	0000		UK, BBC World Service	9740as	11945as	
			11955as 15280as			
2330	0000		USA, Voice of America	7260va	13725va	
2330	2357		Czech Rep, Radio Prague Intl	5930na	7345af	
2330	2358		Vietnam, Voice of 9840as	12020va		

SHORTWAVE GUIDE

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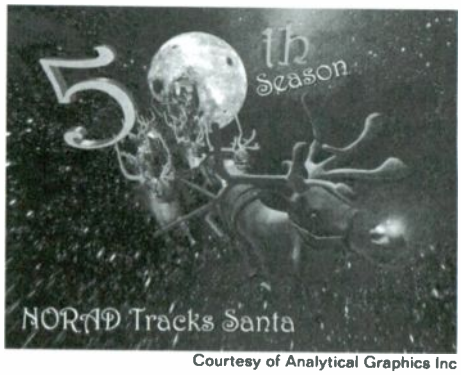
50 Years of Tracking Santa



Courtesy of Analytical Graphics Inc

For the last 49 years on Christmas Eve, the United States military has performed a special mission – tracking Santa Claus. Who is the military organization that performs this service? – North American Aerospace Defense Command (NORAD).

"Good" parents and kids will enjoy watching the Jolly Old Elf during his worldwide travels on "Santa Cams" linked to computers and television sets around the country. NORAD even has a website set up to report on Santa's travels at **http://www.noradsanta.org/**

NORAD won the honor of tracking Santa as a part of their real mission in the defense of this country – to deter, detect and defend. It is played out on a daily basis in the skies over the United States and Canada. NORAD's mission involves the protection of our borders and airspace from attack, and protection for selected government leaders when they fly on government aircraft. And if you have a milair band capable scanner, you can get in on the NORAD action from just about anywhere in the continental U.S.

Table One is a list of NORAD frequencies you should put in a bank/system of your scanner and monitor for activity. You don't need to live near a military base to hear NORAD communications. In our post 9/11 world, major events (sports, parades, national conventions, etc) and VIP movements can trigger a NORAD Combat Air Patrol (CAP). So keep these frequencies handy and you may be pleasantly surprised who you may hear on NORAD frequencies. And congratulations to NORAD on their 50th anniversary of tracking the big guy!

❖ SE Milcom Freqs

Our old friend Jack NeSmith checks in with the following list of frequencies he has recently monitored from his Florida listening post. Thanks, Jack.

227.075	Eglin AFB, FL W-470A [Only thing I have is 125FW/159FS NORAD CAP Air-to-Air-LVH]
227.400	Unknown
234.800	Jacksonville IAP, FL 125FW
236.250	St. Augustine, FL Grumman "Echo Base"
237.800	NAS Jacksonville, FL
251.250	Jacksonville IAP, FL 125FW
253.700	Jacksonville IAP, FL 125FW
254.275	Unknown RCAG Jacksonville Center [Live Oak MOA-LVH]
254.325	Lake City, FL RCAG Jacksonville Center
256.600	NORAD Southeast Air Defense SOCC
257.500	Tyndall AFB, FL W-470A Common
263.400	Jacksonville NAS (Towers Field), FL VS-24 Squadron Common
264.625	Avon Park, FL Range (Bravo Range)
266.500	Florido "A" Trock AAR [This also an Aerial Refueling ACC Random Tracks CONUS-LVH]
267.500	FACSFAC Jacksonville, FL ["Sealord"-LVH]
269.250	Orlando, FL RCAG Jacksonville Center
269.325	Jacksonville IAP, FL Approach/Departure Control
270.400	NORAD Southeast Air Defense SOCC
270.600	FACSFAC Jacksonville, FL ["Bristol"-LVH]
273.550	Daytona, FL RCAG Jacksonville Center
273.900	Jacksonville IAP, FL 125FW
282.300	Alma, GA RCAG Jacksonville Center [Ultra High Altitude-LVH]
282.600	NORAD Southeast Air Defense SOCC
283.700	MacDill AFB, FL [Base TDY Aircraft Operations-LVH]
284.500	FACSFAC Jacksonville, FL ["Sealord"-LVH]
285.650	Savannah, GA RCAG Jacksonville Center
285.725	Avon Park, FL Range [Range Control/Operations-LVH]
290.350	Eglin AFB Arrival [I show this is a High Altitude Jax ARTCC freq-LVH]
292.200	Avon Park, FL Range [Range Control/Operations-LVH]
292.700	NORAD Southeast Air Defense SOCC
298.300	NORAD Southeast Air Defense SOCC
299.500	Eglin AFB, FL 33FW discrete
307.250	St. Augustine, FK RCAG Jacksonville Center
308.925	Beaufort MCAS (Merritt Field), SC VFA-86 Air-to-Air
314.050	Tyndall AFB, FL "Whetstone Control" [Ground Control Intercept Operations-LVH]
314.200	Jacksonville IAP, FL 125FW
314.300	Tyndall AFB, FL 53d TEG/85th TES
317.600	Lowell, FL RCAG Jacksonville Center
323.200	Brooksville, FL RCAG Miami Center
339.700	FACSFAC Jacksonville, FL
341.100	FACSFAC Jacksonville, FL GCI/ACM
342.100	NORAD Southeast Air Defense SOCC
343.000	Jacksonville IAP, FL 125FW
346.250	St. Augustine, FL RCAG Jacksonville Center
351.800	Jacksonville IAP, FL Approach/Departure
351.900	Orlando IAP, FL Approach/Departure
353.950	Eglin AFB, FL Blue air
354.725	Unknown usr/usage
357.000	Pinecastle Range, FL [Ronge Control/Operations-LVH]
357.500	Tyndall AFB, FL Usage unknown
361.400	Tyndall AFB, FL "Hydra Control" [Command Post-LVH]
377.050	Jacksonville IAP, FL Approach/Departure
379.250	Melbourne, FL RCAG Miami Center
382.600	Flight Test [Nationwide-LVH]
383.000	Patrick AFB, FL Command Post [Consolidated CP-LVH]
387.000	Daytona Beach, FL Approach/Departure
388.350	Tyndall AFB, FL W-470A Common [F-15 Red Air (Eglin Mission)-LVH]
393.800	Jacksonville IAP, FL 125FW
399.800	Tyndall AFB, FL 325FW Supervisor of Flying

❖ FAA ARTCC Frequency List

Finally, in this month's FAA Air Route Traffic Control Center report we are going to take a look at the Chicago and Minneapolis Centers in Table Two. For the background on the Air Route Traffic Control Centers, check out our *Milcom* column in the June 2005 issue of *MT*.

So until next month, 73, we hope you have a safe and happy holiday season and good hunting.

Table One: NORAD Frequencies

NORAO HF (kHz, mode various)
3210.5 4085.0 4959.5 5068.0 6795.0 6834.5 7811.0 8967.0 9023.0 9230.0 10280.0 10647.0 11441.0 12060.0 14894.0 15715.0 18532.0 20855.0 20870.0 20873.0 25340.0 26818.0 26910.0 29270.0

NORAD VHF (MHz, NFM)
138.000 138.025 138.200 138.225 139.150 139.925 148.125 148.150

NORAD UHF Nationwide (AM mode)
228.800 228.900 252.000 254.200 275.000 276.400 276.650 277.600 279.400 282.600 285.900 295.800 298.300 300.125 316.300 320.900 328.000 338.400 362.300 364.200 364.800 387.000

Alaska NORAD Region
229.100 238.400 240.200 254.500 254.600 261.600 261.700 261.800 262.400 264.400 269.900 278.000 287.500 288.400 288.500 292.000 293.200 297.600 297.800 315.400 325.000 325.800 364.200 397.800

Canada NORAD Region
234.700

Hawaii Air Defense
259.000 264.800 267.800 284.000 288.200

Northeast Air Defense Sector
225.000 225.800 228.700 228.800 228.900 229.100 234.600 235.800 235.900 239.200 239.400 250.800 251.800 254.200 255.800 258.000 259.600 260.900 262.150 263.600 271.000 273.400 275.000 277.600 278.200 278.400 282.500 282.600 284.800 288.000 288.350 288.400 292.400 292.800 293.600 297.700 298.800 303.900 309.500 312.000 312.800 316.200 316.300 318.100 318.400 320.600 320.900 324.000 326.400 327.200 327.900 328.000 338.400 338.800 342.100 347.400 348.800 351.600 357.100 357.200 358.850 360.700 362.300 364.200 371.000 371.800 376.200 379.000 379.800 384.000 386.000 387.000 389.200 394.800 396.800 399.000

Southeast Air Defense Sector
225.600 228.000 228.400 228.800 228.900 234.600 234.700 238.500 251.000 251.250 252.000 254.200 256.600 263.200 264.400 265.400 270.200 270.400 274.400 275.000 277.600 278.400 278.600 282.400 282.600 287.800 288.400 288.700 288.900 292.700 293.600 295.800 298.300 298.500 302.400 306.400 316.300 320.600 325.500 328.000 338.400 342.600 344.000 356.000 364.200 369.000 375.100 386.200 387.800 392.800 397.250

Western Air Defense Sector
225.000 228.600 228.800 228.900 234.600 234.700 235.300 235.800 235.900 238.000 238.400 238.500 238.600 238.700 239.700 243.500 251.000 251.900 252.000 254.200 256.600 260.800 260.900 261.400 261.900 262.325 262.400 262.800 263.200 264.900 265.400 267.000 270.200 271.000 274.400 275.000 275.900 276.400 277.600 279.400 281.500 281.600 282.600 284.600 287.800 288.400 292.700 293.600 294.400 295.800 298.100 298.400 298.500 300.125 302.400 306.400 309.400 316.300 320.600 321.300 324.000 325.500 327.900 328.000 336.600 338.400 340.600 341.500 341.800 342.300 344.000 346.200 348.200 348.400 351.500 354.200 355.200 356.000 359.800 360.400 364.200 364.300 369.000 374.000 375.100 377.000 386.000 386.200 387.800 390.200 392.800 394.200 397.800 398.000

Table Two: Chicago and Minneapolis ARTCC Frequency List

CHICAGO ARTCC
Aurora, IL
121.500/243.000..... Low: Civilian/Military Aero Emergency/Distress/Calling
123.750/354.000..... Low Discrete: Approach/Departure Services
Bradford, IL
124.550/398.900..... Low: Approach/Departure Services
Burlington, IA
135.600/370.950..... Low Discrete: Approach/Departure Services
Cedar Rapids, IA
132.800/328.400..... Low Discrete: Approach/Departure Services
Chicago (Aurora), IL
125.200..... Low/High

272.700 ..... Low/High
323.200 ..... Low/High
385.500 ..... Low/High
Chicago Heights, IL
132.950/272.700 ..... Low Discrete: Approach/Departure Services
Crown Point, IN
127.800/387.050 ..... Low
Danville, IL
135.750/353.950 ..... Low Discrete: Approach/Departure Services
Des Moines, IA
127.050/319.800 ..... Low: Approach/Departure Services
Des Planes, IL
120.325/317.400 ..... Low Discrete
128.650/298.900 ..... Low
133.200/360.800 ..... Low
Downers Grove, IL
127.600/363.200 ..... Low
135.750 ..... Low
338.300 ..... Low: Special Military Use
364.800 ..... High: Special Use TSU <Amber-03>
Dubuque, IA
125.225/285.500 ..... High
127.775/343.600 ..... High
133.950/281.400 ..... Low Discrete: Approach/Departure Services
Fort Wayne, IN
119.850/362.300 ..... Low Discrete: Approach/Departure Services: Aerial refueling route AR-16 East exit
126.325/269.100 ..... High
Goshen, IN
127.550/263.100 ..... Low Discrete: Approach/Departure Services
133.900/317.600 ..... Low
135.900/317.600 ..... Low: Approach/Departure Services
Grond Rapids, MI
126.125/319.100 ..... High
134.950/287.900 ..... Low Discrete: Approach/Departure Services
Hompshire, IL
133.350/381.400 ..... Low Discrete: Approach/Departure Services
134.200/348.700 ..... Low
Horicon, WI
132.225/327.800 ..... High
132.750/263.000 ..... High: Aerial refueling route AR-312 exit
135.550/343.900 ..... Low
Jones, MI
120.225/269.350 ..... High
125.975/254.300 ..... High
Kankakee, IL
118.225/353.550 ..... High
120.125/256.800 ..... Low
132.500/258.100 ..... Low: Approach/Departure Services
Lafayette, IN
123.850/393.000 ..... Low Discrete: Approach/Departure Services
Leroy, IL
119.225/307.250 ..... Low
Lone Rock, WI
133.300/380.350 ..... Low Discrete: Approach/Departure Services
Maple Park, IL
127.075/299.700 ..... Low Discrete
Milford, IL
120.175 ..... Low
125.050/284.700 ..... Low: Approach/Departure Services
132.500 ..... High
135.400 ..... High
353.800 ..... High
377.200 ..... High
Milwaukee, WI
125.100/323.100 ..... Low Discrete
132.300/360.600 ..... Low
134.750/291.700 ..... Low
364.800 ..... Low: : Special Use TSU <Amber-03>
Moline, IL
118.750/351.700 ..... Low: Approach/Departure Services
135.825/385.650 ..... Ultra-High
Monee, IL
133.425/360.750 ..... Ultra-High
Muskegon, MI
132.275/254.350 ..... High Discrete: Approach/Departure Services
Oshkosh, WI
127.000/387.100 ..... Low Discrete: Approach/Departure Services
132.100/319.250 ..... Low
Ottumwa, IA
118.150/354.100 ..... Low Discrete: Approach/Departure Services
Pullman, MI
128.500/269.600 ..... Low Discrete: Approach/Departure Services
Rockford, IL
120.375/279.650 ..... High Discrete
Rossville, IN
120.975/343.950 ..... High
125.375/370.850 ..... Low Discrete
350.350 ..... Low/High Discrete: Hilltop MDA
South Bend, IN
135.350/273.600 ..... High Discrete
Volk Field, WI
125.050/269.650 ..... Low: Approach/Departure Services
Washington, IA
125.575/385.600 ..... High
133.350/297.400 ..... High
134.325/239.300 ..... High
Unknown RCAG: 124.725 124.825/343.700 127.325/380.050 128.525 132.625/353.850 282.375 348.750 386.650

MINNEAPOLIS ARTCC

Aberdeen, SD
120.600/371.900 ..... Low Discrete: Approach/Departure Services
Alexandria, MN
126.100/269.200 ..... Low Discrete: Approach/Departure Services
133.400/281.550 ..... High: Approach/Departure Services
243.000 ..... Low/High: : Military Aero Emergency/Distress/Calling
Alpena, MI
125.475/269.450 ..... Low: Approach/Departure Services
Bemidji, MN
134.750/251.100 ..... Low Discrete: Approach/Departure Services
Bismork, ND
125.600/281.500 ..... Low/High Discrete: Approach/Departure Services
Broinerd, MN
118.050/239.000 ..... Low Discrete: Approach/Departure Services
Darwin, MN
125.500/323.100 ..... Low Discrete: Approach/Departure Services
Des Moines, IA
118.825/279.550 ..... High
125.650/306.950 ..... Low Discrete: Approach/Departure Services
135.775/372.00 ..... High
Dickinson, ND
124.250/380.300 ..... Low Discrete: Approach/Departure Services
321.300 ..... High: Special Use TSU <Amber-06>
Duluth, MN
127.900/281.450 ..... Low Discrete: Approach/Departure Services
134.550/290.500 ..... Low/High
134.675
321.300 ..... High: Speciol Use TSU <Amber-06>
Dupree, SD
126.800/263.000 ..... Low Discrete: Approach/Departure Services: Aerial refueling route AR-12L exit
Eau Cloire, WI
125.300/335.600 ..... Low Discrete: Approach/Departure Services
133.750/353.900 ..... High
Escanaba, MI
127.650 ..... Low Discrete: Approach/Departure Services
Fairmont, MN
127.750/257.700 ..... Low: Approach/Departure Services
Forgo, ND
127.350/278.300 ..... Low/High Discrete: Approach/Departure Services
Farmington, MN
121.500/243.000 ..... Low/High: : Civilian/Military Aero Emergency/Distress/Calling
133.700/381.650 ..... Low Discrete
Fort Dodge, IA
134.000/288.300 ..... Low Discrete: Approach/Departure Services
Grand Forks, ND
132.150/269.600 ..... High Discrete: Approach/Departure Services
321.300 ..... High: Special Use TSU <Amber-06>
Grand Island, NE
126.050 ..... Low
Green Bay, WI
125.550/370.900 ..... Low Discrete: Approach/Departure Services
Hastings, NE
119.400/278.800 ..... Low Discrete: Approach/Departure Services
135.100/307.200 ..... High
243.000 ..... High: Military Aero Emergency/Distress/Calling
Hayward, WI
126.450/276.400 ..... Low Discrete: Approach/Departure Services
Houghton, MI
127.200/379.100 ..... Low Discrete: Approach/Departure Services
243.000 ..... Low: Military Aero Emergency/Distress/Colling
273.500 ..... High
321.300 ..... High: Special Use TSU <Amber-06>
Huron, SD
126.250/339.800 ..... High Discrete: Approach/Departure Services
International Falls, MN
120.900/377.100 ..... Low Discrete: Approach/Departure Services
Iron Mountain, MI
121.250/322.500 ..... Low Discrete: Approach/Departure Services
133.450 ..... High
Iranwood, MI
135.550 ..... Low Discrete: Approach/Departure Services
Jamestown, ND
124.200/270.300 ..... High Discrete: Approach/Departure Services: Aerial refueling route AR-453/606/619
125.600/281.500 ..... Low: Approach/Departure Services
La Crosse, WI
118.850 ..... High: Approach/Departure Services
128.600/363.000 ..... Low Discrete: Approach/Departure Services
321.300 ..... High: Special Use TSU <Amber-06>
Lincoln, NE
119.525/269.175 ..... High: Approach/Departure Services
Mankato, MN
135.000/306.900 ..... Low Discrete: Approach/Departure Services
Marquette, MI
243.000 ..... High Discrete: Military Aero Emergency/Distress/Calling
Marysville, KS
126.400/317.700 ..... Low Discrete: Approach/Departure Services
134.225/282.300 ..... High
Mason City, IA
127.300/380.200 ..... Low Discrete: Approach/Departure Services
134.250/263.100 ..... High
Minot, ND
118.900/319.100 ..... Low
127.600/279.600 ..... Low/High Discrete: Approach/Departure Services
Mosinee, WI
124.400/317.700 ..... Low Discrete: Approach/Departure Services
O'Neill, NE
128.000/385.500 ..... Low Discrete: Approach/Departure Services
135.875/353.750 ..... High: Approach/Departure Services
Omaha, NE ..... 119.600/290.400 Low Discrete: Approach/Departure Services
128.750/346.300 ..... Low: Approach/Departure Services
134.350 ..... Low
256.700 ..... High
321.300 ..... High: Special Use TSU <Amber-06>
Oscoda, MI
118.525/251.150 ..... Low: Approach/Departure Services
Pellston, MI
132.425/336.400 ..... High
134.600/354.050 ..... Low Discrete: Approach/Departure Services
321.300 ..... High: Special Use TSU <Amber-06>
Pierre, SD
125.100/269.100 ..... Low Discrete: Approach/Departure Services
134.800/228.500 ..... High
243.000 ..... Low/High: Military Aero Emergency/Distress/Calling
317.500 ..... High: Aerial refueling route AR-12H East
Princeton, MN
121.050/397.900 ..... Low Discrete: Approach/Departure Services
Redwood Falls, MN
119.875/263.050 ..... High
127.100/290.200 ..... Low Discrete: Approach/Departure Services
133.075/269.500 ..... High
Rhinelander, WS
123.725/316.150 ..... High
133.650/281.500 ..... Low Discrete: Approach/Departure Services
Rochester, MN
132.350/307.300 ..... Low: Approach/Departure Services
Roseau, MN
127.800/256.900 ..... Low Discrete: Approach/Departure Services
Saginaw, MI
118.050/282.200 ..... Low Discrete
Sawyer, MN
119.100/290.200 ..... Low Discrete: Approach/Departure Services
Sioux City, IA
119.725/363.100 ..... High Discrete
124.100/269.000 ..... Low Discrete: Approach/Departure Services: Aerial refueling route AR-105 east/west and AR-607
Sioux Falls, SD
132.050/317.400 ..... Low Discrete: Approach/Departure Services
321.300 ..... High: Special Use TSU <Amber-06>
Swinns Valley, WI
134.850/352.000 ..... Low Discrete
135.700/307.900 ..... High Discrete
Traverse City, MI
132.900/338.300 ..... Low Discrete: Approach/Departure Services
243.000 ..... Low/High: Military Aero Emergency/Distress/Calling
317.450 ..... High
Watertown, SD
128.500/306.200 ..... Low: Approach/Departure Services: Aerial refueling route AR-16H/L east/west
White Cloud, MI
120.850/322.350 ..... Low Discrete: Approach/Departure Services
132.550/335.65 ..... High

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State-by-State: Way Out West

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

California:

I suppose it's no surprise the most populous state is also home to the most AM stations. And I suppose it's no surprise that the state with the most stations also offers many reasonable DX targets. On the other hand, for Easterners, mitigating against that California logging is sheer distance. (Those of you on the West Coast, fed up with a dialful of the Golden State, please have some sympathy!) Still, California is the easiest of the Western states.

We'll start this month's tour in Los Angeles. LA offers two 50,000-watt non-directional stations: KFI-640 and KNX-1070. Which one is easier? In my opinion it's a wash. It depends on which frequency is clearer in your area. KFI lost its tower to a wayward airplane earlier this year, but I'd be surprised if they aren't back up to full power by the time you read this.

Best Bets for logging California

Los Angeles:	KFI-640, KNX-1070
San Francisco:	KNBR-680, KCBS-740, KDIA-1640
Sacramento:	KFBK-1530

Other 50,000-watt clear-channel stations in LA include KSPN-710, KMPC-1540, KTNQ-1020, KDIS-1110, and KBLA-1580. KMXE-830 in Orange County reduces power to 20kW at night, but is still occasionally heard in the East with their Spanish-language format.

Up the coast a bit is San Francisco. The City by the Bay only has one 50,000-watt non-directional station, KNBR-680. This is also the easiest California station to log at my location; some winter mornings it's easy copy on a cheap bedside portable here in the Nashville area. Other Bay Area stations with powerful signals include KCBS-740, KGO-810, KTCT-1050, KFAX-1100, and KYCY-1550. In a rare long-distance move, Modesto's KTRB-860 holds a permit to move to San Francisco and increase power to 50,000 watts. At this writing the move has not yet taken place, but rumors suggest it's imminent.

Moving inland, we find California's capital city. Sacramento has two 50,000-watters: KHTK-1140 and KFBK-1530. Both are directional and don't favor the east. However, KFBK has been heard (and pretty well) at my Nashville-area location. Listen for both of these.

Elsewhere in the Golden State... Fresno is home to Radio Unica, Spanish-language KWRU-940. Simi Valley's KIRN-670 is a 35,000-watt Farsi-language station, broadcasting to Iranian immigrants in Los Angeles. San Diego is home to one of a very small number of stations that uses more power at night than during the day. KFMB-760 is limited to 5,000 watts daytime, to protect a 740 station in the Catalina Islands. The Avalon station goes off the air at sunset, and KFMB is allowed to increase power to 50,000 watts – however, it must use a directional antenna to protect WJR, Detroit. Despite the high power, KFMB remains a difficult catch in the East.

Three expanded-band stations are found around the state. KDIA-1640 is a religious station in Vallejo, near San Francisco; KFOX-1650 is Korean from Torrance, near Los Angeles; and KFSG-1690 carries a variety of programming from Roseville near Sacramento. All three have been heard in the East, but none are easy catches.

The hardest region to log from the eastern U.S. is the Pacific Northwest. We'll address this region next time.

❖ Katrina

It is, of course, impossible to ignore the largest natural disaster in American history. I have not heard of any broadcasters or DXers losing their lives to the storm, though I fear that's only because of poor communications. (Yes, even at this late date information continues to be incomplete. Survivors have better things to do!) Several days after the hurricane, at least one TV station didn't yet know whether its tower survived; they'd not been able to get an engineer to the site to check. But, as it turns out, their tower was intact, and so was everyone else's. I've not heard of any station losing its tower to Katrina! Buildings and transmitters, on the other hand, have not fared nearly as well.

Anyone who's listened to the AM band during previous hurricanes will not be surprised to hear WWL-870 has done a job the radio industry can be proud of. The station was off the air briefly at the height of the storm – then surprised many by returning a few hours later. Turned out the generator at the transmitter site failed, and it took a few hours to get an engineer out there to fix it.

Rivals Clear Channel and Entercom cooperated, forming the United Radio Broadcasters of New Orleans. At the height of the relief effort, a press release indicated fifteen stations were simulcasting recovery and relief information. Two independently-owned stations in Lake Charles and Jennings, outside the hurricane area, also participated in the group. One other station well outside the area carried United Radio Broadcasters programs – WHRI shortwave in South Carolina. Shortwave frequencies included 5835, 9840, 11785, and 15285 kHz. If you heard an unexplained WWL-870 relay on shortwave, WHRI is what you heard.

For several days, WWL-870 operated at half power voluntarily, to conserve generator fuel. A bit over a week after the storm, commercial electricity was back on at the WWL transmitter and full-power operation resumed. Most New Orleans transmitters were outside the flooded area, as were most FM and TV transmitters in the Biloxi/Gulfport area, so the real problem for restoring reliable service has been electric power.

WWL-TV was also credited with doing an excellent job providing information both during and after the storm. (It should be noted that WWL radio and WWL-TV are no longer co-owned.) The TV transmitter survived, but the station was reportedly signing off the air between 11pm and 5am to conserve generator fuel. The WWL-TV studios were destroyed by the storm; the station has been using studio facilities at Louisiana State University in Baton Rouge. WDSU-TV was similarly reported using temporary studio facilities at co-owned WESH-TV in Orlando.

You've probably heard about local public officials commandeering buses and other equipment and materials for hurricane relief. In St. Tammany Parish north of Lake Pontchartrain, local officials commandeered a radio station. WASO-730, a 250-watt daytimer, had run a news/talk format before being taken off the air by the Federal Trade Commission for failing to pay a legal judgement. Parish officials were using the station to broadcast emergency information to local residents.

There is considerable interest in storm coverage outside the immediate New Orleans area. Some of the interest is from displaced New Orleanians; some from people with relatives there; and some from people with no connection to the city except concern for its future. WWL-TV's signal was being uplinked to satellite; digital TV stations outside New Orleans used this feed to rebroadcast WWL-TV on a subchannel. As mentioned earlier, WWL Radio and the United Radio Broadcasters of New Orleans were also

simulcast on WHRI Shortwave.

United Radio Broadcasters of New Orleans ("URBNO") wrapped up their mission in early October. Hurricane relief operations continue to dominate the news along the Gulf (not to mention the rest of the country) but radio and TV are gradually returning to normal.

New Orleans wasn't the only place hard-hit by this storm. The Mississippi coast was also devastated. WLOX-TV lost its studio-transmitter link tower – and much of their studio roof. WTNI-1640, the main news/talk station on the Mississippi Coast, was off the air for several days. Ten days after the storm, WTNI was back. Like the major New Orleans stations, WTNI was simulcasting with a number of area FMs with a format of relief information and classic rock. They're now back to their regular talk format. Stations in Hattiesburg and Meridian, Mississippi, were also reported knocked off the air by Katrina.

Houston, Texas, didn't suffer any damage from Katrina. It did, however, become at least temporary home to thousands of hurricane evacuees. Within a week, evacuees in the Reliant Complex received their own radio station. LPFM advocates obtained an emergency temporary license for a station inside the arena on 95.3 MHz. It took a few more days to clear up local red tape and get the station on the air – from an Airstream trailer outside in the Astrodome parking lot instead of inside the dome as planned. The volunteer-operated station's official call letters were KH5XIM; they also called themselves "KAMP". KH5XIM left the air on September 18th, its mission accomplished. Their website is still up on **http://www.evacuationradioservices.org** .

One must wonder what the long-term consequences of the storm will be for New Orleans broadcasters. It looks likely the infrastructure can be repaired fairly quickly. However, much of the audience is gone. Over the course of a few days, Baton Rouge has become the largest city in Louisiana. Many New Orleanians are saying they will not return to the city after it's rebuilt. Rumors suggest some broadcast stations will suspend operations if advertising revenue doesn't begin coming in soon. I think it's likely some smaller radio stations in the region will not resume operation.

The consequences of this storm will be with most elements of American society for years to come. Broadcasting will be no exception.

❖ Rita

Thankfully, Hurricane Rita weakened considerably before striking, and moved east, sparing Houston and Galveston. However, damage in the Beaumont, Port Arthur, Lake Charles area was severe. Rumors suggest one Port Arthur, Texas, AM station lost its tower and another area AM suffered tower damage. All FM and TV stations are believed to have survived the storm pretty much unscathed. As in New Orleans, Houston and Beaumont radio stations performed a critical duty providing storm information.

❖ IBOC News

After Katrina, I did a quick check on the FCC's CDBS website. I was surprised to learn that no stations on 880 or 890 kHz are authorized for IBOC operation. The lack of IBOC on these frequencies probably greatly enhanced the ability of displaced New Orleanians to keep up with the news over WWL. Four stations on 850 and 860 are authorized for IBOC, though I suspect KFUO-850 (near St. Louis) is the only one that could generate significant interference. I hate to think what would have happened if WLS was radiating a digital sideband in the 875-880 kHz spectrum...

❖ New station guides

New editions of both major domestic station guides are out. The National Radio Club has released the 26th Edition of their AM Radio Log. As you might imagine, the Log lists U.S. and Canadian AM stations, including technical, address, and format information. The Log is $25.95 in the U.S.; see **http://www.nrcdxas.org** for more information.

As for FM, the first new edition of the FM Atlas since 2003 is now available. This publication, too, offers technical, address, and program format information on stations in the U.S. and Canada (also Mexico). The 20th Edition is $22 from FM Atlas, P.O. Box 336, Esko MN 55733-0336. See **http://members.aol.com/fmatlas/home.html** for more info.

❖ '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!

Gary Sturm
garysturm@monitoringtimes.com

Winter Activities and the Yaesu VX-170

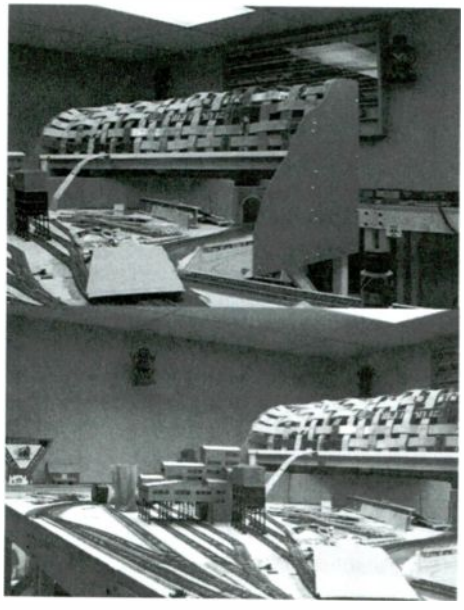
Well, another winter is here again, after a long, hot summer. I look forward to winter – The cold weather sometimes makes for clear, crisp VHF signals on the railroad band. We will try to hear all we can this winter while staying warm indoors.

Winter is also a good time to work on that model railroad layout in the spare room, attic, or the basement. I am making great progress on my railroad layout. Some of my buddies drop by on Saturday mornings to work on the railroad and to have a good time in fellowship. Then at lunchtime, we go eat lunch in Grabill, Indiana, and sit by the railroad tracks to watch trains.

❖ Mountains in the basement!

We started building a mountain near the coal mine area on my layout. The framework of the mountain is made of woven cardboard. I have been busy gathering tunnel portals and retaining wall segments from the hobby shop. We are going to cover the framework of the mountain with brown paper sack material. These sacks will be hot glued in place. Hydrocal plaster will be brushed over the mountain to form the shell of the structure. Molded rock outcroppings will be placed onto the mountainside and it will be painted and sprinkled with ground cover material to give it a scenic appearance.

One of my railroad buddies, John Reitz, has been tutoring me on the fine points of building the mountain and has done some of the cardboard weaving work. John and I are both members of the National Model Railroad Association (NMRA) and John has the distinction of being Master Model Railroader #316 in the NMRA. John's status as a Master Model Railroader is similar to me being an Extra Class amateur radio operator – both a lot of work to earn the title.



Now on to this month's column.

❖ Railmonitoring with Yaesu

I had heard about Yaesu's new VX-170 handheld, which was introduced in August of this year as an update to the VX-150. Vertex-Standard is a U.S. company that sells radios under the Yaesu name. I have been very fond of the VX-150, which I also own. I belong to the VX-150 users group on Yahoo and monitor the Internet threads daily.

I know many people use the VX-150 for monitoring only, since they mention they are not licensed hams. I am an Extra Class ham, but I listen more than I talk. I love monitoring the railroad channels and am always on the lookout for radios that are tops for listening to the railroads. I have owned some duds and some with stellar performance. I even assembled Heath scanners in the 1970s. One of the stellar radios is my 23-year old Regency HX-1000. It still functions fine, except for an occasional memory lapse with the programming.

As soon as a railroad buddy told me about the introduction of the new Yaesu VX-170 and I found it had a long-life (1400 mAH NiMH) battery and memory banks for scanning, I wanted to get one. Through the internet, I found an amateur radio shop that had just received a shipment. Two days after ordering it, I got one of the first ones.

❖ The Specifications...

The receive range is 137-174 MHz on the VX-170. It is a larger radio than the VX-150, standing 4-5/8 inches tall without the knobs and 2-5/8 inches wide. It measures 1-3/8 inches thick without the belt clip. The radio weighs almost 14 ounces with the battery, antenna, and belt clip. The nominal battery voltage is 7.2 volts DC and the radio has a negative ground. The radio draws 45 milliamperes when on standby.

The radio uses a Nickel Metal Hydride battery pack. The battery pack slips on the back of the radio. Charging with the trickle charger takes about ten hours for a full charge from the time that the radio indicates the battery needs to be charged. The manual indicates that prolonged charging (24 hours or more) can lead to early failure of the battery pack. A quick charger is also available, and the radio may be powered from an external source or the cigar lighter of a vehicle through a special EDC5B power cord. I have one and know that it also works with the VX-150.

The receiver is a double-conversion superheterodyne with intermediate frequencies of 21.7 MHz and 450 kHz. The sensitivity is rated at 0.2 microvolts for 12 dB SINAD in the 160 MHz receive range. The selectivity is 12 kHz/35 kHz (-6 dB/-60dB). The audio output is 700 milliwatts into the 16-ohm speaker with 10% Total Harmonic Distortion (THD).

❖ Only just listening in...

I have only related the specifications for the receiver. Although I am an amateur radio operator, I will be using this handheld primarily for railfanning and will only be listening to railroad communications. Remember that this is an amateur radio and it will not transmit outside the amateur band of 144-148 MHz.

A new feature of this radio, useful for non-amateurs, is the numeric password feature. The transmitter can be locked from use by non-licensed persons with a numeric password. The danger of any accidental transmission on 2-meter channels by non-licensed amateurs would be lessened.

The other interesting feature of this HT (handy-talkie) is the digital battery voltage readout. Look at the battery voltage when the low battery light first illuminates. You will know how much "juice" you have left in your battery and how long you can keep on monitoring.

❖ Scanning with the VX-170...

The channel steps are 5/10/12.5/15/20 /25/50/100 kHz. The radio can be set to 15 kHz steps, enabling easier programming of the memory channels. I programmed railroad radio channels #7 through #97 in about fifteen minutes. I started at 160.215 MHz (channel #7) in Memory #7 and ran through the 97 standard U.S. railroad channels every 15 kHz until I programmed up to 161.565 MHz, which is channel #97. Setting the radio with the 15 kHz steps made programming an easy task.

The radio can be set via menus for automatic power-off, with alpha-tags for each memory, scan-resume in three different modes (Busy, Hold and Time), power saver mode, and can be set to skip channels in the scan mode. The alpha-tags allow the user to tag each of the railroad channels programmed with the AAR (Association of American Railroads) identifier. AAR 7 would be railroad radio frequency 160.215 MHz, AAR 8 is 160.230 MHz, etc.

The three scan-resume-scanning modes are typically featured on amateur radios. "Busy" scanning will stop the scanning on a channel and resume the scanning two seconds after the transmission has ended. The "hold" scan feature will stop the scanning and the scanning will not resume until this procedure is manually restarted. "Time" scanning will stop the scanning for five seconds and then the scanning will resume.

This handheld has as many as 10 memory groups or banks in which frequencies can be categorized for convenience to the operator. The radio has 200 memory channels in all. I would estimate the handheld scans about 25 channels per second, which is good for a ham radio. The radio scans quickly enough to allow scanning of all 91 U.S. railroad radio channels without having to use banks. Especially if you are monitoring in a new location, scanning all the allocated channels can be handy to catch transmissions that may otherwise be missed by not listening to all 91 AAR U.S. frequencies.

In case the user wishes to place several frequencies in one or more of the Memory Groups, the owner's manual illustrates how this is accomplished. This feature would come in handy if just monitoring say, three to a dozen or so channels in a certain locale. A single frequency may be placed into multiple Memory Groups, making this a versatile feature of the radio.

If only two channels are being monitored, Dual-Watch could be used. Dual Watch would come in handy for monitoring the individual road channels of two railroads crossing at a junction. Monitoring both the road and dispatcher channels would most likely require the use of the Memory Groups for fast scanning of the channels of interest.

❖ Features I like...

One of the features of the radio that I like is the fact that the display can be set to light up when the scanning stops on an active channel. The radio can also be set to beep when it stops, thus alerting the listener to observe the channel display for an active channel. I also liked this feature on the VX-150 radio. Both the lighted display and the sound can be turned off independently.

One of the features that I prefer on the VX-150 is the angled top display. The display is much easier to check when carrying the radio on one's belt. The VX-170 has a larger, front-mounted display. The VX-170 also has a bayonet type belt clip. The belt clip stays on your belt, but the radio must be rotated upside-down to be removed from the clip.

The VX-170 can be immersed in water for a limited time without damage. The radio has sealing plugs for both the power and microphone jacks. Hypothetically, the radio is capable of being submersed in three feet of water for thirty minutes with no damage. This is good when out in rainy weather.

The radio also includes something every railfan needs – preprogrammed Weather Broadcast Band channels and also weather alert in case of severe weather. This is just another valuable feature of the Yaesu VX-170.

❖ Just how sensitive is it?

I have been monitoring the local railroad channels with the VX-170, using the VX-150 and the Regency HX-1000 for reference standards.

The VX-170 appears to be as sensitive as the older VX-150. However, neither the VX-170 nor the VX-150 is as sensitive for monitoring in the railroad band as the Regency HX-1000. The Regency HX-1000 is about 22 years old and was specially tuned to the rail band for me by Regency. The HX-1000 is equipped with a duck-type antenna tuned for use on commercial railroad radios and on the railroad crew handhelds.

In my home and in my van the VX-170 compares quite well to the reception of the VX-150, but it still doesn't beat the Regency HX-1000. I did run the VX-170 with a 2/440 mobile antenna on my van and checked the performance against my Motorola GM-300 receiver. The VX-170 seemed to outperform the GM-300. The reception was clearer and the VX-170 is actually more versatile, since it can be programmed in the field by the user. The Motorola GM-300 has to be programmed typically by a radio shop.

One good way to check the receive performance on these radios is to program in a distant NOAA weather channel and alternate the radios in the same location while noting the S-meter readings. (The HX-1000 does not have this feature, so I had to go by the clarity of the audio signal.)

I have not noticed internal "birdie" signals, where the radio will stop scanning and lock-up on a blank channel. I have noticed no intermodulation in the radio, either, while traveling with it in the van or at home. Intermodulation (intermod) is where a strong signal, such as a NOAA weather channel, mixes with other frequencies in the radio and appears elsewhere on the band.

❖ RFI and other Gremlins...

I have noticed with the advent of wireless computer servers and DSL modems that I now get some electronic interference in the house with all my scanners and radios. The same type of interference is evident in my 2005 Chevy Uplander van with On-Star, XM-Radio, and the engine electronics in the vehicle. The use of an external antenna seems to eliminate these RFI problems.

Some sources of interference you can minimize and some you may have to live with. The CD player in my home stereo even causes some radio frequency interference (RFI) with my handheld and base radios. A ham told me that battery charging systems for vacuum cleaners and other household devices emit radio frequency interference that can cause these problems with RF interference. Even the Regency HX-1000 is bothered by this interference.

The price, the size and the reputation of Yaesu (Vertex-Standard) makes the VX-170 a worthwhile HT with great features. Some will appreciate the memory bank feature, but to date I have not really needed the banks. The battery's "gas gauge" is one feature I have grown to appreciate. I am happy that I purchased the '170, and have even used it for communicating with my fellow hams. It works well in the van with an external antenna for transmitting. This radio does have an option for a 6-battery pack so you can use an alkaline or rechargeable battery for extended field use.

Overall I am happy with the performance of this radio.

See you in March when we'll discuss more topics of railroads and scanning the rails!

BELOW 500 kHz

DXING THE BASEMENT BAND

Kevin Carey, WB2QMY
kevincarey@monitoringtimes.com

Season Opener

What is it about December? For some reason this month always seems to bring heightened interest in Longwave DXing. Maybe it's because winter is settling in and there's very little static on the band, or that there's no yard work to do. Perhaps, as one listener suggested, it's because of the vacation time that many people take over the holidays. Whatever the reason, it is a welcome change, and listening to longwave is clearly better than shoveling snow!

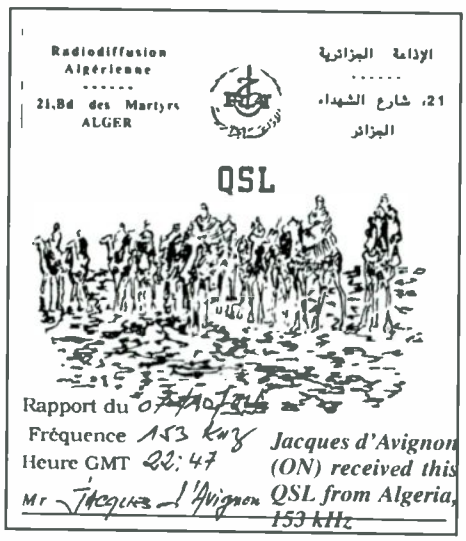
❖ Chasing Euro-Broadcasters

The interest in this topic never ceases, no matter what the season. Yes, you can hear these longwave broadcasters in North America, but you should not expect "armchair" copy. On a clear winter night, you can often make out what's being said and recognize songs, but you probably won't consider the signals to be "strong" by any means. The key is to listen at times when there is a complete path of darkness between you and the transmitting station. This means East Coast listeners should try for these signals between dusk and about 1 a.m. local time.

Listed below are some European stations you may want to listen for. A more complete reference is available online at **http://home.cogeco.ca/~dxinfo/lw.htm**.

Table 1. Selected Euro-Broadcasters

Freq.	Location	Power Out.
153	Algeria	250 kW
162	France	2000 kW
171	Russia	6400 kW
207	Germany	2000 kW
189	Iceland	300 kW
198	England	600 kW
234	Luxembourg	2000 kW
252	Ireland	500 kW



❖ Beacons

Chasing non-directional beacons (NDBs) is another popular activity during the winter months. Low and medium powered beacons are sprinkled throughout North America and occupy the band between 190 and 535 kHz. These stations do not have very interesting programming – just a slow, repetitive CW message (their ID). However, it is not the content of the transmission we are interested in, but the *fact* of reception.

Most beacons operate with less than 50 watts of power (25 watts in many cases) from small, unmanned shacks. They utilize a rather small antenna, and are not meant to be heard for more than 100 miles. Imagine the thrill of pulling one in at five or ten times that distance.

As with broadcasters, nighttime is the best time to listen for beacon DX. Often you'll hear several stations on a single frequency, and will need to sort through them to pick out the IDs. To do this, it helps to know a thing or two about ID formats. For instance, Canadian IDs can usually be identified by two primary traits. First, they typically use a 400 Hz modulated tone (as opposed to 1020 Hz commonly used in the U.S.) Also, they will have a long dash after the ID (DAID). U.S. beacons do not have a dash after the ID. Using these traits alone, you should be able to quickly determine a beacon's country of origin.

When hunting beacons, don't neglect the band during the daytime. Although you won't hear stations from as far away during the day, you're likely to hear some beacons that are covered up by DX at night. In fact, some DXers enjoy the challenge of daytime monitoring. An intercept of 400 miles or more during the day would be a prized catch, indeed. An excellent online resource for beacons may be found at **http://www.classaxe.com/dx/ndb/rna/**

❖ Experimental Stations

Moving down the band a bit, let's explore a unique sliver of spectrum from 160 to 190 kHz. Officially, this is the Part 15 band, where the FCC allows a variety of low powered devices such as wireless intercoms and power line carriers to operate without a license of any kind. An industrious group of experimenters have been using this band for ham-like operation since at least the early 1970s.

Limited by regulation to 1 watt and a 50 foot/15 meter antenna, these experimenters operate their stations in an effort to "push the envelope" of low power communication. Take a slow spin through this band and you might be rewarded with a Lowfer (Low Frequency Experimental Radio) intercept. An updated list of Lowfer stations may be found online at: **http://www.lwca.org/sitepage/part15/index.htm**. Once there, just click the "Low/Med/HiFER" tab to view the current listings.

A little further down at 136 kHz, you may find more experimental activity. In many countries, governments permit amateur access to this frequency with much higher power limits than those imposed on the "Lowfer" band. The predominant mode here is CW and QRSS (super-slow CW). To download software for viewing QRSS signals, visit **http://www.qsl.net/padan/argo/**

Also in the experimental category, another group is trying their luck at the high end of the band from 495-510 kHz (500 kHz nominal), under a special FCC license. Years ago, this frequency range was heavily used by mariners, but today it lies virtually dormant. An adventurous group plans to set up a network of stations all around the U.S. for propagation tests and to prove the viability of the band for two-way communication. This work could eventually lead to a ham band allocation there. For more details, and to see if there is a station planned near you, visit **http://www.500kc.com**

❖ Bottom End Sweep

Below 136 kHz, the main signals you'll hear are military RTTY stations sending encrypted data. These powerhouses are at various locations around the world and can often be heard around the clock. At 60 kHz, you should be able to hear the pulsating carrier of WWVB in Fort Collins, CO. Newcomers often confuse this signal with slow speed Morse, but it is actually a binary coded system for automated clocks.

WWVB is the sister station of WWV operating at 2.5, 5, 10, 15 and 20 MHz. Longwave time stations have the advantage of providing a more stable, ground-hugging signal that is desirable for automated time keeping and laboratory applications. Today, it's even possible to buy an inexpensive (under $30) table clock that locks onto WWVB and provides extremely accurate time that *never* needs to be reset. Today, there are even affordable wrist watches and VCRs with WWVB capability built in.

We could also dip down below 20 kHz into the realm of Natural Radio, but that is a topic for a future column. Stay tuned! Best wishes from the Carey family to you and yours for a joyous Christmas holiday. *See you next month.*

OUTER LIMITS

THE CLANDESTINE, THE UNUSUAL, THE UNLICENSED

George Zeller
georgezeller@monitoringtimes.

ACE Ceases Publication

For over 20 years, *The ACE*, published by the Association of Clandestine radio Enthusiasts, was the only North American club publication devoted entirely to coverage of pirate and clandestine radio broadcasting. *The ACE* bulletin has always been required reading for serious pirate DXers. But, we now have the very sad news that as of August 2005, *The ACE* is no longer being published on a monthly basis.

ACE was originally founded in the early 1980s by Darren Leno. It quickly evolved into the definitive source of information for pirate radio DXers. After a contentious discussion, it was admitted into membership in the now defunct Association of North American Radio Clubs. For 25 years it was the definitive information source for loggings and QSLs of North American pirate stations and clandestine radio broadcasters. Several other individuals manned the publishing role in ACE over the years, including Keith Thibodeaux, Kirk Baxter, Harry Helms, and John T. Arthur. For a long time during the 1980s, the club even had a column by Lani Pettit that covered "spy" numbers station loggings.

ACE was the first North American radio hobby club in which all of its columns were transmitted to the publisher via the internet. John T. Arthur, the last *ACE* publisher, tells *MT* that ironically *ACE* may have been a "victim of changing technology." The emergence of the internet gave DXers an opportunity to get real time information about pirates, rather than waiting a month to receive a bulletin in the mail. That did not eliminate the need for detailed pirate coverage, but it did cut into the support base of ACE.

The elimination of ACE as an active participant in the North American DX hobby is a stunning major event. It leaves a huge void in the unlicensed broadcast DXing scene. Of course, some alternative pirate radio information resources remain. One of them is the column that you are reading here. Another is the Free Radio Weekly internet newsletter and the Free Radio Network web site. As always, we provide contact information for these resources at the bottom of this column.

❖ Radio Free America?

According to the Bangkok *Post* via Clandestine Radio Watch, China is considering the possibility that it might start a Radio Free America clandestine station. This is an obvious pun on the operations of Radio Free Europe over the years. The purpose of the station allegedly would be to provide news and information to people in the United States that is not covered or is glossed over in the USA media. Although this appears to be nothing but some tentative future plans, the concept itself is an interesting propaganda message.

❖ Schoech's QSL Page

We have mentioned this item before, but Martin Schoech of Germany announces that several new clandestine QSL images have been made available on his excellent web site. Martin, of course, is the maven at Clandestine Radio Watch, and he continues to keep us all informed about new developments on the clandestine broadcasting scene. You can check out the latest images at **http://www.schoechi.de/qip.html#cl** on your internet dial.

❖ Orion Radio

With winter DX conditions back with us again, it is time to start checking for European pirate stations. Among those active this month has been **Orion Radio** on 5715 kHz. If you hear them, they welcome reports to either *info@orionradio.nl* e-mail or ORN, PO Box 9, 8096 ZG, Oldebroek, The Netherlands. Europirates commonly operate above the 49 meter broadcasting band in the 6200-6300 kHz range, or in the upper end of the North American 80 meter ham band between 3890 and 4000 kHz. They can be a real DX challenge from North America, but DXers on the east coast have a legitimate shot at hearing them.

❖ Correction and Update

Sharp eyed *MT* columnist Glenn Hauser noticed an error in the September 2005 *Outer Limits* column. On June 30, Florida law enforcement and FCC officials arrested Marquis McDonald and Rasheem Oriley in Fort Lauderdale, FL. McDonald and Oriley were accused of operating unlicensed FM pirates on both 90.5 and 88.7 MHz FM. They were the first individuals arrested under Florida's new law making it a criminal offense to operate an unlicensed pirate in Florida. At the end of June they were transported to Broward County Jail.

In *MT* we incorrectly reported that their station IDed as **WKPX**. It instead interfered with **WKPX**, which operates on a licensed basis on 88.5 MHz. **WKPX** filed the complaint that led to the arrests. The pirate station actually broadcast rap, hip hop, and rhythm and blues music that were spiced with uncensored local street talk. The station had been known to identify itself as **Hava 88.7**, among other names.

The FFC and the Florida Department of Law Enforcement claimed that Hava 88.7 operated with a 10,000 watt transmitter, and that its signal was getting out over a seven mile radius. The transmitter was seized during the arrest, along with the antenna and various other studio equipment.

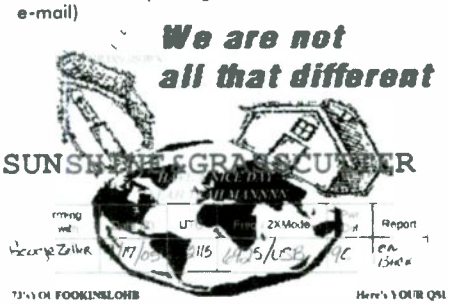
❖ What We Are Hearing

Monitoring Times readers heard fifteen different North American pirates this month. Pirate radio stations never use regularly announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays such as Thanksgiving, Christmas, and New Years. The primary North American pirate frequency of **6925 kHz**, plus or minus 30 or 40 kHz, remains the best place to scan for the pirates.

Captain Morgan- Their Twilight Zone TV audio gives a clue to this station's identity. (None, says to send loggings to the Free Radio Network, ond has QSLed lately)

Ground Zero Radio- Dave Gunn's rock music is unusual, since he mixes it with anti-war advocacy from an abandoned missile silo. (Elkhorn)

Grasscutter Radio- As we see, they still sometimes produce joint rock music programming with Sunshine Radio. (Uses *grasscutterradio@yahoo.com* e-mail)



KCBM- The Ken and Barry show is best heard in the western US, on the unusual freq of 6990 kHz. Rock music is their staple format. (Asks for reports via the Free Radio Network web site)

KIPM- Alan Maxwell's complex drama shows are so eloborate that they are relayed at times on licensed stations. They are the only existentialism advocacy station active in radio today, either licensed or pirate. (Elkhorn)

KSUR- Their rock music is sometimes but not always supplemented by Detroit Lions football audio. (Uses *radioksur@yahoo.com* e-mail)

Pirate Radio Boston- Their rock music shows normally include some local New England groups. They sometimes use odd frequencies such as 6875 kHz, but they also use 6925 kHz. (Uses *pirateradioboston@yahoo.com* e-mail)

Radio Free Euphoria- Captain Ganja is best known

Continued on page 63

ON THE HAM BANDS

THE FUNDAMENTALS OF AMATEUR RADIO

T.J. "Skip" Arey, N2EI
tjarey@monitoringtimes.com

Scanning for Hams

I am humble enough to understand that it is unlikely many of you folks read *Monitoring Times* as your primary source of information related to amateur radio. The exclusively ham radio oriented publications such as *QST* and *CQ*, among others, provide a level of coverage, information and expertise related to the ham hobby well beyond anything I could provide, even if the *MT* powers that be gave me ten pages instead of two to talk about the amateur radio aspect of the larger radio hobby.

I don't think it's too much of a stretch to assume that you are a *Monitoring Times* reader because you also enjoy the wider aspects of the radio hobby. And that is what is so great about this magazine. It stands in the tradition of great radio hobby magazines of the past such as *Electronics Illustrated* and *Popular Electronics* – which took a "DC to Daylight" approach to radio hobby enjoyment.

Folks with a "Wide Band Attitude" may gravitate to good old *MT*, but you would be surprised how many ham folks have no concept of the hobby beyond the frequencies their license grants to their use. These folks do themselves a great disservice by not being aware of how the ham radio hobby can go hand in hand with other radio hobby activities, such as scanning. It would seem to be a no-brainer that scanning would augment any VHF/UHF ham's daily practice, especially if he or she is involved in any form of public safety support work, such as normally comes up through the activities of organizations such as ARES, RACES and SkyWarn.

Personally, there has never been a time in my ham radio career when I didn't own at least one scanner, so the concept of the two aspects of the hobby dovetailing just sort of remained the way I always did ham radio business. But, just in case a few folks have missed this symbiotic opportunity (and to give everyone a look at how these hobby aspects come together, at least for me), let's give this ham radio/scanner notion a walk around the block.

❖ Reviewing a Few Basics

Scanning, in the broadest definition of the hobby, would be the monitoring of any frequencies in the VHF/UHF spectrum. Much of the activity in this part of the radio spectrum can be found in the spaces between ham activity on the 145 MHz (2 meter), 220 MHz (1.25 centimeter), and 450 MHz (70 centimeter) ranges. Private sector and public safety communication of potential interest to a ham can be found throughout the UHF/VHF bands. It doesn't take a great leap of the imagination to see that keeping an ear on the non-ham frequencies can be a great aid to ham radio practice.

Monitoring this broad swath of frequencies in support of amateur radio was not always the easiest thing to do. In the early days of the scanning hobby, most receivers had limited coverage (often crystal controlled) that left large chunks of the bands out. For example, even most of the first generation synthesized scanners left out the amateur radio 220 band. But, as scanners became more sophisticated, with wider bandwidth and more frequency storage, the ability to listen to everything on the bands came into the reach of all radio hobbyists.

What's a scanner doing in a ham column? Read on!

We'll talk in a few minutes about making choices for scanners for ham support but, for now, I want to point out a short list of pluses and minuses.

First a big plus: Most of the broadband antenna designs used at VHF/UHF frequencies (such as the log periodic and the discone) can serve double duty as either amateur band or scanning antennas. And, where dedicated frequency segment antennas are preferred, most common antenna designs in the VHF/UHF range are small enough that more than one antenna can be conveniently mounted either at home or in a mobile environment.

Second big plus: modern receivers in the VHF/UHF range, regardless of if they are for ham or non-ham frequencies, have relatively low current drain with reasonably high performance. Add to this, surface mount design that shrinks even high performance gear down to something that fits in the palm of your hand. My most miserly scanning receiver can run all day on two AA cells.

And finally, the biggest plus of all: many current amateur radio transceivers (both mobile and base stations) include some level of broadband receive capability. This can range from limited coverage of traditional public safety bands up through broadband coverage that runs the length of the radio spectrum (usually with the normal restriction of cellular frequencies due to ECPA regulations). In other words, my friend, that handheld two meter rig sticking out of your back pocket may already be a perfectly serviceable public safety (or more) scanner!

All that said, I can only really think of one minus worth mentioning. Some state and local laws can get a bit twitchy when it comes to scanning, especially if you are operating mobile. Fortunately many of the laws limiting scanner use carry within their verbiage specific exemptions related to amateur radio operators (yet another reason to get your license if you haven't already). However, more than once I have had to explain these exceptions to the local constabulary, often standing at the side of the road brandishing a copy of the very law in question. So while you are preparing to enjoy the shared aspects of ham radio and scanning, have a care for the law of the land. I never travel down the roads without a copy of both my ham ticket and the most current state laws stuffed in my wallet.

Not a minus, but something else that needs full consideration: The scanning world has changed quite a bit over the last few years with more changes in sight. Various trunking schemes, digital signals, and frequency refarming all play a part in deciding what scanning receiver capability you require for where you live. You also have to keep an eye on frequency use changes as local agencies take advantage of advanced VHF/UHF communications technologies. Right now, the environment is volatile enough that it is truly possible to purchase a scanning receiver that will be of no practical use in your local area in just a few months' time. A bit of time devoted to reviewing information at sites such as **http://www.radioreference.com** will go a long way toward helping you make informed choices.

❖ Assessing Your Needs

Allow me to use myself as a test case here. I live in an area where local public safety services are dispatched via a County 911 System. All of the local services within the county are in the process of moving to a 500 MHz Motorola digital trunk radio system from a conventional system of independent

frequencies.

Also of note, there are two major metropolitan areas that routinely figure into the mix of any wide area activity I might want to monitor as a ham. One of these systems is also a Motorola digital trunk system (800 MHz), but the other is an EDACS system.

The State Police in my home state are on a 800 MHz analog trunk system but expect to move to digital in the not too distant future. I also have the opportunity to monitor civilian and military air as well as marine traffic on a major river. Not to mention the passenger, commuter and freight rail activity as well.

Yep ... I live in a frequency rich environment. But let's also not forget the fact that a major natural or man made disaster would probably bring *all* of those systems into play. Now, armed with this information, I can make intelligent choices as to how I may combine my two radio hobbies.

❖ Picking Your Rigs

My ham handheld of choice remains the venerable Yaesu FT-50RD. Yes, there are newer and lighter handhelds in the current marketplace, but none that have caught my eye enough to move on. I have always been of the "use it up, wear it out, make do" school. Is it any wonder my classic Drake TR-33C 2 meter rig is still in use in my shack?

While designed as a dual band 2 meter/70 centimeter rig, my FT-50 is an early serial number model that allowed for modification to permit limited low power 220 MHz transmission. The broadband receive coverage ranges from 76 MHz through 999 MHz. The unit also has 100 memories.

As it stands, my FT-50's capabilities as a conventional mode scanning receiver far exceed some of the earliest scanners in my shack. Given that much of the public safety activity in my area is now trunked, this rig allows me to load all the ham repeaters I need access to, and still leave more than enough space for the relatively small number of conventional public safety frequencies I need to monitor, such as mutual aid.

I did a lot of research into the current crop of digital trunking scanners and settled on the Radio Shack Pro96 as my scanning receiver of choice to monitor the various trunked radio systems in my region. The Pro96 feature set made the most sense for me, not just because of the unit's capabilities but, being a handheld design, it fit better with my "go anywhere, do anything" scanning style. I grab the FT-50 and the Pro96 and I'm good for just about anything that comes my way. Or am I?

Like those late night TV stations say, "But wait...there's more!" My experience in actual practice led me to add one more scanner into the mix. I recently added a Radio Shack Pro97 to my belt loops. This receiver filled in a few small gaps in that it added LTR system tracking and the "Signal Stalker" feature, useful in unknown environments. But more importantly, I discovered that my Pro96 was kept humming with trunk system activity to the point that I found it prudent to break out the marine, air, railroad and news service activity into a separate receiver. I also duplicated the State Police analog trunked system on this unit so I can give it priority when it is warranted by something like a major traffic problem on one of the main arteries.

❖ Antennas Anyone?

Believe it or not, most of my local activity is accomplished with very good results using just the "rubber duckie" antennas that reside on the various handheld units. Still in all, playing with antennas is fun, and it is fairly easy to extend coverage at reasonable prices in the VHF/UHF world. At my base I use a Diamond D-130J Discone. Set at a height above local terrain of 45 feet, it allows me to hit all relevant ham repeaters DFQ (dead full quieting) and then some. It also hears all the public safety systems I have programmed into the scanners. Its clean design has even won praise from my nonradio oriented neighbors. It's about as close to a one size fits all antenna as you are going to find for this type of use.

When operating mobile, I string a bit more coax. When I am not just getting by with the handheld "duckie" antennas, I run my ham transceiver into a Larsen Dual Band mobile vertical on a trunk lip mount. My scanners get treated to sniffing the ether by way of an Antenna Specialists MON752 trunk lip mounted vertical scanner antenna. Of the antennas I tested, this unit was the best compromise, given that my area had both 500 and 800 MHz trunk systems. With all the antennas, including the mobile units, I run low loss coax and high quality connectors.

❖ The Bottom Line

When participating in any of the area ham radio volunteer or emergency related activities, I can usually be depended upon to have the most up-to-date information. This helps me keep my fellow hams informed, safe, and ready to deploy in the best way possible. All because I found creative ways to bring two aspects of the radio hobby together. Oh ... and did I mention, I am having a lot of fun?

May you, your family and friends have a joyous Holiday Season, and may the New Year bring you Peace, Prosperity and the best of DX.

See you on the bottom end of 40 meters!

UNCLE SKIP'S CONTEST CALENDAR

ARRL 160-Meter Contest
Dec 2 2200 UTC - Dec 4 1600 UTC

ARRL 10-Meter Contest
Dec 10 0000 UTC - Dec 11 2400 UTC

Russian 160-Meter Contest
Dec 16 2100 UTC - 2300 UTC

RAC Winter Contest
Dec 17 0000 UTC - 2359 UTC

Stew Perry Topband Challenge
Dec 17 1500 UTC - Dec 18 1500 UTC

DARC Christmas Contest
Dec 26 0830 UTC - 1059 UTC

Clem Small, KR6A
clemsmall@monitoringtimes.

Christmas Down on the Antenna Farm

There is a classic antenna design that is often referred to as the "Christmas Tree Antenna." In German, this antenna is called the "tannenbaum" antenna. The word "tannenbaum" is loosely interpreted at times as "Christmas Tree," but more precisely as "fir tree."

The tannenbaum antenna is a dipole array which has been employed to beam programs overseas by shortwave broadcasters. This beam antenna contains four "trees" like the one shown in fig. 1A. Comparing the tannenbaum "tree" outline of figure 1A to the outline of a Yagi-Uda, and log-periodic dipole array (LPDA), (figs. 1B & 1C), the design certainly could warrant the "Christmas Tree" translation. It is interesting to note in passing that the Yagi-Uda antenna, because its outline looks something like a fish skeleton without a head or tail, has also been nicknamed a "fish bone" antenna.

Going Live

Getting closer to a real Christmas Tree antenna, there are various reports in the technical literature describing the use of living trees, including fir trees, as antennas. In the past in this column, we've reported the successful use of a tall maple tree as a good, HF receiving antenna. Nails, vertically spaced 2 to 3 in apart, were driven into the trunk from 6 to 30 inches above the ground. One of these will serve as the antenna connection. Another nail in the trunk at ground level serves as the antenna's ground connection. I used a 4:1 balun with the high-impedance side toward the tree and the low-impedance side to the coax lead-in cable. Try using the above-ground nails one at a time as the antenna connection while checking for best reception. Or, if an SWR meter is available, check, using the different nails, to find the lowest SWR at the receiver/transmitter end of the coax. Probably we should use only low power for transmitting with tree antennas to avoid possibly injuring the tree. As you can guess, dry, dead trees won't perform as an antenna.

Notice that the above-mentioned tree provided a ground as well as an antenna. In this, it is similar to the Marconi grounded vertical antenna. In the same fashion, electrical contact with the moist underbark of shrubs can be used as an emergency antenna-system ground for reception.

Stringing Along

At least one ham has used a string of Christmas lights on his Christmas tree as an antenna (see website box). The light string must have made a decent antenna, because the operator reported working DX stations with it! Sounds like some of Kurt Sturba's doings, doesn't it? The light string was about 25-ft long, and an antenna tuner was used to obtain a match between antenna and transceiver. Of course, the light strings were disconnected from the power line when used as an antenna! This light-string antenna was in the operator's living room. Often, tall outdoor trees are strung with Christmas lights. On HF and lower frequencies, the longer light-string antennas in these trees should work better than the shorter indoor ones.

Purely Artificial

I've also read of using an artificial Christmas tree that had a metal frame as an antenna. It was set up outdoors and insulated from the ground. A ground rod was connected to the coax lead-in's shield, and its center went to the base of the tree.

Live-tree antennas, light-string antennas, and artificial antennas are examples of the random-length antenna concept in which any length of conductor which happens to be convenient is used as an antenna. On the other hand, there are reports of resonant-length antenna elements being placed within the branches of a tree to produce a good antenna. These elements are best insulated from the tree. As one example, I've snaked the vertical element of a quarter wavelength antenna up through the branches of a tall pine. The antenna worked, but was below average. If I had installed a ground plane under the antenna, instead of the ground rod that I used, it would likely have been a better performer. Another factor is that I used a live tree. The element's proximity to the tree may cause significant loss of signal strength unless the tree is dead and dry.

See the website box to view an antenna tower designed to look like an 80-ft pine tree. Another rather interesting site referenced in the website box discusses using artificial pine trees and preserved palm trees as camouflaged towers which contain antennas.

Under the Tree

This next kind of Christmas-Tree Antenna may be the final proof that our consumer society has gone too far. Would you believe that you can even get a silver, flashing, Christmas-Tree Antenna (that's what the ads say) for your cell phone?! It installs simply with only a screwdriver and its "super bright" lights flash gaily when you use your phone.

And, lastly, I almost forgot to mention one other kind of Christmas Tree antenna. It's the rotatable, all-band, high-gain, super-directional, beam antenna that you are going to buy with the check that your rich Aunt Martha left for you under your Christmas Tree. Now there's the ideal Christmas Tree antenna! But, if that check doesn't materialize, and you'd like to have a high, vertical antenna in years to come, then you'd better be planting you an antenna tree in an open area of your yard soon! Or plant three, appropriately spaced, if you want a vertical beam: director, driven element, and reflector.

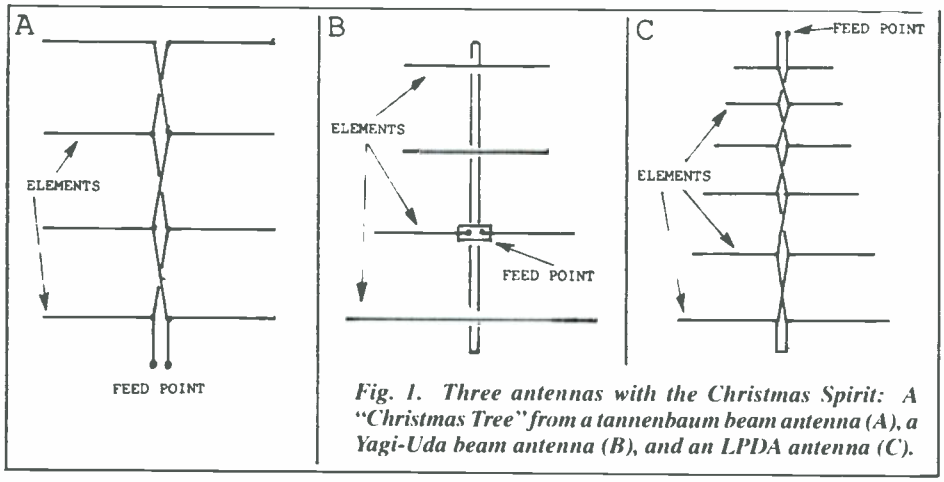


Fig. 1. Three antennas with the Christmas Spirit: A "Christmas Tree" from a tannenbaum beam antenna (A), a Yagi-Uda beam antenna (B), and an LPDA antenna (C).

RADIO RIDDLES

Last Month:

In last month's column I said: "Last month we discussed antennas that utilize water as their conducting elements. Yet in the early engineering development of waveguides, water was utilized

This Month's Interesting Antenna-Related Web site:

How about an 80 ft. fake pine tree antenna tower?
http://the.honoluluadvertiser.com/article/2002/Dec/10/ln/ln12a.html
Or how about artificial and preserved trees as antennas?
http://www.preservedpalm.net/eng/gsm.shtml
This next site is by a ham who reports working DX when using a string of lights on his Christmas tree as an antenna:
http://www.kkn.net/archives/html/QRP-L/2002-12/msg01653.html
Lastly, this site has a discussion on using trees as antennas, and gives several references to articles on that topic:
http://groups.yahoo.com/group/VLF_Group/message/887

as their dielectric! Dielectrics are insulators, not conductors, so what's going on here? Is water a conductor, or is it a dielectric? Or is it some kind of semi-conductor, or semi-dielectric?"

Well, depending on its purity, water can be either a conductor, or dielectric and insulator! Pure water, which contains almost no ions, is essentially an insulator. But when impurities which create significant amounts of ions are introduced into the water, it becomes a conductor. In fact, water purification systems often use the electrical resistance of their purified water as a measure of its purity. The higher the resistance, the more pure the water. Water in rivers or oceans contain lots of ions, and that's why they're conductive and make good ground planes for radio waves.

This Month:

Trees are what we might call "natural radio antennas." Are there any natural radio transmitters and/or natural radio receivers?

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, Happy Holidays, DX, and 73.

Outer Limits continued from page 59

Radio Free Euphoria- Captain Ganja is best known for his marijuana advocacy, but his shows always contain considerable comedy content as well. (Belfast)

Radio Moshiach and Redemption- Better known among DXers as Lubavitcher Radio, they still occasionally broadcast orthodox Jewish programming on 1710 kHz above the medium wave X Band. Their **http://www.radiomoshiach.org/** web site contains a working live audio feed in Windows Media Player. (Brooklyn and uses *radiomoshiach@erols.com* e-mail)

Sunshine Radio- Their female announcer still produces rock music broadcasts, sometimes in cooperation with **Grasscutter Radio.** (Uses the address from Grasscutter Radio; *grasscutterradio@yahoo.com* e-mail)

The Crystal Ship- The Poet operates on various random frequencies such as 6854, 6875, 6925, 7545, 7825, 8000, and 9057 kHz. Rock music and left wing political commentary. (Belfast and uses *tcsshortwave@yahoo.com* e-mail)

Undercover Radio- "Dr. Benway continues to produce rock music programming from the middle of nowhere." He claims various fictitious locations. (Merlin and uses *undercoverradio@moil.com* e-mail)

VUDU- Voodoo Radio produces both rock music broadcasts and drama shows. They seldom involve voodoo. (Elkhorn)

WHYP- The James Brownyord memorial station, allegedly from North East, PA, features a mix of rock music and pirate radio comedy, with their trademark ancient recorded weather reports for Lake Erie cities. (Belfast and uses *whypradio@gmail.com* e-mail)

WMPR- The only "dance party" techno rock station on shortwave today is still active. (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. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14895; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 69, Elkhorn, NE 68022; 383 Kingston Avenue, Suite 94, Brooklyn NY 11213; and PO Box 293, Merlin, Ontario N0P 1W0.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead. With the demise of the *ACE*, the best bulletin is now the e-mailed Free Radio Weekly newsletter, free to contributors via *niel@ican.ne*, and a few pirates will sometimes QSL reports on the Free Radio Network web site at **http://www.frn.net**

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or the e-mail address atop the column. We thank this month's valuable contributors: John T. Arthur, Belfast, NY; Dave Balint, Wooster, OH; Kirk Baxter, North Canton, OH; Dave Balint, Wooster, OH; Jerry Berg, Lexington, MA; Artie Bigley, Columbus, OH; Ralph Brandi, Middletown, NJ; Rich D'Angelo, Wyomissing, PA; Harold Frodge, Midland, MI; William T. Hassig, Mt. Prospect.

Marc Ellis
marcellis@monitoringtimes.com

The HQ-120: Picking Up Where We Left Off

I hope you hadn't been holding your breath waiting for this update of the Hammarlund HQ-120-X restoration! I'm embarrassed to admit that, until now, the topic has gone untouched since our September column. As my regular readers know, I always change out all paper and electrolytic capacitors before applying power to a vintage receiver for the first time. Being more advanced than any other radio we've handled in this column so far, the set has a great many more capacitors. And my vacation and later attendance at the Antique Wireless Association annual conference interrupted the work.

❖ Completing the Recapping

Finally, a few days ago, I sat down at the bench to complete the job. It took the better part of two days to accomplish that and, at the same time, check the restoration work of a previous owner. For some reason, he had replaced a great many of the .05 uF paper capacitors, leaving the other sizes strictly alone. Maybe he happened to have a handful of .05s on hand and planned to follow up with others later. In any case, all were wired in and sized correctly.

The power supply electrolytic filter caps were a different story. Mounted neatly in the original brackets, the multi-section can looked, at first, as if it had come with the set. However, the connections to the solder lugs definitely didn't look factory made. And one section had been left unused – which certainly would not have been part of the original design.

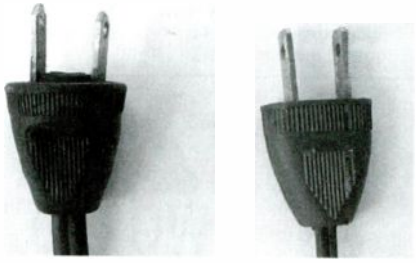
Dismounting the can and taking a closer look, I found that sections rated at 40, 30 and 10 uF had been used; the proper part was a 10-10-10 uF unit. As an interesting aside, I noticed that the substitute can had a "Transvision" part number. A television kit of that brand was widely marketed in the mid 1940s. At any rate, I replaced the can with three 10 uF @ 450 caps wired to a terminal strip mounted on one of the original capacitor brackets. It's amazing how compact and easy to mount these modern caps are compared to the massive original!

The recapping went very smoothly. Thankfully absent were the peculiar, and sometimes unexplainable, owner mods I've come to expect in almost any communications receiver I open up. However, the job *was* made just a bit harder by Hammarlund's stinginess with tie points.

There were places where as many as six leads – including a few of fairly heavy stranded wire – had to be inserted into two tiny holes in a tube socket lug. This was a particular problem when wiring the new electrolytic capacitor leads into the power-supply filter circuit. Sometimes the job was impossible and I had to resort to crimping a lead around the outside of a filled-up lug – relying on the solder to provide mechanical strength.

❖ Parts Sources

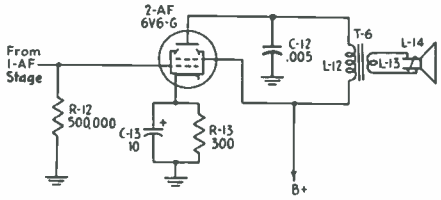
With the recapping complete, I was almost ready to test the set. I needed only to install a new line cord to replace the cracked and crumbling original, replace the weak and missing tubes, and install the control knobs. I used one of the newly-available, period-style, line cords supplied by Bob's Antique Radios and Electronics (111 East 29th St., Lagrange Park, IL 60526; (708) 352-0648; *radiobob1@sbcglobal.net;* **http://www.radioantiques.com**).



Reproduction a.c. plug by Bob's Antique Radios (right) with an actual 1930s plug for comparison.

The cord is terminated in a non-polarized molded plug modeled on one from a 1937 Zenith. Though the cord is not heavy looking, as in period zip cord, the neat repro plug and overall matte finish give it a plausible vintage look. It's eight feet long and available in black or brown at $1.50 plus shipping.

Normally, I can replace most missing or weak tubes out of my own stock. But the HQ-120 uses a few exotic ones – some where more common types would certainly have done. Examples: the 5V4 rectifier and two different dual triodes: a 6Z7 with the two triodes wired in parallel (in the noise limiter circuit) and a 6F8 wired as a diode-triode (used as the detector/first audio tube).



Generic representation of second audio stage. In the HQ-120-X, the 500k volume control takes the place of resistor R12.

And speaking of odd tube usage, I've already mentioned in an earlier article the eccentric employment of a 6F6 (a common audio output tube) as the third i.f. amplifier. I certainly would have expected a 6S7 here, as in the first two i.f. stages. Perhaps Hammarlund made a very advantageous bulk purchase of these tube types.

While I'm handing out plugs, I don't mind mentioning Radio Daze as my parts source of choice. They had the tubes I needed – which arrived two days after I phone-ordered them. I've had equally fast service on capacitors and other parts. Minimum order is a reasonable $10.00 and there is no handling charge. Shipping is by Priority Mail and the customer pays only the actual mailing cost. Radio Daze, 7620 Omnitech Place, Victor, NY 14564; (585) 742-2020; *info@radiodaze.com;* **http://www.radiodaze.com.**

❖ Initial Testing

With the line cord and tubes in place, I connected a speaker and prepared to power up the radio for the first time. As always, I hooked up a voltmeter to monitor power supply output, made sure to keep the rectifier tube in sight, and watched for smoke. If a destructive short circuit were present, there would be negligible output and the tube plates would likely glow cherry red. The glow of the VR-150 voltage regulator tube would serve as another visible indicator of B plus voltage.

After a few moments of warm-up, it became clear that there was not going to be a problem with the B plus. Everything looked normal. However, there was not a peep out of the radio – not even the usual static when moving the bandswitch or scratching an antenna terminal with a screwdriver. I also observed a strange effect when rotating the volume control. At a certain position of the control, a sharp, slow popping, or motorboating, could be heard in the speaker.

Just at this point, I was tempted to close the work session, report to you on what I'd accomplished so far, and take a short vacation from troubleshooting. I had enjoyed the recapping work, as always. Though it's repetitious and mostly mechanical work, there is great satisfaction in replacing all those dirty wax-covered paper capacitors with fresh plastic-enclosed units that could be reasonably counted on not to leak!

But recapping a communications receiver can also be a tension-filled process. Focusing closely on one stage after another, there is always the chance of coming across "rogue parts" or difficult-to-reverse circuit changes installed by previous owners. When I finished the job, I was quite ready to take a break!

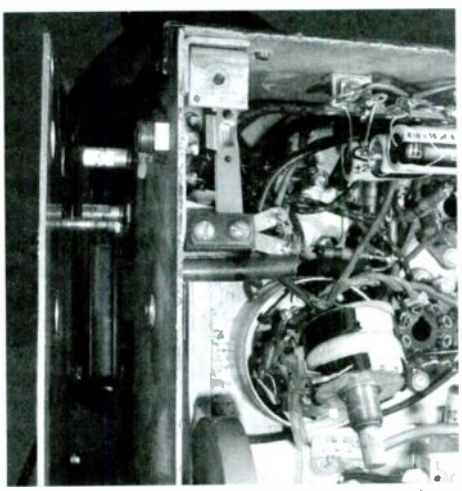
Yet I had very little to write about. Changing out caps on a big receiver is certainly labor intensive – but how much can a person say about changing caps? I think, probably, that next time I tackle a big set for the column (and I am considering a couple of even larger ones), I'll do all of the recapping before even introducing the set to you readers. Then I can begin with the actual testing and troubleshooting. All of which is to say that, very reluctantly, I realized I had to begin the troubleshooting process on this radio just so I could have enough "meat" for the column.

❖ Troubleshooting

I began with the 6V6 final audio stage – introducing a test tone from my signal generator directly into the control grid. I heard the tone in the speaker all right, but it seemed a little distorted and I was still getting that motorboating. I disconnected the previous stage (the 6F8 detector/first audio tube) to make sure that the problem wasn't originating in another part of the circuit and also tried a different 6V6. No luck.

As far as circuit components were concerned, both capacitors and the cathode resistor were new and presumably good. An ohmmeter check showed that the volume control potentiometer (which was in the grid circuit of the 6V6) was the correct size. What else could there be to look at?

I decided give myself a refresher course in final audio stages and came across a discussion utilizing a schematic that I'm reproducing here. Except for some component values, it's very close to the HQ-120-X's design. However, in the '120-X, the 500 k volume control potentiometer serves as a grid resistor in place of the fixed 500 k resistor shown in the schematic.



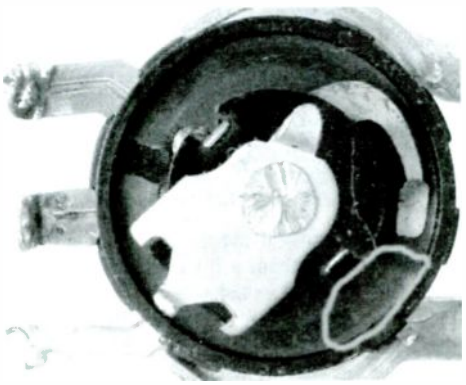
Front panel had to be pulled away from chassis (see text) so that volume control (at lower right) could be dismounted and removed. The three replacement electrolytic filter caps are at upper right.

The discussion pointed out that an open grid resistor, or one with a poor connection, could cause growling or motorboating! I immediately disconnected the wiper arm of the volume control potentiometer and connected an ohmmeter between the arm and one end of the resistance element. Sure enough, the resistance varied smoothly – until I reached the "motorboating spot," and then open-circuited. Moving past the spot restored the connection again.

Now there was nothing to do but remove the volume control for inspection – which meant removing all 13 of the control knobs that I had just installed, as well as all of the front-panel mounting screws. Then I could pull the panel far enough away from the chassis so that I could get a wrench on the potentiometer mounting nut.

Once I had pulled the control out and popped the back cover/a.c. switch, I could see the problem. A tiny section of the graphite resistance element had flaked off just at the spot where the motorboating was occurring. This was enough to keep the wiper arm from contacting the resistance element at that spot. That looked like my problem all right!

Luckily, I happen to have a Mallory serviceman's replacement volume control kit, so it was a simple matter to select a 500k control, mate it to an a.c. switch, cut the shaft to the proper length, and substitute it for the defective one. Applying power and the test tone once more, I found I now had smooth control, clean audio, and no more motorboating.



Rear of defective volume control. You might be able to make out the flaked-off section within the circled area just below the wiper arm.

Replacing the panel and knobs, I moved the audio tone prod from the grid of the 6V6 to the grid of the 6F8 triode section serving as the first audio stage. Instead of the expected increase in volume, there was a significant loss. So it looks as if the first audio stage is also going to put up a fight! More on that next time.

❖ Monthly AM Night

Recently, Rachel Baughn, our Editor, sent me a press release from the Collins (Radio) Collectors Association. It seems that they sponsor an "AM night" on the first Wednesday of every month. Any ham with an AM transmitter of any make is invited to join the fun and operate in this nostalgic mode. The on-the-air get-together is structured as four separate nets – one for each of the time zones: eastern (7-8:30 p.m. local time); central (7:30-9 pm local time); mountain (8-9 p.m. local time); and western (8-9 p.m. local time). Operating frequency is 3880 kHz.

I received the press release on the very day of the October session, and though I have only a temporary antenna and am not set up to transmit, I had a lot of fun listening. I was able to hear the net control for our area and various stations checking in from different parts of the Midwest. By the time you read this in December, the summer QRN should have died down – so be sure and listen! For more information about the organization and the event, visit **http://www.collinsradio.org.**

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.

Electronic Kit Building: Start Your Irons!

The Ten-Tec 1254 SW Kit, Part 2

By Dr. John Catalano

The TenTec manual is especially user-friendly. But before we begin actual construction of the Ten-Tec model 1254 SSB-CW-AM general coverage receiver kit, it's a good idea to search the paperwork for addendum and corrections. The 1254 has a few of them, so write them right into the construction manual or staple them to the pertinent page(s).

At the beginning of each "phase" of construction it gives a "Quick-Reference Summary." This provides an excellent overview of what is going to be built in this section of the manual. It is then followed by the detailed assembly instructions. All parts used on the display board are packed in a zip lock bag with the board.

Remember to use all the electronic construction techniques we previously outlined in Part 1 and use solder sparingly.

If the component is axial, gently bend the leads at right angles to the body of the component, making a "U" shape. Use your needlenose pliers to make the bends **taking care not to stress** the leads where they exit the component's body. Now, find where on the printed circuit board (PCB) this component should be inserted. Components are usually inserted on the side of the PCB with a small number or no copper traces. To be certain, find the PCB diagram in your construction manual and locate the component.

❖ Mix of Science and Art

I suggest that resistors and inductors be inserted into the PCB with the first band on the left, or in the case of vertical placement, on the top. This will make troubleshooting (in the rare case that we would need it!) much easier. Similarly, face all disc capacitor values in the same direction. Remember, diodes and electrolytic capacitors are polarized and must be inserted as directed, not by label positioning.

Check that you are inserting the component into the proper location on the PCB location twice before you insert it. Desoldering is possible, but it's an art in itself that risks damaging the component and the PCB. In manufacturing operations, "Pick and Place" robots perform this component positioning and insertion on PCBs.

While holding the body of the component against the PCB, turn the PCB over and gently spread the leads apart where they emerge from the PCB. This will hold the component in place, allowing multiple components to be inserted and then soldered all at once. Depending on the PCB complexity and your experience, three to seven components can be inserted before soldering them in place.

❖ The Display Board

Follow each step for the construction of the Display Board and insert and solder the components as called out in the manual. When instructed to, carefully remove the LED displays from their conductive packing foam. Take care not to bend the pins; getting all eleven pins aligned and in the holes on the Display PCB is probably the toughest part. Make sure you hold the display tight against the PCB when you turn it over to perform your soldering. Then solder one pin and check that the display is still tight against the PCB. If you find that it is sitting too high on the PCB, apply light pressure while re-heating the pin.

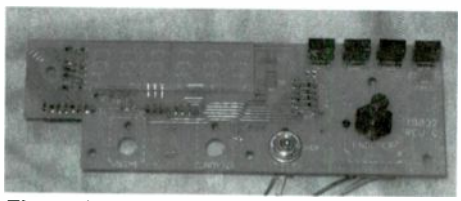


Figure 6 - Completed 1254 display board

The spacing of the holes for the 33 ohm resistors places them a bit close together, not allowing the resistors to lie flat on the PCB. Just make sure the resistors are lower than the top of the LEDs.

TenTec has done a great job with the instructions. So, if you not sure about some detail, just reread the instruction step carefully and match it to the illustrated layout of the PCB. Although TenTec rates the 1254 as an intermediate level kit, all the information is there; enough for an experienced or a novice kit builder to be successful.

Once we complete the Display PCB, Figure 6, it's on to the Main Circuit Board.

❖ Bags and Bags of Parts

The Main Board, Figure 7, is quite a bit larger and more complicated than the Display Board. Unlike the Display Board, the Main Board has a number of different functional circuit blocks. These include:

- Logic and display driver
- VCO (voltage controlled oscillator) and PLL (phase lock loop),
- Audio/detectors/IF amp and automatic gain control
- LO 1 (local oscillator 2) and mixer 2, LO 1/mixer 1 and RF input.

The Main Board manual is broken down into the construction of these building blocks, each with its own chapter or "Phase." The parts are partially sorted by type; all resistors in one bag, etc. Let's begin the big Main Board.

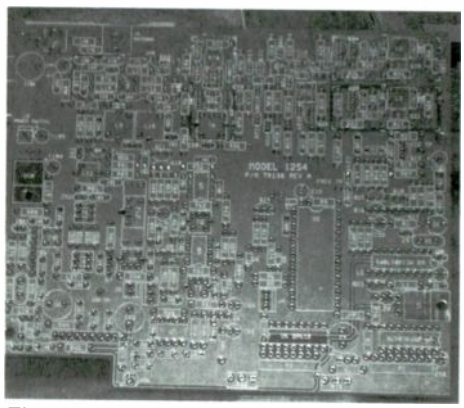


Figure 7 - Naked 1254 main PCB - No components from the solder side.

❖ Clean is Still Good

Start by cleaning all cut leads and solder splashes from your work area. Retin the iron's tip and you're ready to go.

Open the resistor bag and remove only those that will be needed for Phase 2, as listed in the Quick Reference Summary for the particular Phase. Use the Kit Manual Supplement parts location diagrams.

After inserting them into the proper position in the PCB and soldering, follow the instructions and repeat the procedure with each bag of different required components.

❖ Look Closely

Understanding the mechanical orientations of P1 and P2 are perhaps the most challenging thing in the Phase 2 assembly. They are mounted on the other side of the PCB from the other components, but soldered on the component side.

When the short pins of P1 and P2 go into the PCB to be soldered, make sure you use the very bottom row of holes. This will cause the longer pins to point off the board. P1 and P2 are delicate plastic pieces, so don't leave the iron on their pins for too long a time.

The diodes that are required in Phase 2 are not easily identifiable, since their numbers and colored bands are very difficult to read. Perhaps a magnifying glass is a necessity. Printed tags should be placed on the diodes, although page 16 in "Getting Started" helps. Triple check your parts

selection and orientation before you solder.

❖ Before You Go On

TenTec has thoughtfully included "Progress Test" sections after each Phase. These provide intermediate tests that allow you to test what you've just built.

I must confess that, using the Phase 2 "Progress Test" instructions, I found that the function buttons did not operate. I found a solder bridge shorting between the first two pins of P2. It can happen to the most experienced, so carefully inspect all joints immediately after soldering and then again after cutting the leads.

❖ Phase 3

There are lots of parts to solder here, starting with the VCO and PLL circuits. Get out the old magnifying glass for identifying components. Again, be very careful with identifying the diodes whose colors are faint. Orient the three-leaded coils carefully, as well as the transistors. Make sure you don't miss the insertion of any parts. Check while cutting leads that you have actually soldered them. I sometimes find a few I missed!

❖ VCO Alignments

I wondered how TenTec was going to handle this critical set of adjustments with just a simple VOM. In a word – great! All it takes is a well-fitting alignment tool (part of the Radio Shack alignment tool assortment) and a VOM. Connect the voltmeter to the VCO test point, tune the display to 100 kHz as detailed in the instructions, and adjust the L3 for a reading of 3.5 volts. Be light and gentle with L3, lest you crack the adjustment ferrite core. Follow a similar procedure with L2, and the initial VCO alignment is complete. Pretty easy.

Phase 4 has a number of sections. Take your time and enjoy the kit building experience. In Phase 4C be especially careful not to solder-bridge the connections on T2 and T3. The spacing here is tight and is a real test of your soldering ability.

Check over your connections for unsoldered or bridged joints. Use your magnifying glass and compare the traces on the PCB to those found on page 40 of the Reference section. If all looks good, go on to Phase 5. Kit building is a journey as well as a destination. Take the time to enjoy both.

❖ Phase 5

Labels for the disc capacitors are tricky to read on the silk-screened component pattern on the PCB, even using the Kit Manual Supplement diagrams. Try reading the description of the component in the "Quick Reference Information" section to localize the component use on the board.

For example, for C80 it reads "base bypass on Q5." Therefore, we know to look around Q5. But, it is still a trick, and one of the most time-consuming activities in building the 1254.

There is a misprint on page 53, step 5-51. The first reference should be to L7 for the installation of the smaller shield.

❖ Phase 6

This section goes much easier and faster than all the others, due to the enlarged parts location drawings provided on each page.

❖ Oops, No Oops!

Sometimes a surprise occurs when you find out, near the end of construction, that a part called for has been already used. Oops! That means you mistakenly used the wrong value part earlier in the construction. Recheck every similar part on the board. With patience you'll find it. Carefully desolder it and install the correct part. If you destroy a resistor or a capacitor, you can usually get one from a Radio Shack store or on-line. But what a pain!

A completed, correctly constructed Main PCB

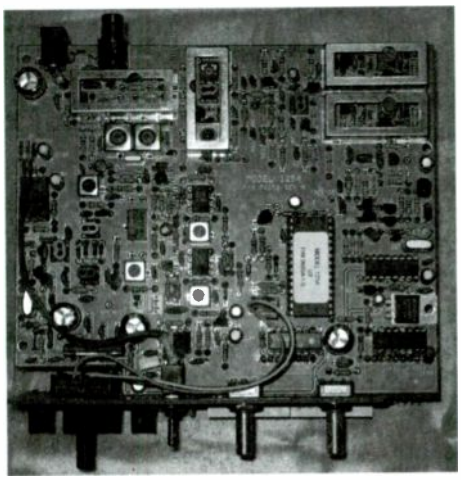


Figure 8 - Completed main PCB mated to display PCB prior to mechanical assembly

is a thing of beauty; see Figure 8.

Once all the parts are in their right places and you've CAREFULLY checked for solder bridges and stray pieces of wire and solder, it's time to put the 1254 in its case and then final alignment.

❖ Yuck, Mechanical!

I hate the mechanical part of construction. It seems I always have parts left over, a worrying situation. However, getting to this point means we are close to an operational receiver – if we did everything right. Ever since my first kit over 40 years ago, when I get to this point I often feel a bit of let-down, knowing that the end of the kit building is near. However, the anticipation of having all these parts become a working dual conversion shortwave receiver is exciting.

The mechanical assembly of the 1254 has some "interesting" steps, requiring melting six plastic pins to hold in the display cover. The trick is to partially melt the pins but not the display cover they are holding. DON'T YOU DARE USE your good Weller soldering iron for this purpose. This is a job for a Dollar Store soldering iron.

I was concerned about the manual's suggested method of mounting the nine-volt memory back-up battery. A loose, metal-cased battery running around the bottom of the PCB could cause real trouble. You can't let that happen to your baby …uh, I mean receiver. Instead, I found a plastic box at a Dollar Store that the nine-volt battery fits snugly into. I used two screws to secure it in the two "slits" on the speaker bracket.

You will need contact cement to mount the speaker to its bracket. It is not supplied with the kit, but is readily available. I used Loctite Contact Cement, which worked fast and seemed to give a secure joint.

Following the mechanical assembly instructions, we're now ready for testing and final alignment.

❖ Almost There

Well, after a few days of mostly pleasurable effort, the 1254 is ready for final test and alignment. If you subjected your work to all the intermediate tests at the end of each Phase, there should be no surprises.

Final alignment requires just two voltage measuring coil adjustments, then peaking the signal strength of an off-air signal, using five coils. Yes, Virginia, it's done by ear, but the results are excellent.

❖ That's It

Congratulations! You are now the proud owner of a 2.25 x 6.5 x 6.5 inch, double conversion, microprocessor controlled, digital shortwave receiver! It features 15 programmable memories, 2.5 microvolt AM sensitivity, 0.5 microvolt SSB sensitivity for 10dB SNR, and you built it from bags of parts! See Figure 9.

Figure 9 - Congratulations! You're the proud owner of a healthy (working), newly-constructed, TenTec 1254 Receiver.

Off air tests suggest that the 1254 is a hot little radio. Accurate and easy to operate, the 1254 is a perfect second "monitoring" receiver around any shack. Its small size makes it perfect for a primary receiver in an office or den.

Ten-Tec suggests a build time of 20 to 25 hours, and they are probably on the mark. They also give the 1254 an "intermediate" building skill level. I would agree with this, although a determined novice with patience could perhaps do the job and enjoy the rewards.

❖ Conclusion

In the 21st century, with instant gratification, shrinking attention spans, and a waning interest in electronic hardware (as compared to the explosion in software), shortwave kits are few; but some good ones, such as the TenTec 1254 receiver, still exist. The 1254 receiver kit is available at a cost of $195 plus shipping from TenTec.

http://radio.tentec.com/kits/Receiver
Ten-Tec Inc.
1185 Dolly Parton Parkway
Sevierville, TN 37862
(800) 833-7373 (865) 453-7172)

MT REVIEW

Tune In International Radio Broadcasts with a Small Dish

By Ken Reitz KSRZR

If you're tired of waiting for digital shortwave services to become more than an expensive experiment or you just want access to a global view of news and information, you might be surprised at what you can get now for less than $200.

❖ Small Dish, Small World

The U.S. domestic satellite known as Intelsat America 5 (97° W) carries a huge load of programming on its 24 C and 27 Ku-band transponders. On the Ku-band side, there are more than 200 video and audio services transmitting in the MPEGII digital format, with many unencrypted (known as Free-To-Air or FTA) services. These channels can be tuned in for free using an inexpensive MPEGII FTA receiver.

One of the companies providing programming on this satellite is Globecast World TV, a French Telecom subsidiary based in Washington, D.C. Their business is to sell uplink and downlink services for companies wanting to provide programming to the various international communities around North America.

In order to promote a greater number of viewers and listeners to the services it broadcasts, Globecast sells, under its own label, a complete small dish satellite TV system (see photo). The entire system – receiver, dish and LNB – is $179 plus shipping, handling and any applicable state taxes. You'll have to provide the RG/6 cable needed to get from the receiver to the site where you've located your dish. If you already have a Ku-band compatible dish, the receiver alone is $139.

Globecast World TV's versatile small dish satellite system. Tune in international broadcasters via World Radio Network with a beautiful signal 24/7 and free! (Courtesy: Globecast World TV)

❖ What You'll Hear *and* See

Check out the list below and you'll see some very familiar shortwave services with some of the best programming to be found. World Radio Network's line-up of international broadcasters, which also includes Glenn Hauser's *World of Radio* program, is worth the installation of this system alone.

Repositioning the dish to receive AMC1 (103° W) allows you to tune in WCPE-FM, the nationally acclaimed, full-time, commercial-free, classical music station from North Carolina whose programming provides a serious antidote to a stressful day. On Galaxy 11 (91° W) you can tune into Yesterday USA, the only station in America playing your favorite Old Time Radio shows 24/7 and commercial-free.

If you have a big dish C-band system, you can also tune in the international broadcasters on Panamsat 9 (58° W), including Deutsche Welle, China Radio International, and RAI International (Italy). Other great stations are scattered all across the satellite arc, broadcasting every kind of radio format from Christian programming to the painfully hip alternative music of KEXP-FM, Seattle.

Turning your dish to Galaxy 3 (95°W) lets you tune into USIA's World Net, with video from the U.S. Information Agency and audio from Voice of America, including VOA's *Music Mix* and *News Now* as well as Radio Liberty and Radio Free Europe.

These are just examples of what you'll hear, and, since this is a satellite receiver, once you hook your TV to the output you'll also be able to watch several hundred channels from around the world, showing everything from adult movies to bible pounding evangelists. The Globecast receiver has a "smart card" reader, similar to the ones used in other small dish systems, which allows you to subscribe to encrypted programming as described on the Globecast web site.

Among the subscription channels on A15 are EuroNews ($9.95/month), a 24/7 international news channel with a European perspective. This channel brings the combined services of Europe's news gathering organizations into one neatly edited channel covering Europe, Africa, the Middle East and Asia. The service offers commentary in seven languages which are accessed simply

Globecast World TV's nerve center. Making the world's TV and radio available to North America's growing international community. (Courtesy: Globecast World TV)

FREE RADIO SERVICES FOUND ON A15

World Radio Network North America (English)
WRN N. A. (Multi-lingual)
WRN N. A. (French)
Radio Netherlands Worldwide (English)
RNW (Dutch)
RNW (Spanish)
Radio Romania International
Radio Tunis International
Polskie Radio
Voice of Turkey
Radio Korea
Additional full time services from The Philippines, Saudi Arabia, Qatar, Iraq, Iran, Armenia and Israel.

ADDITIONAL MPEGII FTA INTERNATIONAL RADIO
PANAMSAT 9 (58°W) C-BAND:
China Radio International Xpndr 6
RAI International (Itlay) Xpndr 21
Deutsche Welle Radio 1 Xpndr 8
Deutsche Welle Radio 2
Deutsche Welle Radio 7
RDP Portugal AMC4 (101°W) Transponder 24

OTHER RADIO SERVICES OF NOTE:
Yesterday USA (Old Time Radio 24/7) Galaxy 11, 18 (91°W) Ku-band
WCPE-FM (Public supported Classical Music 24/7) AMC1,12 (103°W) Ku-band
KXEP-FM (Public supported Alternative music 24/7) G10, 6 (123°W) Ku-band

Eagle/Aspen diplexer switch lets you switch remotely between two dishes instantly. (Courtesy: DVBexpress.com)

by pressing the "language" button on the remote.

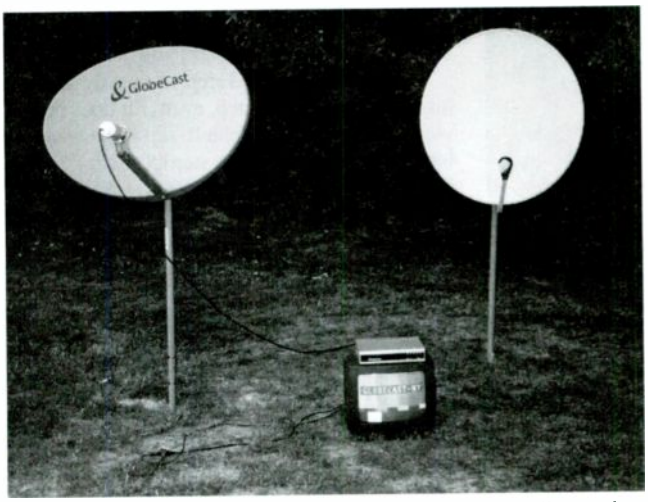
Washington, D.C. based MHz Networks (**http://www.mhz.org**) has just launched on IA5 offering international programming with all English subtitles. Check out their acclaimed International Mystery series and half hour news programs from around the world.

Also offered is Setanta Sports North America ($11.99 /month), which brings, via live broadcast and replay, European sporting events such as FIFA World Cup qualifiers, FA cup, UEFA cup, Bundeslige, Scottish Premier League, and much more. An extensive list of all channels to which you may subscribe are found on the Globecast home page (**http://www.globecastworldtv.com**).

❖ The Multi-Dish Solution

One of the great things about this system is that it's so small it may be installed just about anywhere. Many of D.C.'s high-rise apartment buildings sport these dishes, because for many it's the only way to receive programming from the home country. The system comes with an exterior wall mount, but it can also be installed in a back yard or patio, no matter how small. All you need is an unobstructed view to the south. And, regardless of what your home-owner's association or landlord claims, the FCC allows you to install this type of system on a balcony or patio which is under your control.

To receive two different satellites using the same receiver, you can install two separate dishes and feed them both with a diplexer, which is a signal combiner and antenna switch in one. You program your receiver to automatically switch satellites to pick up the channels you want on another dish. It's a great solution for places which could never accommodate a big dish and where shortwave reception is poor.



The multi-dish solution: Tune in two different satellites using the Globecast system and another dish. Switching is done via a diplexer: no moving parts! (Courtesy: Author)

❖ The Globecast Receiver up Close

This receiver is similar to most MPEGII FTA receivers with a couple of notable exceptions. It's set up to automatically search for and store the Globecast channels on IA5. That's handy when first setting it up. It will not do a "blind search" of all satellite signals on all satellites. However, it does an excellent job of tuning channels when you've manually entered the necessary reception parameters (transponder frequency and symbol rate). I found that this receiver is very sensitive and can display channels with as little at 8 or 9 percent signal quality.

There's a one-button signal strength meter which is a real plus in helping find the signal you're looking for. In fact, the small remote is very well designed and laid out, with one-button switching between audio and video services, and it allows switching from satellite dish to an outside off-air TV antenna.

The on-screen menu is easy to read and navigate. This receiver is packed with advanced features. There are many hundreds of signals which can be tuned in, so it's important to have an electronic program guide which can be edited to allow tuning only the video and audio services of interest to you. To access the edited list, simply press the "FAV" button on the remote. Continued pressing the button cycles through the various favorite lists you may customize.

The back of the receiver features the usual LNB loop-through, which allows you to set it up without having to split the signal coming from the LNB if you're using it in a "slave" configuration with a big dish. Outputs include "S" video cable output, three RCA plugs for left and right audio and TV signal, and an "F" connector for channel 3 audio/video via coax to your TV or VCR.

MPEGII FTA systems are incompatible with DISH Network and DirecTV systems. Those DBS services not only operate on a different part of the Ku-band, but their signals are transmitted in circular polarity as opposed to the linear polarity of MPEGII systems.

❖ Last Word

While MPEGII digital broadcasting on North America's broadcast satellites is nearly 10 years old, programmers are just now starting to see the profit in using this system for Direct To Home (DTH) broadcasts of niche programming of interest to viewers across the continent. Globecast's receiver is among the first to use an addressable smart card to allow reception of subscription channels. Globecast says the FTA channels they offer will continue to be offered for free. Only new specialty channels will be added for subscription.

This trend will likely continue over the next several years, as more MPEGII FTA receivers form a wider market and terrestrially based independent broadcasters realize the potential of reaching an audience of MPEGII FTA listeners via satellite. It could easily become an inexpensive alternative satellite radio service.

❖ FOLLOW-UP

Additional information on items mentioned in this article:

DVB Express has excellent Ku-band dishes, diplexers, cable, etc. at reasonable prices. **http://www.dvbexpress.com**

EuroNews: **http://www.euronews.net**

Global Communications has many C and Ku-band related systems: **http://www.global-cm.net**

Globecast World TV: **http://www.globecast-wtv.com** 888-988-5288

Sadoun Satellite offers a wide variety of MPEGII FTA equipment: **http://www.sadoun.com**

Setanta Sports North America: **http://www.setanta.com/usa**

World Radio Network English Schedule: **http://www.wrn.org/english**

Find reception parameters for all MPEGII FTA services on satellites worldwide at: **http://www.lyngsat.com**

Read a Good Label Lately?

You could learn a lot! Look at your MT label before you throw your wrapper away it tells you how many issues you have left in your subscription. If two or less, renew right away to avoid missing an issue. Keep those MTs coming and we guarantee you'll learn a lot!

WARNING: If you get a neon yellow wrapper on your magazine, don't throw it away: That is your renewal notice! Cut the card out of the wrapper and send it in with your payment. You'll get two notices and then it expires. So take care, don't let your subscription die!

Uniden BR-330T

A Wideband Scanner with Trunk Tracking – Finally!

By Larry Van Horn, N5FPW

Anyone who has followed this column closely over the last year knows that Uniden has been constantly raising the bar with a line of new handheld scanners offering the scanner hobbyist more listening capability. Now, for the first time ever in the scanner marketplace, we have a wideband handheld scanner with trunk trucking capability – the new Uniden BR-330T handheld.

The BR-330T offers continuous frequency coverage from 100 kHz to 1300 MHz (except for the mobile and base cellular bands). Reception modes include AM, narrowband FM and wideband FM. In addition to conventional scanning, the BR-330T has Trunk Tracker III™ technology. This will let the monitor follow unencrypted conversations on analog Motorola, EDACS, EDACS SCAT, and LTR trunk radio systems, including systems in VHF, UHF, 700 MHz, 800 MHz and 900 MHz bands. The scanner can scan both conventional and trunk systems at the same time.

If the scanner is used to scan Motorola trunk frequencies, you can set it so it scans using only the system control channel frequency data. You do not have to program all the trunk system voice channel frequencies into memory in this mode as long as all possible control channels are programmed.

Like its 246/396 Uniden cousins, this scanner uses dynamically assigned memory channels to store frequencies more efficiently than conventional scanners. The 330T has 2,500 of these memory channels used to store frequency, talkgroup, and alphanumeric tag information. This lets you organize the scanner's memory so that it more closely matches how radio systems actually work, making it easier to program and use your scanner, and allowing you to determine how much memory you have used and how much you have left.

Using 99 quick keys, you can set the scanner so you can quickly select systems and groups by using the keypad. This makes it easy to listen to or quickly lock out those systems or groups you don't want to scan.

❖ Preprogrammed Frequencies

The BR-330T is preprogrammed with over 1,000 channels covering police, fire, and ambulance operations in the 25 most populated counties in the U.S. and frequencies for many major automobile races. For race track operations, you can set it to scan races using a frequency list or the frequencies preprogrammed into the scanner. You can scan by car number and driver name, assign the car to a quick key, and set the scanner so it sounds an alert when the car you are scanning transmits.

There are 13 service searches ranges preset in separate public safety, TV/Radio services, amateur radio, maritime, railroad, civilian air, CB radio, FRS/GMRS frequencies, automobile racing, special services, AM broadcasts, FM broadcasts, and TV broadcasts.

The BR-330T also has a feature that lets you include selected service searches or custom search ranges during normal scan operation.

❖ Other Enhanced Features

Many of the features found in the more expensive BCD396T have been incorporated into the BR-330T. Here are a few of the most notable ones.

Close Call™ RF Capture Technology – This one feature that monitors have really enjoyed. Recently at an airshow, a milair monitor was able to find some new frequencies thanks to Close Call. This model has a broadcast screen to set the scanner to ignore Close Call™ or to search hits on known broadcast frequencies, including pager frequencies. It also has a custom screen capability that lets you input up to 10 frequency ranges that the scanner will ignore during Close Call™ or search operation.

★★★★☆

MT Rating: 4 1/4 Stars

You can lock out any system, group, frequency, or channel while scanning or searching. If you lock out a system or group, any channels belonging to that system or group are also locked out. You can lock out up to 200 frequencies and review all locked-out frequencies. The scanner skips locked-out frequencies while using the Close Call feature or while searching.

The 330T incorporates the fast CTCSS and DCS squelch modes search and store. You can see the CTCSS/DCS tone on a programmed memory channel or during searches if this function is selected.

First introduced in the 396, this scanner also has fire tone-out standby. This feature lets you set the scanner to alert you if a two-tone sequential page is transmitted. You can set up to 10 settings (transmit frequency, tone frequencies) then select one of those presets for standby monitoring.

Repeater reverse lets you set the scanner so it switches to the input frequency on a conventional repeater system. Channel alert allows you to set the scanner so it alerts you when there is activity on any channel you specify. For each alert in the scanner (such as channel alert, Close Call alert, emergency alert), you can select from nine different tone patterns and also set the alert volume level independently from the main volume level.

Automatic channel step accepts frequencies on any valid channel step, even if it does not fall within the band plan's default step. Frequency step lets you select a frequency step (5, 6.25, 7.5, 8.33, 9, 10, 12.5,15, 20, 25, 50 or 100 kHz) for manual mode and chain search mode. The scanner's auto

MT First Look Rating (0-10 scale)	
Audio Quality	8
Audio Levels	9
Back light/Display	8
Battery Life	8
Ease of use	8
Feature Set	8
Keyboard/Button/Control Layout	8
Overall Construction	8
Overall Reception	8
Overall Manual	7
Sensitivity	8
Selectivity	7

step feature also lets you set the scanner so it automatically chooses the correct step.

Some of the other features that 396T users will be familiar with include: Quick recall, scan/search delay, text tagging (name each system, group, channel, talk group ID, custom search range, and SAME group, using up to 16 characters per name), unique data skip, duplicate frequency alert, and memory backup.

❖ NOAA Weather Features

Like earlier Uniden models, the BR-330T has a suite of NOAA weather reception features.

Weather search lets your scanner receive your local NOAA weather transmission. The SAME weather alert alerts you when a SAME weather alert is transmitted on a NOAA weather channel. The scanner also displays the transmitted alert type. Weather priority alerts you when a SAME weather priority alert is transmitted on a NOAA weather channel.

❖ Auto Store

Frequency autostore automatically stores all active frequencies in the selected conventional system, and talk group ID autostore stores all new talk group IDs it finds into a channel group you select.

❖ Backlight and Power

The BC330T display and keypad are backlit making the display and keypad easy to see in dim light. You can adjust the back light so it turns on (1) when you press a key, (2) when squelch breaks during a transmission, or (3) manually. There are also low battery alert and battery save functions.

❖ PC Control and Cloning

You can transfer programming data to and from your scanner and your personal computer, and control the scanner using a computer using Uniden's PC Control software. This helps you find frequencies listed on the Internet and load them into the scanner. PC control and programming software can be purchased at **http://www.uniden.com** for $29.95.

You also have a couple of scanner cloning options using two units wired together and over-the-air cloning. You can clone all programmed data, including the contents of the scanner's memory, menu settings, and other parameters from one BR-330T scanner to another BR-330T scanner.

❖ Antennas

The BR-330T has several antenna options. There is a built-in bar antenna for AM radio broadcasts. This antenna can be turned on or off. An external antenna can be used for reception of any of the frequency ranges the scanner can be tuned to via the SMA connector on top of the unit. The unit comes with a rubber duck antenna and an SMA to F female adapter.

❖ Bottom Line

The backlit color has been changed from the blue used on the 396T which made the display harder to read. The 330 uses amber backlight which is easier on the eyes, especially in bright light environments. Also, do not try to view the screen or photograph it using polarized eye wear or lenses. There is a special screen bezel over the display that will not present the display properly with polarizing filter/lenses in use.

Out of the box, the AM/Shortwave reception using the stock rubber duck or AM bar antenna is poor. Add a good external antenna and AM/Shortwave reception improves considerably. Unfortunately, there is no SSB/CW mode capability. This limits the utility of shortwave reception to shortwave broadcast stations (only about 15-20% of the shortwave frequencies covered by this unit).

This scanner is loaded with features for the money. It is a lot of fun to use the BCD396T and BR-330T together to monitor a wide swath of radio spectrum. I now have two scanners programmed with 8,500 frequencies, monitoring a wide variety of services/frequencies. There is a lot of monitoring capability in the BR-330T. If you don't need digital decoding capability in your area or you are looking for a good second scanner, the BR-330T is the model you should consider.

*The Uniden BR-330T (SCN 30) is available from Grove Enterprises (1-800-438-8155 or **http://www.grove-enterprises.com**) for $289.95 plus shipping.*

Table One: BR-330T Specifications

Dynamic Allocation Capacity:
Systems-200 max, Groups-20 per system, Channels-2500, and channels per trunk system up to 200.
Attenuation: 18 dB (nominal), 10 dB (limit)
Operating Temperature:
Normal –20°C to +60°C, Close Call –10°C to +60°C
Scan Rate: 90 channels per second (conventional mode)
Search Rate: 140 steps per second (5 kHz step only)
Scan Delay: 0-5 seconds
Audio Output:
400mW nominal into 24 ohms internal speaker, 30 mW nominal into 32 ohms headphone
Power Requirements:
3 AA Alkaline Batteries (4.5V DC), 3 AA Rechargeable Ni-MH Batteries (3.6V DC), or AC Adapter (6 VDC 800mA) (AD-1001)
Antenna Impedance: 50 ohms
External Jacks:
Antenna Jack SMA Type, Headphone Jack 3.5mm, DC Power Jack (EIAJ TYPE-2 Center Positive) 4.0mm, and Remote Jack 4 Pin Mini
Size:
2.40-inches (W) by 1.22-inches (D) by 5.35-inches (H)
Weight:
0.60 lbs (with batteries installed), 0.40 lbs (without batteries installed)

Specifications certified in accordance with FCC Rules and Regulations Part 15, Subpart C, as of date of manufacture. Features, specifications, and availability of optional accessories are all subject to change without notice.

Frequency coverage: Continuous 100 kHz-1300 MHz (except for cellular bands):

Frequency (MHz)	*Search/ Prog. Steps*	*Service(s)*
0.100-0.525	5 kHz	Longwave (100-525 kHz)
0.530-1.700	10 kHz	AM Broadcast (530-1700 kHz)
1.705-24.995	5 kHz	Shortwave (1705-24995 kHz)
25.000-26.960		5 kHz Petroleum products/Broadcast pick up band
26.965-27.405	5 kHz	Citizens Band Class D
27.410-27.995	5 kHz	Business/Forest products land mobile
28.000-29.680	20 kHz	10-Meter Amateur band
29.700-49.990	10 kHz	VHF Low band land mobile
50.000-53.980	20 kHz	6-Meter Amateur band
54.000-71.950	50 kHz	VHF TV Broadcast channels 2-4
72.000-75.995	5 kHz	Miscellaneous land mobile and Astronomy
76.000-87.950	50 kHz	VHF TV Broadcast channels 5-6
88.0000-107.9000	100 kHz	FM Broadcast
108.0000-136.9750	25 kHz	Civilian aircraft
137.0000-143.9875	12.5 kHz	Military land mobile
144.0000-147.9950	5 kHz	2-Meter Amateur band
148.0000-150.7875	12.5 kHz	Military land mobile
150.8000-161.9950	5 kHz	VHF High band land mobile
162.0000-173.9875	12.5 kHz	Federal government land mobile
174.0000-215.9500	50 kHz	VHF TV Broadcast channels 7-13
216.0000-224.9800	20 kHz	Miscellaneous services/1.25-Meter Amateur band
225.0000-399.9500	25 kHz	UHF Military aircraft
400.0000-405.9875	12.5 kHz	Miscellaneous services
406.0000-419.9875	12.5 kHz	Federal government land mobile
420.0000-449.9875	12.5 kHz	70-cm Amateur band
450.0000-469.9875	12.5 kHz	UHF Public service
470.0000-511.9875	12.5 kHz	UHF-T Public service/UHF TV Broadcast channels 14-20
512.0000-763.9500	50 kHz	UHF TV Broadcast channels 21-62 (except channel 37: 608-614 MHz)/Astronomy
764.0000-775.9875	12.5 kHz	700 MHz Public service/UHF TV broadcast channels 63-64
776.0000-793.9500	50 kHz	UHF TV Broadcast channels 65-67
794.0000-805.9875	12.5 kHz	700 MHz Public service/UHF TV broadcast channels 68-69
806.0000-823.9875	12.5 kHz	800 MHz Public service (mobile-to-base)
849.0125-868.9875	12.5 kHz	800 MHz Public service (base-to-mobile)
894.0125-956.0000	12.5 kHz	33-cm Amateur band/900 MHz Business/Public service
956.0250-1300.000	25 kHz	Miscellaneous services/25-cm Amateur band

John Catalano, PhD
johncatalano@monitoringtimes.com

Radio to the Max

Over ten years ago I came upon a receiver control program called RadioMax. Back then I was impressed with its simplicity of operation, while providing all the basic features necessary for radio monitoring ... and then some. In the past decade we have looked at this program by Future Scanning Systems in a number of *Computers & Radio* columns and compared it to other receiver control and logging programs.

RadioMax usually came out in the top five every time. As we hit the middle of this decade, many of these radio programs are no longer available. Either they could not work with new Windows operating systems or their capabilities were eclipsed. Although the last revision, 5.22, is over two years ago, guess who is still hanging in there? Yup, RadioMax.

How Does It Compare

It's been exactly five years since we put RadioMax version 5.17 through its paces. Now, in 2005, I have lots of questions concerning version 5.22. Will RadioMax 5.22 work under Windows 98 SE and Windows XP? Will it still be as user-friendly as version 5.17? How will RadioMax's features compare to other 21st century radio programs? Let's load RadioMax 5.22 and take these questions one at a time.

First Things First

RadioMax's parent company's name has changed. Initially, in the 1990s, it was Future Scanning Systems. Now its name is Data Delivery Devices, LLC. Their website is **http://www.datadeliverydevices.com/RadioMax.htm** .

A demo version of RadioMax version 5.22 that will operate for thirty minutes is available for downloading. We used the real thing (uncrippled) for this article. The download, including the manual in MS-Word format, is about 2.4Meg. However, the download was quick, even using a dial-up connection to the Internet. From talking with the people at Data Delivery Systems, although version 5.22 has not strayed from the initial RadioMax concept, some new features have been added.

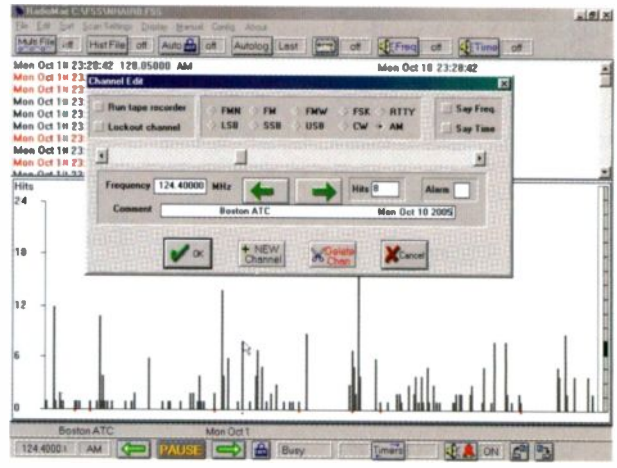


Figure 2 – Right click on a "hit" line to display/edit that frequency's data.

Which PC?

RadioMax 5.22's PC requirements are the most basic I have ever encountered, so the answer may be that almost any PC will run it! To summarize, all that is needed is a PC running Windows with a serial port. That's it! For utilization of the program's sound features, a SoundBlaster compatible sound card is required.

Just for fun, I tried to load RadioMax 5.22 on an old IBM 701C laptop. This slide keyboard, color LCD laptop, circa 1995, has a very small footprint, even by today's standard. However, with a 486 processor running at 66 MHz under Windows 95, it is not exactly a modern machine. The results were surprisingly good. Everything functioned as advertised! Although I didn't try it, I guess Data Delivery Devices' claim that RadioMax can run on a 386 PC under Windows 3.1 is valid.

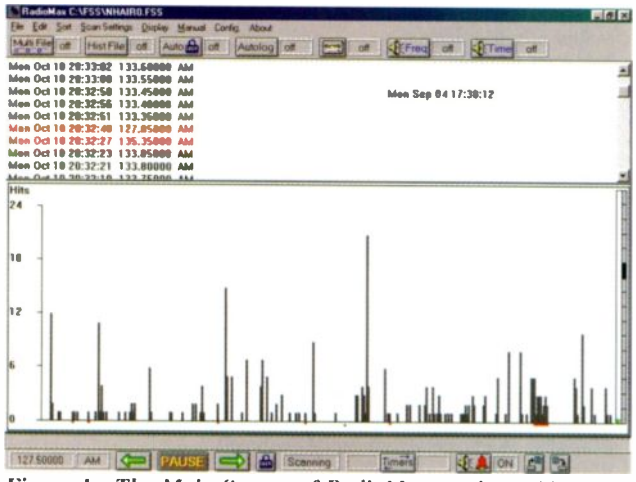


Figure 1 - The Main Screen of RadioMax version 5.22, where it all happens.

Fast Forward to 2000: All features of RadioMax 5.22 ran great and surprisingly fast on a Pentium 233 MHz with 256 Meg of RAM running Windows SE. I would suggest this as the minimum PC requirement for RadioMax 5.22.

At the other end of the PC spectrum, RadioMax 5.22 ran perfectly on a Pentium 4, 3.2 GHz PC with 1 Gig of RAM running under Windows XP. So the program clearly displayed its operating system flexibility.

In all cases, installation was quick and simple with the program operational within a minute.

Which Radios?

We tried RadioMax 5.22, via a homemade interface where required, with an ICOM R-71, R7000, and an ICR-1000. All operated flawlessly.

The list of supported radios by manufacturer includes AOR, Drake, ICOM, Kenwood, Lowe, Optoelectronics, Uniden and Watkins. Twenty-nine specific models are listed, including the computer-only ICOM PCR-1000. All Kenwood radios are supported.

Interestingly, some of the supported radios are ham transceivers such as the ICOM 751. I assume RadioMax will only control the receiver portion of the 751, although I have not tried it.

The program betrays its age a bit in that the list of models under each manufacturer is a bit dated. For example, the ICOM R75 is not explicitly supported. The R75's basic functions may be able to be controlled by choosing the R72 and entering the address for the R75 in the box to the right in the Configuration, then Radio, menu.

However, glaring omissions are Yaesu and JRC receiver support. RadioMax 5.22 does not support radios from these companies.

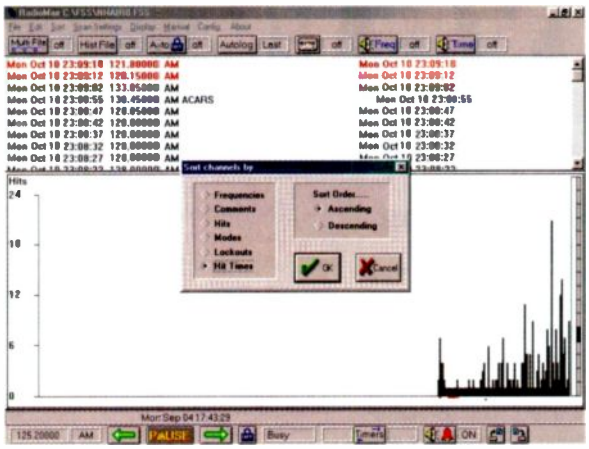


Figure 3 - Sorting RadioMax's results by hit times. You can also sort by frequency, comments, hits, modes types or lockouts.

Fire It Up

Although RadioMax has lots of features, which we will look at later, the two that stick in my mind are its natural ease of operation and its use of computer-generated voice enunciation.

As with other versions, RadioMax 5.22's operation centers around a frequency versus signal "Hits" display graph. See Figure 1. The frequency that the receiver is tuned to is mapped on the horizontal X-axis. The vertical Y-axis displays "Hits" or how many times this frequency was found to be active. Commands are accessed from dropdown menus in the Command line at the top of the display.

Once a signal is detected, its signal strength is shown on a thin vertical bar at the far right of the display. Information associated with that frequency is displayed at the top of the display. If selected, you will hear a voice announcement of the frequency and the time of intercept. The user can choose a male or female voice for the frequency/time announcements. Version 5.22 also lets you use your own voice. Very slick.

The program has a number of useful operating modes. RadioMax can scan a list of specific frequency channels manually entered by the user. The user can also input station data for each specific frequency channel. A file of the channels can then be saved for later scanning. Up to 5000 frequencies can be loaded from a file and the display will auto-scale to accommodate the range of frequencies.

Since the program is capable of multi-file scanning, you are not limited to just scanning one file of frequencies.

Lazy Listening

If you're not up for typing tedious lists of station data, RadioMax can import data from a number of databases including UDBF format (PerCon) dBase files, Betty Bearcat DBF, Mr Scaner DBF and ASCII text files.

In RadioMax's range search/scan mode, when the program detects a frequency in use it stops and saves the frequency and time of hit and then, after a user defined time period, continues scanning. Later, the user can add station data. In the future, when this frequency is found to be active again, this data, along with a monitoring time stamp, is displayed in the top section of the main display, Figure 1. The program creates and stores an active history file of all these intercepts.

Although based on a VHF/UHF scanner receiver methodology, the system has adjustable squelch trigger level control and adjustable start-stop timers. This works surprising well for shortwave monitoring, whenever the atmospheric noise is not too bad.

When you get tired of all the computer modes of tuning, you can use the mouse on the graph to perform lots of functions. Quick frequency jumps, scan direction changes, pause, and moving up/down the tuning range are all accessible using the mouse. A right clip on a specific "line" on the graph, which represents an intercept, will display its details. See Figure 2.

Real Multitasking

Multiple copies of RadioMax can run simultaneously on the same PC to control multiple radios. The limitation here is the number of Com or serial ports that you have installed on your PC. For most of us, this is limited to two radios.

However, you could take an older, inexpensive PC and dedicate it to radio control and logging by installing inexpensive multiple serial port PC cards. Then, using RadioMax 5.22, five or more radios could be controlled simultaneously for a very small investment.

Sound Features

RadioMax is rich with audio features. It can control an external tape recorder with remote control capability – a natural for unattended monitoring. If you use a stereo tape recorder, one channel can be used for recording signal audio while the other audio channel can record RadioMax's voice announcements, resulting in no-mistake frequency and time identification.

For those of you who want to stay in the digital domain, RadioMax provides for radio audio to be stored on your PC's hard disk when there is signal activity. These features, coupled to the program-generated "History" file, can provide the user with a complete archive of signal activity. If you are lucky enough to have a soundcard with duplex capability, which most are today, RadioMax 5.22 can play back previously recorded audio files while recording new intercepts.

Data Manipulation

On this subject, the RadioMax web site says it all, "RadioMax may scan, sort and save by multiple parameters, such as frequencies, hits, comments." Sort parameters are selected via the "Sort" Command line pull-down menu. See Figure 3.

The "Save" possibilities, accessible from the "File" menu, include Save All Channels, Save Channels with Hits, and Save Unlocked Channels.

Yeah or Nay?

RadioMax 5.22 is still a very easy-to-use receiver control and logging program. Today there are programs that have greater capabilities, such as RxPlus which also works with a greater number of compatible radios. This is a limitation of RadioMax 5.22 as a consequence of the length of time since it was updated.

Listeners who do not need or want all the bells and whistles and want a simple to use control and logging program should consider RadioMax version 5.22. Make sure your radio is supported, then give the free demo a try. You may find that RadioMax is just what you're looking for. The full RadioMax 5.22 program can be downloaded from the web site above for a cost of $45.

Time Passages

As the year ends, let us once again take this time to reflect. My thanks to all those who have emailed me, especially those who sent words of support and encouragement. My hope is that we have helped to teach and to entertain. My appreciation goes out to all the manufacturers who have submitted products for our perusal in this column. And Happy Holidays to all *MT* readers.

What's NEW

Tell them you saw it in Monitoring Times

World's First GPS-Enabled Scanner

Have you been complaining that scanner operation in the increasingly complex world of trunk and digital systems has gotten too complicated? Uniden has come up with a new scanner to take some of the pain out of monitoring, especially for mobile users who need to monitor signals from various services over a wide geographic area. The new Uniden BCD996T is a desktop design that may also be used in an in-dash or mobile installation.

"The BCD996T, the first GPS-enabled model in the scanner industry, is another milestone in the evolution of scanning," said Paul Opitz, product manager at Uniden America Corporation. "These new features will provide an efficient way for agencies that need compatibility in multiple geographic areas to use the scanner without having to reprogram the equipment for each location."

When a user-provided GPS unit is connected to the BCD996T, the scanner is able to automatically turn system reception on or off depending on the user's location. (For this feature to work, the user must first assign lat/long and range information to each system.) In addition, the scanner can display other location-based information, such as dangerous intersections, school zones, or general points of interest.

Of course, the Bearcat BCD996T also offers Close Call™ RF Capture Technology, which tunes to any active radio frequency within close range, whether programmed or not (excluding cellular signals). Frequency range is 25-1300 MHz.

The BCD996T also offers APCO 25 digital capability, to increase interoperability between agencies using different types of radio systems. Trunk systems supported by this scanner include Motorola Type I 800 / Type II 800, 900, UHF, VHF, P25; EDACS wide, narrow, SCAT; and LTR. Maximum scan rate in search mode is 100 steps per sec, except when scanning 5 kHz steps which reaches a maximum of 300 step/sec.

Other features include dynamic memory management (maximum of 6000 channels and 400 systems), fire tone-out, tone search, service search, control channel scanning, and multi-site programming. One unique application of the GPS connection is the speed-trap alert: The scanner will sound alert tones if the unit is traveling above a set speed limit while it is within a user-defined grid area!

The BCD996T is slated to hit retail shelves in spring 2006 and carries a suggested retail price of $849.99.

MFJ End-fed Zepp Antennas

When an end-fed antenna is desirable or when a center-fed antenna is not possible or convenient, these hang and play™ end-fed Zepp antennas provide excellent no-compromise performance.

The MFJ end-fed Zepp is a completely assembled single band half-wave antenna. It's designed for direct coax feed and handles a full 1500 Watts legal limit with low SWR.

Hang and Play! Just follow the easy installation instructions – no cutting, soldering, tuning, or trimming.

They radiate in a wide broadside pattern. Feedline/stub can be "bent" at the bottom and pulled away at an angle.

Super-strong fiberglass feed point insulator, glazed ceramic insulator, heavy-duty 7-strand, 14 gauge hard copper wire, extremely strong solderless crimped-construction. Super-strong custom fiberglass SO-239 mount provides stress-relief for the ladder line.

The 1/2 Wave End-Fed Zepp Antenna comes in five models, ranging from a 23ft horizontal element with an 11ft vertical stub for the 15 meter band ($31.95) to a 67ft element with 34ft stub for 40 meters ($44.95). Coaxial feedline is not included.

To order, get a free catalog, or for your nearest dealer, call 1-800-647-1800; or write to: MFJ, 300 Industrial Park Road, Starkville, MS 39759; or go online: **http://www.mfjenterprises.com**; or fax to: 1-662-323-6551.

IRCA Mexican Log

10th Edition (Winter 2005)

The *IRCA Mexican Log* lists all AM stations in Mexico by frequency, including call letters, state, city, day/night power, slogans, schedule in UTC/GMT, formats, networks and notes. The call letter index gives call, frequency, city and state. The city index (listed by state, then city) includes frequency, call and day/night power. The transmitter site index (listed by state, then city) tabulates the latitude and longitude of transmitter sites. This is an indispensable reference for anyone who hears Mexican radio stations. Size is 8-1/2" x 11".

Prices: IRCA/NRC members - $9.50 (US/Canada/Mexico/ sea mail), $12.00 (rest of the Americas/ Europe airmail), $12.50 (Australia/ Japan/New Zealand airmail). Non-IRCA/ NRC members add $2.00.

To order, send your funds to: IRCA Bookstore, 9705 Mary Ave NW, Seattle WA 98117-2334. (Please make check out to Phil Bytheway), or use PayPal to: fokker_d8@yahoo.com (please include an extra $0.50 to cover the service charge). For more information, visit **http://www.ircaonline.com**

Two-Way Radios and Scanners for Dummies.

By H. Ward Silver

Every time I see one of the Wiley Publishing *...for Dummies* books on a bookstore rack, I always get a chuckle (I hear I am not alone). But I must admit, if it is something that really interests me, yep, I buy it. Now the world of radio listening has two titles in this series of publications to choose from.

Recently, H. Ward Silver, N0AX, published *Ham Radio for Dummies*, and he has now followed it up with a more general book on the radio hobby, *Two-Way Radios and Scanners for Dummies*.

The book title is somewhat misleading, as there is more than two-way radio and scanners in this book. Shortwave radio is also included, but you have to get in to the table of contents to see what subjects are covered in this fascinating aspect of radio listening.

Part One of the book is some real basic introductory material into radios and the wireless world. Two-way radio communications are covered in Part Two and include FRS/GMRS, citizens band, emergency communications, business radio services, marine radio, and amateur radio.

In Part Three are six chapters covering shortwave and scanner listening. Part Four has six chapters on the technical side of radio, and the final section of the book, Part Five, comprises four chapters found in all Dummy books – *The Part of Tens*.

This book is written in typical Dummy style and is a good basic book for the newcomer or someone on the outside looking at what this radio hobby is all about. If you have been around the hobby a bit, you probably won't find much here to chew on.

Unfortunately, some of the frequency information presented in this book is just plain wrong. For instance, on the back of the Cheat Sheet cutout in front of the book, the author lists National (U.S.) Emergency Frequencies. He lists National Guard emergency frequencies as 34.900 and 163.4875. The first frequency has never been a nationwide allocation, much less a NG emergency freq, and 163.4875 is a US Air Force allocation. Another example from the same sheet lists 163.525 as a military disaster op frequency. Not only is it not a disaster frequency, it wasn't even authorized for military use until this year.

Overall, looking past the frequency errors, if you have a friend or relative you want to get interested in the radio hobby, drop by your local bookstore dealer and get a copy of this book. Oh yeah, and get them a subscription to *Monitoring Times* for the right frequency information.

The list price is $21.99 and is available at bookstores and internet websites such as Amazon and Barnes and Noble.

– Review by Larry Van Horn

Books and Equipment for announcement or review should be sent to What's New, c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC, 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel Baughn, editor@monitoringtimes.com.

Stock Exchange

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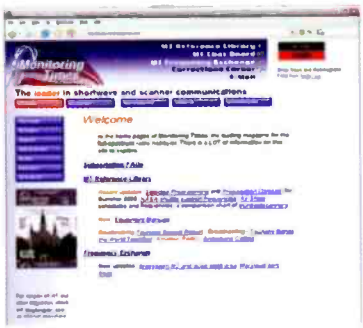

Re_Inventing Radio through Innovation

E1XM $500*

The E1XM is the world's first radio to combine AM, FM, Shortwave, and XM Satellite Radio Ready technology into one ultra-high-performance unit.

- AM/FM/Shortwave/XM Satellite Ready Radio
- 1700 station presets
- Digitally synthesized PLL tuner with synchronous detector
- Passband tuning, selectable bandwidth filters and Selectable Single Sideband (SSB) reception
- Dual conversion superheterodyne circuit design
- Stereo line-level audio inputs and outputs and external antenna connections
- Dùal Clocks and programmable timers
- Headphone jack
- Built-In Antenna: telescopic antenna for AM, FM and Shortwave reception
- External Antenna Connection for the addition of auxiliary antennas
- Calibrated LCD signal strength meter
- Power Source: 4 "D" Batteries (not included); AC Adapter (included)
- Dimensions: 13"W x 7-1/2"H x 2-1/2"D
- Weight: 4 lb 3 oz.

E5 $150*

AM/FM/Shortwave Radio

The E5 is the world's leading multi-band and Single Side Band (SSB) enabled radio, uniting performance and mobility into one compact unit, and bringing the power of local and world radio into the palm of your hand.

Features
- FM-Stereo, AM and full-Shortwave coverage (1711-29999 KHz)
- PLL dual conversion AM/SW circuitry with SSB
- 700 programmable memory presets with memory scan and auto tuning storage (ATS)
- Clock, sleep timer and alarm functions with world zone settings
- Tunes via auto-scan, manual-scan, direct key-in entry and tuning knob
- Internally recharges Ni-MH batteries
- Station name input
- Dimensions: 6-5/8"W x 4-1/8"H x 1-1/8"D
- Weight: 12.2 oz.

Features are subject to change

E10 $130*

AM/FM/Shortwave Radio

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

Features
- Shortwave range of 1711 – 29,999 KHz
- 550 programmable memories with memory page customization
- Manual and auto scan, direct keypad frequency entry, ATS
- Clock with alarm, sleep timer, and snooze functions
- Earphones
- Supplementary wire antenna
- Power Source: 4 AA Batteries (included) or AC Adapter/Charger (included)
- Dimensions: 7-1/2"W x 4-1/2"H x 1-1/2"D
- Weight: 1 lb. 1oz.

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